Nonliving Stakeholders

**Reimagining the relationship
between humans and objects
in a throwaway economy**

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Transdisciplinary Design Thesis 2016

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Abstract

A throwaway economy has produced enormous waste for more than 50 years on earth, and specifically the overuse of disposable items has arised to one of the most serious problems in urban environment. A lot of educated individuals are aware of the problem, but lack of actions has aggravated it in everyday lives. How can design play an important role in this context? Through a framework and several case studies, I have discovered that offering environmental options only in a consumption process has its limits in changing current human behaviors because of a preformed perception about disposable items and wastes.

What if we consider an object as a stakeholder in the waste stream? With the re-imagination of the new relationship between humans and objects, I have developed two roles for an object: a service provider and an intelligent individual. If we speculate that an object can think, communicate with each other, and even track human behaviors, how do they change our everyday environments?

Container Union is a speculative group of containers that protect themselves from human behaviors in a throwaway economy. Through unionizing objects, the union offers the supplies, a service, and a system. Departing from a human-centric mindset, Container Union enables us to rethink our attitudes towards objects, and to understand the deep meaning of an ecosystem by reorganizing the relationships among objects, humans, and Mother Nature.

Furthermore, this project sheds light on how this new perspective can be applied to current information technology, design methodology, and service design to effectively address the notion of climate change and to envision a holistically sustainable future. The ultimate goal of this project is to broaden the scope of its application in various fields, and develop practical methods.

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Introduction

Figure 1. Food table in a design conference

As a Korean, born and raised in South Korea, the life in New York has given a wide range of experiences to me. Among them, one daily challenge to endure was the culture of single-use consumption and the way of waste disposal. Unlike my country, disposable items are all around the people living in New York City mainly because of a loose recycling system. Disposable items, such as a plastic food container or cutlery, have been well designed to throw them away after a single use.

I have gone through a lot of uncomfortable moments in various social events, seminars, and networking spaces. In the venue, many professionals and industry experts showed up and had intelligent conversations. However, in most cases, they used numerous single-use items (Figure 1), which all different kinds of wastes have been relentlessly disposed of in a same trash can, and piled them up into somewhere. The guests might not have a choice because the host has already prepared for single-use items for the events. This phenomenon has been repeatedly observed, which makes me feel quite uncomfortable. I believe a majority of educated people are already aware of the seriousness of excessive consumption and waste. Although they discuss new ideas to resolve social and environmental problems to face, they keep ironically causing waste that impacts on the environment.

Why do they still use the problematic products? How can people make better decisions? These questions have stimulated me to be able to arise my research topic.

How might design help individuals' decision making?

How might we reduce single-use consumption in our everyday lives?

As an industrial designer, I particularly examined the relationships between humans and man-made objects. Goods have been created for human needs and consumption, but eventually they have become the direct cause of environmental damage. On the other hand, as a transdisciplinary designer, I have attempted to draw a prevalent waste issue from diverse angles. I believe an expanded concept of design can introduce a new approach to environmental and social issues, and help to imagine positive future.

In dressing up products just to persuade people to buy them, design has contributed, and still contributes, to an everlasting flood of new products. But now design can play an active part in stemming that flood.

- Dieter Rams

Framework

Corporations have started a throwaway economy

Sustainable makers lay responsibility to consumers

Holistic understanding of product lifecycle is required

Corporations have started a throwaway economy

The history of throwaway economy has not been last long. In the past, it was commonplace to reuse products. In the early 1900s, milkmen delivered fresh milk to each household and recollected empty milk jars in order to wash and reuse them. However, according to the book Garbology, Coca-Cola introduced the "one-way" container in 1964 (Figure 2). The new glass bottle was equally reusable as before, but it was intended to be thrown away. In addition, the advancement of plastics has cultivated modern throwaway culture. A scientist in Dupont invented a PET bottle which does not explode in a refrigerator.[1] Most soda manufacturers switched their containers from glasses to plastics due to its convenience and light weight as well as low cost. This new throwaway system has allowed the soda company to free it from the local bottling plants that clean and refill used bottles.
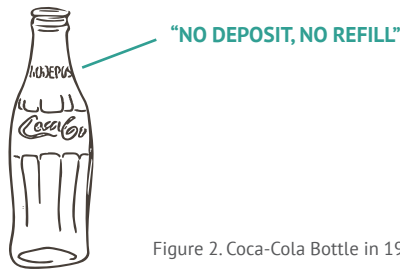

"NO DEPOSIT, NO REFILL"

Figure 2. Coca-Cola Bottle in 1970s

With a single-use soda bottle as a starting point, many current food containers are designed to be thrown out. Now, the throwaway economy is regarded as a very obvious pattern for both food manufacturers and consumers. Since the introduction of one-way PET bottles, consumers have pursued convenience. As a result, the US has been suffering from an enormous scale of single-use container waste. According to the data from Environmental Protection Agency (EPA) report in 2012, Municipal Solid Waste (MSW) generation in 2012 was three times bigger than that in 1960. Moreover, as Figure 3 shows, the data also reported that packaging and container waste accounts for the largest portion in municipal solid waste, and the second biggest one is non-durable goods. In percentage of total MSW generation, recycling (including composting) did not exceed 15 percent until 1990. Fortunately, the recycling rate has

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1 Humes, Edward. 2012. Garbology; Our Dirty Love Affair with Trash. New York: Penguin Group.

Figure 3.
Total municipal solid waste generation
by product category (before recycling)

grown significantly over the next 15 years, the recycling rate has grown more slowly over the last five years.[2]

In an industrial design point of view, disposable items were initially designed for safety and hygiene, such as medical purpose. However, as we can see, disposable items have been used more than medical purpose. Their low prices with less durability allowed manufacturers and retailers to use cheap containers broadly to convey their actual products to consumers. The containers and packages are basically created to protect and deliver products safely, rather than being used only once.

In a business perspective, food companies basically sell food. Food can be completely digested in a human body, whereas the containers of the food cannot disappear. There are tons of containers that have been created for an enjoyable amount of food, and remained on Earth longer than a human lifespan. Coca-Cola has introduced versatile bottle caps to reuse the empty bottles, or to use Plantbottle™.[3] They do not take responsibility to collect and degrade coke bottles completely.

What if corporations did not start using single-use packages for their products? How would the environments be? The trade-off for immediate benefit eventually led for corporations to pay for long-term environmental costs. Due to the results of a throwaway economy, many individuals, organizations and environmental activists have made a lot of efforts to reduce waste.

2 United States Environmental Protection Agency. 2014. Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012. Solid Waste and Emergency Response, Washington: United States Environmental Protection Agency.
3 http://www.coca-colacompany.com/plantbottle-technology/

Sustainable makers lay responsibility to consumers

One common strategy is using reusable items instead of disposable items. A grocery bag is a good example. Many countries have already banned a plastic bag, and encouraged people to bring a reusable bag to a grocery store. Those who do not bring their bags are supposed to pay for them. In the US, the California state legislature has enacted a ban on plastic grocery bags since 2014.

Another strategy is to change from toxic and non-degradable materials to sustainable materials. Environmental activists and organizations have introduced biodegradable, compostable, or edible products such as an organic canvas shopping bag or an algae water bottle. It is true that many single-use items are made out of plastics, that are not environmentally degradable.

Given that plastics cause waste, what about reusable plastic products? A reusable polyester shopping bag is also made from petroleum just like a single-use plastic bag. Why do we dispose of a transparent plastic container? Why do we reuse a plastic lunch box?

The real problem of the strategies is that the reusable and sustainable products are also manufactured in a large scale, and they are awaiting for consumers to be sold such as other manufactured products. Because the manufacturers have shifted the responsibility of sustainable use on consumers, now we have both disposable and reusable items and both plastic and organic products on store shelves. As a result, reusable items could not substitute for disposable items.

In this regard, the reason why single-use items are such prevalent is not because we do have neither enough reusable items nor the bad choice of material but because manufacturers avoids their responsibilities in a market. It is necessary to think about how to utilize the existing products and redesign a pattern of consumption.
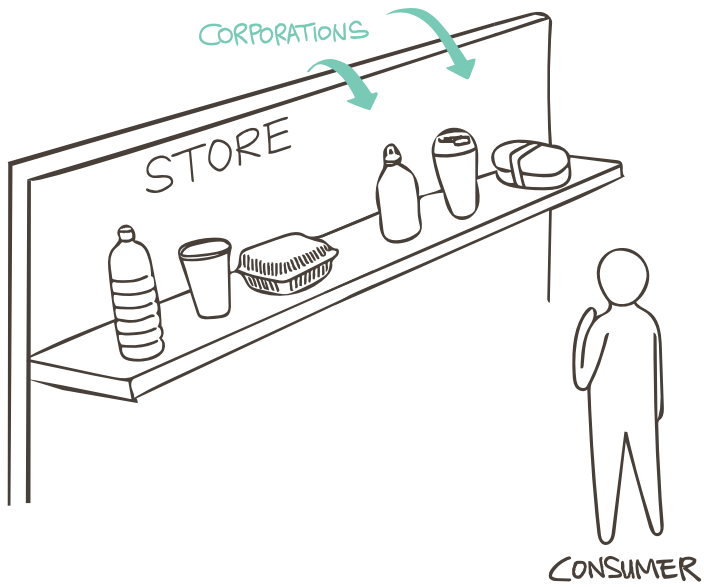
Figure 4. Corporations keep adding new environmental products in the markets, but the environmental responsibility depends on the choices by consumers only.

Holistic understanding of product lifecycle is required

One of the most common thoughts in throwaway economy is that many single-use items would be in a closed loop under a virtuous life cycle of a product because they are made from recyclable materials such as glass, plastics, or papers. Moreover, many products have been produced with recycling symbols, which indicates the different types of sorting methods. It is true that more people have been participating in a recycling system. Then, what is wrong with the current situation?

Unfortunately, the containers made of paper or plastic with food waste are indeed very difficult to be recycled. Moreover, people hardly recognize how hard it is. Helen Bingham from Keep Britain Tidy said,

There is a disagreement, or lack of understanding, between the waste industry and the coffee industry. The coffee companies say the cups are completely recyclable, you can put them into paper bins, but the question is how they are going to get into the recycling stream without being a contaminant. The coffee companies and the waste industry need to talk to each other. Because it's a hell of a lot of cups.

Also, the article mentioned,

Other products such as grease-stained pizza boxes pose a similar recycling challenge to coffee cups.[4]

There is also another issue in a recycling process. A majority of people keep consuming new products and recycling them because it is believed that used goods would end up with being completely recycled after leaving their hands. However, as a matter of fact, field experts advise the best way of recycling is to reduce purchase because the amount of consumption is much more than that of recycled products. In addition, recycling efficiency can be considerably restricted due to contamination. The well-known Three R's (Reduce, Reuse, and Recycle) should be done in order, which represents a list of three ways to cut down the waste.

It is easy to find the examples that lacks awareness of consumption. Many single-use items have a recycling symbol and a message for users to recycle the containers. However, those items instruct one to recycle

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4 Cocozza, Paula. 2016. "Caffeine hit: what happens to Britain's 3bn empty coffee cups?" The Guardian. March 15. Accessed March 16, 2016. http://www.theguardian.com/environment/2016/mar/15/coffee-cup-britons-3-billion-so-few-recylced.
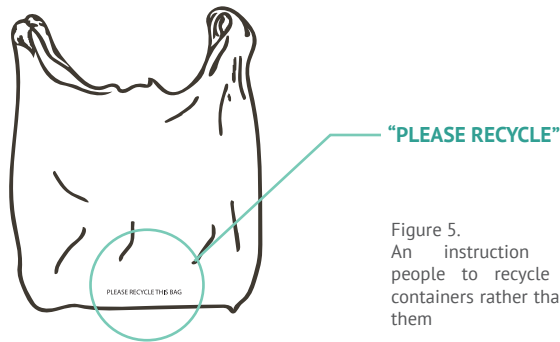
"PLEASE RECYCLE"

Figure 5.
An instruction encourages people to recycle disposable containers rather than to reduce them

disposable containers rather than to discourage from using them as Figure 5.

Due to a lack of public understanding and communication between front stage—making and consuming parts—and backstage—cleaning parts—in the waste stream, people have disposed of food containers in a recycling bin. It requires extra efforts to sort the waste again by recycling organizations and facilities. From an economic point of view, the cost of waste management has been covered by tax since city government is in charge of waste management. From an ecologic point of view, more waste need more resources to deal with them such as garbage trucks on the streets. For these reasons, there are cities and countries that request households to put all different types of the recyclables in the same waste bin so that waste management organizations can group them.

How might we broaden our understanding about the whole product lifecycle? Taking the lifecycle and further impact into account, the world might have less useful waste.

The desert of the real isolates from literally vital knowledge in four ways: because it's invisible; because it's somewhere else; because our sensory bandwidth is too narrow; and because we're 'educated'.

- John Thackara

Design principles

Based on the research findings and framework, I have formed three design principles.

1. Corporations have started and maintained a throwaway economy to attract consumers. However, they have a big responsibility on single-use system. The design solution should **intervene in an everyday consumption process that corporations create and operate.** In the context of single-use consumption, the commercial spaces to intervene might be retail stores which sell disposable items, takeout restaurants or coffee shops that carry disposable items to contain and deliver their food.

2. Manufacturing reusable products or changing materials is a limited strategy to substitute disposable items. Instead of proposing a new product that changes only its design or the choice of material, the design solution should **design a new pattern and system to reduce new production**.

3. Many people have participated in recycling so far, but it turns out not to be an ultimate solution. People tend not to have enough understanding of future impact from their behaviors. Therefore, the design solution should **address a holistic vision of the product lifecycle for users** to spontaneously decrease their consumption rather than merely to depend on recycling.

Part 1.
Design as Intervention

How might design intervene individual's decision making process?

B ased upon aforementioned design principles, I set up the following hypothesis with a series of case studies.

Hypothesis   *If an environmental option is provided in a consumption process, people would take a pause, and be able to pick an environmentally-favorable choice based on their knowledge.*

I analyzed a consumption process and investigated a few moments for environmentally-favorable decisions in the process. Figure 6 shows a general consumption process starting from the stage of WANT to that of DISPOSE. There could be many factors that influence on decision making in the process, but here focuses on the decision based on individual knowledge about environment. For case studies, I intervened the stage of SEARCH to reduce new purchase and the stage of DISPOSE to extend the product lifetime since those two steps are the very moments that a corporation should get involved in.

Case study #1   **Case study #2**

| WANT | SEARCH | GET | USE | DISPOSE |

Figure 6. Consumption processes and two case studies intervened them

Case Study 1. Locally DIY

The effort has been made to repurpose and/or redesign used products before getting rid of them into a waste bin. It is commonly called *Do-It-Yourself (DIY)*. DIY is an effective way to prolong product lifetime and decrease unnecessary consumption for an individual. However, it is quite limited to perform DIY. Although tons of DIY books and videos have instructed how to utilize used items, a majority of people is not even aware of repurposability of the products at the moment of purchase.

I thought DIY can be an opportunity to reduce consumption of brand-new products. As shown in Figure 7, *Locally DIY* aims to encourage people to repurpose used products by displaying them on store shelves next to new ones in the same category. They are cleaned and labeled for another usage. For example, a used milk jar can be labeled as a food scoop (Figure 9), a delivery box as a magazine file (Figure 10), a pop tap as a hanger connector (Figure 11), and an egg container as a craft organizer (Figure 12).
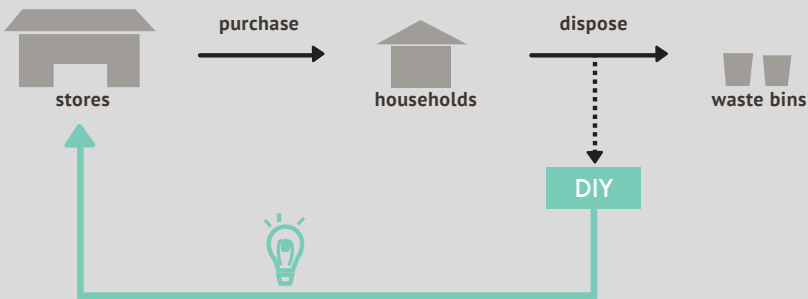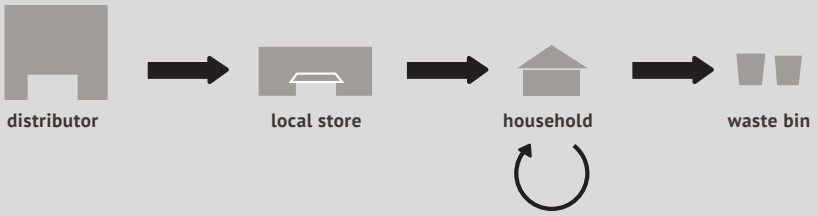

Figure 7. Locally DIY diagram (1)
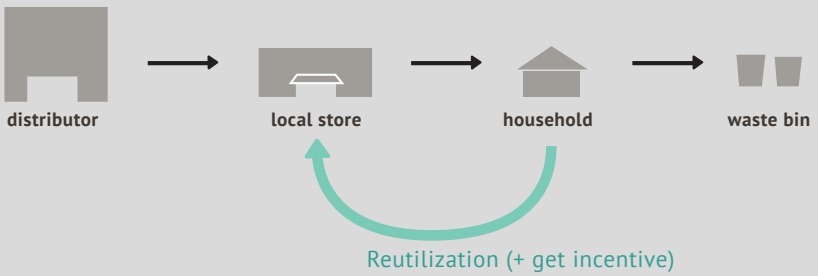
Locally DIY offers an option that could be an alternative product through a simple handcrafted process from everyday household wastes. As Figure 8, reutilizing them eventually allows a town to cut down an inflow of new products by reducing purchases. Furthermore, those who bring the alternative to a store can hold incentives to benefit them (i.e., accumulating points for next purchase).

PRESENT

distributor → local store → household → waste bin

FUTURE

distributor → local store → household → waste bin

Reutilization (+ get incentive)

(——→ the amount of product flow)

Figure 8. Locally DIY diagram (2)

Figure 9. a milk jar as a food scoop

Figure 10. A delivery box as a magazine file

Figure 11. A pop tap as a hanger connector

Figure 12. An egg container as a craft organizer

After taking photos, I shared them with a group of people through Facebook in Figure 13. The announcement has been written in both Korean and English to collect as many feedbacks as possible.
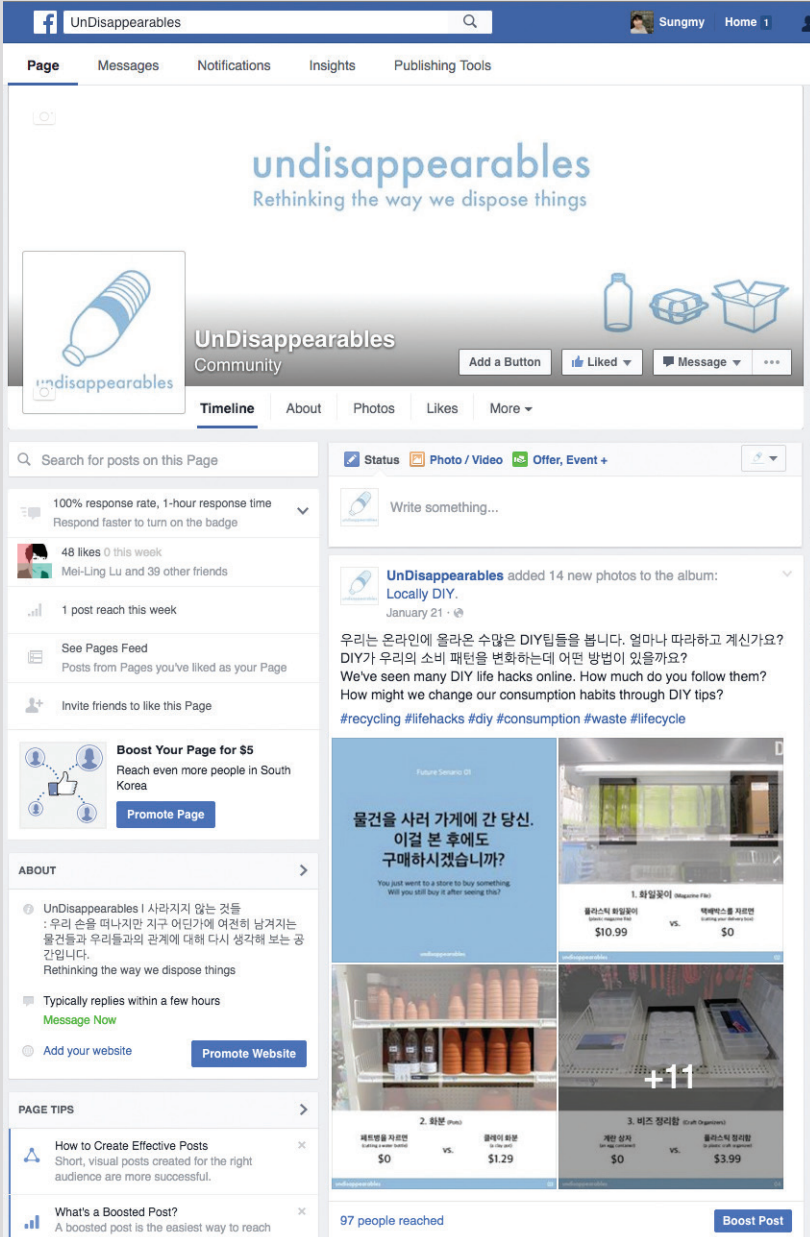

Figure 13. A Facebook page "UnDisappearables"

Case Study 2. Reusing Bins

While investigating the meaning of waste, I have discovered that many products are dumped away in the end when an owner does not want to use them anymore. People have a tendency to dispose of their possession when "they" do not need them, or when they do not need them at "the moment". In other words, a lot of wastes are actually thrown away under the "unwanted" status rather than they become useless or unusable.

From this idea, I designed *Reusing Bins*, which is a set of new waste bins classified with several categories based upon reusability instead of material (Figure 14). It intervenes the moment for an owner to dispose of things, which gives an opportunity to utilize them for those who needs in the near future. Of resuable waste to be collected, some in a good condition would allow others to officially harness them locally.

REUSABLE
if washed

REUSABLE
if washed
and modified

REUSABLE
if remanufactured

COMPOSTABLE
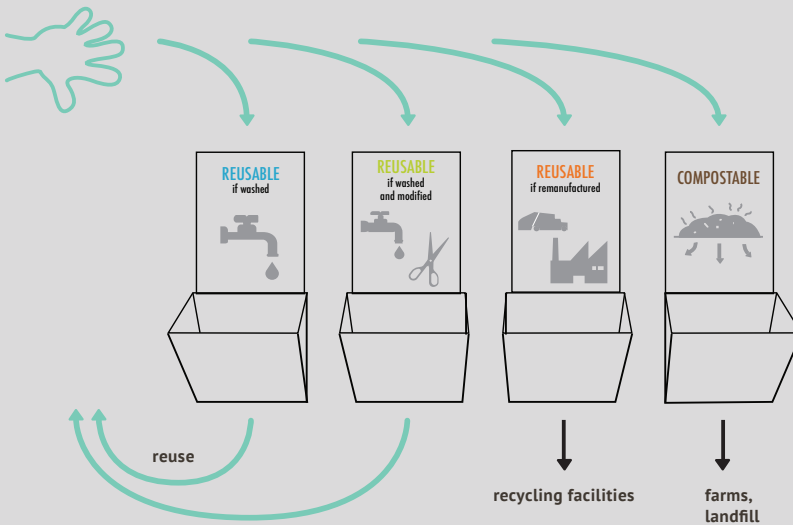
reuse

recycling facilities

farms,
landfill

Figure 14. Reusing Bins diagram

To test this idea, I installed Reusing Bins in a studio space on campus and observed it for about 10 days. The categories of the bin were "Reusable if washed", "Reusable if washed and modified", "Reusable if remanufactured", and "Compostable". In order to help the classification, I

embedded two wash racks in the first two bins, and spread used ground coffee in a "Compostable" bin (Figure 15).

As those bins were filled with reusable wastes quickly, I had to organize them during the experiment. Since I received the feedback that the "Reusable if washed" bin and "Reusable if washed and modified" bin were too similar to distinguish, I modified those signs as "Reusable" and "Reusable if washed or modified" later.

Figure 15. Initial installation of Reusing Bins

Figure 16. Reusing Bins after 10 days of its installation

Putting all case studies together

The two experiments intervened in two different steps of a consumption process. Based on the result, I decided to combine two case studies with a single local system. Once waste could be classified in a proper fashion through Reusing Bins, the useful items from the bin can be retouched and displaced into a local retail store like Locally DIY.

In this local system, it is necessary to have a new role *waste retoucher* to collect, wash, and modify wastes. A waste retoucher could be anybody including individuals, volunteers, makers, organizations, or city agencies. They collect useful items from Reusing Bins, design the instructions, and send them to local retail stores or distributors.
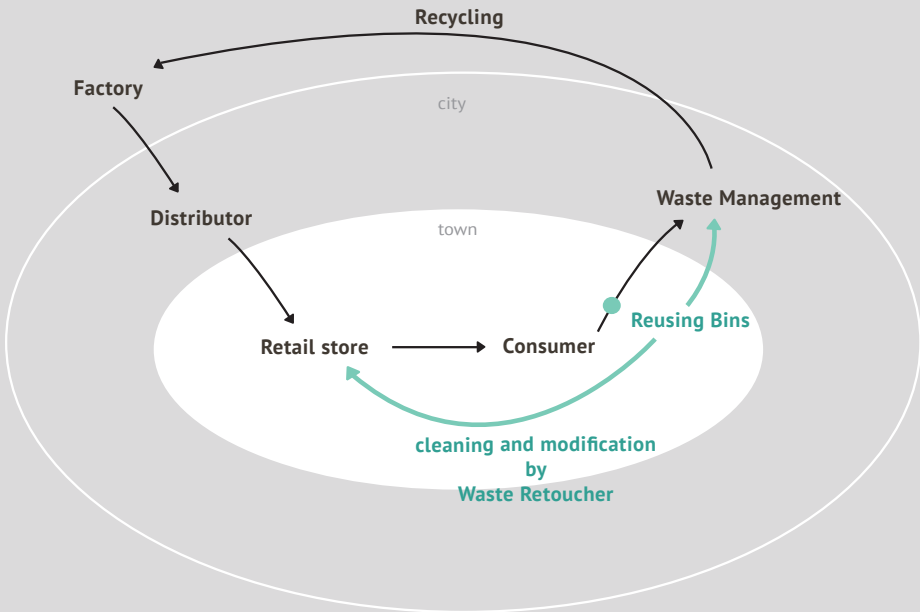

Figure 17. A combined local system diagram from the previous case studies

Assessment

Both case studies in Part 1 had attracted the attention of the participants. However, there are a couple of issues to be resolved.

First, the participants had different thoughts and standards on hygiene and product reusability. Due to a range of opinions, it was hard to expect the intended decisions. Second, if a used product that is already considered as trash substitutes for a brand-new one fully, it often requires cleaning and redesigning process. However, if the cost gap between the two is small enough, it is hard to expect users to choose the used. Finally, this idea needs an extra role to operate the system. We may imagine a voluntary individual or an organization, but assigning a new role to them without compensation would be difficult to maintain the system continuously. These problems could not satisfy the hypothesis that offering an environmental option might lead to an environmentally -favorable decision. The purpose of the prior case studies was an attempt to alter the behavior of the educated individual in a daily life. However, it ended up with being rarely changed due to strong perception about waste that has been already preformed earlier.

Part 2.
Design as Speculation

How might design envision a new relationship between humans and objects?

One of the reasons that previous case studies did not satisfy the hypothesis was to fail in changing a personal perception about waste and encouraging one to reuse it. On top of that, most people took it for granted that a used product is no more than trash that is dirty, unusable, unpleasant and undesirable to reuse. Once they regard it as a useless waste, it is quite hard to change their behaviors. From this insight, I have investigated the human attitude towards an object.

Humans   Objects   The environment

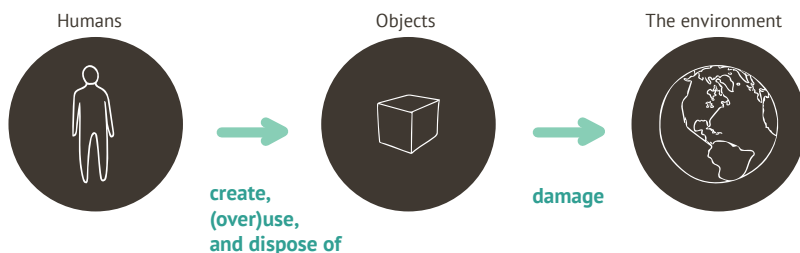create, (over)use, and dispose of   damage

Figure 18. Relationship diagram among humans, objects, and the environment

Humans have manufactured diverse objects, but they have not taken full responsibility after use. Although an object gives rise to environmental pollution both directly and indirectly, it has been easily overlooked the environmentally-unfriendly impact from human activities behind (Figure 18). For this reason, humans have attempted to redesign objects in an eco-friendly way in order to sustain human activities, allowing for manufacturing, overusing, and disposing of them. I have felt that humans are too ego-centric. These objects can be thought as victims because the root cause of environmental contamination has been humans at almost all times.

How might we rethink the objects that are victimized by humans? To understand the relationship and interaction among humans, objects, and surroundings, I drew the stakeholder map that takes objects into account as one of our stakeholders (Figure 19).

The concept of a stakeholder is reasonable for an object. In a theory of Stakeholder Analysis, the way to identify a stakeholder is to consider all the individuals or groups that are likely to affect or be affected by a proposed action.[5]

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5 Work Group for Community Health and Development at the University of Kansas. n.d. Section 8. Identifying and Analyzing Stakeholders and Their Interests. http://ctb.ku.edu/en/table-of-contents/participation/encouraging-involvement/identify-stakeholders/main.
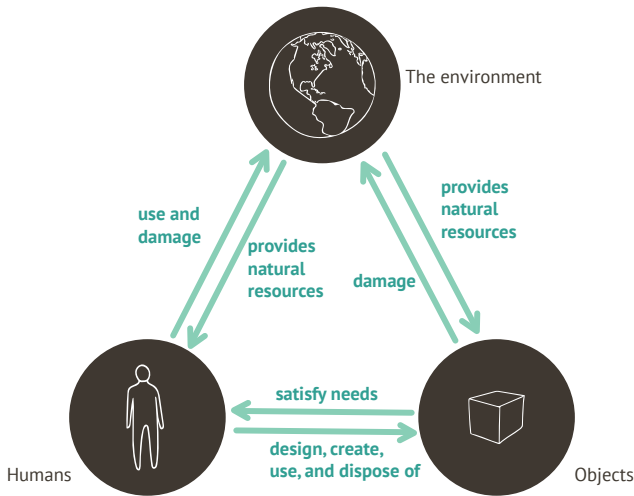
Figure 19. Stakeholder map among humans, objects, and the environment

In a product lifecycle, a product is definitely affected by a human behavior. The life of the product depends upon a human need, usage, and its production cost. In turn, this causes direct damage to the environment which is another stakeholder. Eventually the damaged environment impacts on humans again as a vicious circle.

This concept is not a totally new idea. The idea of considering objects as equal beings as humans goes along the lines with the Eastern Worldview.
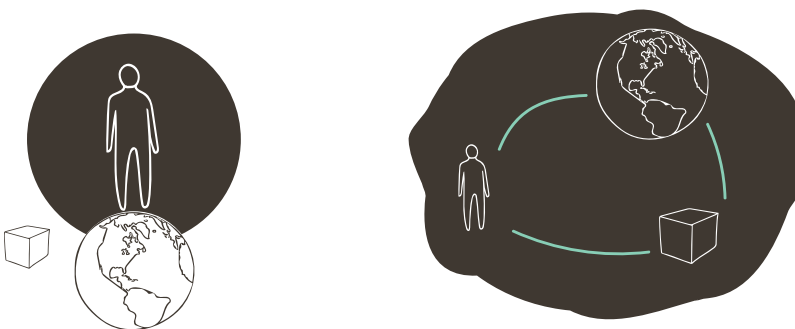

Figure 20. Comparison between the Western Worldview (Dominant Worldview) and the Eastern Worldview (Deep Ecology)

Philosophers have pointed out the weakness of the Western Worldview in dealing with climate change. In this view, humans are dominant species who have the right to utilize natural resources. In contrast to the Western, the Eastern Worldview considers humans as one of the organisms interconnected with others (Figure 20). It even regards non-living things as part of the ecosystem.[6]

> Eastern traditional Worldview looks at the universe as an organism, which means 'all of the parts of the entire cosmos belong to one organic whole and that they all interact as participants in one spontaneously self-generating life process' (Wei-Ming, 1989: 67). It is helpful to establish a more harmonious relationship between humans and nature. Asian people have lived in that organic worldview throughout their history. [7]

As western countries have led industrial revolution and economic development for a couple of centuries, the Western Worldview has been a standard lens of seeing the globe. John Thackara also has emphasized the importance of the ecological Worldview.[8]

> Our relationship with material world would be more respectful and joyful, if only realized that we are part of the world of things, not separate from it.

> The Greatest challenge of our time, he believes, is to foster widespread awareness of the hidden connections among living and non-living things.

Once we begin considering an object as a stakeholder, we will be able to identify a deep obstacle and its consequence. In addition, this idea can be the key point to recover the relationship between humans and objects and rethink single-use consumption and waste issue in a wider point of view.

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6 Magee, Barb. n.d. "Chapter 26 Environmental Worldviews, Ethics, and Sustainability." Barb Magee's Science Classes. Accessed 2016. http://magee-science.homestead.com/APES/APES_Review/ChapterOutlines/26_-_Environ_Worldview__Ethics__Sustainability.pdf
7 Cheon, Young-Cheol. 2010. Overviews of Western and Eastern Worldviews. March 20. Accessed May 2, 2016. http://www.lifecommunication.org/2010/03/overviews-of-western-and-eastern.html
8 Thackara, John. 2015. How to Thrive in the Next Economy. New York, New York: Thames & Hudson Inc.

Based on the concept of an object as a stakeholder, I have developed another hypothesis.

> **Hypothesis**   *If people are able to consider an object as a stakeholder in the waste stream, people would change their attitudes and behaviors with objects in an environmentally-favorable way.*

Taking a non-living stakeholder into account, the relationship between humans and objects can be broken down into three categories in Figure 21.

Human-leading relationship

Equal relationship
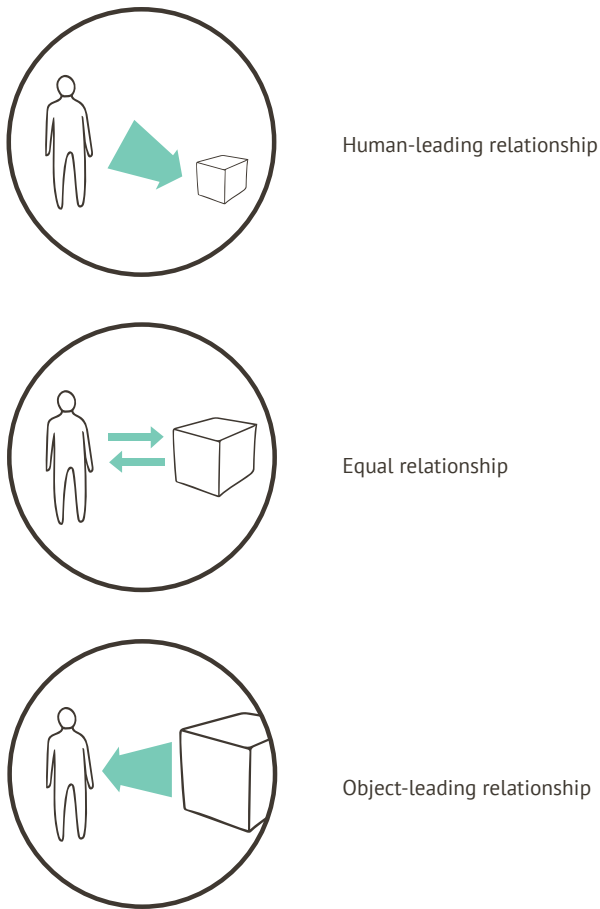
Object-leading relationship

Figure 21. Three possible relationships between humans and objects

First, a *human-leading relationship* describes that all objects are created to satisfy humans. In other words, humans give roles and duties to objects. Objects must follow the given roles until humans want to stop. The second depicts an *equal relationship*. Objects provide humans with services and similarly humans need to pay a proper amount of reward for objects. Both of them are connected by contract. Under this relationship, humans also take responsibilities to receive an appropriate service. The last one is an *object-leading relationship*. Objects can request their needs to humans, and humans have to follow or at least to negotiate with them.

Had humans taken a different relationship with objects from now, what change can we expect in terms of environmental interaction that affects human behaviors? I have taken advantage of a speculative design to describe an imaginary relationship for the last two.

Designers cannot always solve problems, we cannot switch off the vast electromagnetic networks surroundings us all. Although we cannot change reality, we can change people's perception of it.

- Anthony Dunne and Fiona Raby
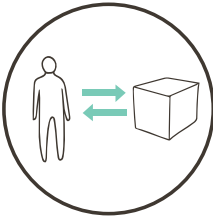
Part 2-1. Object as a Service Provider

How can we pursue an equal relationship with an object? In a word, an equal relationship can be defined as a give-and-take. It requires a human to fulfill a certain duty for an object as well as to request what one wants to an object. This relationship can be found between a seller and a buyer. A merchandiser offers either an item or a service, while a consumer purchases it.

Now consider an object as a service provider. A typical product is created to serve something for humans. For example, a spoon helps to eat soup. A lunch box kit helps to contain food and to stay organized when you are on the go. In this sense, it is not difficult to imagine an object as a service provider. The physical form of the object can be also a part of service as well as a tangible tool itself.

How would an object interact with a human under this scheme? I have applied the role of a human service provider to an object. The following case study will demonstrate a new interaction between a non-living service provider and us from the moment of the purchase.

Many of us already lease, rather than purchase, a device as part of a service contract—a car, a refrigerator, an answering machine, a photocopier. In so doing, we purchase performance—moving, cooling, message taking, or copying—rather than the product itself.

- John Thackara

Case Study 3. Service Contract

Assuming you order takeout food, it often comes along with a container, a cutlery, and a napkin. Each one is designed to offer a service by the time of the purchase, but it is highly likely to ignore them because food store includes all the costs within a single food price.

Service Contract shows an example of a speculative interaction that reimagines the relationship between a consumer and a product (Figure 22). For instance, in a food takeout scenario, you make a contract with a service provider every time when you purchase a "service". Generally speaking, a retail store plays a vital role to be a bridge between a service provider and a consumer. A contract broker is a middleman in the store who helps to sign a service agreement. Figure 23 shows an example of a service contract for sales.

Figure 22. Service Contract prototype

Suppose you order a chicken teriyaki at a cafeteria, you receive a service contract (a substitute for a receipt) at the point of the purchase. The contract confirms the list of service providers and their terms. After eating the whole chicken, the contract indicates that other services stay remained. The term says you have 5 months more to be able to reuse your container. The total price already includes both food and disposable items. Paying for these services means the responsibility for you to fulfill the duties until the expiration of the terms.

The participants of this case study were impressed by the idea of service providers and terms because they have never thought about the disposable items as a service. They also expressed the curiosity on what to do with the remaining items. It was effective to be aware of the service aspect with all disposable products around us.

WHOLE FOODS
MARKET

4 Union Square E
New York, NY 10003
(212) 673-5388

SERVICE CONTRACT

Broker: Jenny
02/09/2016   12:45:23
....
SERVICE PROVIDERS   TERM
CONTAINER   5 MONTHS
  12 OZ PLASTIC BLACK BASE
  MICROWAVE SAFE
FORK   1 MONTH
  PLASTIC WHITE

NAPKIN   1 DAY

PAPER BAG   1 WEEK

INGREDIENTS
CHICKEN TERIYAKI   1 DAY
  12 OZ 1 OZ/0.79
....
  TOTAL TERM   5 MONTHS

  SUBTOTAL PRICE $11.92
   8.75% TAX $1.04
  TOTAL PRICE $12.96
....
  PAYMENT   CREDIT
  CHANGE $0.00
....
  SERVICE RECIPIENT SIGNATURE

....
THE PRICE IS CALCULATED BASED ON
SERVICE PROVIDERS' CAPABILITIES.
WHOLEFOODS MARKET IS AN AGENCY FOR
SERVICE AGREEMENT FOR BOTH SIDES.
CONTRACT CANCELLATION IS AVAILABLE IN 7
DAYS WITH CONTRACT AT THE AGENCY.
WHOLEFOODS MARKET IS NOT RESPONSIBLE
FOR UNILATERAL BREACH.

Figure 23. Example of Service Contract
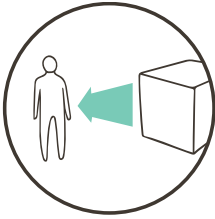
Part 2-2. Object as an Intelligent Individual

This part explains an *object-leading relationship* that an object leads a human behavior. What if an objects has difficulty in providing service to humans? What if it wants to protest against humans? If an object may have more capability beyond providing service, what would it be? To continue the speculation process, imagine an object as an intelligent individual which expresses its emotion and even does possibly thinking and communication.

Case Study 4. Container Union

Suppose disposable food containers have been abused and abandoned by humans in spite of a service contract. Such treatment absolutely gives a negative impact on the environment, leading undesirable contamination. Even though it is not deliberate for an object to destroy the environment, constantly relentless actions of a human make it worsened.

Disposable containers generate an agency together called *Container Union*. The goal of the union is to protect themselves from humans and demonstrate their voices on behalf of all containers. It provides various supplies, a service, and a system with the member of the union to communicate with humans and to reduce thoughtless consumption.

Case Study 4-1. Supplies

The following illustrates several examples of supplies that the union can offer for a coffee shop, a workplace for a container, to alleviate undesirable abuses. Figure 24 shows a container rest station to be able to keep track of working hours for in-house containers per day to prevent them from overtime work. Figure 25 is the certificate distributed by the union for a Travel-free shop. In this place, traveling of in-house container is prohibited to minimize the risk of being broken or abandoned. Consumers are required to bring their own containers to enjoy coffee outside instead.

Figure 26 illustrates another supply, crime-based price calculator that measures the risk cost for a container. Any potential behavior to harm a container by humans is counted as crime. If a ceramic mug has been cracked, it could be an example of crime. Consequently a human who frequently injures a container has to pay more to use in-house containers in the future.

Container Union provides First-aid kit to all workspaces like Figure 27. The kit includes an epoxy ointment for immediate adhesion, a roll

cast to keep the shape of containers, a piece detector to search and collect broken pieces, and a sterile box to deliver the pieces to external emergency room in a sterilized condition.

Figure 24. Container rest station

Figure 25. Travel-free shop sign

Figure 26. Crime-based price calculator

Figure 27. First-aid kit

Case Study 4-2. Elegant Takeout as a service

Still another way to save materials is to make a given unit of product more effective in providing the desired service.

- Natural Capitalism

Products have been produced mostly to satisfy human needs, but endless human greed has demanded more and more. Meanwhile excessive resources have been used up and unwanted products have damaged the environment little by little. Designing a new product can be no longer a solution for the ceaseless desire. The following introduces one strategy both to save resources and to satisfy consumers by providing the desired service.

> When a product is designed as a continuous flow of service, its materials are completely reclaimed for use in the next generation of that or another product. There is virtually no waste, and energy use is greatly diminished and spread out over indefinite use. Any toxic substances in the product can be kept tightly controlled, and prevented from leaking into ecosystems. For example, Carrier, the world's largest manufacturer of air conditioning equipment, is already offering thermal comfort contracts for buildings. Carrier can maintain the desired comfort level through a combination of energy efficient building retrofits, new equipment, and improved control and management.[9]

Here is the case that needs to apply the strategy. In a coffee shop, people prefer drinking coffee in a ceramic mug or a glass jar rather than in a chemically coated paper cup or a thin plastic cup for better taste and mood. (Think about fancy restaurants. They do not serve food with disposable dinnerware.) However, those who get takeout cannot enjoy coffee in a preferable cup when they do not drink it at the venue. Moreover, it increases waste of containers.

What if Container Union can offer a service to humans to mitigate the problem? *Elegant Takeout* is the service operated by Container Union to provide the subscribed members with better experience, allowing them to borrow a reusable cup available and return it to any partner store.

9 Ecotrust. n.d. Product As Service. Accessed February 26, 2016. http://www.reliableprosperity.net/product_as_service. html.

Figure 28. Consumers are introduced the service Elegant Takeout at a counter in a coffee shop.

Figure 29. The members of Elegant Takeout can use any kind of containers outside of the shop.

This enables to maximize the utilization of the existing containers and reduce the consumption of disposable items.

Figure 31 describes how Elegant Takeout works in details. Instead of each coffee shop owns a certain amount of cups, Container Union manages all existing cups in a city, and provides them to the coffee shops. The shops do not own the cups but use them through a partnership in the union.

Consumers are able to subscribe the service at a coffee shop counter. The service member can bring various types of reusable cups to the outside of the shop. It is a paid service, and the membership fee is run as a deposit. A receipt as Figure 30 shows a membership, a service type and a corresponding term. A valid member is eligible for a reusable cup without a limit, but the member needs to return it within a week. The member pays for coffee only whereas a non-member has to make full payment for all items including a disposable cup that is lower quality. This eventually leads to save one's budget.

A member returns a used cup to any partnered shop in a city. The shop is responsible for cleaning and maintaining the cup. In case of not returning, Container Union may deduct a certain amount from the member deposit. A membership can be renewed after a subscription is over.

Furthermore, any member is allowed to register a personal cup to Container Union to reduce the risk – forgetting to return or damaging it. The member also gets benefit by avoiding the purchase of a new cup. It ends up with increasing the usability of the existing cups, which in turn, coffee shops contribute to reduce the disposable and its management remarkably.

Figure 30. Different kinds of receipts between members and non-members

Container
suppliers

provide reusable cups and plates

offers marketing
channel to consumers

Container
Union

supports reusable cups and plates

Coffee shops

provide cleaning
and maintenance

improves the
experiences

pay for membership
register personal cups

return
used cups

reduce
disposable
wastes

serve drinks in
reusable cups
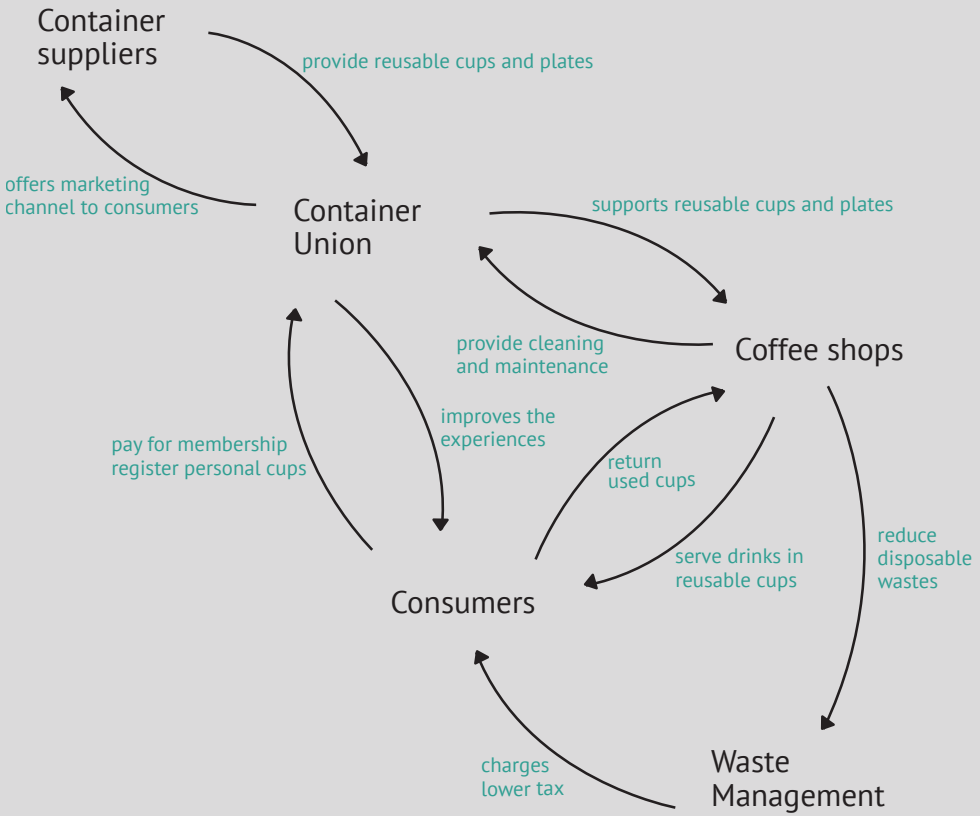
Consumers

charges
lower tax

Waste
Management

Figure 31. Service diagram of Elegant Takeout

Case Study 4-3. Climate Credit as a system

How can Container Union change a society in a larger scale than a city? Here I use the term, a society, as the general aggregate of people living together on the globe. Based on the previous scenarios, I have developed an environmental credit system named *Climate Credit*.

In the future, any interaction between humans and products could be technically traceable. With this traceability, human behavior that affects the environment reflect one's credit (Figure 32). For example, overuse of single-use items is regarded as a socially poor behavior because ultimately it has a bad impact on our surroundings. Climate Credit could affect a variety of social activities such as employment, rental agreement, credit card application and so forth (Figure 33). The underlying rationale in this system is to be able to put on the brake on eco-unfriendly-oriented consumptions by both directly and indirectly affecting one's further social actions. An employer might request a Climate Credit score to a job applicant for a reference check (Figure 34). Likewise, the applicant might consider the score of the company when choosing a job. A landlord might have the right to request the score to reduce everyday trash before a rental contract with a tenant, and vice versa.
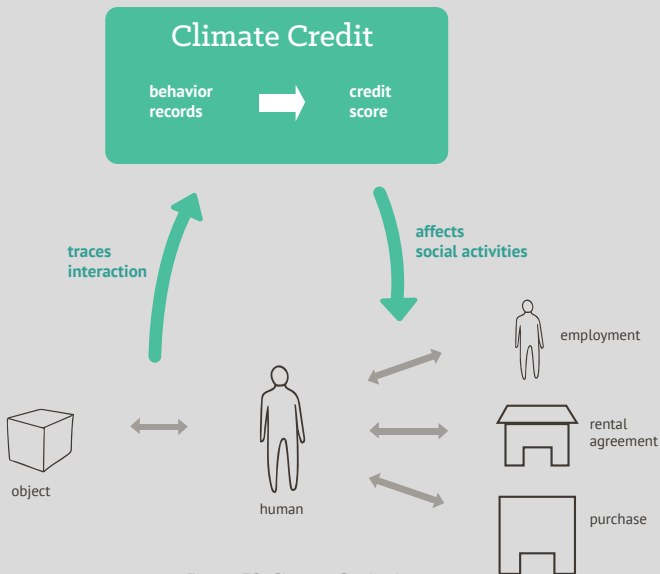

Figure 32. Climate Credit diagram

Figure 33. Climate Credit traces all purchasing activities.

Figure 34. Companies might request a Climate Credit score during a hiring process.

Assessment

Indeed, the framework discussed in Part 2 has showed that a general perception of waste came into a major obstacle before making an environmentally-favorable decision. As long as the way of dealing with objects is not respectful, it would be very difficult for human beings to change their behaviors and thereby to lead the eventual reduction of single-use consumption.

I have also learned that the Eastern Worldview can be a core concept to resolve a prevalent waste problem. When the idea of victimized objects hit my mind, I began by personifying objects to explain the concept to the Western because it was a little hard to have them follow my thought process due to the difference of their Worldview. I think it is largely because Western society has been developed based on the Dominant Worldview. The main idea is to respect objects around us as well as to personify them, and further to better understand universal responsibilities of humans in a mass-production-and-mass-consumption society. An object does not need to pretend a human. However, a human needs to recognize an object as part of ecosystem just like itself, as if it were a non-living stakeholder. There has been an environmental campaign or narrative that attempted personification of an object to stimulate sympathy. Nevertheless, it turns out not to be an effective way under the Dominant Worldview.

In addition, the scenario described in Part 2 has successfully allowed us to envision a new relationship with an object. However, the concept may take some time to be accepted by the public. The third and fourth case studies were no more than just simple illustrations in a coffee shop from a daily life. It can be extended to more practical applications as discussed in Part 3.

Part 3.
from Speculation to Application

Internet of Things industry
Design methodology
Service design

How might we apply the idea of a non-living stakeholder into a real life to move beyond speculation? As for the aforementioned design principles, producers should take initiative to change everyday environments with a strong impact. It involves the individual behavior as well. In the case study 4, the scenario would not work if a coffee shop owner were not a partner with Container Union. Likewise various industry leaders have to join the union for good practices. In this part, I am going to discuss three fields that help to increase practicality.

Internet of Things (IoT) industry

The idea of Container Union would not stay in a science fiction due to the emergence of *Internet of Things*.

> Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. [10]

IoT technology enables to track human behaviors. It also allows for communication between objects without human interaction. With the help of IoT, it is technically feasible to expect intelligent objects as described in the fourth case study.

I have discovered that most innovative IoT technologies have focused on producing business-oriented and feature-rich devices under the name of "smart". For instance, a smart alarm clock has the functionality to speak weather and traffic information with voice recognition. The state-of-the-art battery encompasses home monitoring as well as door locking. These are good examples of human-leading relationship. However, it is hard to find the product to pursue either equal or object-leading relationship to take environmental impact into account.

Designers and developers should be able to design new products in more a humane and respectful way. IoT technology is not only an opportunity to start a new business, but also a chance to have a better relationship with an object.

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10 Rouse, Margaret. 2014. Internet of Things (IoT). TechTarget. June. Accessed February 2016. http://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT

Design Methodology

The new relationship with an object will make it possible to move forward over *Human-centered Design*, which is one of the common design methodologies in design industry these days.

As described in Figure 35, design has been used to yield revenue. Meanwhile, the business owners have pursued profit rather than taking care of their consumers. Next, *User-centered Design* has been developed to focus on a consumer rather than a producer. Before long, Human-centered Design has been emerged in order to consider all (human) stakeholders in a design process. I have no doubt that humans are an important element in design, nevertheless, the idea of putting something in the center has its limitation to deal with climate change. Hence, we need to be conscious of other elements such as non-living objects in the ecosystem. In other words, everything has to be well-networked and well-interacted within the whole system.

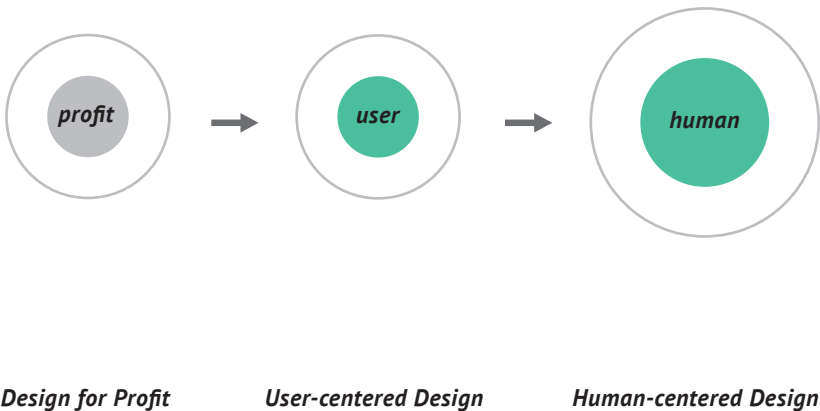**Design for Profit**   **User-centered Design**   **Human-centered Design**

Figure 35. The evolution of design methodology

Based on the idea above, I propose a new design methodology, called *Ecosystem-minded Design*. (A better terminology might be coined for this, because the term "ecosystem" is commonly understood as the only organism even though the right definition for it has to include both organism and non-living things.) I hereby remain the suggested methodology for further study.
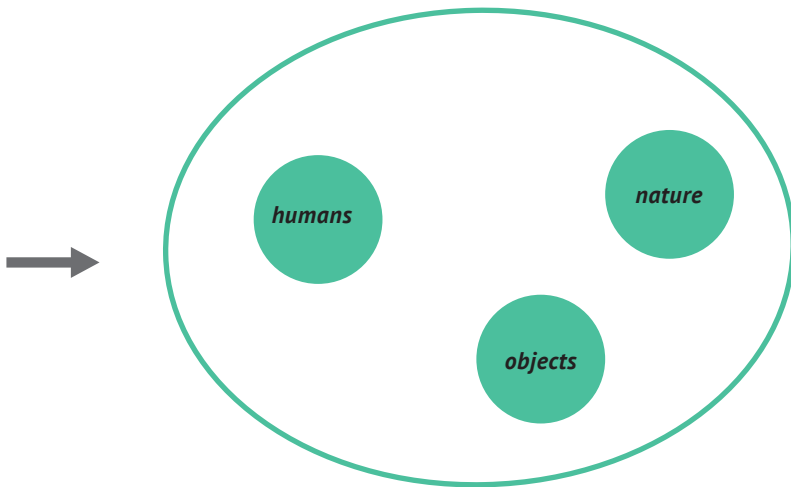
Ecosystem-minded Design

Service Design

In a service design perspective, the concept of an object as a stakeholder can help to evolve service design in a comprehensive way. The existing service design tools have been designed to focus on humans from a diversity of angles. Meanwhile, non-human stakeholders such as the environment or tangible objects that have been often overlooked. How could we redesign the existing ones with a base of this new concept?

A service blueprint can be redesigned differently. For example, a typical service blueprint has "multiple channels" under the section of "user journey" in a vertical axis (Figure 36). Usually the channel represents
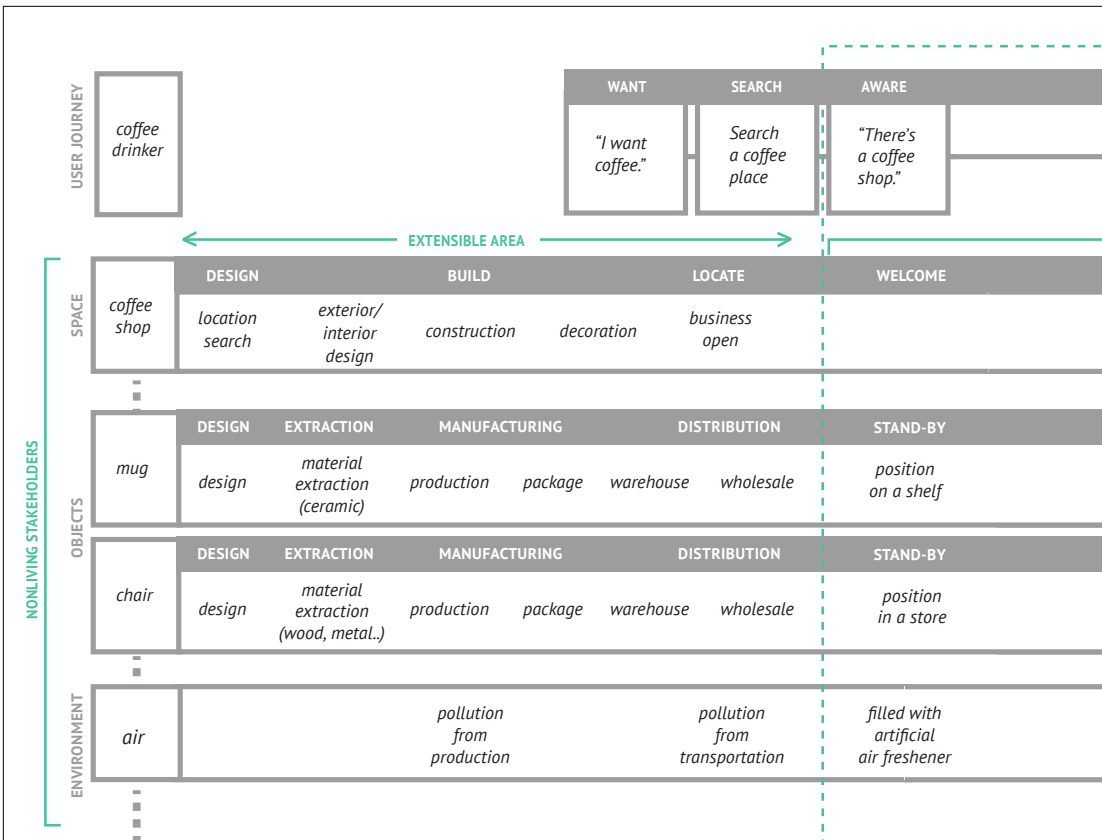
Figure 36. Example of a new service blueprint

a marketing path such as a space, a product, a phone, online, or mobile. These channels show various touch points when users interact with a service.

Borrowing from the new concept of Ecosystem-minded Design, those channels are actually non-living stakeholders. As described in Figure 36, for example, a coffee shop and a mug have their own life journeys from DESIGN to LANDFILL. Moreover, several elements of natural environments such as air, water, or soil can be other stakeholders under this concept. In this manner, channels are stakeholders. We can identify how many all stakeholders but humans are affected by a service, and on what impact a user and a service can make to the stakeholders through the new style of the blueprint.
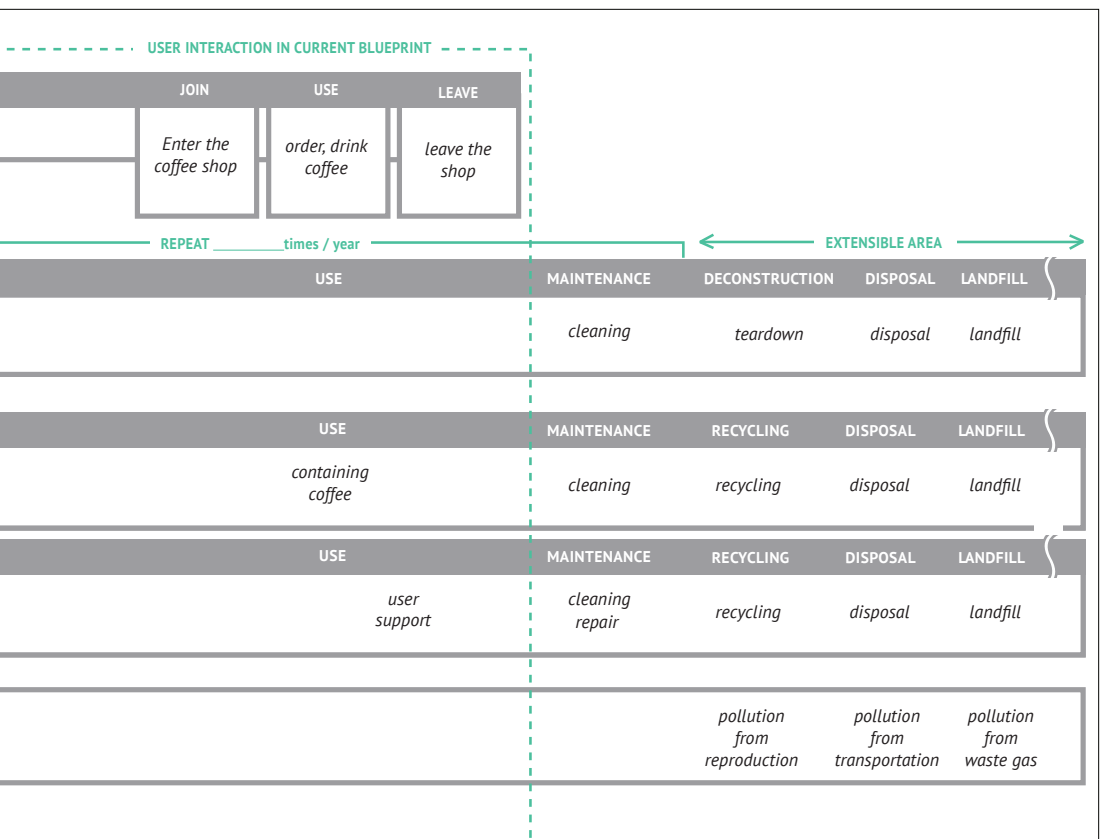
At the same time, the journeys of non-living stakeholders extend a service blueprint in a horizontal axis. (Figure 36) A typical user journey ranges from the stage of AWARE to that of LEAVE, whereas this new blueprint shows the existence of non-living stakeholders before-AWARE and after-LEAVE stage alongside the user journey. This new blueprint covers from the birth to the death of stakeholders. Again, it reveals that the actual user interaction happens only in a short period, and many non-human stakeholders need to prepare for that interaction. It also states how many times the user interaction can be repeated, and how long the non-living stakeholders will remain on Earth after finishing their journeys.

Conclusion

Over the past few decades, rapid industrialization has caused considerable concern by producing tremendous amount of waste in a throwaway economy, and thus gradually threatened our lives with environmental degradation. It is true that a lot of efforts have been made to resolve a waste issue, however it still remains open.

I have attempted to approach this issue from a different angle, in particular, predominately focusing on a disposable item which is all around us for the educated people in urban environment. Eventually I could obtain several findings based upon my research as follows: a) it is the very company that has begun a throwaway economy, b) sustainable makers tend to shift all the responsibility onto consumers, and c) it is required to have a holistic understanding of product lifecycle. Those insights have led me to set up a series of case studies and design principles.

A prior hypothesis turned out not to be true through an experiment because thoughts and standards on product reusability quite varies in terms of decision making in an environmentally-favorable way. Borrowing an eye from the East Worldview and a theory of Stakeholder Analysis, I have developed a new concept of a non-living object as a stakeholder. This design theme builds an object-leading relationship that interacts with humans, and affects their further actions effectively. Besides, I have illustrated the example of the object representative - Container Union - which offers various supplies, a service and a system on behalf of containers.

This project sheds light on the right direction to address an environmental concern with the help of transdisciplinary fields such as information technology, design methodology and service design. Furthermore, it can broaden the range of applications in a variety of areas with practicality.

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About the Author

Studied Industrial design, and worked in an office furniture company in South Korea, Sungmy has recognized that commercial exploitation of design distorts the nature of human-centered design. Based on her experiences, she helps marginalized people and damaged environments through systemic approaches, design strategies, and tangible experiences. Her practice is focusing on interactions among objects, services, and the ecosystem. She is interested in environmental and social justice, sustainable economy, and humanitarian design.

Placeholder