THE FUTURE OF THE DOMESTIC OBJECT 2025

Deriving possible futures of the domestic object through foresight methods, FOT cube
and ideational drawing

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ABSTRACT

In the current techno-social digital era, objects are significantly shifting in how they are made and for what purpose. Objects that are mass-produced are starting to be engaged in social networks and provide additional value by being technologically connected to a social network. The ownership of goods has shifted, from the individual ownership of products to a sharing model with a community. Given changes in function, ownership, and technology, how might designers create domestic objects that will remain relevant over the next ten years?

This paper examines how standard product design processes may accommodate foresight methods and future-state considerations. Three foresight methods are explored: 1) horizon scanning which identifies changes in the broader contextual landscape; 2) comparable scenario development, derived from the three axes of function, ownership and technology, presented here as the "FOT Cube"; and 3) ideational drawing as a way of thinking through concepts.

Acknowledgements

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TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

INTRODUCTION

This research paper examines how product designers might anticipate possible evolutions of the domestic object in this techno-social era by using foresight methods and ideational drawing as a model of inquiry and anticipated development.

Given changes in function, ownership and technology, how might designers create domestic objects that would have relevance over the next ten years? Three foresight methods are explored 1) Horizon Scanning; 2) A three axis scenario development presented as "FOT Cube"; 3) ideational drawing.

In examining possible futures of domestic objects, ideational drawing is used as a tool to think through concepts and development.

Foresight methods are used to inform and navigate the yet undefined future ecologies of the domestic objects, as they become technology engaged. Examining the tension in the movement of function, ownership and technology, the FOT cube model was designed as a process innovation method to define polarities, navigate the complexity of these movements, and their possible co-mingling. Technological evolutions considered here examine polarities such as the micro-distribution "print on demand" model, to the implications of mass-distributed "smart", connected household objects to a network. The FOT cube model is the framework of eight worlds that may exist in a decade. It provides an articulation of implications for objects insight for ideational drawings by product designers.

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series of applied research methods used in combination. This approach is important because it allows new ways to approach complex problems.

How designers brainstorm solutions to consumer needs and problems as well as economic models and technology engagement, I excavate these issues using *foresight methods*. *Foresight methods* for designers allows us to anticipate the needs of a consumer in a rapidly changing technology landscape. By considering *nested framework processes* and *foresight methods*, this paper intends to unpack consumer usage and designer solutions to anticipate how new innovations can be developed.

Chapter One outlines the context of function and utility. Examining the value of an object, and why one object is chosen over another to complete a task, designers explore how to create meaningful additional value. Further investigation seeks to understand what objects do and, how they are being tasked for multiple purposes. Chapter Two identifies changes in the purchasing patterns and ownership of objects in western consumer culture. Discussion of how this impacts object design is informed by economics, as well as the shifting polarities between the individual ownership of a product versus its sharing with a community. Chapter Three discusses how technology and its applied tools are changing design, and explain considerations for designing networked objects. How designers approach objects that are continually connected to a network and considered a *SPIME* construct, is elaborated on.

In chapter one through three, object utility; ownership models and technological developments are elaborated. Chapters four through six examine these issues through methods such as *Horizon Scanning, 3-axis frameworks* and *ideational drawing* and creative processes such as Stanford's ME310 Model in order to create new innovations in a shifting unknown technological landscape*.* My research takes up these models as inspiration to create a new methodology of inquiry, which I call the *"*FOT Cube" model. The FOT Cube model is a stable ideational framework that designers

can use when designing for complexity in particular when arguing new objects with techno-social experiences.

Chapter Four outlines a three-strategy method: foresight, ideational drawing and The FOT Cube. These methods are combined to create new products for emerging markets. As a research method, foresight is implemented to fuel fresh insights while meeting the existing demands of new markets and developing solutions for complex territories. This chapter further examines *foresight methods* in combination with *a three-axis cube model* to derive possible futures as an ideation method for designers. Chapter Four examines *the Popper Diamond*, which elevates this research by combining a qualitative and quantitative approach.

In developing objects within a context of economy and the importance for designers to understand how shifts in process can lead to new innovative products, Chapter Five unpacks The *Double Diamond* approach and the *ME310 Innovation Design* process from Stanford University to consider new ways of developing products. Chapter Six examines the impact of trends in usability and product design. Using a horizon scan method, trends have been broken down into the following subcategories: Social, Technology, Economy, Ecology, Political and Value to create a well-rounded approach.

Chapter Seven demonstrates the eight Future Worlds and their logic. Ideational drawings are included in this chapter as a proof of concept for objects that could exist in these worlds.

The conclusion reviews the concepts raised throughout this paper and discusses future worlds of products and design practices. Two appendices have been added to the paper. The first is an elaborated articulation of the trends as part of the STEEP V process used in the world design. The second is a guide for designers on how to use methods articulated of Horizon Scanning, FOT Cube, and Ideational drawing in accordance with the ME310 model.

CONTEXT

"I'm the type who'd be happy not going anywhere as long as I was sure I knew exactly what was happening at the places I wasn't going to. I'm the type who'd like to sit home and watch every party that I'm invited to on a monitor in my bedroom."

- Andy Warhol, *America,* 1985

Warhol's quote pre-dates the Internet, where one can participate with the monitor and stream channels with the outside world. It presents a signal to our changing relationship to home, its purpose, and its relation to objects. Warhol presents his bedroom as a portal to the outside world an extension of the self where it can exist in multiple places as an observer, rather than the inhabitant of a space designed for reprieve.

The monitor was an invention used as a portal for entertainment, via which we could watch television programming. The experience of watching television in one's home holds little difference with the experience of dong the same in another home. The post-war industrial era allowed products to be produced in a cost effective way, in high quality, with easy accessibility through mass production and distribution. Today we see a shift in how products are being acquired, shared and connected to a networked community with additional functionality. The lines between public and private spheres have become increasingly blurred. This has changed how we perceive an object's utility and, by creating an additional functionality, the object changes its relationship to the home and opens it to the outside world.

This paper examines the utility of an object by examining the value of an object at home, and why one object is chosen over another to complete a task. It presents a process for designers to create meaningful additional value in an object's design. In considering an object's utility for the future, it is important to understand its history and the value of objects at home.

4

Chapter 1: Function

How do objects end up in our home? Some are inherited, others we buy for ourselves.
Function examines the intent of utility in an object. Is the object's designed core purpose a single
intent for the consumer to manipulate object to achieve one goal or is does it have multiple
values, the ability to aid with many tasks?

←**Single function**----------------**FUNCTION** -------------------- **Multi-function**→

This axis examines what an object does. The polarity and tension is whether an object has a
single or multiple purposes. How does the object change when it has multiple purposes?
Function is always an axis point between usability, which I outline in this research as a binary
between **Single function** and **Multi-function**. The tension in this axis is the intent of object in its
design. Does it have one primary concern in aid in its user, or will it have multiple roles in how it
serves to the needs of the user.

Csikszentmihalyi and LeFevre, indicate that owning objects is a subconscious need. The mind
does not function well idling, and humans need some other activity to direct attention either to
accomplish a task or even watch television. (Csikszentmihalyi, LeFevre. p 22). Due to this need to
accomplish goals, Csikszentmihalyi and LeFevre argue objects exist to assist humans, which is
fundamental for our need to complete tasks. What Csikszentmihalyi and LeFevre do not
elaborate on is why so many options of objects that can be used to complete the same task exist
in the marketplace. With numerous options in the marketplace, if the function of objects is the
same, why do we choose objects the way we do?

Don Norman discusses what attracts humans to products in the post-industrial era. He distills
human behavior in relation to objects to three main characteristics: "visceral, behavioral and

reflective" (Norman 2004, p. 39). Visceral design speaks to physical and sensational reactions to objects and that the senses: touch, smell, sight and sound have profound impact on the consumer. This highly personal and subjective experience creates challenges to 'design for pure function', and adds additional criteria for the designer to consider when developing a product.

While sensory design informs what draws consumers to products on a primal level, behavioural design speaks to the user and experience of the product. Consumers experience a plethora of familiarities, understandings and sensations that include function, performance and usability. Function specifies what activities the object supports, and how the performance is descriptive of function as well as the ease of usability (Norman 2004, p. 37).

Reflective design extends beyond the immediate reaction of visceral and behavioural design by appealing to consumers' sense of personal satisfaction, self-image, and memories. Reflective design provokes personal feelings of pride, or shame, of the user of owning, displaying or using a product (Norman 2004, p. 38). Norman indicates no single product can hope to satisfy everyone, and the designer must understand both the product and purchaser for the product they are designing. Norman's approach is important in understanding a product designer's perspective in developing objects that serve a single function. He distills these to visceral, behavioural and reflective to understand the added value of an object to the consumer's life. A product designer may consider all three factors in order to appeal to the consumer, effectively meet their needs, and build an object with specific utility.

In developing products of additional value, a designer must understand how to design for complexity. The notion of functionality and complexity to the concept of utility is elaborated by Pieter E. Vermass and Wybo Houkes: "artifacts are the means as well as the products of intentional human action" (Dreier p. 29). Consumers manipulate "artifacts" or products, to attain goals, and designers intentionally create artifacts for such specific uses. As an example,

designers make toasters for consumers to able toast bread. Pieter E. Vermass and Wybo Houkes introduce the concept of objects having multiple uses through the notion of 'misuse.' It is important to understand the misuse of an artifacts or the products intention as an "alternative view" to the standardization of product design. An example given for an "alternative view" is a screwdriver placed in a crack and used to extract a small object as a lever given as an object, the screwdriver was not designed for this purpose. Although the delineation between a standard and an alternative design or how it is used by the consumer is clear, Vernass and Houkes do not articulate how consumers know what the original intention for an object is. At what point is a consumer's interaction with the object considered standard or alternative?

In the standard view, design is described as an activity to provide means to an end. Specifically, that an artifact itself is the means, and used as a manipulation of the means to an end (Dreier, p. 30). Beth Preston argues objects have an intention, a proper use, and are specifically named after that use. To this way, a consumer may understand the purpose for an object. For example, toasters and screwdrivers are named for their specific intended function. However, if the designer's intentions were sufficient, users' intentions would be, with no distinction made between creative use, design and production. A problem indicated in this standard view is that it maintains that products are understood as objects with simple functions, and that design can only adhere to the specific function of the product design and its standardized performance (Dreier, p.33). Vermass and Houkes argue that the naming of objects is not consistent in design practice. Compact discs, for example are not called "music-carriers" (Dreier, 45), which indicates that if the artifact is used for a single purpose, the tendency is to attribute a functional name.

Coffee makers make coffee, corkscrews unscrew corks; shoe polish, polishes shoes. The naming of objects is an important part of establishing function regardless of its ambiguity as its event, in combination with other objects or its transformative quality, may be important. Further, they argue that artifacts or products have different functions relative to different tasks. Much like the example

of compact discs which are not called "music carriers," the relation between product and usage can, and does, extend beyond the initial design. Objects (such as compact discs) may refer to skills in situated action, and extend the view of artifact design and artifacts through the use of plans (Dreier p.47). The multi-use of an object, such as a compact disc, allows for multiple interpretations through usability, creative usage, and intentionality.

In summary, all objects serve a need, and in some cases can open intent to serve multiple or alternative uses. The tension for designers to consider how to approach the design of an object to serve one or multiple functions is a polarity that needs to be evaluated in the design process.

Chapter 2: Ownership

As Norman has articulated, the function of an object has shifted from being designed for the specific needs or demands of a mass market to ownership being a reflective act. The purchasing of objects becomes an extension of what one may value in addition to the purpose the object serves. Ownership is a polemic examination of tensions belonging to an object as either individual or social usability. The intention of the object is either to be individually owned by a consumer, a part of its value proposition or is something that is communally and shared.

←**Individual** ---------------------**OWNERSHIP** ----------------------- **Social**→

With **Ownership** as the axis, the **Individual** and the **Social** are continuums between product intention and other potentialities. Understanding the social value or personal value of an object, as part of its economic value and its intention, is an important factor to consider in this axis.

To understand why models of ownership of multiple objects serve various purposes, we must consider why and how we own products through a historical lens. In one extreme point of view,

the usefulness of the object is to acquire social status. Such a point of view erases the potentiality of products and objects to mere consumerism. Jean Baudrillard notes that every object has two functions "to be put to use, and to be possessed" (Baudrillard, p. 48). Baudrillard states that the pure object which is devoid of any function is abstracted from its use; it becomes part of a collection or simple artifact in our lives. A collection of fine china plates used for display is an example of this. Baudrillard reveals that the nature of the collected object is a reflection of their owner's personal fascination. The object can be seen as privileged, collectors love their objects based on their membership in a series, both as a qualitative and quantitative act. One can be jealous of an object that is not attained, but gained by another. However, these polarities are not necessarily solely binaries to the argument of objects and utility. Baudrillard states the function of an object is analogous to the system of habits that oscillates between practical specificity and absorption by a series or a collection (Baudrillard p. 53). He describes the duality of how we experience the object, which is to say that by wearing a watch, we possess time and that the object (e.g.. the watch) is no longer sanctioned to space of home but rather, it becomes a beating element with the same "organic satisfaction as the regular throbbing of an internal organ" (Baudrillard p. 53). The watch being the explicit objectification from household to self raises the following question: if individual ownership is based on desire to possess and to own, in order to extent our subjecthood, then are the power of purchasing and the notion of consumerism engendered practices?

Paco Underhill, a writer and anthropologist, considers consumers purchasing patterns and habits. He writes that by 2025, one-fifth of Americans will be sixty-five or older. The result may be a changing visual world to accommodate aging eyes with products redesigned for older hands and vision (Underhill, p. 129). After watching hours of recorded video footage of American shoppers, he argues how and why purchasing power is engendered. Men tend to purchase things they try on, in ratio of approximately sixty-five percent, by contrast to female shoppers who purchase twenty-five percent of what they try on (Underhill, p. 99). Eighty-six percent of women look at price

tags, while only seventy-two percent of men do so. Underhill states women tend to do most of the purchasing and are the primary buyer in the American marketplace. Men however are starting to remain single longer therefore as a result they will purchase things their fathers never had to buy. Similarly, as women stay single longer, or become single again, stores (such as hardware stores) that are traditionally geared to male consumers will need to shift how they accommodate services, as well as the products and features they advertise.

Community markets are changing. Underhill further elaborates on how online shopping is changing how we shop in order to provide an experience physical retailing cannot. Online shopping provides limitless selection, price comparison, convenience, speed, and limitless product information (Underhill p. 216). The digital age affects how we shop, what we shop for and ultimately what we customize for ourselves. Csikszentmihalyi and LeFevre cite that an American will own more than four hundred electronic appliances during his or her lifetime (Csikszentmihalyi p. 20). They pose an interesting comparison of artifacts to a new species that reproduces itself: objects like spears evolving to become arrows, then bullets and so on to Star Wars (Csikszentmihalyi, LeFevre p. 21). Csikszentmihalyi and LeFevre pose that although artifacts can be symbiotic with humans their relationship can be parasitic, and the survival of the object is at the expense of the human host given the interdependence between survival of natural resources and the artifacts we produce (Csikszentmihalyi, LeFevre p. 21). It is important to look at previous models of economy in the household, and its relation to community in order to understand this.

Klaus Nielsen discusses objects and their economy in his article on how baker apprentices learn their trade. He explains that the term 'economy' comes from the ancient Greek word "oikonomia" or "household manager" defined as someone who manages a household (Nielsen p.212). To understand this household, it is important to understand its relation to a community. Nielsen further elaborates the expansion of the origin of economy to community and market-based economy. Community economics describes how smaller groups locally produce in order to

support their independence with sharing as a concept central to community economics, in particular with regards to land, material resources, and knowledge. Market economics are based for buyer competition that exchanges service and goods with sellers. The goal of market economics is to secure financial profit and private property.

With common needs, the current market indicates resources can be shared, and new business models of co-ownership are developing beyond locally produced goods. Emerging companies like Bixi™, where users can purchase a membership to access to bicycles on an hourly or daily basis rather than owning and maintaining their own bicycle, is becoming more prevalent in larger cities. This model is being extended to car culture with services like Zipcar™, where customers can use and return a car by the hour, without a middleman to distribute the product rather a personal "smart card" connected to a network to sign in and sign out the vehicle. These examples signal that ownership models are starting to shift whereby individual ownership of a mass-produced product is only part of purchasing patterns. The reflective value of ownership is starting to shift from individual ownership to membership-based models that reveal how community informs both the organization of ownership and usage but new models of how objects are distributed. Designers need to consider how ownership models change how a product is used in the marketplace. Is the purpose of object to be individually possessed, or something to own part of the time and shared by a community?

Chapter 3: Technology

Technology plays a key role not only in how objects are designed, but in how consumers are starting to purchase time with objects such as bikes and cars. Smart keys and smartphone-based transactions are changing how objects are organized within the community. This raises the following questions: how does technology play a role in the creation and distribution of objects? How does a digitally-networked object change our relation to an object and each other?

←**Standalone**-------------------**TECHNOLOGY** ------------------- **Networked**→

Technology reveals a strained axis between **Standalone** functionality and **Networked** usability by addressing the degree of connectedness the object has to a community using technology. Shifts in these polarities inform differences between a standalone object to a potential networked object. **Standalone** describes an object without networked functions. It can be designed with digital tools, without any network within itself whereas **Networked** signals the device is to connect socially with individuals, other objects or systems.

It is important to understand that technology is not only changing the function and ownership of products, but how objects are made. In the industrial era of the late 1800s, product ideas were hand-drawn on paper and mass-produced by industrial machines. With new devices such as MakerBot™, consumers can design plans digitally and share them online for and on-demand printing. This has not only changed how objects are designed, but it has the potential to radically shift how objects are produced and distributed. 3D printing machines are being used to print anything from tools and gears to figurine models. Resulting objects are not printed with embedded technology. They can, however, be printed in a refined manner, with significant detail. It is important to note that although using high-end technology, objects designed with this method are not technology-engaged products, and remain independent from social networks once printed.

The concept of connecting products through a network, either through this fabrication or via this networked presence, is further elaborated on by Bruce Sterling. In his book "*Shaping Things"*, Sterling discusses the shift away from the "Gizmo" (or object with no technology) to the "SPIME" object, a manufactured object with extensive informational support. SPIMEs are data driven, designed on screens, fabricated digitally, and tracked through space and time, and data-minable (Sterling, p. 11). An example provided is a wine bottle with a label with a barcode and a website

address. The website was not intended to be viewed on the bottle, but on a third device with a screen displaying more information about the wine. Sterling argues that the current production models for objects creation are not sustainable. Sterling's argument adds to discourse of objecthood by suggesting that all objects are engaged with a network, which designers need to consider as part of their design. The Henry Dreyfuss "Five Points Approach" which examines these issues by looking at safety, utility, maintenance, cost quality and appearance, does not account for the techno-social (Sterling p. 8). Designers today will need to consider the cogitative load of an object and opportunity cost (Sterling p. 22). A problem noted by Sterling is the micromanagement often associated with techno-social infrastructures.

Julian Bleeker builds on one question raised by Sterling's descriptions of "SPIMES", and discusses the object's potential to blog. Bloggers, as described by Bleeker, are "participants in a network of exchange, disseminating thoughts, opinions, ideas – making culture – through this particular instrument of connections called the Internet" (Bleeker p. 165). Bleeker describes primary behavior of "blogjects" that have rules of behavior in the SPIME world. Specifically blojects track and trace where they are and where they've been. Blogjects have a self-contained embedded history of their encounters and experiences and always have some form of agency – they can instigate action, participate and have an assertive voice within the social web (Bleeker p.167).

Bleeker describes the tracking of an object such as luggage being traced through an airport terminal from destination to destination. The use of a barcode or RFID chip acts as a method of retaining history and as a record of the luggage's experiences in the world. Bleeker argues the intellect is in its ability to effect change that it has the ability to instigate action, to be decisive and to articulate. Within the 'internet of things', activity primarily exists in the networked public space of streams, feeds, trackbacks, permalinks, wiki inscriptions and blog posts (Bleeker p. 169). Bleeker presents a possible future for the internet of things to shift from data-blogging to

intelligent object agents. An example of this shift would be from a car providing statistics on routes and gas consumption to becoming an internet-enabled object that speaks about on micro, macro social, cultural, political, and personal matters (Bleeker p. 174).

What happens when an object is continually connected to a network? How does this change the intention of the object? This signals a distinct shift from objects of function to objects of service. Donald Norman speaks of the shift from products, to products with services. He cites Apple's IPod as an example, of a product designed for service. He indicates that it is not an isolated product, as it has been adjusted to extend itself as the product of an online storefront, and as a companion product to browsing and purchasing new products as part of a seamless and total product experience (Norman, 2011 p. 152). Laurie Young attributes the rise of service-based economies from the apparent decline of the manufacturing sector. American manufacturing is reported to be 13% of the Gross Domestic Product (GDP), a decline of 26% in 1970 by the service-based economy representing 75% of economic activity. The United Nations reports that service sectors grew from 65.4% of developed economies in 1990 to 73.5% in 2005 (Young p. 2).

Designers need to think about the additional value often and how to approach its design. How the techno-social element adds value in the owning, reflective, purchasing and acquiring experience or in the connected value of the object itself needs to be a key consideration. Philips Future Laboratory describes the new economic value of design as the consideration of both personal value and shared value. Josephine Green, Senior director of trends and strategy at Phillips Design, states that: "If the industrial era was characterized by consumption, the next era will be characterized by context" (Green, p. 13). Her research indicates at a personal level, economic value is defined by the act of transformation to grow, experience and transform rather than as the act of consumption. Green argues companies will need to shift from technology, or market-led companies to be socially led and people-driven, relevant to today's customers in a context-based economy.
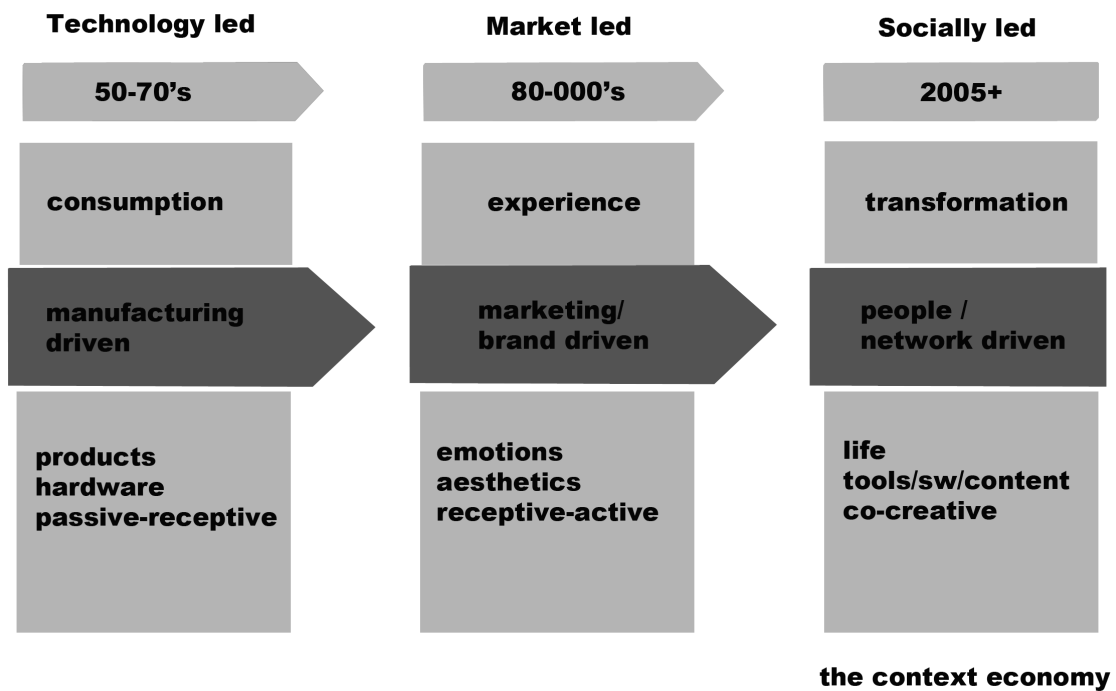
Technology led	Market led	Socially led
50-70's	**80-000's**	**2005+**
consumption	**experience**	**transformation**
manufacturing driven	**marketing/ brand driven**	**people / network driven**
products hardware passive-receptive	**emotions aesthetics receptive-active**	**life tools/sw/content co-creative**

the context economy

Figure 1: Visualized Context Economy   (Green, p. 30)

Social-technology objects are designed to be connected to a network, which Sterling defines as "SPIMES" (Sterling, p 8). This questions the value of objects being standalone unconnected objects versus social, context-engaged products. Green's contribution presents a cultural shift from a brand-driven economy to a network-driven economy as a one-directional model. This is significant because it suggests that designers will need to consider a context-based economy when designing new products.
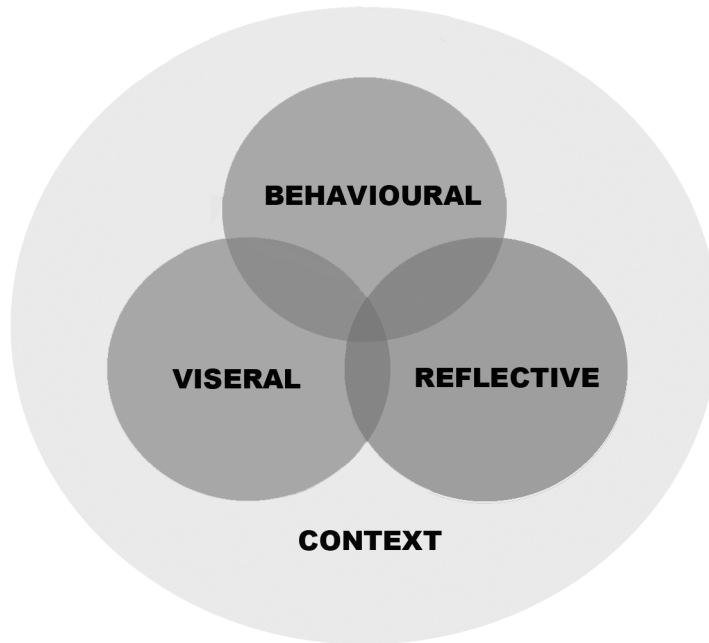
Figure 2: Visualized Modified Norman Model

If Green argues that context economy is reflective of today's era, it is important to understand how product designers can incorporate context, network-driven products when designing an object as per the modified Norman model above. Designers must consider this polarity, and decide when to design standalone objects for small or large-scale distribution versus developing objects with networked social contexts.

Chapter 4: Methodology

In designing a new process for innovation for product designers, foresight methods are used as tools to think through the complexity of the shifting models of function, ownership and technology, in order to attempt to anticipate how to design for possible futures as well as understand implications of domestic objects over time. The time horizon of 2025 is significant because it allows us to see potential impacts of current trends, and to look beyond current barriers of current day technologies. My methodology utilizes the following: foresight, ideational drawing, and my

contribution to the discourse, the FOT cube, in order to examine the future of design, usability, and technology engagement.

FORESIGHT as Method

Foresight horizon scanning and matrix development are used in this research as a method to develop possible futures of objects in 2025. The year of 2025 was chosen as it is far enough in the future to understand the implications of the horizon scan in a meaningful way and to think beyond current technologies as barrier. As a research method, foresight can be used to create insights, learn demands of new markets, and develop implications for action in complex territories. By using foresight methods to develop new products, a context is created to directly enable creativity within the constraints and frameworks in design. The generative phase of foresight is the foundation for a process of inquiry. It consists of gathering, analyzing and synthesizing of existing knowledge, in order to codify knowledge into a new vision of the future. Rafael Popper indicates three main stages of this generative phase: Exploration, Analysis and Anticipation (Popper, p 47). Exploration provides an understanding of main issues, trends and drivers. A driver is the understanding of what is propelling the trend. Analysis is an understanding how the main issues; trends and drivers influence each other. Anticipation examines previous considerations and aims to develop possible futures.

Popper indicates trend extrapolation and impact analysis are long established tools of forecasting (Popper p. 64). This offers valuable insight as a proven method of inquiry. Denis Loveridge articulates the "STEEP V" acronym examining trends in social, technological, economic, ecological, politicical and values based categories, which aids in understanding trends by looking beyond a niche scope (Loveridge p. 2). Trends are established by gathering signals of shifts, which may build into a larger trend. Signals provide detail to trend insights that could point that can be further developed for larger-scale scenario development for policy processes. Further,

Rafael Popper articulates the "Foresight Diamond", which is used as a framework to examine qualitative, semi-qualitative and quantitative methods extrapolated to creative, interaction, evidence and expertise based methods. This is significant to both my research as well as the future of design because it articulates additional methods that can be used in the brainstorming process.

As articulated, Buxton, Petherbridge, Henderson and Rosenberg research argues that ideational drawing is integral to the generative design process. This paper argues ideational drawing should be included as method in the Popper Diamond, as a method of semi-conscious brainstorming as part of the ideation process of design.

Figure 4: Modified Popper Diamond

The Diamond demonstrates a practical framework of thirty-three methods articulated by Popper. As shown in the modified diamond, ideational drawing should situate itself in the creative polarity of the diamond as a research method for design. Ideational drawing is closest to essay or scenario writing as a research method, as it suggests a narrative or reasoning. While several approaches have been used as my methodology, their pedagogical similarities offer a complimentary approach. It is important to note that these methods can apply to a process independently or in combination with other research methods in the DIAMOND.

IDEATIONAL DRAWING as Method

To consider adding ideational drawing as a research method, one must understand how drawing is used in the ideation and research phase. Bill Buxton writes in "Sketching User Experiences", that even if the designer laboured for hours, or days over a drawing, the rendering style is intended to convey the opposite: by conveying it was done in minutes, a sketch indicates that "I am disposable, so don't worry about telling me what you really think, especially since I am not sure about this myself" (Buxton p. 106). Buxton believes that sketching adds to the design process by indicating that it is quick, timely, inexpensive, disposable, plentiful, and provides a distinct gesture with minimal detail. This type of 'thinking drawing' provides an appropriate degree of refinement that corresponds to the designer's level of certainty in the designers mind, and asks to suggest and explore a subject rather than to confirm with providing a level of ambiguity that will be able to be interpreted in different ways (Buxton p. 111-113). This incompleteness of a drawing, the way it provides a vague description, allows the outcome to be discussed and iterated in the reading of the image, which is integral to the design process. Buxton classifies drawings into five categories: sketch, memory drawing, presentation drawing, technical drawing, and description drawing. Sketching, is a type of thinking drawing, memory drawing is a render-made to record and capture ideas; presentation drawing is a type made for a customer and may be more refined; technical drawing used for fabrication; description drawing is intended to explain an emergency exit, for example (Buxton p. 121-123). Buxton clearly differentiates the role of sketching in the

design process from that of a prototype. A prototype has different properties than drawing. It must be didactic, describe, refine, answer, test, resolve, be specific, and act as a depiction (Buxton p. 140).

Buxton argues the act of drawing is as integral to the user experience design process as both ideation and conversation-based tools are to in technical user design processes. Deanna Petherbridge presents additional examples in her essay "Nailing the Liminal: The difficulties of defining drawing", showing how drawing is used for dialogue purposes by architects, engineers, planners and designers. Drawing, according to Petherbridge, is used mainly in three capacities: as a medium for communication, a medium for design, and a medium for analysis with the goal of fostering knowledge and understanding (Petherbridge p. 27). For the purposes of this paper, sketching or drawing is examined as a process of knowledge and understanding to think through concepts.

Petherbridge refers to the research work of Kathryn Henderson, who claims "Sketches are at the heart of design work". They serve as thinking tools to capture fleeting ideas on paper where they can be better understood, further analyzed and refined and negotiated" (Petherbridge p. 33). Henderson further articulates and refers to sketching as "Messy Practice", or hand sketching and a "mixed practice" of computer graphics. In this study the notion of drawing as Petherbridge describes as a "boundary object", and its ability to be a "holding ground and negotiation space for both explicit and yet to be made explicit knowledge" and its potential for a tool of communication (Petherbridge p. 33).

In this process, sketching as ideational drawing is used to think through problems, and create new ones, as part of the problem framing process. Drawing a user's experience with a potential new object presents a context for product designers to think about how to draw objects of experience that may be networked in a way not previously conceived.

Petherbridge introduces this as a "boundary object", however it can be considered as a proof of concept, and a method to describe and illustrate a potential new problem to solve.

Terry Rosenberg refers to ideational drawing as an act of raw thinking, specifically "thinking-in-action and action-as-thinking". He refers to ideation drawing as thinking space, where space is thinking and is presented as artifact, and makes the clear distinguished point that ideation drawing is "thinking" and not "thought." Drawing is used to ideate as a present activity and the "immediacy of the thinking-act". (Rosenberg p. 109). Rosenberg cites the examples of the work of John Rhys Newman, a senior Design manager of Nokia Design's Insight and Innovation team. Newman describes the process of his drawings in meetings and conference calls where he is "half listening, half drawing" and the semi-preciousness and semi-focus of the drawing and the accidents that occur as his focus drifts. Part of his process is to date stamp the drawing, and place the drawings in a set of manila envelops to file, as an effort of producing the drawing itself as a relinquishing of a hold on thinking, to see what happens as a leap of thought through drawing. Rosenberg further articulates Newman's drawings into three categories: "Fictions", "In Sight and Mind", and "Generative Drawings". All drawings are done in pencil on copier paper and identified with a date stamp.

Fiction Drawings as classified by Newman are "musings or doodles" as they are not illustrative of anything specific and are more reflective a thinking act. In 2006, a series of fictional drawings involved issues of flooding, in particular influenced by global warming and the floods in New Orleans. The drawings show objects stacked high, using chairs to levitate boats and atypical awkward gathered objects, absent of water. The objects drawn in this space construct an imagine space as a result of a flood. This disruptive act of the flooding can change how objects are normally viewed and used in its designed space. It is in this misuse of objects that new shapes begin to form, and through the act of drawn repetition new ideas can emerge from shapes that erupt from a semi-illustration of an imagined flood.

In the category of "In Sight and Mind" Newman's drawings show a few identifiable objects, illustrating the artifacts he uses as drawing aids (pencils, paper, paper clip, eyeglasses etc.). The drawings start as observation drawings, a pair of glasses is drawn in a meeting for example and is built upon, as Rosenberg describes "a world of alternative logic". (Rosenberg p. 120). These drawings typically are derived by what is in front of him on his desk. They are semi-observational, as the drawing practice tends to be interrupted with other activities such as being on the phone, or in a meeting. Objects are layered on top of each other, and this tracing of objects on a desk, observed and have imagined in distraction, form new types of objects that are not typically depicted from pure representational drawing. These examples offer valuable insight into how designers can use drawings in various ways in the creative process and speak to the importance of generative and ideation drawing because it permits a non-language based method to build new products.

The third category of Newman's drawings, are generative drawings. In these drawings Newman poses an exploratory question, for example "Why do we build sandcastles?" Some of these drawings are as a result of conversations; some identify key elements of building sandcastles such as buckets and spades. In some of Newman's drawing the material and scale shift the buckets from industrial to playthings. Again, repetition is used here to ideate and replicate the act of building a sand castle. By posing questions, Newman has introduced constraints on his drawing, and is using drawing as point to answer a question non-verbally through shape and form. In shifting scale and tools he begins to change *what is a sand castle*, and how could it be re-imagined. In drawing these new playful shapes, they act as a record to be considered when addressing a new design problem and how to approach a new form of a new object that does not yet exist.

Ideation, generation and fiction are significant to this research because it articulates how designers are already using drawing as a method of inquiry as it allows ideas to build quickly in an action based way.

The FOT Cube as Method

The FOT Cube has been created through this research as a new method of inquiry. Inspired by the complexity of designing products for users in a technology-engaged way, I created this method to approach designing products innovatively. Further, *Horizon Scanning* is used as a method of surveying trends, understanding their underlying drivers and potential implications through the framework of "STEEP V." The STEEP V is an acronym examining trends in social, technological, economic, ecological, political and values-based categories. Researching signals and form, then developing trends, provides insight, which can inform and act as lenses within the FOT Cube process.

The FOT Cube generates a structured framework to investigate new object design and challenges via its consideration of techno-social networked technology as part of the product design process. It guides designers in considering how their product situates itself with regards to function, audience, and engagement. Developing a strategic conversation about the future of objects, my research has led me inquire the ideation process for product designers, in order to invent a new process. When creating new products in a rapidly changing technological environment. An appendix has been added to this paper as a guide for designers to use the FOT Cube.

Kees Van Der Heijden states that a *matrix approach* is appropriate in situations of considerable uncertainty (Van Der Heijden p. 247). In terms of understanding the inter-relationships of driving forces, typically, a two-by-two matrix of critical uncertainties is used to generate several plausible

scenarios for plausible worlds. The cube model, developed as a 3-axis framework considers the polarities in function, ownership and technology in product design, to act as grounding points of considerations for product designers. A cube can examine the 3-axis of polarities to create eight possible future world scenarios, which are to act as a guide for re-imagining the product through different lenses. These scenarios are valuable because they generate a well-rounded view of the possible world the objects are designed for. A cube model is not typical of the foresight process. Perhaps, as Heijden elaborates, the matrix model maximizes the range of scenario outcomes and the potential impact. The cube model however, can redefine the foresight process in a significant way by allowing on a guideline on elaborated worlds, thus maximizing outcomes. The nature of the choice for scenario dimensions, are what is high-impact and highly uncertain for a large range of possible impacts (Van Der Heijden p. 248). I choose to investigate the cube model to elaborate on possible futures within a stable framework. Trends thus texture and develop the world's design to mimic possibilities of future uncertainty.
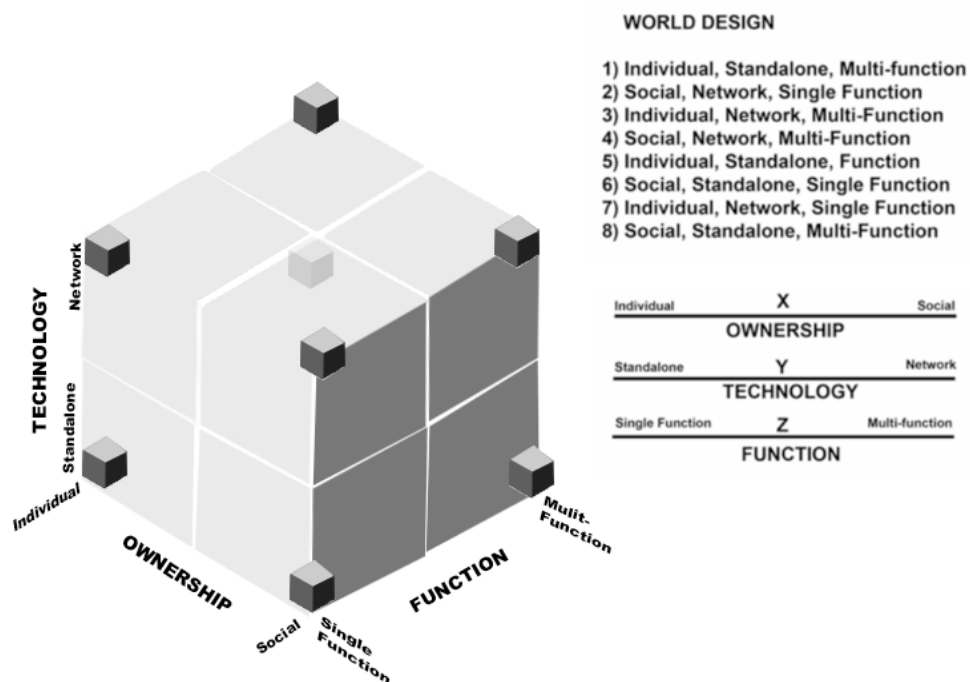

WORLD DESIGN

1) Individual, Standalone, Multi-function
2) Social, Network, Single Function
3) Individual, Network, Multi-Function
4) Social, Network, Multi-Function
5) Individual, Standalone, Function
6) Social, Standalone, Single Function
7) Individual, Network, Single Function
8) Social, Standalone, Multi-Function

Individual	X	Social
	OWNERSHIP	
Standalone	Y	Network
	TECHNOLOGY	
Single Function	Z	Multi-function
	FUNCTION	

Figure 3: FOT Cube, Ceperkovic

24

As stated, additional criteria are implemented through a variable set of trends. These design criteria allow us to imagine objects in new ways from its origin to predicting its future. Ideational drawings are generative in nature, and inform questions as to how objects are constructed in this world.

The contribution of the FOT Cube to product design is to incorporate the techno-social, shared ownership, and technology networked functions as considerations in product design. This paper includes an appendix on how the FOT cube can be used in a brainstorming cycle. In considering the 3-axis, the left side direction of ownership, technology, and function are heavily rooted in traditional design, and its history. By incorporating all facets of 3-axis, function, ownership and technology, the FOT Cube examines singularity versus multi-function with the individual and the social, and standalone and networked.

←Single function----------------FUNCTION ----------------- Multi-function→

←Individual ----------------------OWNERSHIP ----------------------- Social→

←Standalone--------------------TECHNOLOGY --------------- Networked→

Products have historically been individually designed to be owned, retained individually, no connection to a network and to have a single function. The consideration weighted on the right hand of the axis appeared with objects into the future, shifting the product into shared ownership, networked connectivity and multi-functionality. This shift pushes products to a tipping point, changing products into techno-social products with multi-functional services. It fundamentally changes how products are conceived, fabricated and distributed. In the perceived threat of 3D printing, and the masses creating individual, standalone objects, with single functionality, the cube proves new ways to ideate and conceive of intelligent objects and its potential use for mass distribution.

Chapter 5*: Product Design Process

When looking at previous product design methods, Henry Dryfus's five-point approach in: safety, utility, maintenance, cost, quality and appearance provide valid considerations when designing an object. This method, however, does not consider the current context with its socially-led economy or complex issues of designing with technology. It does not incorporate methods to innovate and iterate on the design of products. This is problematic because it does not consider objects in a technology-engaged manner. It does offer valuable considerations for the prototyping phase of this research.

The Double Diamond approach (Design Council United Kingdom) elaborates the "Discover, Define, Develop and Design" cycle as a method for designers to consider when developing products. The Double Diamond model is a well-considered product design model. It articulates a method to expand and funnel the design process. Ideational drawing, for example could be part of the discovery process when brainstorming solutions and product feasibility. What the Double Diamond model does not incorporate is an ongoing, service-based model for products engaged with a community, nor does it articulate the designer's responsibility to consider post-delivery phases.

Figure 5: Visualized Double Diamond Model, Design Council UK, 2005

The Stanford University ME310 Design Innovation Process was developed as part of curriculum for a project-based engineering design course at Stanford University.
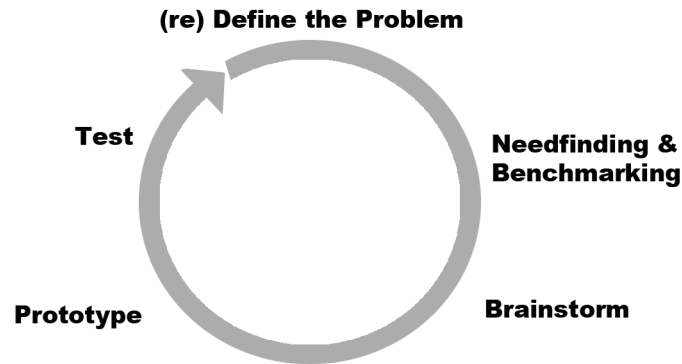

Figure 6: Visualized ME310 Innovation Design Process, Stanford University

This five-phased approach considers the following:

- Define the problem by observing the needs of the intended users
- Benchmarks what technologies exist to identify design opportunities
- Brainstorm to develop new ideas
- Prototype to create a proof of concept
- Test and iterate to improve the design

It can be assumed that a variety of methods can be used between the brainstorm and prototype process prior to the model stage. Ideational drawing, for example, would be used as method to think through concepts, and generate ideas on how to approach problems. This paper uses horizon scanning using the STEEP V Framework, and FOT cube to create eight possible future worlds for designers to consider in developing products. Ideational drawing as a primary generative method to the brainstorming process considers new domestic objects of the future.

The FOT cube would be used in combination with this model, during the designer's brainstorming phase of the product design process. This paper uses the FOT Cube in tandem with ideational generative drawing as an innovative process tool for product designers to understand how to consider implications of the techno-social future object. It is proposed in this paper, that once the problem is defined, and benchmarking phase has been completed, setting a timeframe would be an important next step for designers to consider developing products. A timeframe could be cast to a point where conceived technologies have radically shifted. The time horizon should not exceed more than ten years for products with a reasonable intention to reach a marketplace.

Figure 7: Modified ME310 Innovation Design Process, Stanford University

Eight possible worlds as a source for potential future for objects to inhabit create a rich basis to ideate and brainstorm possible objects an identified problem. It is important to note that, if an intended problem is focused on only one polarity (e.g. single owner, one function), all worlds may not need to be explored. As the perimeters of the worlds are firmly set, additional questions can be asked to start the drawing exercise. As part of this research paper, these questions asked prior to drawing:

What does this world look like? Who lives here?

What would the identified person(s) use in this world?

What common objects might not exist in projected timeframe?

How will an object change in the projected timeframe?

How do trends identified influence this world and affect objects?

What new problems are suggested by the drawing?

The purpose of the drawings is generating a large volume of ideas quickly. Sharing ideas is critical in this phase, creating visual examples to support conversation and collaboration particularly in cross-disciplinary teams.

When moving to a prototyping phase, it is an important to keep in mind the adapted Norman-Green Model. This model helps guide questions on the object's relationship to its intended audience, as well as its context and activity within a community. Dryfus's approach to considering safety, utility, maintenance, cost, quality, and appearance may occur in the final prototype and testing phases. These factors among others, may reframe the problem that initiated and may need to be further iterated and refined. An appendix has been included in this paper as an articulation of how designers can approach the FOT Cube as part of the brainstorming process.

Chapter 6: Trends and Impacts

Using Horizon Scanning, specifically the STEEP V process, trends were examined and classified using categories of social, technology, economics, ecology, political and value. I have incorporated these concepts along with generating new approaches to these issues. Trends are defined in this chapter, as well as articulated through graphs, charts, and creative output, in order to generate with discursive options design communities. The process of identifying a trend requires identifying signals in the present day within the last five years, and classifying larger

underling currents to encapsulate a larger trend or issue. Trends were examined and were referenced through North American sources such as Wired Magazine, and Fast Company, as well as news sources such as The New York Times and CNN. Trends are detailed in the Appendix.

SOCIAL TRENDS

Computer knows best

This examines the growing trend of North Americans finding their significant others through online services, and how courtship practices are changing.

Nomadism

This trend examines the impact of the decreasing value of home ownership in the United States. A migrant working class may change buying patterns and decisions, the duration of stay based on employment, and entrepreneurship opportunities.

Co-Op Life

As urban centers become increasingly dense, consumers patterns are starting to shift to shared models of ownership, as well as flexible time based credits with objects that were once owned.

TECHNOLOGY TRENDS

Born Big Brother

Technology is becoming increasingly omnipresent, from increased public surveillance in dense North American urban centers by law enforcement to the emergence of wearable consumer cameras such as Google glass.

Because my body tells me so

Wearable biofeedback devices have started to emerge in the consumer marketplace as fashionable accessories. This device driven method of self-monitoring movement has built new communities online as well as big data statistical database performance of the individual consumer body.

DIY Tools

"Do it yourself" maker culture has grown from hobby projects to become an industry. Through maker channels such as Etsy™, individuals can develop and distribute products to consumers without third-party distribution through storefronts.

ECONOMIC TRENDS

Make me some lemonade

New micro-funding models act as a catalyst for a new market of micro-entrepreneurs, and new niche market demands.

Crowd source everything

This trend examines how crowd-based services have become increasingly powerful in the marketplace. From audience participation in developing content for merchandisers to leaving recommendations on social networks, crowds influence how products are made, and inform consumers choices.

Having fun standing still

In economically strained times, North Americans are changing their patterns of purchasing goods and experiences with a focus on improving home surroundings and local experiences.

Grow something

Locally grown and one-hundred-mile diet movements have brought the question of buying food closer to home and have created hobby-farms of small gardens in dense urban centers.

My house hugs trees

Sustainable housing has become a feature in new urban developments. How a home integrates into its environment and leans into borrowing power rather than demanding it is a growing demand.

Power up

Given increasing consumer demand for power, global electricity demand is projected to double between 2010 and 2030.

POLITICAL TRENDS

Regulated garbage

As government becomes more involved in the waste economy, garbage and how consumers can dispose of products in a cost-effective way will increasingly become regulated in how consumers can dispose of products in a cost-effective way.

Knock it off

In the current uptake of 3D printing, products are easily replicated and printed on demand. Piracy has shifted from the black market to the home market, where users can share schematics to print objects at home.

Dissolving monuments

With the increase of an individual's digital footprint, rights to dissolve or preserve online presence are still in question with lawmakers. Virtual possessions such as digital music, email address or other digital properties remain inconsistent legislation around how they can be preserved, passed on or dissolved.

VALUE TRENDS

Delayed marriage

This trend examines the growing trend of North Americans delaying marriage until much later in life.

Stackable homes

This trend examines how dense urban centers are growing faster than their suburbs for the first time in decades in the United States.

Experience based gifts

This trend examines how experience-based gifts over object-based gifts are on the rise.

TREND IMPLICATIONS IMPACT ON AXIS

Trend implications on the axis were recorded based on the potential impact on the object's value either in its function, ownership, or technological engagement.

	Single	Multi-Function	Individual	Social	Standalone	Networked
	Function		Ownership	Ownership	Technology	Technology
Computer knows best	•	•	•	•		•
Nomadism				•	•	
Co-Op Life				•	•	
Born big brother	•	•	•			•
Because my body tells me so	•	•	•			•
DIY Tools	•	•	•		•	
Grow something	•	•	•		•	
My house hugs trees	•	•	•		•	
Power up	•	•	•		•	
Make me some lemonade	•	•	•		•	
Crowd source everything				•		•
Having fun standing still	•	•	•		•	
Regulated garbage	•	•	•			
Knock it off	•	•	•		•	
Dissolving monuments	•	•	•			•
Delayed marriage	•	•	•			•
Stackable homes	•	•	•			•
Experience based gifts	•	•	•		•	

Table 1: Trend Implications on Axis

IMPACT ON WORLDS

1) SWISS ARMY LIFE	2) LOGIN LAND	3) I EVERYTHING	4) FLUID EVERYTHING
Characteristics: Multi-functional, Individual, Standalone **TRENDS:** DIY TOOLS MY HOUSE HUGS TREES POWER UP MAKE ME SOME LEMONADE	Characteristics: Single Function, Social, Networked **TRENDS:** COMPUTER KNOWS BEST CROWD SOURCE EVERYTHING	Characteristics: Multi-Functional, Individual, Network **TRENDS:** BORN BIG BROTHER BECAUSE MY BODY TELLS ME SO HAVING FUN STANDING STILL STACKABLE HOMES DELAYED MARRIAGE	Characteristics: Multi-Functional, Social, Networked **TRENDS:** EXPERIENCE BASED GIFTS
5) PERSONAL TOOLSETS	**6) BIXI LAND**	**7) PING NATION**	**8) CO-OP KITCHENS**
Characteristics: Single Function, Individual, Standalone **TRENDS:** GROW SOMETHING REGULATED GARBAGE EXPERIENCE BASED GIFTS	Characteristics: Single Function, Social, Standalone **TRENDS:** CO-OP LIFE NOMADISM	Characteristics: Single Function, Individual, Networked **TRENDS:** DELAYED MARRIAGE REGULATED GARBAGE COMPUTER KNOWS BEST	Characteristics: Multi-Functional, Social, Standalone **TRENDS:** NOMADISM CO-OP LIFE

Table 2:   Impact on Worlds

In reviewing the frequency impact on polarities, individual ownership appears heavily impacted by

the trend index. "Computer Knows best" appears frequently in almost all polarities. In terms of

impact on worlds, one trend, "experience based gifts", appears to be the only trend affecting this

world. It is noted that creating unique socially owned, networked experiences with objects may be

an extreme consideration in object design.

Chapter 7: FUTURE WORLDS 2025

Worlds are sent in the future year of 2025. These worlds were designed based on the polarities of

the axes of ownership, technology and function. The implications of the trends texture the world

design of eight possible futures. It is important to place the timeline far enough in the future to

image new technology possibilities outside of current toolsets to imagine new possibilities.

This chapter is structured more abstractly, to create possible worlds and futures as an ideational

construct for designers to approach new worlds to design for. The worlds specifically looked at

"The Kitchen" as a starting space to understand drawing an object within the logic of the world. In

every world, a wastebasket was drawing to illustrate the different functions in each world.

Figure 8: Future Worlds

WORLD 1: SWISS ARMY LIFE

Swiss Army Life is a world where individuals own objects that can do many things, and are developed using high technology but remain off the grid.

Characteristics: Multi-function, Individual Ownership, Standalone Technology

Trends that impact this world are: DIY Tools, My House Hugs Trees, Power Up, and Make me Some Lemonade

In the year 2025, criteria for objects at home are highly individualized: objects can accomplish multiple tasks, and are not connected to their owner's social networks. With easy access to 3D printers individuals print objects on an as needed basis. With the ability to easily print and customize whatever object you would like as part of small manufacture runs, scarcity is not an issue. Objects have become more sophisticated, go beyond one basic function, and can accommodate multiple tasks. Although self-consciousness about waste is a concern, how to effectively recycle objects and transform them into new ones has become value-add in this world. This ability makes your objects more unique and individualized. One main issue in this world, as textured by the "Power Up" trend is that with power at a premium, objects have no or very little battery life. The ability to be man-powered if energy is needed to complete its function is an object value-add as well.
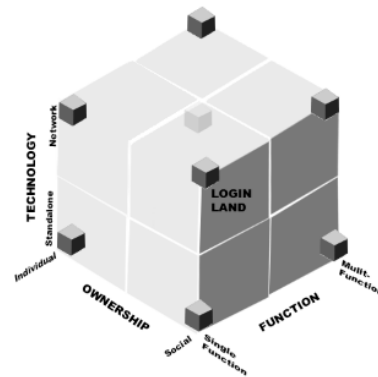
Figure 8: Swiss Army Life Ideation drawing, Ceperkovic

As part of the ideation drawing process, a series of shapes start to emerge trying to reinvent how garbage receptacles are used and developed. This drawing was derived thinking about how to incorporate an indication strip in waste receptacles displaying messages on what is biodegradable within the container. This object is influenced by the "My house hugs trees" trend in how we can reconsider how objects disposed of. Which manufactured objects exist in a world where everything is made on demand was also considered. Garbage bags were considered as a

manufactured product that could lend itself into the culture of this world, and integrate how consumers dispose of things in this world.   Other objects created in this world are a set of car keys retaining power through its key chain as an alternate source of power (Power Up trend). A redesigned mop, would incorporate this method of reusable energy, and, based on physical movement, would allow light to be generated. DIY tools influenced the creation of dissolvable stir-spoons and editable dog bowls that could reside in a kitchen space at home.

WORLD 2: LOGIN LAND

Login Land is a world where all objects are developed for communal use, and designed for one primary function. It is important to note that these objects are always online and connected to a social network.

Characteristics: Single Function, Social Ownership, Networked Technology

Trends that impact this world: Computer knows best and Crowdsource everything.

In 2025, objects at home are intended for more than one consumer. They are shared for a reason, produced by a large company, and mass distributed. Given the digital support, this type of object this would be considered a luxury item. It could exist in common spaces within a home environment. The digital-enabled value to push content from our networks into our homes, creating personal billboards, is a key feature. The product is networked to the internet, and is intended to have a single function. The value of an individual's social network is integral to the

design of objects. Objects of users are always required to log in to use the product. Experiences

with the object are consistent from consumer to consumer, the only variable being techno-social
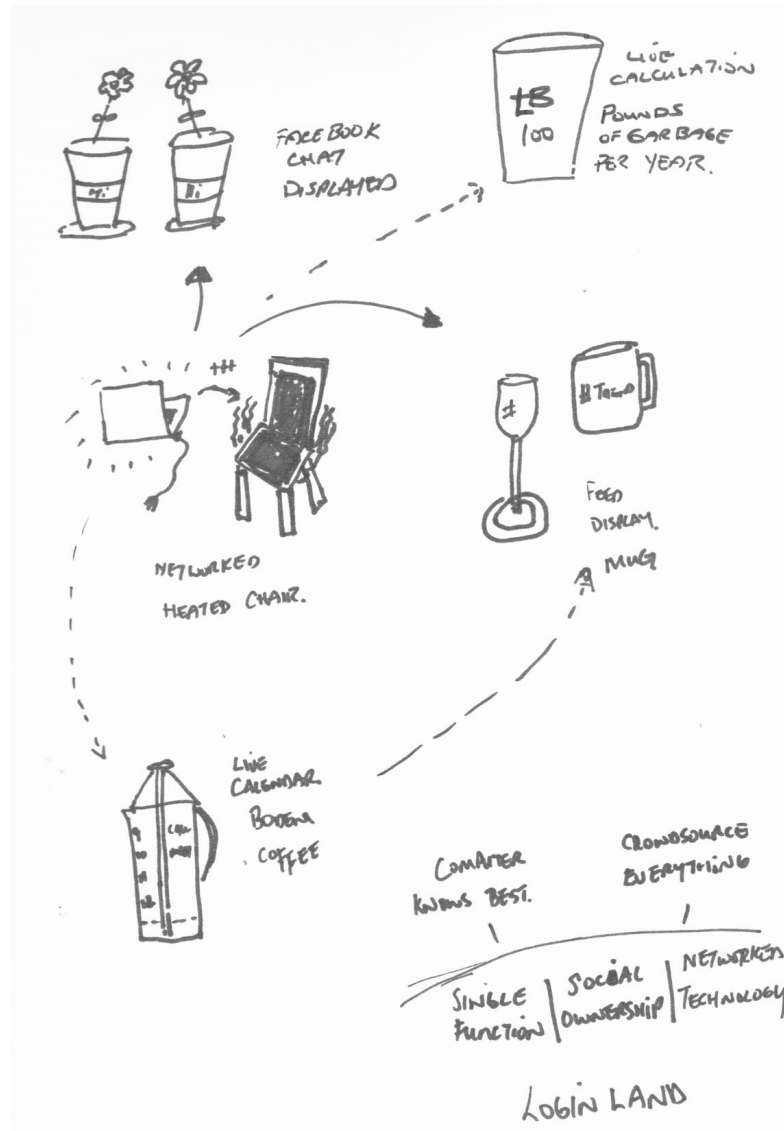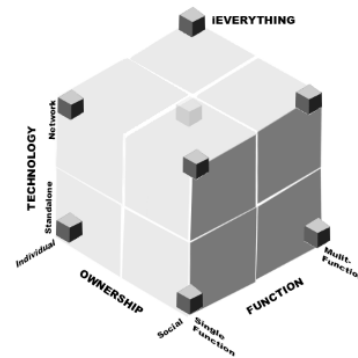
content.

Figure 9: Login Land Ideation drawing, Ceperkovic

Example of ideation drawings in this world show a home office chair that heats up based on the

extent of its user's social network being online, an networked garbage can that can calculate how

many pounds of garbage are thrown out a year, a coffee mug that shows what is currently

trending on Twitter™, planters that display live Facebook™ or Skype™ chats with different people within the user's network, and a coffee maker with a dynamic live connection to an open calendar. These objects consider the value of the billboard. These objects that would be present or used for a significant amount of time. They would be always "on" during its use. A desk chair could be at a home office, or a chair to come home to after a long day of work. Objects, as shown have a primary purpose to sit, drink or grow. However, this double as a signal to the user's social network. It is expected that others in the owner's social network have similar objects to provide similar, consistent experience.

WORLD 3: iEVERYTHING

iEverything is a world where objects have multiple uses, are designed for a specific person, and persistently connected to a network.

Characteristics: Multi-Function, Individual Ownership, Network Technology

Trends that impact this world are: Born Big Brother, Because my body tells me so, Having fun standing still, Stackable homes and Delayed marriage.

Objects at home in this 2025 world are designed for one person. This is a gadget-based world, where the more an object can do to help you, the better. Although objects are designed for social network integration this is an intensely private world. It is important that this object assists with

day-to-day tasks, and be part of its owner's routine. As privacy is an underlying concern in this world, a consumer might want passive signals to engage with their network. Objects are developed for people on a budget, and mass-produced to keep cost low. The lifespan of these objects is very long. They are designed for integration into personal habits and this usage could be measured over time.
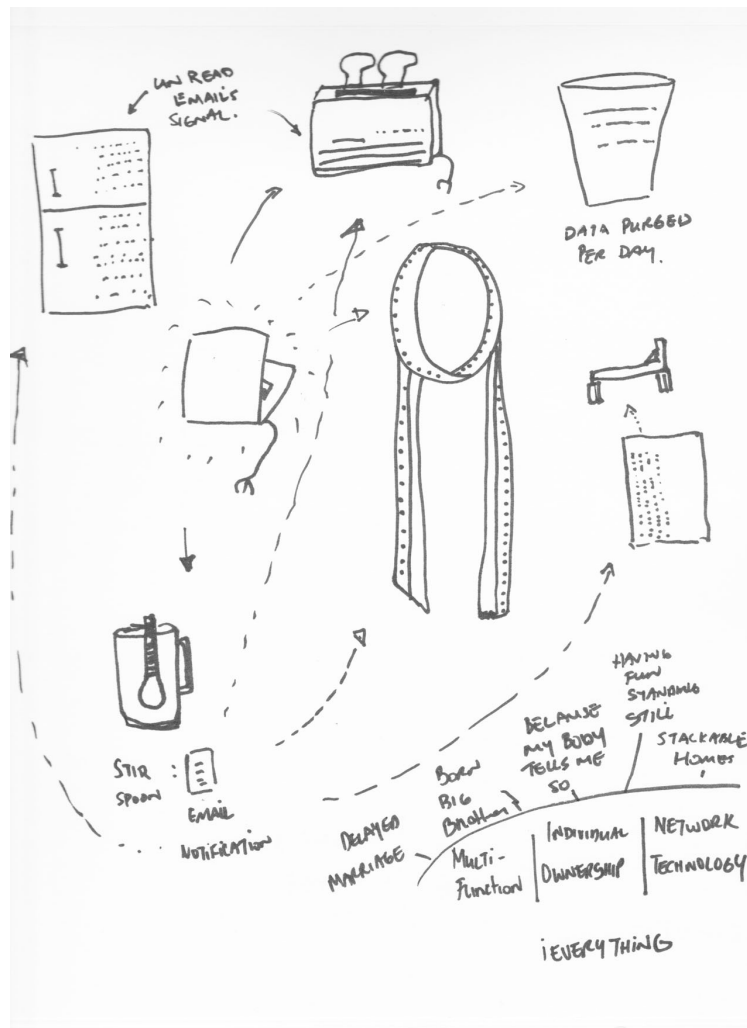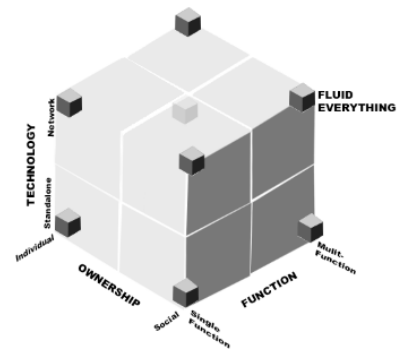

Figure 10: iEverything Ideation drawing, Ceperkovic

The examples above show items that are connected to a network. Garbage cans display how much virtual data is purged per day. Scarves and blankets that signal every time you have a website hit on your personal site. Teaspoons that stir your coffee indicate how many emails you may have received or that have not been read. This logic was extended to fridges and toasters to

imagine how these other objects could display this data. Objects considered were spoons, blankets, and other textiles that is a part of an individual's daily routine. These objects support the individual at home, and become integrated into their daily life while respecting their privacy in a network.

WORLD 4: FLUID EVERYTHING

Fluid Everything is a world where objects are communal, have multiple functions and are connected to a grid.

Characteristics: Multi-Function, Social Ownership, Networked Technology
Trends that impact this world: Experience based gifts.

In this world we see that objects at home are shared and have the capacity to work together. Domestic objects in this world are connected to a network and designed for more than one function. This world is filled with unique experiences and is constantly shape shifting. All objects are seamlessly integrated from one object to the next, and always on. This object is shared, connected to a network and is mass-produced. It is not a hand made object, and it is the delight of using the objects in combination that make them unique to the user.

It is important to note, that only one trend impacted this world as an object that is social in ownership, networked and has multiple functions. Creating unique socially owned, networked experiences with objects may be an extreme consideration in object design.
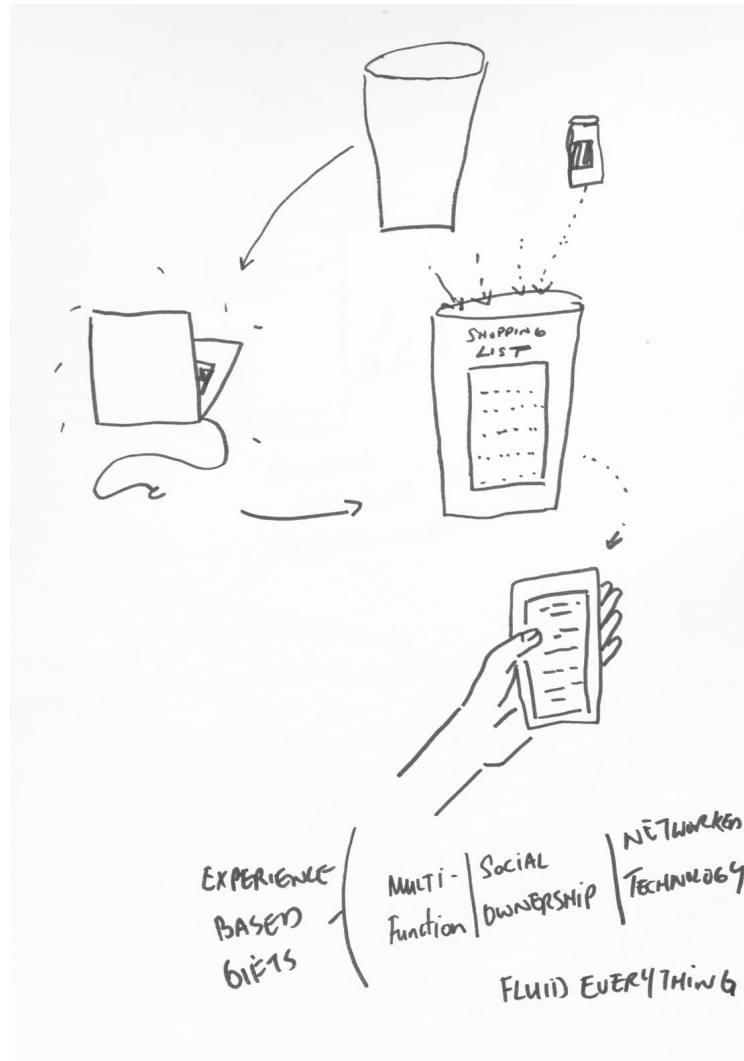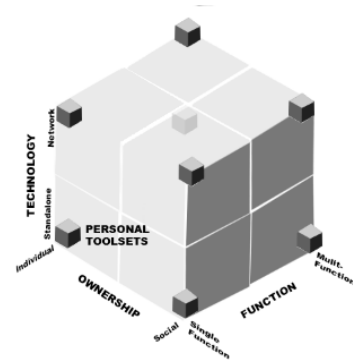

Figure 11: Fluid Everything Ideation drawing, Ceperkovic

When thinking through drawing, universal domestic objects that were mass-produced were imagined. The first ideational drawing was of an umbrella, and the shape was elaborated on, and wondered if could integrate from outside to inside the home. This inspired a window curtain that raises or falls based on weather conditions via internet network. A garbage can was considered as a universal object. Through ideational

drawing, it was proposed that a garbage can that recognizes barcodes and displays a shopping list as well as adding it to your phone would be appropriate in this world, as even though universal in experience, its uniqueness is based on a user's interactions. Any object in this world would be considered easily replaced, passed on, or disposable. The lifespan of the product in this world is limited.

WORLD 5: PERSONAL TOOLSETS

Personal Toolsets is world where objects have a specific single use for a specific individual. This is not a shared object. Objects can be developed using a high-end technology, however it remains off the grid.

Characteristics: Single Function, Individual Ownership, Standalone Technology
Trends that impact this world are: Grow something, Regulated garbage, and Experience based gifts.

In 2025, this world we see that objects are designed for an individual, that they do not have any embed technology to connect the object to a network and have a single purpose function. Little has changed in this world in terms of object design since 2013 outside of technical processes in designing the product. What propel the objects into the future are the influences on trends. Experiences are integral to object design. Objects in this world could be a garbage can that plays music when used. This logic was extended to kitchen mixers and utensils. Money is not an issue in consuming goods however; customers are environmental conscious, which is reason for a shift in product design.
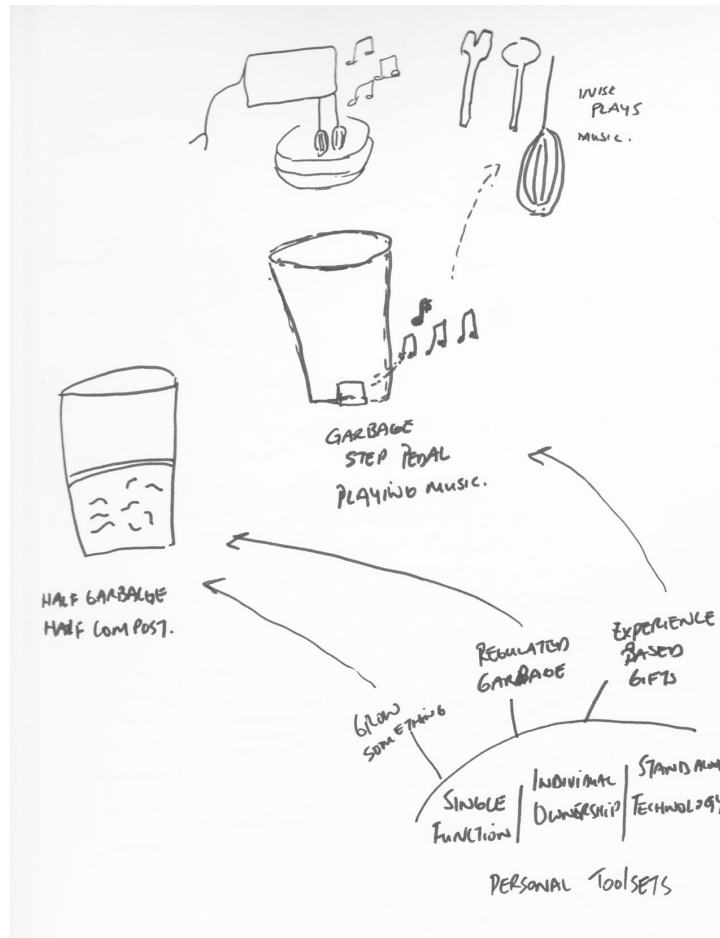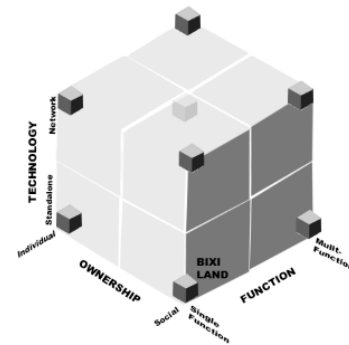
Figure 12: Personal Toolsets Ideation drawing, Ceperkovic

As an individual, standalone, single function product of the future, the products are very much similar to current day products. Grow it yourself trend incorporating in this project might develop a garbage can that can act as a compost.

WORLD 6: BIXI LAND

Bixi-Land is a world where objects have one function and designed to be shared. It can be constructed by technology, however it is not connected to a network.

Characteristics: Single Function, Social Ownership, Standalone Technology

Trends that impact this world are Co-op Life, and Nomadism.

In 2025, objects in this world are communal and shared. There is no concept of ownership with a community access is standard mentality of inhabitants in this future. Objects do not have any connection to online social networks or capabilities and are purely intended for a single function in the home. Objects could be expensive or only used occasionally and therefore shared for to be accessible. Inhabitants of this world are transient and the value of objects and home have shifted in that products do not have a sense of preciousness attributed to an individual owner and can easily passed on. Uniqueness of the object is not important as its ability to accomplish one task effectively. The notion of "Home" is changing in this world, and could be a short-term rental, hotel, or staying at other people's homes as temporary locations.
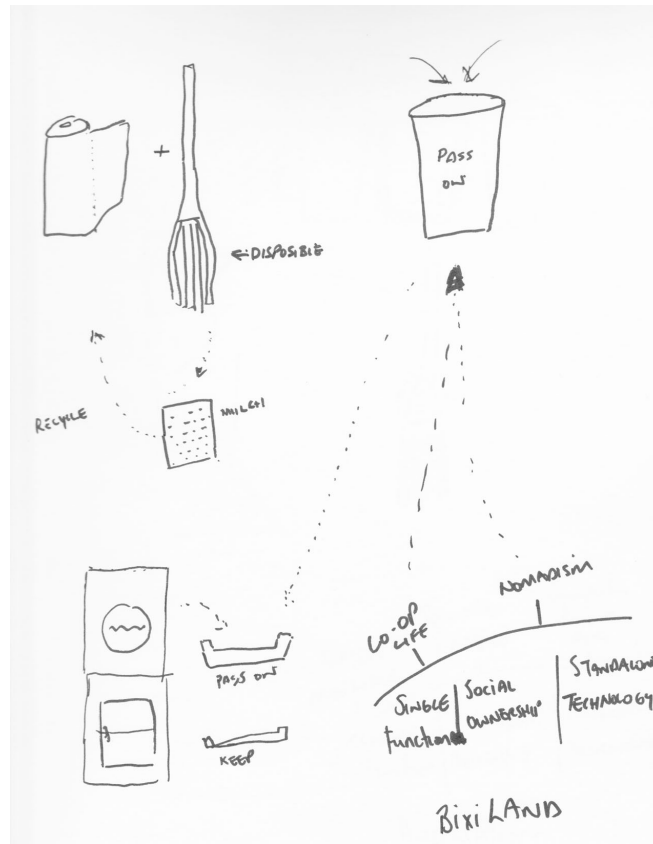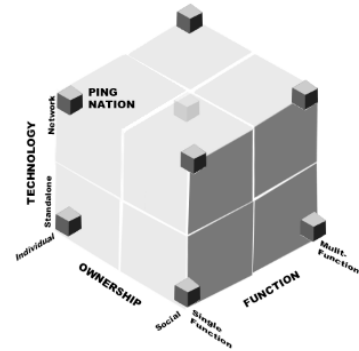
Figure 13: BIXI LAND Ideation drawing, Ceperkovic

In drawing objects that inhabit this world, reconsidering how garbage is disposed and what new bins could be created as a way to pass on objects in transitional spaces was considered. How this concept could be reinvented in laundry machines was considered, with trays installed to leave behind new clothes for the next user. Objects in this world are shared, and looking at trends such as co-op life and nomadism, must be easily transportable and transferable. Developing a mop with a disposable head, similar to a paper towel could be developed. These types of objects would not be connected to a network and have a single intended function.

WORLD 7: PING NATION

Ping Nation is a world where objects are individual owned, have one specific function and are connected to a social network.

Characteristics: Single Function, Individual Ownership, Networked Technology

Trend that impacts this world: Delayed marriage, Regulated garbage and Computer knows best.

In 2025, this world we see that objects are designed specifically for individual within the home. Objects are connected to the internet and social networks, and are intended for one function within the home environment. Objects are simple in its design with limited functionality and being connected to a network becomes an important consideration in how objects are designed. The network recommendation highly influences objects and objects are fixtures within the home and are kept for a long duration as opposed to a short period of timed. Items in this world are mass-produced, and could be considered a luxury-based item. Owners of these objects are environmentally conscious and products have minimal impact on the environment and could be made of recycled materials.
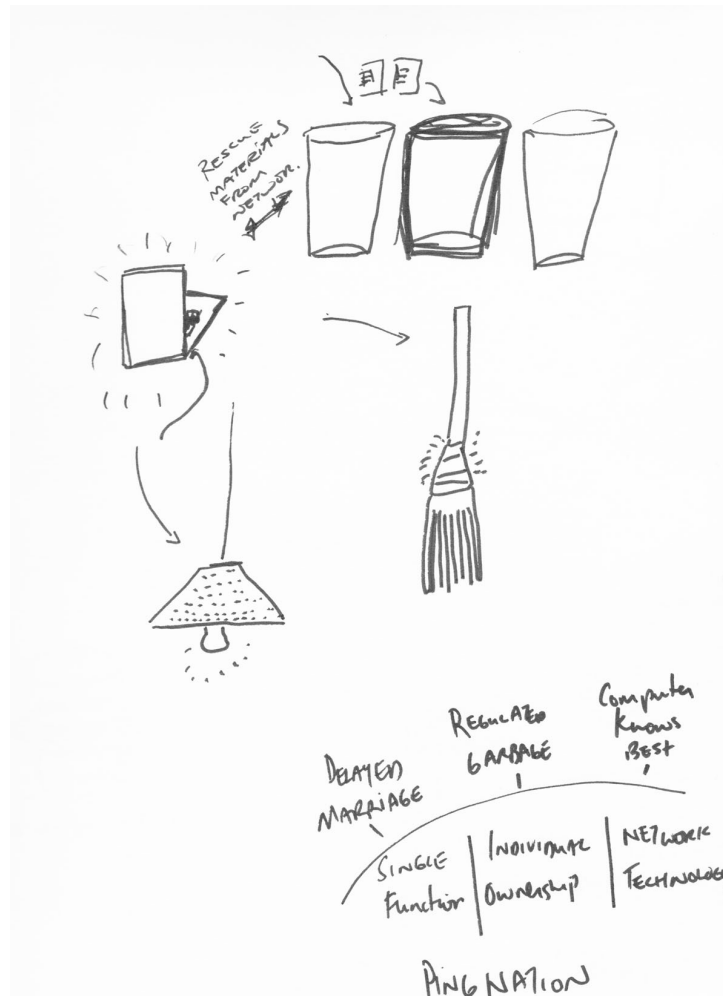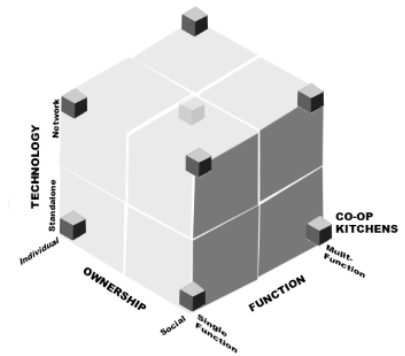
Figure 14: Ping Nation Ideation drawings, CEPERKOVIC

Objects derived through drawing to ideate this world could be a garbage can that would catalogue possible materials that could be purchased through your network. Overhead lighting that are illumined based on big data such as tweets with a word the computer decides for you based on your preferences. It could be a mop that indicates how many times it's been used in its lifetime.

WORLD 8: Co-Op Kitchens

In Co-op kitchens objects have the capacity to do many things and are designed to be shared. Although objects can be designed with technology tools this product is not connected to a network.

Characteristics: Multi-Function, Social Ownership, Standalone Technology

Trends that impact this world: Nomadism and Co-op life.

In 2025, this world's objects are built to be shared and have multiple functions. These are to be considered universal objects within the home. It becomes a standard where everyone has one, and it's has no technology network capabilities. Objects in this world are mass-produced, and are inexpensive. The owners of these objects are transient, so consistency of an object in one household would easily translate into another household.
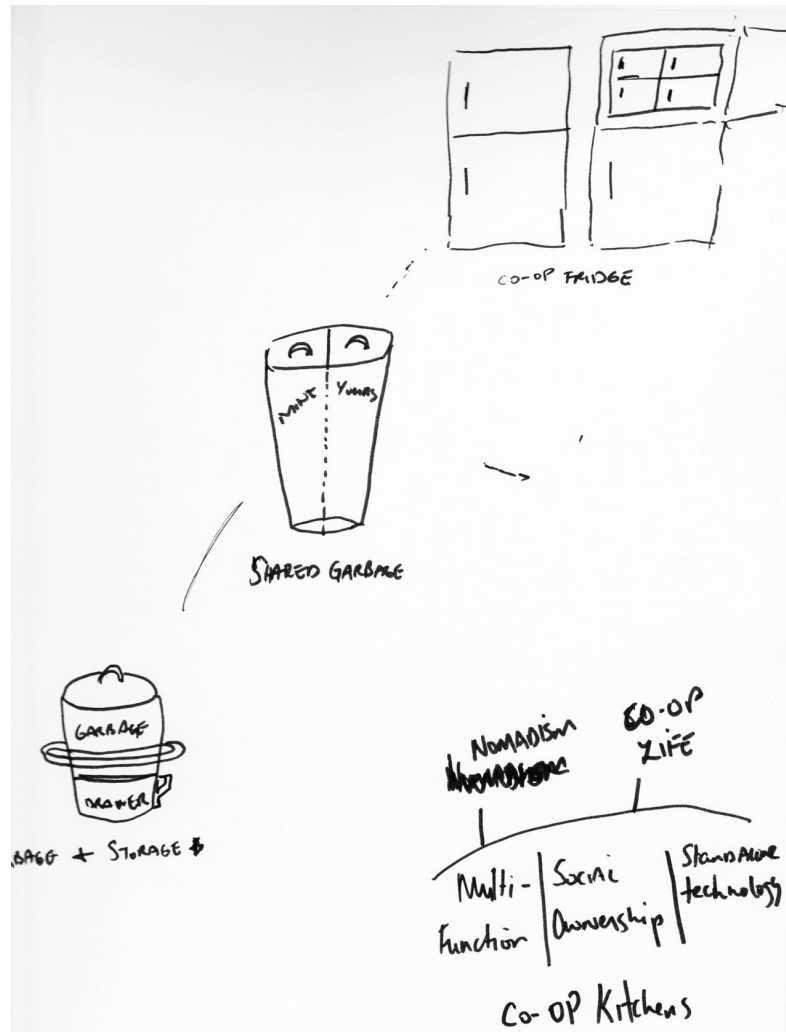
Figure 15: Co-Op Kitchens Ideation drawings, Ceperkovic

In drawing objects that inhabit this world, necessity tools for transients as starting point was considered. In this world objects were compartmentalized such as "mine and yours" sections of the garbage can was drawn. This logic was extended to fridges as possible other objects that would be in this world. Adding additional functionality to a garbage can might be adding a storage container as a feature of what to keep and what would be thrown away.

Conclusion

This paper began with a quote by Andy Warhol. What Warhol understood was how to reimagine objects of mass distribution for personal use. Understand where the objects live and how notions of home could change impacted the research in its future world design. In today's society, a shift from mass consumption to niche consumption has changed the function and economic ownership of products. Mass production has shifted to mass product services with consumers engaging with products for a longer period of time and continually paying to enhance objects. Technology will always be a variable, and its standard is a moving target that is rapidly developing. I have examined why we purchase the way we do, and the important consideration of the techno-social future. How objects integrate with their own online presence, and lifespan can exist long after the object itself disappears. In other cases, objects like a bottle of wine, could take years to get to market and how approach contemplating it's techno-social relationship to an audience when chance are, new platforms are yet to exist. The methodology of foresight and ideational drawing aids in understanding how designers can approach this complexity and create clear boundaries in understanding how the object could operate in various worlds and its possible co-mingling.

Developing a trend deck of current signals in the changing ground of social, technology, ecology, economic and value factors challenge both the object and its design in the future. By developing eight worlds, although it allowed a certain complexity in how to consider an object, it creates difficulties and problematizes the parameters in the design idea process. Although Heijden elaborates that this model to maximize the range of scenario outcomes and potential impact, its complexity is often difficult to navigate and differentiate when in the moment of creation of design ideas through ideational drawing itself. One concern presented using the model itself is that it does not factor in the possibility of waste. If an ideational drawing is developed using this FOT Cube framework, and if an ideational drawing did not fit the specific criteria, where does it go? This research has boldly taken on these questions in order to illuminate insight on the future of

product design process and considers the impact towards incorporating contextual value of products while firmly understanding both limitations on utility and ownership.

As discussed, worlds that were designed with the left side of the axis (single ownership, standalone technology, single function) are static and do not challenge objects far enough into the projected future of 2025. In one world, "Fluid Everything", the world was pushed to the other extreme to a society where everything is shared, connected, and had multiple function was difficult to contemplate as an absolute plausible future and started to move into design fiction rather than a plausible universe. The extreme reveals the potentiality of objects if pushed to its limits.

What my contribution of the FOT Cube allows for is an integrated and holistic view of objects and usability in order to create a framework for ideation. By creating this process no one world can or would dominate, but rather a multiplicity of overlapping of worlds would exist. This challenges how we understand the complexity of objects at home by thinking of how objects can co-mingle and be integrated into consumer's lives. It allows for a system for designers to ideate from as a brainstorming tool with prescribed restraints of Function, Ownership and Technology approaches to an object. An appendix was added as a guide for designers on how to use the framework within the ME310 Model.

Although ideational drawing was a strong tool to iterate and ideate it has its limitations to convey what the object was or how it worked possible in its complexity in a network.
It should be noted, that handwriting was an interesting by product to the ideational drawing. With difficulty drawing techno-social aspects to the object handwriting became a notation to self, illustrating what the object was and how it functioned. This literation became part of the drawing. The scrawling of the notion became a record of a thought in the moment.

In closing, the marriage of foresight and ideational drawing leads to a new language construct in how designers can approach object design in the complexity of a techno-social age. By incorporating the FOT Cube model, designers can move beyond current approaches and gain a complex understanding of ownership, technology and function to innovate products for consumers of the future. This research has taken an innovative approach by developing a nested framework and adds significantly to design discourse through the analysis of the ideation process for product design and the incorporation of new methods to contemplate how products can design new objects for the future.

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APPENDIX A: TRENDS ELABORATED

SOCIAL

<u>COMPUTER KNOWS BEST</u>

A new generation of mating rituals of online partnership and etiquette are growing to be a fundamental part of courtship practices. With tech savvy adults in their twenties and thirties off loading their partner matching decisions with recommendations from a computer algorithm. With internet dating sites managing expectations from affairs, short-term relationships, to long-term commitments.

Evidence of this trend is shown through the proliferation of online and mobile dating networks that an annual international conference "iDate" has been established. The goal of the conference is better management of online personal sites, improving profitability, increasing traffic and improving conversion rates to paying customers. Wired Magazine has indicated, online dating has grown into a four billion dollar business. The range of online introductions range from dating sites, social networks, chat rooms to online multiplayer games. Addition evidence of an emerging shift is Lauren McCarthy, use of Amazon's mechanical turk, to develop a product called "social turkers". Using a camera enabled mobile phone, users are able to live stream cast their date, allowing crowd sourced real time feedback on social interactions of first time dates.

Implications: Individual Ownership; Single Function, Network Technology

The polarities most affected in this trend are individual ownership of products. Whether this is a self-care object to beautify the persona in an online experience, lighting, or placing a personal camera spotlight, the intended consumer is single, and engaging with others through a networked technology with the focused goal to meet other single online humans with similar intentions. Objects in this setting are not shared in a household setting, and owned by one person.

With the decreased value of home ownership in the United States; the increase of moving to different cities based on work and opportunities are increasing. A migrant working class might shift how we buy and where we life. As social networks become more and more ubiquitous, an omnipresent social network may exist.

A market of low end, low cost, assembly furniture markets allows single income customers to build a living environment at low costs. IKEA™ for example grew 11% in 2012 above previous years sales figures.

New online communities have been built for temporary single travelers on a budget. Including AirBnB™, a web community offering temporary rented apartments for transient customers. Couchsurfering™ is a website that allows users to find a temporary place to stay anywhere in the world on someone else's sofa. These new places of rest are compromising hotel profits, and are starting legal debate on what constitutes a hotel and its bylaws in some cities.   In some regions such as California's "Silicon Valley" Hacker hostels invite programmers to live in a dorm like environment where the proximity to other programmers to develop ideas and work in projects have become a premium resources above just a place to sleep.

Implication: Social Ownership, Standalone Technology, Multi-Function

The polarities in this trend are social ownership, standalone technology and multi-function utility. As a nomad, objects are transient whose shelf life goes beyond the individual use of one individual and passed through a community. Using space sparingly, this product may have multiple functions to be more economic in its value. It may be constructed with digital tools,

however its goal is not to be connected to a community and remain with aligned with the culture of a nomad off the grid lifestyle.

CO-OP LIFE

As urban centers become increasingly dense, environmental and economic conscious consumers shift to shared model of ownership and rent time with objects that were once owned.

Larger personal purchases such as automobiles are starting to shared on a per hour or even per minute bases with services like Zipcar™ and Cars2go™ growing in downtown city centers. The concept is not only for objects, but is extending to meals. "Eat With" and "Left over Swap" are both food-sharing co-ops where participants can share either the cooking in community-based kitchens, or order portions of food from home based cooks with too many left overs. Co-operative culture, has extended to our workplaces with co-operative spaces where individuals can rent desk space on a per day or per month basis allowing a mix of workers to telecommute, or develop their own independent companies in an accessible way.

New tool based libraries are starting to be more predominate in city centers such as the "Toronto Tool library", allowing customers to rent expensive power tools by the hour or day. Corporate community driven spaces such as Toronto's "Workroom", allow customers to share and rent sewing machines by the hour to be used on site in addition to selling tools and fabrics.

Implication: Multi-Function, Social Ownership

In thinking about domestic objects, the polarities most affected in this trend are Social Ownership and Multi-function. Products in this trend are designed to be shared and can serve multiple purposes in its design to be most efficient as a shared object. Products in this trend can be

expensive in nature, and not often used and therefore the efficiency in sharing the object with the community may be best way to access the product.

TECHNOLOGY

BORN BIG BROTHER

Technology is becoming omnipresent with increased public surveillance police cameras in dense urban centers. With the emergence of technologies like Google Glass to the marketplace, content developer and lawmakers are trying to predict implications for consumers, and society when everything will be public and notions of privacy will be forever changed. With increased public surveillance an increased illegal activity may move underground. Silk Road for example is part of the Dark net and functions as an illegal marketplace where there are no comprehensive search engines.

Implication: Multi-Function, Individual Ownership, Network Technology

Objects in this trend are heavily weighted in individual ownership and networked to a community. It may serve a dual purpose, such as glasses that shield eyes from intense sunlight, as well as act as a camera engaged with a network. It is a personal object, not to be shared, and it clearly identified belonging to a single individual to either amplify their identity in a network, or quietly lurk.

BECAUSE MY BODY TELLS ME SO

Signs of technology becoming wearable second screens have entered the marketplace. Technology embedded jewelry, such as Nike's Fuel bracelet or Jawbone Up bracelet act as bio feedback devices where self-monitoring is consulted with technology, and offloading bio data history to an enabled device. This device driven method of self-monitoring movement has built

new communities online, where users connect only through their bio progress reports. Data is recorded and can be shared with an online community. Increase development of device of biofeedback devices, increases big data of individuals to include physical movements, body statistics and social network information.

Implication: Individual Ownership, Network Technology, Multi-Function

In thinking about domestic objects, the polarities most affected in this trend are individual ownership, network technology and multi-function. Using ones own bio data to perpetuate and add value measurements and instruction over time while connected to a network. Examples of this could be bracelets that measure how much walking was completed in a day. It could serve a dual function of telling time, or additional information gathered through bio data. Networked technology measure progress over time, and can connect to others in the community who use the object in a similar capacity to achieve goals.

<u>DIY TOOLS</u>

 "Do it yourself " or "DIY" culture has become more than a hobby and has be come an industry, one maker at time. Through maker channels such as Etsy™, individuals can develop and distribute to customers without third party distribution channels such as storefronts. Events like "Maker Fair" are showing products built on demand. Objects like MakerBot™, a home based 3d printer, show the potential of users to share information and schematics to be able to print at home.

As tool creation is become digital, projects that can be fueled by crowd sourced services such as Kickstarter™, and Indiegogo™, have found an audience before the product is made and be developed in small batches of distribution. Companies such as Shapeways™, and Ponoko™,

offer digital fabrication as a service so that anyone can rent time on 3D printers or computer controlled milling machines.

Implication: Individual Ownership, Standalone Technology, Multi-Function

In thinking about domestic objects, the polarities most affected in this trend are Individual Ownership, Standalone Technology, and Multi-function utility. The DIY trend implores a 'hack to own' outlook so customers in this trend prefer individual customizing the product and identify themselves as a 'maker'. Objects may be constructed with digital means, however are not connected to a digital network. Often products are adapted from its original intent to create something new, and in this transformation create multiple use functionality through its manipulation.

ECONOMICS

<u>MAKE ME SOME LEMONADE</u>

Micro entrepreneurs have flooded the marketplace selling goods and services based on expertise. "Etsy™, created the craft fair of the future." Claims Alison Arief, of Wired™, magazine. In 2012 it has sales of $900 million up 70.3 percent from the year before.

Kickstarter™ and Indiegogo™ are websites that allow people to pitch projects to other users for potential micro funding. Different tiers of investment allow different rewards, often a first ownership of a product. Investment however is not without risk. A number of failed research and development based project that were unable to deliver product to market. Mythic™ an action game from a fake company that raised almost $5,000 before it got shut down. Eyez™ a HD video-recording glasses that accumulated $343, 415 and 2,000 backers and has missed it's shipped date for over a year. It is an opportunity for people to build "nutty" projects. The Robocop

statue, world's largest jockstrap for the Guinness world records for example have been successfully crowd sourced financed by Kickstarter™.

Implication: Multi-Function, Individual Ownership, Standalone Technology,

Micro entrepreneurs are developing products at a small scale for individual ownership for exclusive early entry in the marketplace with limited distribution. Products may have multi-function in purpose as to have the most unique feature set as a catalyst for the product to reach the market. With customers contributing different tiers of financial contribution, different levels of product functionality can be achieved. The greatest impact is standalone technology objects where the sophistication of digital technology is limited, given the small start-up teams.

CROWD SOURCE EVERYTHING

With crowds becoming product advocates in a real localized way, entrepreneurs have gone straight to market to assess interest in products. Success is often predicted before the product is even made. Larger companies have seen the success of micro-funded campaigns and are introducing crowd sourced developed products in the market place.

Muji™ a Japanese haute design store specializing in low process to shoppers in Tokyo and Paris, made close to $2 billion last year from ideas generated though crowd sourcing.

Mobile product services such as YELP™ and Foursquare™, are based on crowd sourced contributions and recommendations on local patrons. American newspaper USA today dubbed the recent Superbowl as the "crowd sourced bowl" based on the number of ad campaigns who used crowd-sourced techniques.

Istock Photo™, used crowd sourced photography as part of their business model, and in 2006 and took in twelve million in 2012 the projected income from Goldman Sachs is projected at two hundred and sixty-two million.

Implication: Single Function, Social Ownership, Network Technology

In thinking about domestic objects, the polarities most affected in this trend are social ownership, network technology and single function utility. The premise of trend is that customers are generating design and sharing it with a common audience. Network technology is a key aspect as it allows customers to engage with each other as part of the techno-social aspect of the experience. Often, the products have a single functionality in its utility such as Yelp™ which offers recommendations left by other customers.

HAVING FUN STANDING STILL

In economic strained times, North Americans are looking to stretch their dollar farther. "Staycations" or vacations at home, enjoying the city they live in or buying in group buy in bulk masses such as group on, so the increase in a frugal based economy where value and dollars spent do not necessarily go hand in hand. Improving one's personal environment through the addition of objects may be a key aspect of this trend where one cannot afford unique travel experiences and instead purchases luxury goods at home (preferably at a discount).

Implication: Multi-Function, Individual Ownership, Network Technology

In thinking about domestic objects, the polarities most affected in this trend are Individual ownership, Network technology and multi-function. Individual ownership is an important aspect to this trend. Money is spent in a frugal manner, however what drives this trend is individual experiences and status. Objects may offer more functionality as a result to stretch a

dollar further, and the network capabilities is an important method for products to be purchased for group discount of the collective community. Objects themselves may shift to embody these polarities.

ECOLOGY

GROW SOMETHING

Coming out of the locally grown and 100-mile diet movements, consumers have brought the question of buying food closer to home, and have started growing their own food even in small urban space.

An increased industry of vertical window gardens have been developed specifically for city dwellers with lack of outdoor spaces. Companies such as "plants on walls" who build felt pocket made for wall spaces at home, or Brenda Riley's "Window Farms" building home kits for urban dwellers to grow vegetable gardens at home. Cities are being challenged with legalizing zones of urban farms with chickens and other typical farm animals to inhabit backyard spaces.

Implication: Single function, Individual Ownership, Standalone Technology

In thinking about domestic objects, the polarities most affected in this trend are individual ownership, standalone technology, and single functionality. This trend points to the individual need to own and cultivate their own garden product. Even by purchasing food products locally, the individual is making a conscious choice in purchasing fresh items for themselves. Although technology might be used to develop products like window gardens, the objects themselves are not networked to a community as part of its core functionality. In the case of the window garden, it's single function, is to provide fresh produce in limited spaces at home.

<u>MY HOUSE HUGS TREES</u>

Eco Housing and integrating natural conversions of energy into the home has now become a feature set of new urban development projects. Solar power farms, grey water toilets, temporary shelters made of paper, developing sustainable homes have been an important signal to consider how the home fits in its environment and leans into borrowing power rather demanding it.

Implication: Multi-Function, Individual Ownership, Standalone Technology

In thinking about domestic objects, the polarities most affected in this trend are individual ownership, standalone technology and a multi-function in its utility. Domestic objects shaped by this trend, would be owned and be an integral element within the home. In its eco-friendly build, it would operate in a multi-purpose, multi-function way being sustainable, in addition to completing it's designed function. An example of this would be a grey water toilet. Objects within this trend would most affect the standalone technology polarity, with no need to be connected to a networked community.

<u>POWER UP</u>

With the increasing need to plug in things from small devices to hybrid vehicles the global electricity demand has been projected to nearly double from the year 2010 to 2030. Power generation and distribution are looking for looking at new ways to generate cheaper and sustainable energy. A shift to natural materials and methods such as wind and solar power energy are being further developed as a new means of cheap sustainable power. A depletion of natural materials, such as lithium used to power batteries raises the question how we can develop smaller, sustainable power into designed objects.

Implication: Multi-Function, Individual Ownership, Standalone Technology

In thinking about domestic objects, the polarities most affected in this trend are

Individual ownership, standalone technology and multi-function in its utility.

Products in this trend would be individually owned, and need to find a power source to be used. It

may serve a multi-function, a need substantial power in order to operate over a long period of

time for example an MP3 player or a hand held video game device. It would be considered a

standalone technology, and it's purpose for individual ownership, not connecting to peers in a

network.

POLITICAL

REGULATED GARBAGE

As government becomes more involved in the waste economy, regulated garbage is how we can

dispose of products in cost-effective way to the city and overall to the environment. In some cities,

government has provided additional services for home dwellers to separate their garbage from

recycling for separate pick up and have placed a cap on how much garbage a home can put out

for pickup with additional cost being assessed. Legislation is have been considered in certain

cities on how companies are polluting the environment through waste and processes, and are

being more active in setting up regulations to limit corporate waste. In some cases, up-cycling

has being incorporated in business case models, specifically from the textile industry where

customers can bring clothing back to stores for a rebate, and clothing manufactures can use the

textiles as material toward a redeveloped product.

Implication: Individual Ownership, Standalone Technology, Network Technology

In thinking about domestic objects, the polarities most affected in this trend are individual

ownership, standalone technology and networked technology. As products are purchased the

waste associated with the purchase is being examined in this trend. The packaging as well as the lifecycle of the product is being considered. Technology plays a factor on both polarities, whether it is the waste associated with 3D printed objects on demand, or the lifecycle of a technology embedded product where the technology is obsolete before the end of its functional use.

<u>KNOCK IT OFF</u>

In the current uptake of 3D printing, products are easily replicated and printed on demand for instant manufacturing. Piracy has shifted from the black market to the home market, where users can share schematics to print objects at home.

As the cost of printing declines, and that open designs become more predominate, lawmakers will need to adapt and regulate what is piracy and how designs can be shared without infringing on product design company products.

Implication: Single Function, Individual Ownership, Standalone Technology

In thinking about domestic objects, the polarities most affected in this trend are individual ownership, standalone technology and single functionality. Personal ownership of an individual object, and the rights to the design of the object is in question. If a knock off a high end designed product is available to be printed on demand, what are the ownership rights of the designer? An example of domestic object that could be printed is a coat hook. Although technology is used to design the product, the 3D object does not have network capabilities, and primarily designed to have a single function.

DISOLVING MONUMENTS

With the increase of individual's digital footprint, lawmakers are deciding if users can have a digital right to dissolve or preserve their online presence. Can a person have the right to erase their name from Google, and online social networks permanently once they have passed on? What happens to their user name, twitter handles or email address? Do these address go back into circulation? Or does one's online presence stay preserved? Who owns your iTunes music library when you pass away? With more questions then answers lawmakers are shaping policies based on these questions. Other companies such reputation.com have built their business on erasing parts of your online presence that comes up in a Google search.

Implication: Single Function, Individual Ownership, Network Technology

In thinking about domestic objects, the polarities most affected in this trend are individual ownership, network technology and single function utility. Who owns someone's digital products and identity once they have deceased? Does the corporation who owns the platform have the right to dissolve such archives? Domestic products in this trend are networked inherently its design. It is built as a techno-social product connected to a community and has primarily a single function or goal for the consumer.

VALUE

DELAYED MARRIAGE

Statistically, North American marrying age has shifted until much later in life. The population reference bureau of the United States indicates woman are delaying marriage until after university, and often the more educated the less children the woman with only a high school education. Women with a high school education are shown statistically to have on average 2 children, compared to women who have a graduate degree who have 1.6 children. Statistics from

the national health statistic report of the United States show that first marriages are delayed and that co-habitation is on the rise from 3 to 11%. Forbes magazines indicated that smaller households could be a factor of Millennial s view on family, work and friendship indicating that compared a 1992 study of Wharton College graduates to a recent graduating class, that women today are more inclined they can do greater good through work, rather than motherhood. The delay on dual income households, shows that consumer behavior patterns are starting to shift and that buying for the home, is in fact buying for one's self. It could show more temporary furnished options rather than long term purchasing and delayed home buying.

Implication: Individual Ownership, Network Technology

In thinking about domestic objects, the polarities most affected in this trend are individual ownership and network based technology. As products become more customized for an individual rather than for co-habitation or shared households. This trend has an important impact on Network technology from the shift of single person's network to a community to be engaged socially, to a couple's network to each other in relation to home affairs and managing personal relationships in their shared network.

STACKABLE HOMES

According to the Wall Street Journal, for the first time in decades, many US cities are growing faster than their suburbs. This reflects the shifting values of urban living.   One reason for the shift back to urban areas may be improvements in quality-of-life factors, such as safety and access to cultural amenities.

According to Census data released in 2012, in 27 of the United States' 51 largest metropolitan areas, city centers grew faster than suburbs between July 2010 and July 2011. By contrast, from 2000 to 2010 only five metro areas saw their cores grow faster than the surrounding suburbs.

Implication: Multi-Function, Individual Ownership, Network Technology

In thinking about domestic objects, the polarities most affected in this trend are individual ownership, networked technology and multi-function. As prices become a premium for square footage, ownership of spaces and objects will be most impacted in this trend. Objects must be multi-functional in nature to accommodate efficiency in living dense urban centers. It may be networked, to be engaged with the community and be inline with values of moving to a dense city center to be closer to cultural amenities.

<u>EXPERIENCE BASED GIFTS</u>

Experience based gifting over object-based gifts are on the rise. Gifts such as travel, courses, or other event based experience unique for the intended individual. The goal of a unique experience based gift is memory driven based on action, rather than memento or need for a specific artifact to celebrate the occasion. Retailers are responding creating event based experiences according to the Wall street journal such as surprise-based tweet gifting with Starbucks or creating a more comprehensive in store experience unique to the shopping experience.

Implication: Multi-Function, Individual Ownership, Standalone Technology

In thinking about domestic objects, the polarities most affected in this trend are Individual ownership, standalone technology and multi-function. The importance of owning ones own experiences as a unique product offering is predominating in this trend. Technology factors are limited and overall any products in this trend are designed for an individual rather than a networked community. It may be multi-functional in its ability to be considered a gift to pass on to others providing them a unique experience. The greatest implication of this trend is an individuals lack of need for materiality where the experience supersedes material value objects.

APPENDIX B: A GUIDE FOR DESIGNERS

Having a common framework to discuss approaches on product innovation is an important aspect to consider when working in teams with diverse specialties. It allows designers, engineers, business leaders and technologists to work in a collaborative way to frame problems and design solutions.

This guide acts as a rational process to consider as an iterative cycle on developing a product and anticipate future needs of an audience.

1) First, ask a big question.

In conceptualizing a new product for the market, it is important to frame and define the problem.

If for example, your client is interested in developing a product for an aging population questions like: "*How to develop a bathmat for an aging population?"* may be too specific. Start with a broad question such as *"What new products could accommodate an aging population at home?"* Questions can be further refined and revisited later on in the process.

2. Is there a need for this product?

The next step is researching and validating the question. Is this the right question to ask? Examining what other products address this problem, and what is currently being available on the market may aid in framing the question. This research could reveal facts about your intended audience such as: places in the home that have the highest rate of injury for an aging population, products most often used, products that could be improved specifically for an elderly audience.

Benchmarking technologies that maybe of service aids will be noted in this step. New technologies, materials or opportunities could factor into the prototype phase later on.

3. Brainstorm

Brainstorming can be both a collaborative and individual based design process and can incorporate a variety of frameworks and methods. This guide illustrates a select group of methods to be used in combination. Horizon scanning, FOT Cube model, World Design, Ideational drawing can be used as a primary methods leading to the prototype proof of concept stage of a designed product.

3a) Horizon Scanning

Horizon scanning can be a method used to set a scope of current signals and trends that may shape the scope of the project. Using a framework, such as the STEEP V, allows a wide survey of trends to be examined beyond one specific category. Understanding Social, Technological, Economic, Ecology and Value based trends.

First, start revisiting your research question, and research signals in this area. Key questions to investigate in this process are:

What are trends that are starting to emerge based on the grouping of signals?
What are the impacts does that trend have?
What is driving this trend?

Organizing the trends using a framework like STEEP V, and naming each trend to identify further classify the trend is a necessary step.
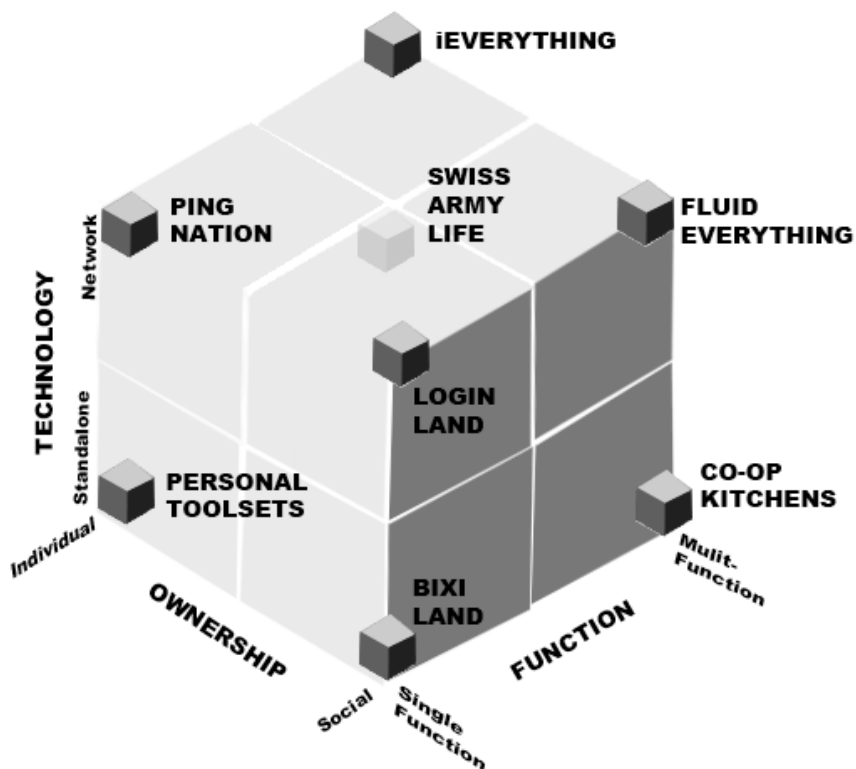
3b) FOT CUBE and World Design

The FOT Cube allows the designer to situate the logic of the world and who inhabits it. It creates an understanding of where what the object does, for whom and its relationship to a digitally connected network.

Using trends developed in the horizon scan process, filtering them through the cubes axis polarities to note where are the critical impacts on the FOT cube will shape the world design. Key questions to ask in this world design are:

What is the logic of the world?
How does the trends influence the logic of this world?

4) Ideational drawing

Ideational drawing is an improvisational action technique based on the criteria provided in the world design process. The act of drawing is generative and designers should limit themselves, or censor themselves during this stage of inquiry. This process is highly exploratory, and the goal is to generate as much material in as possible in a limited amount of time to build on each drawing.

Questions that may considered during the drawing process:

What does this world look like? Who lives here?

What would the identified person(s) use in this world?

What common objects might not exist in projected time frame?

How will an object change in the projected time frame?

How do trends identified influence this world and affect objects?

What new problems are suggested by the drawing?

It is important to consider, what specificities you as a designer have started to address. When the drawing begins to break down into the logic of the object, (in how it moves or bends for example) it may be moving past the ideational stage and more of a descriptive drawing of a potential prototype.

4b) Order the drawings.

In this stage designers can start to order the drawing based on an agreed hierarchy, and if it address the initial research criteria. This is a ranking drawings demonstrates a selection process by the designer or team, to move forward into the next stage of the product design process.
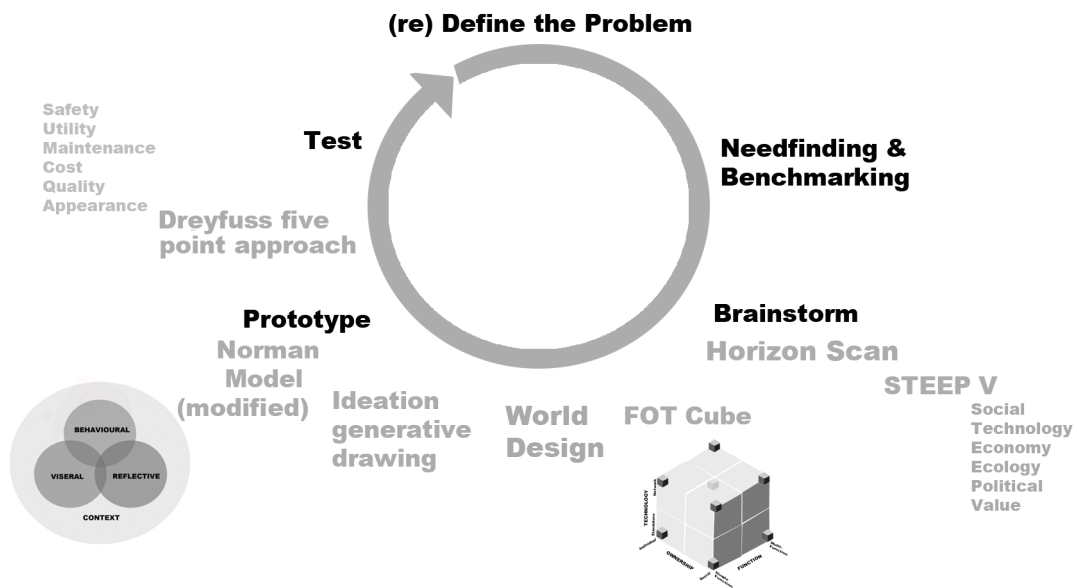
5) Prototype

The goal of this phase is to move forward and design a solution for the intended framed problem. Designers will work with their team to develop a proof of concept. Understanding the visceral,

behavioral and reflective qualities of the product and how this fits with the intended consumer of the product is important to understand in this planning phase to understand it's viability.

Further concerns in understanding the viability of the prototype is to consider product design factors such as safety, utility, maintenance, cost, quality, appearance. A greater definition of the value proposition will be developed in this stage to understand the viability of this product in the marketplace.

6) Testing

Testing will understand issues in the designed solution. This may be technical, usability or design factors that need to be further considered. Frequently, a return to the prototype stage is needed to iterate and further refine the product.

7) Revisit the question.

In ending the cycle of product development, it's important to revisit the initial research question.

Have you done what you sought out to do?

What is the value proposition of the product?

Defining the value in what the product does, who does it serve and how, will create a greater clarity on the designed intention and how this product will serve as an innovative solution in the marketplace.