



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Swansea
College of Art
Founded 1853

An Investigation Into How Designers Can Use Systems and Methods to Ensure a More Sustainable Future.

Name: Lauren Evans

Student Number: 1703142

Course: BA (Hons) Surface Pattern Design

Module: Independent Inquiry ADAD6001

Tutor: Julia Lockheart

Word count: 5414

This is submitted in partial fulfilment of the requirements for the degree of BA (Hons)
University of Wales Trinity Saint David, Swansea (11th December 2019).

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Summary of Topic

This independent inquiry will investigate how designers can use systems and methods to ensure a more sustainable future. “Design in this objective sense is everyone’s concern” (Buchanan and Margolin, 1995, p. 13). It would therefore seem that designers have an important role to play, in making the world sustainable. This role requires a conscious attitude towards the environmental impact they will have on the world. Using systems thinking to ensure a sustainable future is key, as it’s the only way to illuminate vast amounts of waste. This will include work of James Lovelock and Lynn Margulis, alongside Michael Braungart and William McDonough.

Introduction

This independent inquiry will investigate how designers can use systems and methods to ensure a more sustainable future. Due to the fact that 'Designers create so much of the world we live in, the things we consume, and the expectations we seek to fulfil. They shape what we see, what we use, and what we waste.' (Berman, 2009, p. 1). It would therefore seem that designers have an important role to play in making the world sustainable. This role requires a conscious attitude towards the environmental impact they will have on the world. Through my practice at University, I discovered that there are many problems within the design industry. During my second year I worked alongside a Welsh company called *Orangebox* (2019), this supplied me with an understanding of how much waste there is. This triggered an investigation into how circular systems can improve the environment, focusing on solutions that have already been devised. The first chapter of my independent enquiry will discuss sustainable design within circular systems. These include, the Circular economy's framework (Ellen Macarthur Foundation, 2019) and *Cradle-to-cradle* (Braungart & McDonough, 2009). I will also talk about how waste can be seen as a resource to designers. The second chapter will talk about systems thinking, inspired by natural cycles. Looking at James Lovelock and Lynn Margulis, alongside Michael Braungart and William McDonough. The third chapter is discussing innovative designs that are made from waste or fully biodegradable materials. *Orangebox* is outlined throughout the investigation but my collaborative work is shown in the final chapter. I also look at revolutionary designers like Buckminster Fuller who created the geodesic dome, alongside contemporary companies such as *Really* (2019) and *Texfelt* (2019). This research leads me to believe, designing from a problem is helpful for the environment and encourages designers to think outside the box. It gives consumers less things to consume when a product is designed with sustainability and circular systems in mind. Since researching sustainability and the effects design has on the environment, I am interested in fulfilling this in my own practice.

Chapter 1

‘Design in this objective sense is everyone’s concern’

(Buchanan and Margolin, 1995, p. 13).

In recent years the problem surrounding waste has become a major topic globally. “Global annual waste generation is expected to jump to 3.4 billion tonnes over the next 30 years, up from 2.01 billion tonnes in 2016” (World bank, 2018). Sustainable design seeks to reduce negative impacts on the environment, it’s about how designers can build thoughtfully, without waste. Due to the overuse of nature’s resources, the environment has changed. Humans rely on natural resources for survival but as the demand continues, as the population grows, many resources have been depleted. This makes the urgency for a sustainable future greater than before. Sustainability is the “Avoidance of the depletion of natural resources in order to maintain an ecological balance.” (Oxford English Dictionary 2019) A balance between living organisms such as humans and the environment we live in. This should be a priority as we need each other to sustain a life that past generations had before us. Designers should take this opportunity to be innovative and forward thinking. By using waste as a resource and following systems that redefine growth.

According to Brundtland, humanity has the ability to make development sustainable. (1987) “to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.” (Brundtland, 1987) He believes the future generations are entitled to the same level of economic well-being as present generations. This can only happen if designers and consumers work together to create a balance between nature’s resources and social needs. Oxford English Dictionary defines a resource as “A stock or supply of money, materials, staff, and other assets that can be drawn on by a person or organization in order to function effectively. (2019) Recently the UK Government Office for Science has disgust waste as being a resource. (2019) This is because waste still retains a great deal of value, due to the further possibilities it holds. More accurately it should be described as a resource. Waste is becoming a new resource to many designers as it still provides usefulness in their practice. Waste is usually free, and companies pay to dispose of it. A material is likely to be waste if it’s leftover, unwanted or a burden on the

producer or holder, for example left over quarried stone stored where there is no certainty it will be used. (GOV, 2016). This leads to consumption. The majority of western society live in abundance and buy lots of things that might never use, instead of buying one item that can sustain a life. "They use more energy and resources monthly than previous generations during their whole lifetime." (Thackara, 2015). This is a shocking figure and should encourage change within society.

Previous generations have lived without all of this 'stuff', so why can't future generations? "If we look on a global basis, in the west we have probably hit peak stuff. We talk about peak oil. I'd say we've hit peak red meat, peak sugar, peak stuff ... peak home furnishings," Steve Howard, Sustainability Director, IKEA, 2016 at a 'The Guardian' debate (Farrell, 2016). Using resources to fulfil basic needs is okay, but we often buy items that are damaging for the environment, just to fill some voids in our lives or make a social statement. Steve Howard believes we've hit crisis point and can't possibly need any more stuff. Often the encouragement to buy comes from a price point. Cheaply made products are not usually durable, due to how cheaply they have been made. When an item is damaged it goes straight to the bin. More often than not, people are too lazy to attempt to fix things, or the product was so cheap that they believed buying an alternative was the easiest option. Consumers are unattached to items as they can always buy something new. Overconsumption is believed to be costing the earth.

It seems the linear systems are no longer viable, and there is a call for circular systems that do not add to the waste problem. One system that does this is the Circular economy. It is "A framework for an economy that is restorative and regenerative by design" (Ellen Macarthur Foundation, 2019). It looks beyond the current take-make-waste linear system and aims to gradually design waste out of the system. In a circular economy, waste is used as resources for other processes. Remanufacturing, reusing and recycling ensures that materials and products continue to circulate in the economy. This system is similar to the methods that the UK Government Office for Science has in place for a sustainable future (2019). It seems to be an encouraged way forward for designers. It's also talked about by the European Environment Agency (2017). "By recirculating products rather than discarding them after use, the circular economy would retain product and material values better than today's

linear economy.” (European Environment Agency, 2017, p.7). The linear economy uses natural resources and then disposes of them, causing environmental problems. Natural resources can’t replenish quick enough for social consumption. This poses a threat to the environment and a more efficient system is clearly needed.

Cradle to Cradle is a system that has similar methods to circular economy, such as reduce, reuse and recycle. “This framework seeks to create production techniques that are not just efficient but are essentially waste free.” (Sustainability Dictionary, 2019) Using waste as a resource is a good start for companies. These systems will positively help reduce waste, and in time sustainable companies could be waste free. “Cradle to cradle tries to put human beings in the same “species” picture as other living things— and to us, a misuse of material resources is not just suicidal for the future human generations but catastrophic for the future of life.” (Braungart & McDonough 2009, p3). Cradle to Cradle explains that we should not damage, non-renewable resources as we won’t be able to pass them on to future generations. This was also said by Brundtland (1987). They believe focusing on healing and avoiding environmental disasters is the only way to go forward. This production system is inspired by nature. It mimics nature’s model, creating a commercial and environmentally efficient system. By evaluating the product or materials, continuously through its life, it will help the designer reevaluate the system to make it fully sustainable. From production to transportation, it’s important to consider everything at an early stage before it impacts the environment.

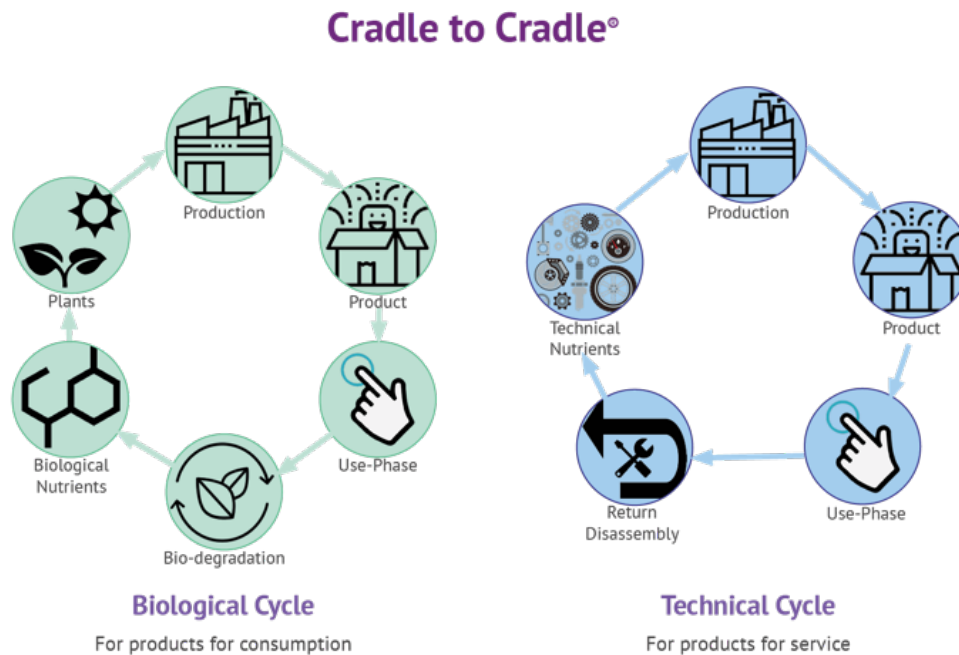


Figure 1- Cradle to Cradle: 4 success stories, from countertops to fabrics.

This diagram shows *Cradle to cradles* system. It analyses the technical cycle of a products life. It is a circular system with two parts, the opposite to the well-known linear economy. Its aim is to keep all resources and materials in one circular loop and commends product stewardship as it still keeps the waste in its cycle. Materials used in industry or commercial processes get separated into categories, this includes materials such as metal, fibres and dyes. The First cycle is biological, it is for organic materials that can be disposed of in the natural environment and decompose without causing any harm. The second cycle is Technical, this is where non-harmful synthetic materials go. This process uses the same materials continuously without losing value.

Sustainability is an issue, that is everyone's concern, but designers have an important role to play in how people reuse, recycle and reimagining materials. This is because they are at the forefront of design and trends. When examples are set people follow.

Chapter 2

What is a system? According to the Oxford English Dictionary (2019) a system is “A set of principles or procedures according to which something is done; an organized scheme or method.” It is a group of interacting or interrelated entities that form a unified whole. (Merriam-Webster, 2019). James Lovelock (1919-) claimed earth maintains itself like a big system. He is the originator of *Gaia theory*. “living organisms interact with their inorganic surroundings on Earth to form a complex, synergistic & self- regulating system that helps to maintain and perpetuate the conditions for life on the planet.” (Lovelock & Margulis, 1979, p44). The balance between the two, sustain each other. If companies took on systems similar to this, and adapt their processes of design and manufacturing, it would have a positive impact on the environment and the economy. This is because systems need to be managed for resilience, this is the ability to recover from perturbation, the ability to restore or repair themselves.

During the summer I spent 2 months working with a local company *Orangebox*. They are ‘the smartworking company’ (Orangebox, 2019) from South Wales owned by *Steelcase*. Smart Working is a business productivity “revolution” that looks to “provide people with the tools — the culture and leadership, workspace and technology — that enable people to choose when, where and how they do their jobs,” writes Alison White (2018). Choosing where and how you work is becoming more popular, so the business is thriving. Supplying furniture for offices, workspaces, universities and social areas. Keeping up with modern trends and environmental issues. They aim to be more sustainable in the future, focusing on sourcing materials as local as possible and finding ways to work towards a more efficient circular economy.

Orangebox make products for collaborative and interactive workspaces, from chairs, stools and even modular meeting rooms (Orangebox, 2019). Connecting people not furniture. The welsh Furniture company is featured twice in the book *Cradle to Cradle*, alongside other companies in the 2008 edition. They are commended by Braungart & McDonough “furniture like that made by Steelcase and Orangebox is designed for disassembly time and time again, and the materials are chosen for their nearly infinite capacity to be reused.” (2009, p6).

They are being highlighted because the company have agreed to take ownership of their products even after purchasing, meaning they can re-use elements of the furniture to create new products without using more raw materials. Braungart & McDonough are impressed by the company's ability to disassemble and reuse materials over and over again. These practices align with *Cradle to Cradle* approaches and form a good first step to a circular economy. More companies should take responsibilities for their products to prevent consumers just throwing them away. More often than not components that are being thrown away can be re-used. Product stewardship is a simple way to implement change regarding waste. If the item can be returned when no longer needed or damaged, elements like the framework can have a second life. A trace of the old design with the new should still be valued, as it has not yet been exhausted. Traces of these old components on new items should be something to celebrate. An example of this would be a palimpsest. Oxford English dictionary defines palimpsest as "A manuscript or piece of writing material on which later writing has been superimposed on effaced earlier writing." (2019) The components from previous designs may be marked or scratched but consumers need to recognize that not everything needs to be perfect, and in fact these traces have a moral value.

Metadesign provides a system that enables designers to change or create, behavioural paradigms. It is inspired by living systems and aims to improve existing ones within design, combining ideas that form a framework. *Orangebox* are currently working towards regenerative design systems, it is described as the process that restores, renews or revitalizes their own material sources. Regenerative design is a whole system approach to design. It uses systems thinking to create strong and reasonable systems, that combine the needs of society with nature. When systems work well, we see a kind of harmony in their functioning.

During my time at *Orangebox*, it was hard not to notice the vast amount of waste being produced every hour. The waste stream was clearly a big problem with the majority going to be incinerated. This has an impact on the environment but also a financial impact for the company as it costs them to get rid of what is valuable waste. If designers think about the waste before the product is made, there would be less waste being produced, as adjustments could be made to prevent it. An example of this would be a pod designed by

Orangebox, these are modular pods that consist of a number of panels, depending on the size of the pod.



Figure 2- Air Group

This image shows a selection of air pods *Orangebox* offer. Each of these pods have 5 layers of panelling, every panel is covered in fabric and cut on the Gerber cutter. They are around 80cm wide. This means if the fabric is 1 meter wide, there is always 20cm waste each time a panel is cut. Although this is a large piece of fabric waste the company are yet to think of a use for it in their products. If designers, thought about the fabric size and the waste that could be produced before putting a product into production, things like making the pod panels 20cm bigger are an easy way to prevent waste. By planning ahead designers can ensure that they are designing with circular economy in mind.

Currently systems are producing waste instead of being fully sustainable, this is an example of allopoiesis. This is where the process by which a system produces something other than itself. A Production line is an example of this. At *Orangebox* 50 tonnes of waste is produced every week (2019), some of this waste came to the university for a collaborative project with surface pattern design students. When working with *Orangebox* we received a bale of 46 varieties of fabric. This was a single day's waste. This leads to another systemic problem

currently at the company, none of the waste is separated. This separation is crucial for future process the waste can undertake. Currently the waste loses its value as soon it comes off the Gerber cutter. Waste separation would be helpful even if it is only separated into natural and synthetics fibres. This will make the process of re-use or recycle much easier. By using *Cradle to cradle's* separation system, which are shown in figure 1, it will let them use the materials continuously without losing its value.

Chapter 3

"Green design, green architecture, environmental design, eco-design, sustainable design, sustainable products, eco efficiency and sustainable consumption- all these have claimed to bring design, ecology and environment together over the past two decades." (Fry 2009, p.183) Fry throws light upon this as a trend. Something fashionable to discuss, but unfortunately, they haven't been acted on, therefore it's still a problem. Over the last few years the environmental impact caused by design and materials have come to light. The majority of designers have taken it upon themselves to design with sustainability in mind. Aiming for a circular economy. Recycling, reusing and redesigning. Creating a balance between design and sustainability, similar to what Lovelock said about earth maintaining itself like a big system.

Recycled material

Last year Orangebox teamed up with University of Wales Trinity Saint David and gave surface pattern design students the chance to reimaging the waste. "Keep products and materials in use" (Ellen MacArthur Foundation, 2019). This is a fundamental principle of a Circular Economy, which is beneficial for *Orangebox*. When designing from the waste supplied by the company I was intrigued by the smaller pieces. The larger sections could be used for sampling or could even be used for collaborative projects. While there's still possibilities for these pieces, the smaller bits usually get thrown away or incinerated. By exploring different techniques with the recycled fabric in my practice such as plotter cutting, my idea was to create a modular fabric that could then be used for upholstery. Adding value to the waste and saving money for the company. Using modular systems in design allows for less waste and longer life of products. Good construction equals minimal materials.

Buckminster Fuller was renowned for his comprehensive perspective on the world's problems. (Buckminster Fuller Institute, 2019). He developed pioneering solutions with innovative design that created technology that improves human lives. After 1947 Fuller created the geodesic dome. It was lightweight, cost efficient and easy to assemble, all of which are comparable to my modular hexagon fabric. The dome was inspired by nature's

geometric designs and was strong enough to hold itself together because of the balancing compression and tension forces in building. The possibilities for modular design are great, as its easily assembled. This means when a section is damaged or no longer needed it can be changed by the supplier, then instead of the whole thing becoming waste only a small section would be, if it can't be fixed.



Figure 3- Modular fabric on the sully stool.

This image shows my modular hexagon fabric, pinned on to the *sully* stool at *Orangebox*. Showing the potential of modular fabric for upholstery. The fabric could be upholstered to chairs or even pod panels, previously shown in figure 2. During my internship at *Orangebox* it was important to them to consider the wellbeing of the workers, which is usually the case across all offices. Taking this into consideration the modular fabric was inspired by the natural fractal hexagon. "The results of many studies show that exposure to fractal patterns in nature reduce people's levels of stress up to 60%." (Lambrou, 2012). This is because of a physiological resonance within the eye. More research suggests, some artwork with these types of patterns yield a relaxation affect, along with landscapes and architectural designs. This is a substantial figure, that shows the importance of these patterns. Due to their ability to reduce stress and create a happier work environment. As a designer, I often take

inspiration from the environment, and by using reoccurring shapes like hexagons the impact on consumers can be more positive. Bringing the outdoors in can create a calmer work environment, which is what Lambrou explains. The aesthetic experience of biophilia and bringing the outdoors in comes from the relaxation we feel when outdoors. When the outdoors is brought in by using patterns and shapes on furniture, it creates an aesthetic experience of being outdoors.

Recycled new materials

After experiencing how much textile waste comes from 1 furniture factory, I discovered some interesting ways of recycling scrap materials. These materials include fabric, leather and newspaper. One of *Orangebox's* suppliers is *Kavdrat*. They are part owners of the upcycling company *Really*. They have produced a solid textile board from end of life textiles and off cuts. This upcycled material is premium-quality engineered and suitable for industrial-scale projects. It's a high-density material made from cotton and wool. It can be an alternative to existing materials depending on the application. The materials themselves challenge conventional thinking and the process of working with them. The product reveals new opportunities for collaboration and circular design. On their website (2019) *Really* claim that the materials underline that the notion of 'waste' is, in itself, a waste. Cutting-edge, they revitalise end-of-life textiles into a viable material, which can be recycled again and again. Showing that circular design exists beyond ambition and is a powerful reality today. They provide an elegant solution to a pressing problem: currently, only 25% of the 95% of textiles that can be recycled actually are. A small proportion, but a start to a trend that Fry (2009) argued wasn't being acted on.

At *Orangebox*, I contacted a similar company *Texfelt*, who shred textile waste to produce underlay. They are also looking to create wadding for furniture, this provides a unique opportunity for *Orangebox* as they produce fast amounts of waste and use wadding in their furniture. Creating a circular loop like this is fitting.



Figure 4- Shredded fibres from J, R Fibres and Texfelt

This Image shows raw waste fibres after being shredded at *Texfelt* factory in Bradford. There are only a few problems with this solution that *Orangebox* face. The first being *Texfelt* only take certain types of fabric waste. These includes Knitted waste, wool, cotton, synthetics, carpet tread waste, weaving/ upholstery threads, polyester belting and high tenacity thread waste. The fabrics must be fire retardant which isn't an issue because all furniture fabrics for upholstery would already be coated. Further to my systems thinking proposal in part 2, *Orangebox* would have to sort the fabrics as they come off the Gerber cutter, ready to send to *Texfelt*. The separations of waste would then have to be kept somewhere in the factory to be transported in containers. Which generates the next problem of transportation.

Texfelt is based in Bradford, West Yorkshire and *Orangebox* is based in Nantgarw, near Cardiff. The company often try and use local suppliers to keep CO2 emissions to a minimum. Therefore, the situation isn't fully sustainable. According to an article by Zeke Hausfather, at carbon Brief (2019), transport was responsible for around 34% of the UK's CO2 emissions in 2017. This has increased from 21% in 1990 as other sectors of the economy have cut their emissions while transport CO2 output has barely changed. It's clear *Orangebox* would need to make the most of these trips by transporting a large amount of waste material at one time. But this would be valuable if the companies can conduct a suitable deal between them. Where *Orangebox* sends waste and *Texfelt* supplies wadding for furniture, this would create a closed-loop system, that they are working towards.

"While recycling is great in a lot of ways, the ultimate goal is to get people to prevent waste in the first place." (Jones, 2016). By designing a feedforward system and thinking about the waste before the product is made, it can be anticipatory. Using waste as a resource in this

decade is important because there is so much of it and it has nowhere else to go except landfill or incinerations. Designers can use this valuable waste to create new materials. Jorge Penades is a Spanish designer who creates furniture from waste leather. Moulding together shredded leather and natural bone glue to create pieces of furniture.



Figure 5- Shredded leather furniture.

Penades told *Dezeen* "I found leather especially interesting because it's the first material in history that humans have used," (Morby, 2015) He then went on to say, "But what really shocked me was the lack of well-established recycling processes." (Morby, 2015). As a whole, society still hasn't got enough systems in place to deal with waste and the recycling process, this is the reason behind Penades work. He is proving that there is still value to the waste, by creating new material. Currently he is creating furniture such as tables, but Penades believes the process can be used to produce flooring, tiles and even shoe soles. (2015) The material is flexible, but still stiff and is aesthetically pleasing because of its marbled effect.

WooJai Lee, a designer based in the Netherlands is highly interested in materials. Experimenting and exploring their potentials. Lee works both in constructional and

sculptural ways, combining these to create a unique style of work. An example of this, for which he is praised is the paper brick.



Figure 6- Paperbricks Pallet Bench

Made from recycled newspaper, a strong strength with the aesthetic similar to marbled stone. Like a construction material the newspaper still has a warmth and soft tactility. The only material used here was the recycled newspaper and wood glue, it was then pressed into a mould. Similar to my own work with *Orangebox*, the bricks are modular and slot together to form furniture. With holes down the side of each block allowing them to connect and be joined together. After experimenting with recycled paper fibres, Lee discovered that each round of recycling makes them shrink and decrease. This is what motivated him to create a sturdy solution. "I wanted to give paper rubbish a new life as a much stronger and longer lasting material," Lee (2019) He has devised an innovative way of recycling newspaper, alongside creating a sustainable material. This will benefit the design world, rather than add to the problem.

Unconventional materials

Due to the social trend surrounding the environment, designers have been coming up with lots of new materials that are sustainable, and in some cases complete the circular system. An example of this is an ecological packaging made from potato skins. Designed by Simone Caronni, Paolo Stefano Gentile and Pietro Gaeli. They have created a fully sustainable alternative to polystyrene or paper cones. It's called *Peel Saver* and is made of starch and fibre components.



Figure 7- Peel Saver

This image shows the stages of the material, it goes through the process of maceration and natural drying, then it bonds together and hardens. The designers discovered how much potato peel waste is produced by fries companies. Realising that the waste had value, they put it to good use and created a container for food. The entire cone is biodegradable and therefore a sustainable product, returning to the biological cycle and becoming fertiliser for plants or animal food. "Today it is now a necessity that products and packaging are sustainable and recyclable, this project is a proof of how much can still be done in this

direction." (Hitti, 2018) This resonates with Fry (2009) as he explains there is more to be done, on this slow but important process.

Another more industrial use for potato peelings comes from designers Rowan Minkley and Robert Nicoll. They believe that circular economy should be the starting point when designing any new products and materials. They use the potato peelings to create an alternative to single use materials like MDF and chipboard. This is an autopoiesis system that flows within itself and the environment.



Figure 8- Chip[s] Board

It's eco-friendly and called *Chip[s] Board*. The product came about after the designers discovered the short lifespan of disposable materials. "the UK furniture sector currently disposing of or incinerating 140,000 tonnes of MDF per year, due to its inability to be recycled." (Hitti, 2018) This is an alarming figure and adds to the growing amount of waste that comes from the furniture industry. This chipboard is biodegradable and made from potato peel binding agent mixed with fibres from potatoes, bamboo, wood or hops. Combining material waste and food industry waste they discovered a sustainable wood substitute. This material could be useful for *Orangebox* as they use wood in some of their

products. By creating this link, the company could be one step further to a circular system. By using biodegradable wood substitutes instead MDF and chipboard, they wouldn't need to pay to incinerate the wood, saving them money and preventing any further damage to the environment. This proves to be a better solution all round.

Conclusion

It's obvious to see that designers are starting to use systems and methods to ensure a more environmentally focused future. The high amount of impact that designers have into everything we see and use, suggests their role should require a conscious attitude towards sustainability. By using systems and methods designers can change the current implications of design. Designers need to be innovative in order to design for the purpose of future generations. Globally waste is now a huge problem, it's now time to focus on designing sustainably, to reduce the negative impacts on the environment. The constant need for resources has resulted in an urgency for a sustainable future. To ensure this, a balance is required between humans and the environment we live in, otherwise natural resources can't replenish themselves. Waste is valuable to designers as they consider it to be usable material, that has yet to be exhausted. The population attitude to throwing away goods has led to high consumption rates. Cheaply made products do not help the situation as they are not durable. Designers need to focus on the durability of a product rather than the economic side. However, a cheaply made product should still have the chance to be reused, or definitely recycled. A system allows an organised way of designing. Companies should adapt process, as they manage resilience. Working with *Orangebox* allowed me to see the original linear system first-hand, this made me consider other systems, such as the circular economy. The linear system currently produces too much waste to continue as a reliable system. They introduced me to other possible outcomes. The circular economy model allows change for the better, meaning more sufficient systems. The model is a system in itself and requires designers to think carefully about a products life before it's been produced. *Cradle to cradle* is another system that encourages reduce, reuse and recycle. These current systems help reduce waste, long term. Unfortunately, it's not a quick solution. More efficient system are clearly needed, in order to allow a sustainable future. Meta design enables this, as designers are encouraged to change existing systems. Designers should consider new materials within these systems. These materials range from redesigned modular fabric to biodegradable potato peel. These are still a working progress and many designers do not know about them, as of yet. Designers are quick to use unsustainable materials such as acrylic, before even considering these new materials. In most cases people think sustainable materials aren't pleasant to look at, this investigation

proves otherwise. As shown in figures 5 and 6, these materials are aesthetically pleasing. There needs to be more acknowledgment for these sustainable materials, before designers will consider them. The whole idea of these sustainable materials allows themselves to return to the biological system it came from. Therefore, it's a better, alternative system to the existing linear one. When sustainable materials finally get the credit they deserve, it will become a trend in itself, this new material system will ensure a sustainable future. Designers are key to ensure a successful long-term system.

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