

Technology in the Circular Economy: The Fight for Global Sustainability

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ABSTRACT

The purpose of the case study is to describe circular economy business models in Latvia, Czech Republic & USA to identify the success factors and the key issues, and recommend a solution to the problem based on analysis and theory.

The Circular Economy (CE) model covers five main areas of activity: production, consumption, waste management, secondary raw materials market, as well as innovation and investment. It is a circular process focused on resource efficiency, where manufacturing, consumption and use are redirected in the economic movement. The value of products and materials is maintained for as long as possible, waste generation and resource use are being reduced, and once the product has reached the end of the life cycle, resources remain in the economy, where they are used again to create additional value. It is also in the economic interest of business to make the best use of such available resources, specifically technology. In fact, the CE means economic and efficient thinking. The CE covers the entire life cycle of a product, from eco-design, product production, sales and so-called after-sales service. Maximizing resources and value, while minimising the creation of the waste is the primary goal of the CE. However, the objective of not producing waste can be worked into each phase of the product life cycle.

So far, contemporary research debates have focused more on the wider implementation of the principles of the CE. There is a lack of research on the practical examples on the development and management of circular business models in companies (in the micro business environment level). Researcher Lewandowski (2016) developed a theoretical model for the circulation business model canvas, initiating scientific discussion.. However, so far there is a lack of focus on practical studies of business cases on the implementation and management of such new circular business models. The sector

also lacks economic and financial estimates on the viability and financial feasibility of circular business models and their impact on the profitability ratios and the competitiveness of businesses (Uvarova et al., 2019a; 2019b).

Keywords: Circular economy, business models, recycling, ewaste, technology

1 INTRODUCTION

In recent years there has been an increased focus on the implementation of the Circular economy (CE). The CE is a topic high on the political agenda all over the world, and receives increasing attention from scholars. Researchers (Uvarova et al., 2019a) also emphasizes that the existing tendencies show the fact that in the future more and more business and societal areas will need to develop their business models in line with the CE principles. Eventually, they will not be able to exist without them.

In recent years, the governments and organizations are taking actions for sustainable growth. The first Circular Economy Action Plan from European Commission (EC) was launched in 2015. In 2020, EC adopted a new CE Action Plan (European Commission, 2020a) – one of the main blocks of the European Green Deal. Particular attention is paid to the sectors that use most resources and where the potential for circularity is high, such as electronic and ICT (European Commission, 2020b). In line with the new sustainable products policy framework, European Commission issued a 'Circular Electronic Initiative' - that will promote longer product lifetimes and include, among others, further actions. One of the actions provides regulatory measures for electronics and ICT including mobile phones, tablets and laptops under the Ecodesign Directive, so that devices are designed considering energy efficiency and durability, reparability, upgradability, maintenance, reuse and recycling (European Commission, 2020b). The EC's intentions

are expected to improve the current situation in the field of e-waste. According to the "New Circular Economy Action Plan for a cleaner and more competitive Europe" (2020a) electrical and electronic equipment continues to be one of the fastest growing waste streams in the EU, with current annual growth rates of 2%. Furthermore, it is estimated that less than 40% of electronic waste is recycled in the EU.

From the perspectives of the EU, where continued improvements of legal regulations for CE takes place, the situation in the US may be characterized as independent. Instead of a single legal regulation or strategy of CE principle implementation, like in the EU, the US leaves it up to each state to decide whether to regulate it. Subsequently only 25 out of 50 states have e-waste recycling regulations (Gladstone, 2020). Furthermore, barriers for successful CE implementation both in the EU and the US lies in cultural-cognitive views of modern society, where explicit doubts on quality and overall performance of products made in a sustainable way still exists (Ranta, Aarikka-Stenroosa, Ritalab and Mäkinena, 2018). Emphasizing CE in the field of IT can be achieved through intense marketing campaigns that would press corporations to consider benefits of CE implementation in their business and propose further sustainably made product placement and promotion.

2 BUSINESS MODELS IN THE CIRCULAR ECONOMY

Business models in the Circular Economy shape how renewing product life cycles creates a sustainable future. There are various different models to consider that accommodate different fields. Technology, service, consumer product and agricultural corporations utilize these various models in different manners. For the purpose of analyzing the CE in relation to technology and e-waste, these different models will be analyzed and assessed accordingly.

2.1 Access and Performance Model

Access and performance model is a business strategy that provides the capability or services to satisfy user needs without need to own physical products. Some examples of this are car sharing, tuxedo hire, leasing phones, and leasing cars. This business model falls under the umbrella of circular economy due to its ability to deliver value while minimizing ecological costs (Sustainability Guide, 2018). Leasing cell phones is a particularly strong example to exhibit the benefits an access and performance model can have on technology. To create cell phones, energy is needed both in factories and in mines when gathering critical minerals to build these phones. In modern day society, most people own cell phones and upgrade them frequently. During this time, these old cell phones are being disposed of. This is creating an extreme amount of technological waste.

However, if the access and performance model is applied to cell phones, the amount of energy, resources, and waste can be greatly diminished. For example, The Duth enterprise, Fairphone, is a company that has created their own sustainable

smartphone. "We're moving one step closer to a circular economy by encouraging the reuse and repair of our phones, researching electronics recycling options and reducing electronic waste worldwide" (Fairphone, 2020, p.1). This company is using recycled and environmentally sustainable materials to build these phones. They are also created to be easily repaired with recycled parts. This creates a sustainable product that will last a long time. This will reduce the amount of upgrades a person makes with their cell phone.

Another case of this is the new method of leasing cell phones from your provider. Most providers offer a leasing system in which you can lease your phone for a period of time and then return it. This process makes the consumer give the phone back, where it can then be recycled or re-leased. This will reduce the amount of cell phones made and the amount of cell phones wasted created by consumers disposing of their electronics.

2.2 Extending Product Value

A circular business model is how a company creates, captures, and delivers value with the value creation logic designed to improve resource efficiency through contributing to extending useful life of products and parts (e.g., through long-life design, repair and remanufacturing) and closing material loops (Nußholz, 2017). Utilizing resource loops within a circular economy is critical to achieving optimal results in multiple industries, but most predominantly within the technology industry. Resource loops may either be slowed or closed. Within a slowed resource loop, resources are made to last longer. As a result, the need for new materials is reduced and through repairs and maintenance, there is less likelihood of needing a new substitute product. Within the technology industry, the resource loop is moving at an alarming rate, requiring the need for new technological products nearly every year. Mobile phones once built to last three to five years now barely last consumers a year. As technological advancements increase, this digression in the quality of technological goods proves that the resources are not worse, but the marketing for the products is better (Bocken, Pauw, Bakker, Grinten, 2016). Through making consumers and producers alike aware of the effects of this heightened resource loop, the idea of a closed resource loop must prove to be optimal. Within a closed resource group, the materials and raw goods are able to be continuously reused and recycled, therefore closing the loop and allowing a significant reduction in global e-waste.

2.3 Classic Long Life Model

The classic long-life model is concerned with long-product life, supported by design for durability, reparability, upgradability and modularity. The value proposition and delivery focuses on high-quality, long-lasting products (reparable, reusable over time) and high levels of customer service. The upfront price is often "premium," which would typically cover the long-term service and product warranty cost over the product lifetime absorbed by the manufacturer (value capture).

Companies that produce higher quality products have an ability to charge customers higher prices. Essentially, low sales volumes are offset by a premium pricing strategy. (OECD, 2019). Manufacturers can extend the life of a product not only through reuse and repair activities, but also by changes in product design (designing them in a way that increases durability). Company Miele, for example, belongs to a group of companies which challenge "planned obsolescence" as part of their overall vision, and provides a 20-year functional lifespan of appliances. Customers should be aware of the circular economy and should buy luxury products claiming to last beyond a lifetime (e. g. luxury watches such as Roley or Patek Phillippe) rather than cheap but poor-quality products. Through the design of long-life goods and product-life extension (i.e. service loops to extend a product's life, for instance through repair, remanufacturing), the utilization period of products is extended and/or intensified, resulting in a slowdown of the flow of resources. (Bocken et al., 2016)

2.4 Encourage Sufficiency

Encourage sufficiency business model is about long-lasting products as well as the classic long-life model. Business models relating to sufficiency follow a "non-consumerist approach to sales". Solutions that actively seek to reduce end-user consumption through principles are also included. Durability, upgradability, service, warranties, reparability and a non-consumerist approach to marketing and sales are examples of this method. The main principle is to make products that last and allow users to hold on to them as long as possible through high levels of service. That means that the manufacturer creates a high-quality durable product and offers it with high levels of service. Additionally, the company takes a non-consumerist approach to selling fewer high-end products rather than products built-in obsolescence. Sufficiency-based business models to date are often premium business models as they are high end and the price premium justifies slower sales as well as higher service levels (value capture).

Premium business models can be exemplified by the furniture company, Vitsø which has developed a video directed against obsolescence. Patagonia has also created a campaign that coined the iconic phrase, "Don't buy this jacket" in an advertisement to encourage repair and rescue of its already sold clothing. Positive impacts of encouraging sufficiency include the reduction in the consumption of resources, sustainable living, long-term customer loyalty and new repair and service markets (Bocken et al., 2016).

2.5 Extending Resource Value

Closing loops in business model innovation is about capturing the value from what is considered in a linear business approach, as by-products or "waste." These strategies may be "micro" in scope when materials are reused in manufacturing processes within a production facility. They may also be considered "macro" when products are eventually disposed of and the content is recycled via an entirely independent network. This business model is already profitable for some materials such as

aluminum where the energy costs of creating the material are higher than re-melting. "Extending resource value" is about the collection or sourcing of otherwise "wasted" materials and resources to turn these into new forms of value. The value proposition is focused on exploiting the residual value of resources, potentially making the product more appealing to certain customers (e.g. those with a "green" interest), while reducing material costs and the overall product price. Forms of value creation and delivery include new collaborations and take-back systems to be put in place to collect/ source materials. Value is captured by turning otherwise "wasted" resources into new forms of value. Also to "extend product value", gap exploiters exploit resources from other companies, but in an ideal case, manufacturers themselves develop business models for resource reuse (Bocken et al., 2016).

Some businesses are exploiting the new opportunities represented by these changing conditions by developing circular business models and services that gain value from extending the lifetime of smartphones and their components. The most widely reported response amongst "traditional" actors (producers, retailers and mobile service providers) was engagement in take-back and buy-back of used phones and refurbishing these for resale and/or cannibalising them for their components most often in partnership with a refurbishment specialist. Prior to the emergence of smartphones, phones taken back in developed countries were mostly shipped to developing countries for refurbishment and resell, or discarded in an environmentally hazardous manner. Refurbished smartphones are now at least partly being resold in the collection country or elsewhere in Europe, offsetting purchase of new phones here. Refurbishment and resell businesses and repair services are reporting rapid growth in demand. As people become even more dependent on their smartphones, the demand for rapid repair has grown with emphasis on physical repair shops offering 70 Circular Business Models in the Mobile Phone Industry repairs within an hour. Some producers reported beginning to design for greater durability and reparability to reduce warranty costs (Watson, Gylling, Tojo, Throne-Holst, Bauer and Milios, 2017).

2.6 Industrial Symbiosis

Industrial symbiosis - a part of industrial ecology, focuses on the flow of materials and energy through local and regional businesses. Its principles are based on beneficial economic and environmental collaboration of traditionally separate industries, where waste of one establishment becomes a raw material for the other (Chertow, 2000). Collaboration in industrial symbiosis is not limited to waste materials only. Essential operating resources of businesses such as energy, labor, logistics and expertise can be shared through collaborative agreements in order to reduce costs and total impact of the industry on the environment. (Bocken et al., 2016). Industrial symbiosis are often realized at eco-industrial parks where place-based exchanges happen. By collaboration, businesses make great effort for a collective benefit greater than the total amount of individual benefits achieved by acting alone. This

type of working together can positively affect social relationships among the participants, which can also extend to surrounding neighborhoods. (Chertow, 2000).

3 CAMPAIGN OVERVIEW

The goal of this marketing campaign is to engage technology companies of all sizes and make recycling technological goods to be an attractive initiative. The campaign will be segmented into various stages with the overall goal being to reduce e-waste on a global scale. Due to the thousands of tons of e-waste that currently consume our planet, this initiative must be implemented to maintain our earth's sustainability. The draw of the campaign is the reality that large technology companies are building products that have limited resources. Without implementing an efficient and effective method of recycling, there is no way that these companies will be able to continue in this manner for decades to come.

The heart of the campaign is the reality that e-waste is one of the biggest hindrances that allows for climate change among many other environmental tragedies. The worldwide accumulation of e-waste has more than doubled in the last decade. In 2016, according to the United Nations University, the yearly e-waste accumulation is calculated to reach 49.3 million tons — enough to fill more than a million 18-wheel trucks stretching from New York to Bangkok and back. By 2021, the annual total is predicted to surpass 57 million tons (Larmer, 2018).

It is clear that this is one of the most unspoken yet prominent issues that the world is facing. With companies putting human wants before earth's needs, it is guaranteed that the earth will not survive under these forceful conditions. The marketing campaign targeting these organizations will help bring awareness to the severity of the issue that has great potential to be reversed.

3.1 Analysing the Target Market

The circular economy was created to reuse resources to create something new. This new form of economy helps our environment, and directly affects the way businesses will create products and use resources. The importance of this is that it helps reduce the environmental impacts of our production and consumption and helps us address the emerging resource scarcity issues in the future.

E-waste is electronic waste. These are electronic products that have come to the end of their life cycle and are being disposed of. In a technology efficient world, the amount of e-waste is continually rising every year. This can be seen in many different companies. Electronics come out, and within a year or two there is an upgraded product on the market. "The amount of worldwide e-waste generation is expected to exceed 50 million tons by 2020, with an annual growth between 4% and 5%" (LeBlanc, 2020). The amount of e-waste production is growing rapidly year by year, and it is polluting our environment and wasting our resources.

The target market is big technology companies. It is imperative that they understand what e-waste is and the consequences of this mass waste. These are the companies producing, upgrading and selling these products at rapid speeds. They need to be informed and knowledgeable about the resources they are using to build these electronics, how it can be reused, and how they can better allocate their resources and waste. It is important to the health of the globe that these big technology companies practice recycling techniques, build sustainable products, and put e-waste initiatives into place.

Many companies have taken initiatives to help reduce the amount of e-waste produced. One example of this would be Apple. Apple has a recycling initiative set in place that makes it simple to recycle any product in any country or region. The regulations vary slightly from each country, however the general basis is the same. You can recycle any product in any condition, and if they feel that product has value they will allow you to trade it in and give credit for the product. By adding in this credit, this pushes consumers to want to recycle their products rather than throwing them out. If the company can recycle the components or resources of these products, they will use them to create refurbished products. "In 2018, the company refurbished more than 7.8 million Apple devices and helped divert more than 48,000 metric tons of electronic waste from landfills" (Apple PR, 2020). By collecting just their own recycled products, Apple was able to make a large impact on the amount of e-waste created each year. They were able to reuse and refurbish many products, giving them a new life cycle and helping to reduce the company's carbon footprint. In further efforts to help reduce e-waste, "Apple also uses 100 percent recycled tin in a key component of the main logic boards of 11 different products" (Apple PR, 2020). By doing this, they are able to create many of their well valued products by using recycled elements. This company is a prime example of a company who cares about their carbon footprint and about reducing e-waste. This company set up a layout and initiatives that other big technology companies can follow to help in efforts to protect the earth from e-waste. Big technology companies are the root of this e-waste, by having them take part in these initiatives they can help combat this worldwide issue.

3.2 Determining Campaign Goals

The goal that is trying to be attained is to incorporate big technology companies into the initiatives set in place to help reduce e-waste. We will be creating a campaign that can be targeted towards technology companies to help reduce global e-waste. By creating this campaign, we are informing technology companies as well as consumers of what e-waste is, and how we can reduce it. We will be creating a campaign that can be put into effect by multiple different technology companies, all who share the same essential goal of reducing e-waste and increasing recycling efforts.

3.3 Business Model Canvas

The basis of business in general is a perfectly designed business model, however, people often get overwhelmed when thinking about business models, so they are looking for a simple tool, which can be a Business Model Canvas (BMC). This strategic tool was created by Alexander Osterwalder (Austrian theorist) and Yves Pigneur (Belgian computer scientist and professor at the University of Lausanne) in their bestseller "Business Model Generation" (2010).

"A business model describes the rationale of how an organization creates, delivers, and captures value" (Osterwalder and Pigneur, 2010, p. 14). BMC is defined as "a valuable strategic tool which is used to conceptualize new business models or to document existing ones. It helps to guide decisions about the launch of a product, a startup or a new process by illustrating the value and core activity of a company" (50Minutes.com, 2017, p. 6).

Essentially it tells mainly entrepreneurs how the key drivers of a business fit together and provides a simple way to create a clear business model using just a single sheet of paper. This strategy is flexible and accessible, because it can be used to describe any company from the largest and the most well-known company to a startup with just a single employee. "The right side of the canvas focuses on the customer or the market (external factors that are not under your control) while the left side of the canvas focuses on the business (internal factors that are mostly under your control). In the middle, you get the value propositions that represent the exchange of value between your business and your customers" (Athuraliya, 2019). Osterwalder's canvas consists of nine parts, which are the "building blocks" of the business model design template. The model without the presence of one of the blocks does not work. The name of each is given in bold below.

3.3.1 Customer Segments

Customer Segments defines the different groups of people or organizations on which the model will be oriented. Customers are a source of business revenue and each model must include at least one customer. They can be divided into several categories according to the types of market: mass, segmented, niche, diversified and multi-sided (Osterwalder and Pigneur, 2010). Mass market represents a wide view of potential clients with similar needs. Segmented type divides customers into categories based on gender, age or income. In the niche market, the offer is focused on specific needs and characteristics, e. g. Rolex. Diversified markets are located in more industries with different problems and needs. Multi-sided markets bring together at least two independent segments, which provides different value to everyone, e. g. provider of newspaper creates a relationship between readers and advertisers (Osterwalder and Pigneur, 2010; Hesselbach and Herrmann, 2011).

3.3.2 Value propositions

The value propositions seek to solve customer problems or satisfy customer needs and also describe the complex of

products and services that create value for a specific customer segment. (Hesselbach and Herrmann, 2011). The value of the offer is perceived differently by different customer segments, in some cases its quantification is possible, most of them are qualitative values (Heikenwälder, 2014). The value propositions may be quantitative (price and speed of service) and qualitative (overall customer experience and design) (Osterwalder and Pigneur, 2010).

3.3.3 Channels

The channels in the business model describe the method of communication and contact with the customer and the form of delivery of the value offer (Osterwalder and Pigneur, 2010). The business model channels can explain how to increase awareness of products and services among customer segments, support and communication with customers, the form and method of gaining value (e. g. purchasing a product, providing a service) and providing after-sales service (Heikenwälder, 2014). The types of channels include the owned ones, e. g. social media sites, and the partner ones, e. g. partner-owned websites (Athuraliya, 2019).

3.3.4 Customer Relationships

The building block describes the types of relationships which the company establishes and maintains with specific customer segments, in addition ensures survival and success of any business (Hesselbach and Herrmann, 2011). Typical representatives of building relationships in business models include the personal assistance, self-service, communities and co-creation (Heikenwälder, 2014).

3.3.5 Revenue Streams

This element represents the cash that company generates from each customer segment (Osterwalder and Pigneur, 2010). As with channels, revenue sources need to consider whether a particular customer group can use them and which payment methods they will prefer. Companies can generate revenue from: purchase of specific rights of ownership, payment for the use of a specific service, subscription fees, leasing/renting, advertising, licensing or from brokerage fees (Athuraliya, 2019).

3.3.6 Key Resources

The assets that are necessary to offer and deliver the previously described elements are characterized in this part of the business model (Hesselbach and Herrmann, 2011). The key resources could be physical, financial, intellectual or human and the company can own or lease them, or even buy them from key partners (Osterwalder and Pigneur, 2010).

3.3.7 Key Activities

This part of the business model covers a set of activities that must be performed in order to be able to deliver a value offer to customers through channels and to be able to maintain established relationships (Heikenwälder, 2014). Key activities may include production, coordination, network maintenance and vary depending on the type of business model, e. g. for

Microsoft the key activities will include software development, for Dell supply chain management (Osterwalder and Pigneur, 2010).

3.3.8 Key Partnerships

“Key Partnerships describes the network of suppliers and partners that make the business model work. Some activities are outsourced, and some resources are acquired outside the enterprise” (Hesselbach and Herrmann, 2011). Some companies establish partnerships to increase efficiency, optimize costs or reduce potential risks. Key partnerships may be permanent or temporary and play a significant role in the majority of business models, but there exist a number of business models that work without key partnerships (Osterwalder and Pigneur, 2010). Types of partnerships may be a strategic alliance, coopetition, joint ventures or buyer-supplier relationships (Athuraliya, 2019).

3.3.9 Cost Structure

The last block defines all operating costs connected with the function of the business model, which can be calculated easily after defining all of the elements. These include the costs of creating and maintaining value, key partnerships, costs related to creation of relationships with customer segments and costs related to the operation of channels (Heikenwälder, 2014). “Businesses can either be cost-driven (focuses on minimizing costs whenever possible) and value-driven (focuses on providing maximum value to the customer)” (Athuraliya, 2019). Once the company has completed its business model canvas, discussion and brainstorming on individual segments of the BMC should follow. Another possibility is to analyze the business models of competitors and similar entities and thus get inspired by new ideas.

3.4 “Creating a Sustainable Future” Campaign Overview

Companies who are taking part in these initiatives must be able to get the word out to their consumers. It’s important that both companies and consumers are informed as to what e-waste is, and how we can reduce it on a global scale. Social media is one of the biggest platforms used to gain recognition from a large target with varying demographics. By using social media to push the concept of e-waste and how we can reduce it, we can inform a vast majority of people about the issue. Big technology companies should use their social media platforms to inform their consumers and to show the initiatives that are put in place by these companies.

3.5 “Creating a Sustainable Future” Campaign Goals

There are five key concepts to the marketing campaign that will help persuade companies to abandon their former, harmful ways of operation and transition into a new and eco-friendly business. The first is the awareness that this initiative will create. Many people are unaware of what e-waste is. Further, people do not know exactly what technology that they discard. It is understood that if people are made aware of the harmful effects that their role in the issue of e-waste plays, they would be more prone to recycle and use technology to the fullest of its

abilities.

The campaign will also utilize lead generation marketing. This form of marketing is the process of stimulating and capturing interest in a product or service for the purpose of developing a sales pipeline (Lead Generation, 2019). The sales pipeline that the marketing initiative will focus on are the recycled products that the technology companies are selling. It is essential that we emphasize the sales component because of the impact this will have in persuading technology companies to adapt new methods of sales while promoting sustainability.

The campaign will also introduce a sales support pipeline. This pipeline will be founded by the technologies current customer support line. However, these employees will have access to new information about e-waste and the positive outcomes of purchasing a recycled technological good. This will result in minimal investment while continuing to boost the purpose of why the initiative should be adopted. The pipeline will also show the companies dedication to creating a sustainable business model and planet and while encouraging potential customers to purchase the recycled products. The sales support pipeline is expected to boost customer retention and growth. Quality assurance of the recycled products must be guaranteed for the effects of the campaign to be properly implemented. When customers see that the products they are purchasing are no different than the product they are accustomed to using, they will have no reason to not be encouraged to buy such products. Further, the mental satisfaction that the customers will get from knowing the positive effects of their purchase will also lead to furthered customer retention.

The marketing strategy of this campaign is to provide full transparency on both ends. On the end of the supplier, the transparency lies with the cost of selling recycled products as well as the potential backlash the company may face. However, the reassurance that the cost will soon break even as customers overcome the backlash when realizing the recycled and un-recycled products are identical will be enough to persuade this initiative to progress. On the side of the consumer, the lack in error of the recycled products combined with the satisfaction of contributing to a larger cause will play a large part in satisfying the consumer and ensuring customer retention.

3.6 Digital and Social Media Engagement

Social media is a big part of consumer’s lives worldwide. Social media has been growing exponentially since its release. “Social media statistics from 2019 show that there are 3.5 billion social media users worldwide. That equates to about 45% of the current population” (Mohsin, 2020). With this many people on social media, it is inefficient not to use these platforms to your advantage. Social media is a great platform to get the word out and to create conversation and engagement with the situation at hand, which would be reducing e-waste. As well as connecting a large number of people, we are connecting and informing a large age range of people.

The three main generations that use social media are Millennials, Generation X, and Baby Boomers. In these categories, “90.4% of Millennials, 77.5% of Generation X, and 48.2% of Baby Boomers are active social media users” (Moshin, 2020, p.1). Social media usage allows the campaign to reach a very large target market. It’s imperative that we get this information out to a large group of consumers, so we can teach, inform, and reduce.

With social media campaigns, companies will be able to inform consumers about e-waste. Big technology companies can offer initiatives to recycle consumers' old e-waste. They can do this in several ways. Big technology companies can produce goods with recycled products, therefore creating a sustainable technological product. Another initiative is to create recycling efforts among stores. Similarly to Apple, companies can use social media to spread the word of consumers that they are collecting old products. The social media posts can be used to create conversation and knowledge about the concept of e-waste. These posts can vary from e-waste facts, creative recycled content, and promotions of companies that are taking recycling initiatives. Companies can further push these initiatives by offering returns on products that have value, or producing returns if consumers promote these posts on social media. Social media is a great tool to spread the word and inform millions of people. Companies should use this to their advantage to teach consumers about e-waste, and how we can reduce it. It's crucial that companies start taking effective steps to push the use of recycling among technological companies.

3.7 Corporate Social Responsibility

Utilizing the importance of Corporate Social Responsibility (CSR) throughout this campaign is essential in persuading companies to adopt these new methods of sales. The first tactic that will be presented in relation to CSR is the presence of innovation in a technology company. Using innovation as the base for promoting sustainability will make the campaign much more enticing to implement. With technology companies, innovation is key. The best way to present this form of innovation is creating recycled products that operate identically to first-hand objects while creating a more sustainable planet.

CSR is also something that has the potential to be extremely cost saving. Because there are so many different methods of recycling, cost is going to play a large factor in the success of the campaign. However, once companies begin to implement this new method of production, they will eventually see returns as customers realize the potential of these products. This plays into CSR because more consumers will be inclined to purchase the recycled product which for a certain time can be priced down to bring in a larger consumer base.

Brand differentiation will also largely support the CSR initiative of this campaign. By making one of the core values of the company to reduce global e-waste, something that little to no technology companies have proclaimed, the targeted technology company will then become more differentiated in a

saturated market. The goal for this is that more companies will follow in its footsteps once it is realized that the brand differentiation with reducing e-waste is bringing in a large customer base.

Long term thinking is critical when it comes to executing this business model. The circular economy revolves around long term thinking, not only for the planet but also to satisfy human wants and needs. Not only will recycling technology help in the long-term benefit of the planet by reducing e-waste, but it will also create greater awareness among consumers.

Customer and employee engagement is also important to consider when analyzing Corporate Social Responsibility. Customer engagement is built off of customer satisfaction or dissatisfaction. Whether a customer is satisfied or not with a purchase, product reviews show that customers will comment on their feelings about a product regardless. If quality assurance is put in place, the campaign will be even stronger as product reviews will remain positive. Further, employee engagement is just as important. Hiring employees that are passionate about the cause is essential in pushing the product effectively. When employees are passionate about the product that they are creating or selling, the customer is more likely to feel similarly. (Epstein-Reeves, 2012)

3.8 Financial Benefits and Disadvantages

There are many reasons why companies and consumers should or should not recycle products and materials. There are three main benefits and reasons for recycling – economic, environmental and safety/public health benefits (Kumar, Holuszkoa, Espinosa, 2017). For companies, it is more common to look at economic reasons – it is important to understand how it benefits the company if they are choosing to recycle the materials or products. But they can't forget environmental and social reasons - they are also useful if a company represents the idea of recycling and use that as good campaign material.

Electronic devices contain up to 60 different elements, some of them are hazardous, however most are valuable - such as precious and special metals - copper, gold, silver, palladium, aluminum and iron (Namias, 2013). The estimated value for all the e-waste in the world is more than 48 billion euro. The printed circuit board represents the most valuable part of e-waste accounting for over 40% of the total e-waste metal value (Kumar et al., 2017). Kumar show that there are also researches about gold and silver used in the electronic industry - 320 t of gold and 7500 t of silver is consumed by the electronic industry every year and urban mining of e-waste could generate 21 billion USD each year. Cucchiella et al. (2015) and Kumar et al. (2017) showed that the notebooks, tablets, and smartphones are the most valuable categories for the e-waste stream due to the presence of a larger concentration of precious and critical metals. Almost 3-6% of the total e-waste is printed circuit boards. More than 80% of gold and Platinum Group of Metals, and over 70% of silver are locked in

screens, monitors, and small IT equipment. The Kumar et al. (2017) research shows that the potential revenue from e-recycling exceeds 2 billion EUR (2.2 Billion in USD).

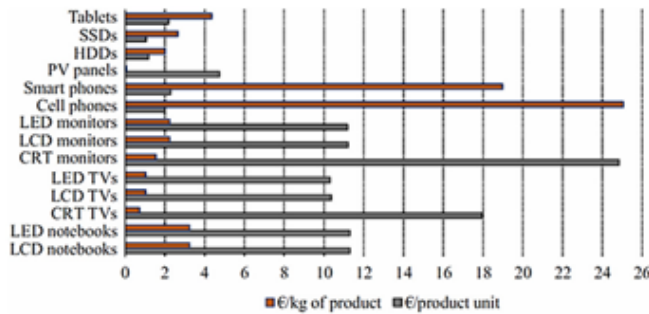


Fig. 1. Potential revenue from e-waste streams (Cucchiella et al., 2015).

3.8.1 Case study of Dell

Dell is one of IT sphere companies that works with implementation of CE principles in its business, that proves to have both environmental and financial benefits (Ranta et.al., 2018). Dell focuses on development of closed loops for plastics that are used in their products. This allows to extend the life of plastics, make a smaller carbon footprint in the production while also cutting on cost. According to analysis made by Dell this approach makes a significant 44% or 1.3-million-dollar benefit for natural capital compared with use of virgin plastics (Dell, 2020). Closed loop principles are being implemented throughout the manufacturing process, e.g. closed loop for gold recovery from e-waste, that is used in production of new motherboards. This process not only has financial benefits, as e-waste contains higher amounts of gold rather than gold ore (Kumar et al., 2017), but also reduces environmental damage by 99% compared to mining of virgin gold (Dell, 2020). However, Dell struggles with a few institutional barriers that are based on cultural - cognitive view of products that are made sustainably. It mostly appears that there is a doubt about the quality and price offers that are not up to par with traditionally made products, however Dell clearly denies any of these issues to apply on their products (Ranta et.al., 2018).

Besides recycling of materials companies can reclaim e-waste value by reusing certain devices or components, if the value of them is high enough (Ereuse.org, 2020). However, Parajuly et.al. (2019) emphasizes existing pressure for the reuse sector. Not only current warranty arrangements cut the lifetime of products but also eager customers to purchase brand new products over reused ones although they meet the same standards. Unpredictable customers' attitude towards recycled products in comparison to brand new ones makes it a big financial risk for electronic companies to implement CE principles.

Not only the recycling of electronic waste products could help reduce the primary resource usage in manufacturing which

would decrease the cost of production, but also it could help to reduce the environmental pollution.

3.9 Global Effects

Talking about global effects of this campaign, the main points we promise from CSF in different kinds of benefits and their global impact are giving people knowledge about the circular economy and its purpose, opening up new job opportunities connected with increasing smaller entrepreneurship and upgrading social economy as well as lower both resource consumption and greenhouse emissions. As we all know, a serious global environmental damage for nature as a result of an increasing human population in the world is an unsustainable use of natural resources (Musova, Musa & Huliakova, 2016). With this marketing campaign a bigger percentage of the world's population will have a better view at CE and will be familiar with the topic which will apparently affect their future behavior about purchasing or not a new product and let them think more deeply how they can recycle or reuse the old one. However, the biggest impact in a global transition towards a circular economy would be helping lower the world's consumption footprint. Improving resource efficiency also contributes to an ambitious climate mitigation. (OECD, 2018).

"It is evident that the linear model of economic growth, that we relied on in the past, does not fulfill the needs of present, modern societies in the globalized world" (Malikova, 2016, p. 1).

Different circular approaches can promote sustainable design solutions for the circular economy within the whole world's sustainable goals. Major changes are required in consumption as well as production systems and the effective cooperation of all countries and stakeholders (customers, manufacturers, government, financial and legislative services) is necessary. The businesses that cannot assimilate with circular economic conditions, do not have any chance to succeed in the tough competitive environment (Malikova, 2016). The effect will be unequivocally huge, will deliver positive results, will contribute to reduce the environmental and health problems and will maximize the efficiency of the use of world wealth.

3.10 Overview

The goal of this campaign is to combine social media with recycling efforts to help big companies inform consumers about reducing e-waste. This campaign uses social media to help inform on what e-waste is, as well as promote the companies who are taking initiatives to recycle old products and reward consumers for recycling. Some of these initiatives included offering credit to those who recycle something that still holds value. These initiatives help push consumers to want to recycle, as well as teach them the benefits of recycling and the harmful effects e-waste has on our planet. These initiatives have a big impact on corporate social responsibility as well. These initiatives help corporations protect the earth, offer more sustainable products, save money, and become more

environmentally conscious. This campaign covers a number of important issues that corporations must take into consideration, regarding e-waste and recycling.

4 CONCLUSION

Electronic devices contain different elements that could be recycled again and it makes a financial benefit to a company as well as environmental benefits, although electronic companies face risks that customer attitudes will affect demand.

In the campaign created, we utilized an extremely popular platform: social media. By using social media we can create a message that teaches consumers about e-waste and promotes consumers to be engaged and to make a difference by recycling these goods. This helps inform the consumers, as well as inform companies of these techniques, and promote these companies and their initiatives.

In addition to social media, the value of Corporate Social Responsibility also played a large part in developing the campaign to be effective. Both consumers and suppliers were analyzed to determine the best methods to accurately target the appropriate market. The biggest driving force is the assurance that consumers did not know about e-waste and that bringing it to their attention will persuade them to take part in this initiative and feel ethically responsible for the sustainability of the planet.

Access and performance models are business models that allow consumers to satisfy their needs without owning the products. These are things such as rental services, leasing services, and sharing services. This type of business model falls under the circular economy because of its unique way of keeping a product in use and delivering value while limiting the ecological costs. These are great business models to minimize the energy, resources, and waste needed to create these needed products. Extending product value is one of the most valuable facets of the Circular Economy. By ensuring that products are being created that will go beyond a single product life cycle will promote global sustainability and create a better planet for future generations to come.

The classic long-life model focuses on producing high-quality products and on extending the life of them through changes in product design. Product values, that would be lost through wasted materials or prematurely discarding, are instead repaired, upgraded or remanufactured, which ensure a long utilization period of products. Positive impact includes reduction in consumption of resources and waste, which have an enormous environmental impact. Companies which are taking advantage of the model have a capability to charge customers high prices which covers durability and high-standard quality.

The extending resource value business model becomes even more efficient because energy costs of getting and creating materials are higher than re-melting for example aluminum.

These cost changes contribute to recycling and decreasing waste materials. Industrial symbiosis as an economic and environmental collaboration that is useful for agricultural and production sites, a size of SME's, however is highly unlikely to be implemented in big IT companies, because of their manufacturing specifics.

CE implementation in IT company Dell has proved high financial benefits as they save money and resources for processing and using raw materials like precious metals and plastics in their products and at the same time reducing ecological footprint and pollution by up to 99%.

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Encourage sufficiency model builds on the classic long-life model. Its main purpose is to create products that will last and users will be able to keep them for as long as possible, along with high quality service. Companies based on encouraging sufficiency models usually call for the user to invest in higher price but higher quality products rather than cheaper ones with a shorter lifespan and subsequent disposal. Some of the positive effects are, for example, a reduction in resource consumption, customer loyalty or the opening of new markets for repairs and services.

The business model canvas is a one-page simple plan visualizing the overall setup and concept of product of a company in terms of nine main blocks, that represent different essential elements of business. The model takes into account the customer and the value provided including the ways of logistics of these values towards them. It also adds related financial dimensions, covering the areas and methods of paying customers for the value provided and the cost associated with running the business model.

Resource consumption and efficiency, waste management as well as environmental protection are the challenges that need to be addressed globally for their effectiveness. Because we are consuming and extracting more raw materials than the world is able to provide, we can apply the same to waste.

Then we facilitate market access and create business opportunities for the EU and others, we can slowly lower greenhouse emissions and also reuse materials and give them a new life, so we lower resource consumption as well.

REFERENCES

- Apple Press Release. (2020, February 26). Apple expands global recycling programs. Retrieved from <https://www.apple.com/newsroom/2019/04/apple-expands-global-recycling-programs/>
- Athuraliya, A. (2019). The Easy Guide to the Business Model Canvas. Retrieved April 24, 2020 from <https://creately.com/blog/diagrams/business-model-canvas-explained/>
- Bocken, N.M.P., Pauw, I., Bakker, C., Grinten, B. (2016). Product design and business model strategies for a circular economy, *Journal of Industrial and Production Engineering*, (Vol. 33:5, pp. 308-320). Retrieved April 17, 2020, from <https://www.tandfonline.com/doi/full/10.1080/21681015.2016.1172124>
- Cucchiella, F., D'Adamo, I., Lenny Koh, S.C., Rosa, P. (2015). Recycling of WEEEs: an economic assessment of present and future e-waste streams. *Renewable and Sustainable Energy Reviews* (Vol 51, pp. 263-272). Retrieved April 19, 2020, from <https://www.sciencedirect.com/science/article/abs/pii/S1364032115005808?via%3Dihub>
- Watson, D., Gylling, A.C., Tojo, N., Throne-Holst, H., Bauer, B., Milios, L. (2017). Circular Business Models in the Mobile Phone Industry. Retrieved February 22, 2020, from <https://norden.diva-portal.org/smash/get/diva2:1153357/FULLTEXT02.pdf>
- Dell (2020). Dell and the Circular Economy. Retrieved April 21, 2020, from <https://www.dell.com/learn/ag/en/agcorp1/corp-comm/circular-economy>;
- Epstein-Reeves, J. (2012, June 03). Six Reasons Companies Should Embrace CSR. Retrieved April 20, 2020, from <https://www.forbes.com/sites/csr/2012/02/21/six-reasons-companies-should-embrace-csr/>
- Ereuse.org (2020). Electronics Reuse Concepts. Retrieved April 21, 2020, from <https://www.ereuse.org/reuse-of-electronics/>
- European Commission. (2020a). A new Circular Economy Action Plan, For a cleaner and more competitive Europe. European Commission. Retrieved April 18, 2020, from <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN>
- European Commission. (2020b). EU Circular Economy Action Plan. Retrieved April 18, 2020, from <https://ec.europa.eu/environment/circular-economy/>
- Gladstone, N. (2020). The United States has a colossal e-waste problem. This is why. Retrieved April 18, 2020, from <https://www.digitaltrends.com/cool-tech/e-waste-recycling-unit-ed-states/>
- Heikenwälder J. (2014). Business Models Canvas. Retrieved April 24, 2020 from <https://dobra-strategie.webnode.cz/teorie/business-model-canvas/>
- Hesselbach, J., & Herrmann, C. (Eds.). (2011). Functional Thinking for Value Creation: Proceedings of the 3rd CIRP International Conference on Industrial Product Service Systems, Technische Universität Braunschweig, Braunschweig, Germany, May 5th-6th, 2011. Springer Science & Business Media. (Vol. 352 pp. 333-334). Retrieved April 24, 2020, from https://books.google.cz/books?hl=cs&lr=&id=QxqIGssi-kAC&oi=fnd&pg=PR3&dq=Functional+Thinking+for+Value+Creation.&ots=W3p8Yfw8EJ&sig=8qqYuiO4V108yUWDJyb1n596Ku0&redir_esc=y#v=onepage&q&f=false
- Hofmann, F., Jokinen, T., & Marwede, M. (2017). Circular Business Models. Retrieved April 17, 2020, from <https://sustainabilityguide.eu/methods/circular-business-models/>
- Kumar, A., Holuszkoa, M., Espinosa, D.C.R. (2017). E-waste: An overview on generation, collection, legislation and recycling practice. *Resources, Conservation and Recycling* (Vol. 122, pp. 32-42). Retrieved April 19, 2020, from <https://www.sciencedirect.com/science/article/abs/pii/S0921344917300290?via%3Dihub>
- Larmer, B. (2018, July 05). E-Waste Offers an Economic Opportunity as Well as Toxicity. Retrieved April 20, 2020, from <https://www.nytimes.com/2018/07/05/magazine/e-waste-offers-an-economic-opportunity-as-well-as-toxicity.html>
- Lead Generation: A Complete Guide - Marketo. (2019). Retrieved April 20, 2020, from <https://www.marketo.com/lead-generation/>
- LeBlanc, R. (2020, January 15). Learn More About E-Waste Recycling With These Facts and Figures. Retrieved from <https://www.thebalancesmb.com/e-waste-recycling-facts-and-figures-2878189>
- Máliková, J. (2019). Impact of globalisation on circular economy and sustainable development. Retrieved April 25, 2020
- Marian R. Chertow (2000), "Industrial symbiosis: Literature and taxonomy", *Annual Review of Energy and the Environment*, Vol. 25(1):313-337, pp. 314-316. (https://www.researchgate.net/publication/249558396_Industrial_symbiosis_Literature_and_taxonomy)
- Mohsin, M. (2020, March 23). 10 Social Media Statistics You

Need to Know in 2020 [Infographic]. Retrieved from <https://www.oberlo.com/blog/social-media-marketing-statistics>

Namias, J. (2013). *The Future of Electronic Waste Recycling in the United States: Obstacles and Domestic Solutions*. Columbia University, New York, United States. Retrieved April 19, 2020, from https://www.allgreenrecycling.com/wp-content/uploads/2016/11/Namias_Thesis_07-08-1312.pdf

Nancy M. P. Bocken, Ingrid de Pauw, Conny Bakker & Bram van der Grinten (2016) Product design and business model strategies for a circular economy, *Journal of Industrial and Production Engineering* (<https://www.tandfonline.com/doi/full/10.1080/21681015.2016.1172124>)

Nußholz, J. (2017, August 22). *Circular Business Models: Defining a Concept and Framing an Emerging Research Field*. Retrieved April 17, 2020, from <https://webcache.googleusercontent.com/search?q=cache%3A9bl4CqKNPE8J%3Ahttps%3A%2F%2Fwww.mdpi.com%2F2071-1050%2F9%2F10%2F1810%2Fpdf>

OECD (2019). *Business Models for the Circular Economy: Opportunities and Challenges for Policy*. OECD Publishing, Paris. (Vol. 112 pp. 28-29). Retrieved April 17, 2020, from <https://books.google.cz/books?id=12WQDwAAQBAJ&printsec=frontcover&hl=cs#v=onepage&q&f=false>

Our Impact. (n.d.). Retrieved April 17, 2020, from <https://www.fairphone.com/en/impac>

Osterwalder, A., & Pihneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. John Wiley & Sons publishing. (Vol. 288, pp. 14-40). Retrieved April 24, 2020 from <https://kramerus-vs.nkp.cz/view/uuid:d9d0ca90-f15a-11e8-a5a4-005056827e52?page=uuid:7256e0a0-3c2a-11e9-9be5-5ef3fc9bb22f>

Parajuly, K., Kuehr, R., Awasthi, A.K., Fitzpatrick, C., Lepawsky, J., Smith E., Widmer, R.; Zeng, X. (2019). *Future E-waste Scenarios*. Retrieved April 21, 2020, from <http://wedocs.unep.org/bitstream/handle/20.500.11822/30809/FutEWSc.pdf?sequence=1&isAllowed=y>

Ranta V., Aarikka-Stenroosa L., Ritalab P., Mäkinen S. J. (2018). *Resources, Conservation & Recycling. Exploring institutional drivers and barriers of the circular economy: A cross- regional comparison of China, the US, and Europe* (Vol. 135, pp. 70-82). Retrieved from <http://dx.doi.org/10.1016/j.resconrec.2017.08.017>

Shepherd, L. (n.d.). *5 Ways Marketing Impacts The Growth Of Your Business*. Retrieved April 20, 2020, from <https://info.themezzaninegroup.com/blog/5-ways-marketing-im>

[pacts-the-growth-of-your-business](#)

Uvarova, I., Atstaja Dz., Korpa, V. (2019a). *Challenges of the introduction of circular business models within rural SMEs of EU*. *Journal of Economic Sciences* VOL IX / No.2 ISSN 1804-9796. Retrieved April 17, 2020, from https://www.researchgate.net/publication/336937134_CHALLENGES_OF_THE_INTRODUCTION_OF_CIRCULAR_BUSINESS_MODELS_WITHIN_RURAL_SMES_OF_EU

Uvarova, I., Atstaja, D., Vitola, A. (2019b). *CIRCULAR ECONOMY DRIVEN INNOVATIONS WITHIN BUSINESS MODELS OF RURAL SMEs*. In *Proceedings of the International Scientific Conference*. Volume VI, p. 520 - 530. Retrieved April 17, 2020, from <http://journals.ru.lv/index.php/SIE/article/view/3951>

Z. Musova, H. Musa, Z. Huliakova (2016). *Innovative Approaches in a Socially Responsible Marketing in a Global Environment*. *Globalization and its Socio-Economic Consequences*. 1467-1470.

50Minutes.com (2017). *The Business Model Canvas: Let your business thrive with this simple model*. (Vol. 34, pp. 6). Retrieved April 24, 2020 from <https://books.google.cz/books?id=mXJgDgAAQBAJ&printsec=frontcover&hl=cs#v=onepage&q&f=false>