Where to find the Circular Economy in New Zealand - An examination of waste management systems

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The previous article in this series pointed out the Circular Economy (CE) in its theory. This article aims to illustrate practical examples within New Zealand's economy. These examples complement several of the United Nations Sustainable Development Goals (SDGs). Each example will be analysed as to what potential it has in promoting the SDGs. Going from theory to practice, this article attempts to demonstrate the benefits of a CE to the economy of Wellington, New Zealand through the promotion of circular and interconnected business practices. To begin, this article examines the existing Wellington waste management system; in particular, the plastic disposal industry. Continuing on the city's waste management systems, this article observes existing food rescues. After examining two separate industries, this article provides a suggestion on how to connect them by using existing infrastructural capacities to maximise resource utility and reduce waste.

The Goal of Circularity

Waste management across New Zealand is an ongoing issue that each household must take ownership of. Much of it is a lack of awareness and that is the responsibility of the government to ensure residents are informed about the what, the how, and the why. After examining the numbers for Auckland, over 10% of waste is deemed contaminated that ends up in landfills, which can enter into our ecosystems (Evans, 2018). Mixing of separate materials, such as paper, glass, metal, clothing, and foods or even toxic waste, is a major issue for processing centres. When this happens local processing centres send their waste overseas, as it is considered a hazard for the centres to operate, placing the onus on another economy. Increasing capacity to separate materials through infrastructure investment is required to manage this waste locally, which will incur higher operating costs. An alternate economical format exists by utilising existing capacities, creating incentives and increasing promotion of waste management systems to the public. A mixture of both strategies is the ideal.

Local waste management for Wellington has improved steadily over the last several decades. Nevertheless, much can be done to maximise efficiency and that is the ultimate goal of a CE (Geisendorf & Pietrulla, 2018). The biggest challenge lies in shifting consumer mentality from conventional waste management systems along the lines of 'buy, consume, throw away' to a circular approach (Hockerts & Weaver, 2002). Contemporary waste management systems appear to be focused on the 3Rs (reduce, reuse, and recycle) (Geisendorf & Pietrulla, 2018). By changing the status quo we can strive towards achieving a multitude of SDGs. Most notably, SDG 11 and 12 – sustainable cities and communities, responsible consumption and production – are targeted by effective waste management.

Changing the consumer mentality is only the first step. Circularity is driven by demand and regulation. Demand for better resource management requires government input, which paradoxically is determined by the consumer/voter. Consumer behaviour and/or state intervention can inspire policy and increase measures to promote more effective markets. In the case of New Zealand's waste management, it has been a

synthesis of both. However, driven primarily from a regulatory standpoint due to the necessity for effective waste management, as the state looks to reduce its overall imports on plastic, decrease manufacturing costs, and boost the local economy.

Waste Management - Plastics

One of the recent changes in the last decade to New Zealand and in particular Wellington's waste management has been the introduction of the only existing polyethylene terephthalate (PET) recycling plant in the country, operated by Flight Plastics Ltd. In 2011, the Waste Minimisation Fund (WMF), a Ministry for the Environment sponsored fund, granted $30,000 to Flight Plastics Ltd to determine the economic feasibility of operating a PET recycling plant in the greater Wellington area (Ministry for the Environment, 2018). In 2013, Flight Plastics Ltd received additional $4 million from the WMF to build a PET treatment plant that would enable complete onshore recycling of PET (Ministry for the Environment, 2018). In the past, New Zealand had been shipping any collected PET to offshore buyers (Ministry for the Environment, 2018).

Aside from the logistical challenges of moving PET and creating additional environmental waste through transport, exporting PET appears counterproductive to a CE; only placing the burden elsewhere on another economy. Processing PET locally provides the economy with jobs and reduces the price of packaging due to cutting out imports and large transport costs. Additionally, Flight Plastics Ltd is offering the services of recycled plastics from the local economy to be sold in Australian markets (Flight Plastics Ltd, 2019) Local recycling also benefits the environment by reducing the amount of plastics introduced into the system from imports and redesigning the recycled plastics to be easily replaced and reintroduced, creating a sustainable circularity. In 2018, Countdown teamed up with Flight Plastics Ltd to purchase recycled PET (RPET). The result was a reduction of imported plastics by 177 tonnes per annum by the supermarket chain (Countdown, 2018). The effects can already be felt, especially in the fruit and vegetables being sold. Since packaging costs have been reduced, the overall price has come down since June 2017, where the percentage change from the same quarter of the previous year of market prices have dropped by 5.6% for the quarter of June 2018 and another 4.8% for the quarter of June 2019 (Stats NZ, 2019). This illustrates the significance of how lowering material inputs can lower the cost of goods sold and how circularity can transform previously considered waste into revenue. This targets SDG 11 and 12 directly.

Waste Management - Food

A shared component that connects all elements in society is food. Waste management of food is a tricky issue since an estimated 30 percent to 40 percent of produced foods go to waste (Food and Agriculture Organization of the United Nations, 2019). A total of 157,389 tonnes of food is wasted by New Zealand households per year, which is worth an estimated $1.17 billion annually (Love Food Hate Waste New Zealand, University of Otago, WasteMINZ, 2018). Food is essential to our lives and in recent years ethical questions have arisen to consider the origins of our production cycle. There is no definitive solution towards individual diets on creating sustainable circularity. Consensus hasn't been reached to answer those questions. However, there exist possibilities within Wellington's waste management to address responsible consumption and in turn create a sustained CE.

There exist several initiatives that are addressing food waste within Wellington alone. The Free Store, for instance, has been around since 2010 and collects surplus food and clothing from various businesses in Wellington and in the hospitality industry and redistributes them to those in need of it the most (The Free Store, 2019). In doing so, the Free Store has engaged in multiple partnerships with local businesses to ensure a continuity in business and work towards a sustainable future.

Kaibosh is another food rescue group operating out of New Zealand's capital and is the nation's first of its kind. Mostly consisting of volunteers, the group's goal is to be the link between the food industry and people most in need. Kaibosh aims to bring quality surplus food to community groups and reduce industrial and societal carbon emissions to protect the environment. Kaibosh communicates food waste awareness through its engaged communities and believes the norms and behaviours of individuals will change the culture and dialogue around consumption for the betterment of collective society and reduce overall waste. As an organisation, Kaibosh has been recognised for its valiant efforts by the Sustainable Business Network (Kaibosh, 2019).

WorkerBe Oasis is a group that works in partnership with Kaibosh and runs its own programme in Wellington. Their mission statement is to create a zero waste local food system around Wellington by reconnecting communities through regenerative agricultural practices (Pledge Me, 2019). WorkerBe Oasis has identified that 30% of all New Zealand kerbside waste is organic waste, which equates to 75,000 tonnes of organic waste in Wellington alone (Pledge Me, 2019). Through one of WorkerBe Oasis programmes known as Kaicycle, the group collects organic waste and turns it into compost – a valuable resource that can be utilised in a multitude of forms (including biogas or as a fertilizer). The idea is to create a network of urban farms capable of producing self-sustaining food for local communities.

So what can local consumers do to address food waste? For starters by reducing the amount individuals purchase the less likely there is to be waste. In the event that waste is unavoidable, individuals can make a big difference towards creating their own sustainable waste management system by installing biodegradable systems in their own households. Since this isn't always feasible or practical, alternatively one can connect with local organisations such as the mentioned organisations above, who are able to provide assistance. These measures would contribute towards progress in the following UN SDGs for zero hunger (SDG 2), affordable clean energy (SDG 7), sustainable cities and communities (SDG 11), responsible consumption and production (SDG 12), climate action (SDG 13), and partnerships for the goals (SDG 17). The last two 13 and 17 being less obvious are achieved by reducing excess methane gases produced by organic waste landing on landfills and through cooperation of multiple businesses and communities.

How to boost the Circular Economy

For some people the idea of a CE seems distant and unobtainable. An abundance of options are available for consumers, producers, businesses and governments. The key is to increase the dialogue and demonstrate the merits of the CE. Connecting people and markets with the concepts of the CE can influence the supply chain and operate more efficiently towards a common goal of the national economy. Consumer mentality must change to achieve the CE. Individuals can set the tone for industries to reshape design thinking and for government to level the playing field to provide equal opportunities.

The private sector is making efforts to strive towards sustainability, whether from a business or an ethical perspective. The clear cut arguments for a CE for

businesses lie in the public image and branding aspects of sustainable practices. Another argument lies in procurement and in the ability to manage finite resources. However, the most important argument is found within emerging trends and therein lies consumer demand. The Sustainable Business Network (SBN) provides an example of an organisation dedicated to connecting businesses and people with the common goal of achieving sustainable targets that benefit the economy and the natural environment.

SBN is working on reshaping the landscape of the economy to feature more collaborative approaches in business. In 2018, SBN teamed up with Fuji Xerox, the Auckland City Council, the Bay of Plenty Regional Council, and the 3R Group to form the Circular Economy Accelerator (CEA) with the purpose of increasing participation and promoting the ideals of the CE. Initial results indicated that there was major interest in businesses linking with the CEA, who also established a report that analysed the state of New Zealand's plastic packaging economy in order to help businesses assess their ability to transition towards CE alternatives.. SBN thus provides an ideal tool for businesses to connect with the concepts of the CE.

From Theory to Practice

It is necessary to maintain a holistic approach to any system when striving for a CE. In the case of waste management, a society-level recovery system is required that incorporates multiple aspects of the supply chain from various industries – packaging, electronics, glass – to name a few. The goal is to maintain residual value of any given resource and to minimise waste for a sustainable future. Recovering existing materials in circulation provides a challenge for logistics. Reverse logistics in waste management provides an existing solution. A multi-faceted approach, reverse logistics involves the recovery of materials to be separated for dismantling and the handling of toxic waste. To achieve this, production designs must merge with systems thinking – meaning an inclusion of multiple services to achieve a common goal, such as producers and retailers teaming up with waste management systems. For instance, one could incorporate asset tracking to monitor delays, disruptions or unexpected changes in delivery that inhibit the process of circularity. At the same time the dismantling of goods and materials needs to be addressed by providing facilities that can identify hazardous/toxic wastes. The intricacy of waste management dictates the need for reverse logistics designs that are capable of navigating consumer demands, which will allow businesses to manage the supply chain in an efficient manner to respond to any challenges ahead.

One avenue for partnership in achieving more effective waste management is the inclusion of existing infrastructures, such as national postal services, couriers or private logistics. All of which often carry empty loads back to their facilities, so the idea would be to use their logistical capacity to collect waste on their way back in such a manner that is deemed safe for transport. The obvious argument is access to consumers. Consumers are the ultimate driver of the CE. Current consumer behaviour is an inhibitor to achieving the CE, due to the consumer's control over the end-of-life cycle of any given product. Convenient access is crucial to the consumer's decision making. Studies in the United Kingdom and Japan on the collection of printer cartridges have shown that when the consumer is faced with the option of disposing waste by personally transporting it to a collection point for processing they only resulted in a collection rate of 10-15% (Toner News, 2008) (Recycling Guide, 2019) (Esposito, Tse, & Soufani, 2018). Instead consumers choose to throw waste into the general rubbish, which ends up contaminating the waste product and making it difficult to recover/separate.

The other argument for national postal services providing a partnership in waste management is the distribution infrastructure they already have as part of a systems approach towards a CE. Apart from access to the majority of New Zealand's households, postal services have a range of facilities or properties that can be utilised or repurposed towards the processing of materials in addition to their postal duties. The question is how can postal services provide an effective model that boosts circularity. By providing incentives for the consumer, businesses can reduce the effects of their products on the environment. For example, providing prepaid shipping labels with every purchase or initiating rewards programmes for every item returned. The government can play its part by introducing laws that require retailers/manufacturers to collect/deinstall larger appliances, such as washing machines, that are difficult to collect. This isn't a revolutionary concept, the logistics conglomerate Deutsche Post DHL Group offers the deinstallation of used goods onsite in addition to its multitude of services evolving around providing data on volume of returns and sorting of materials (Esposito, Tse, & Soufani, 2018).

Challenges to circular waste management

With change comes the potential for a challenging adjustment period. For postal services in New Zealand there are several questions in need of answering. From a logistical perspective, the disassembly of collected goods is the biggest question. This would require adequate facilities capable of handling the volume of consumer demands to maintain circularity. This could constitute facilities located in a specific region that handles nationwide/regional demands or even in several suburbs that handle local waste. Onsite sorting from postal services can alleviate the burden, provided the capacity exists. Precious metals can be very capital intensive and require large investments (more on financial costs below). Then the content of waste itself can be problematic. E-waste and/or hazardous components are a challenge for any waste management.

The financial aspect of circular waste management is the biggest question that needs to be answered by policy makers and businesses. Several costs come together: collection; disassembly; recycling/remanufacturing; storage; disposal; and transport (between facilities). So who pays? Will there be an enforced tax and on who (the consumer, the producer, or the general public)? Who reaps the financial gains from recycling/remanufacturing? Is it the general public from a cleaner environment, businesses for reducing input costs on production, logistics and postal services for adding an additional service, government from reducing the amount of waste to be shipped overseas, or is it an amalgamation of all the above for the greater good of society? Whatever the solution, policy design must be complimentary to the distribution of operational costs and integral to the supply chain.

Figure 1 illustrates a mind map to how postal services can provide the infrastructural capacity in a circular economy:

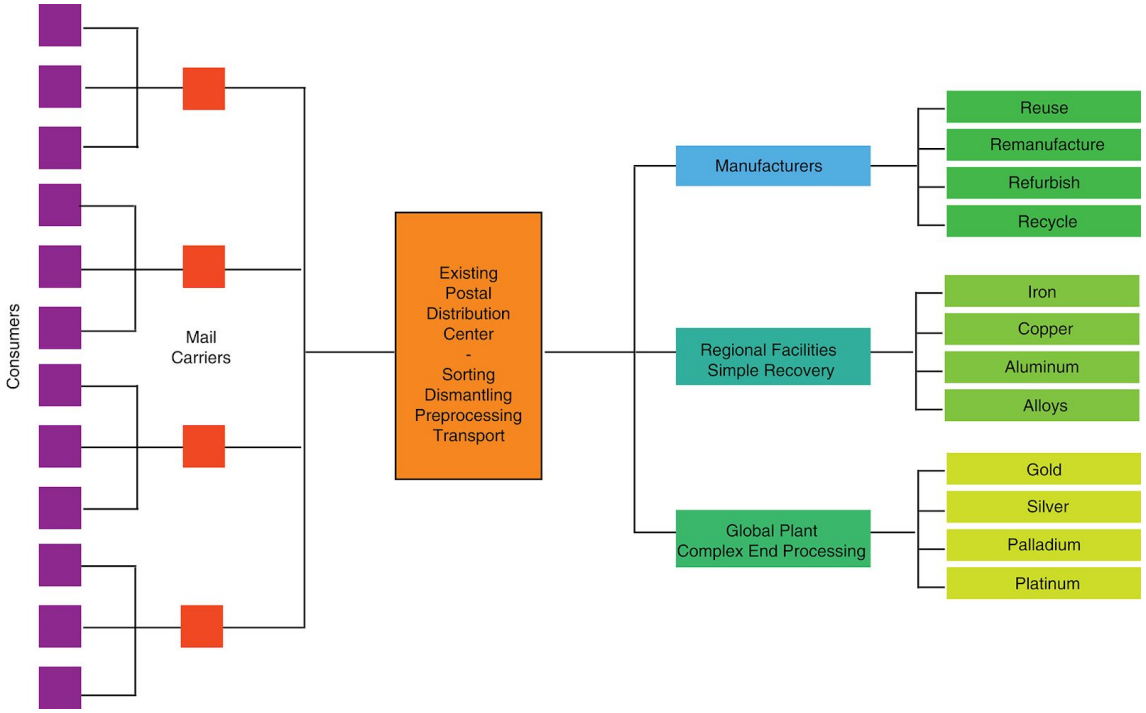

Image from Thunderbird International Business Review

Concluding Remarks

A CE can be attained through utilizing existing infrastructural capacities that can significantly contribute towards the achievement of the SDGs. For this to occur, clear pathways need to be identified/provided by government to support the free market rather than inhibit a CE through tedious regulation, which might deter businesses. Of course too little regulation will leave room for abuse and potential exploitation within markets. A careful balance must be struck by lawmakers. None of this can be achieved without a significant shift in mentality among all aspects of the economy, in particular the consumer.

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