# EXAMINATION OF THE DESIGN PROCESS OF REPURPOSED APPAREL AND ACCESSORIES: AN APPLICATION OF DIFFUSION OF INNOVATIONS THEORY

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EXAMINATION OF THE DESIGN PROCESS OF REPURPOSED APPAREL AND ACCESSORIES: AN APPLICATION OF DIFFUSION OF INNOVATIONS THEORY

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Abstract: The overconsumption of fashion products has resulted in an abundance of second-hand apparel and textiles, which are still functional, but have been discarded because they are no longer fashionable. This second-hand apparel can be recycled in various ways, including repurposing the fabric into a new apparel and/or accessory product. This method of apparel and textile recycling was the focus of this study. Apparel designers creating repurposed apparel and/or accessories were surveyed to better understand the process they go through when repurposing apparel and textiles. Roger's (1983) Diffusion of Innovations Theory was used as the theoretical basis for this study. The innovation characteristics were used to predict the designer's current and future usage of the process of repurposing. The researcher also measured the designer's opinion leadership and environmental awareness to determine the effect on the perceptions of the innovation characteristics and the current and future usage of the process of repurposing. Results of the content analysis show there is no standardized process for repurposing and a proposed process was created as a result of this study. The results of the multiple regression indicated that the innovation characteristics are significant in predicting the current and future usage of the process. The results of the MANOVA indicated no significant difference between the levels of the designer's opinion leadership and environmental awareness on their perceptions of the innovation characteristics or their current and future usage of the process of repurposing. Repurposing apparel and textiles could be a solution to the problem of fashion overconsumption and could keep unwanted second-hand apparel and textiles out of the landfill and preserve precious natural resources for future generations.

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# CHAPTER 1

## INTRODUCTION

Environmental sustainability has been the interest of researchers for over a decade. However, the nature of the fashion industry is contradictory to this movement. The creation of fashion products uses resources, increases the impact on the environment, and generates waste (Fletcher, 2007). As fashions change every season, the consumer is enticed to purchase new apparel styles, resulting in very high levels of material consumption. Consumers often discard their old, yet still functional apparel. Gregory (1947) refers to this as purposeful obsolescence, where apparel becomes prematurely obsolete, not because it is no longer functional, but because it is no longer fashionable. Therefore, consumers are psychologically induced to replace goods that are still useful. This results in an abundance of second-hand clothing with no apparent purpose.

While some of this clothing may still find a second life with new consumers, a majority is unwanted because it is no longer fashionable. This still functional, used clothing is often thrown away or donated to a second-hand store. According to the

Council for Textile Recycling (1997), textiles account for 3.9 million tons of the solid waste stream, or about 4% of the total content of landfills. This may not seem like much, but it is overwhelming to know that almost 100% of this textile waste is recyclable. Consumers primarily recycle their clothing and textiles through donation to a thrift or charity store followed by passing them on to friends or reusing as rags (Domina & Koch, 1999). The least used methods of recycling are consignment, garage sales, and modifying for reuse. Unwanted, yet still functional clothing is an untapped resource. Finding a purpose for this clothing and developing a method to produce it could reduce waste and save precious natural resources.

Textiles and clothing can be recycled and/or reused in three ways: 1) at the fiber stage where it is shredded into fiber fluff and re-spun into yarns or used for a variety of other purposes, such as stuffing for furniture; 2) at the garment stage, where it is donated to a thrift or charity shop and made available for resale and; 3) at the fabric stage where it is taken apart and the fabric is used to create a new product. According to Birtwistle & Moore (2007), consumers are unaware of the need and the importance for clothing recycling and lack knowledge of how and where to dispose of clothing. This agrees with suggestions made by Hawley (2000) and Domina & Koch (1997) that consumers need to be educated that nearly 100% of their used clothing is recyclable and that numerous markets exist for used textile and recycled fiber products. In addition, Birtwistle & Moore (2007) and Hawley (2000) agreed that the reuse of textiles and the purchase of products made from recycled textiles needs to be embraced by consumers.

There has been very little research on repurposing apparel or accessories as a form of textile recycling. Therefore, there has been no identified design or product development

process for the creation of repurposed apparel or accessories. Research does exist for sustainable design practices in a broader scope and generally speaking, repurposing has been included as a subset of sustainable apparel product development. This is true for the Cradle to Cradle Apparel Design Model introduced by Gam, Cao, Farr, & Heine (2009). This model encourages apparel designers to consider the afterlife of a product throughout the design and product development process. Reusing apparel is included as a possibility for the product after it is no longer desirable to its original owner. This model mainly stemmed from the Cradle to Cradle philosophy as popularized by McDonough & Braungart (2002). This philosophy includes the idea that waste equals food where waste should either be returned to the earth safely to nourish new growth, or it should be recycled to create a new product. In addition, Fletcher (2007) included repurposing as a possible solution to the problem of overconsumption of apparel and textiles. Further research, specifically related to designing repurposed apparel and/or accessory products, is needed to determine if this is a viable solution to this problem.

For decades, research has been conducted regarding how innovations diffuse through social systems using Rogers' Diffusion of Innovations (1983) model. Most of the research focuses on new, innovative technological products, measuring the characteristics of the innovation. The original five innovation characteristics as introduced by Rogers (1983) are relative advantage, compatibility, complexity, trialability, and observability. These characteristics help researchers understand how, why, and to what extent an innovation will be successful or unsuccessful. However, very little research exists regarding a process as an innovation, nor combining repurposed apparel and/or textiles with Diffusion of Innovations Theory, as proposed for this study. Determining the

perceived innovation characteristics of the process designers go through when repurposing apparel and/or textiles will allow the researcher to understand if this process is considered innovative and subsequently, how it will diffuse through the social system and continue to provide an environmentally sustainable option for designers and consumers.

## Statement of the Problem

Little research has been conducted on the repurposing of textiles and apparel, but numerous studies have been conducted on other forms of sustainable apparel such as organic cotton apparel or apparel made from renewable resources. While this is a step in the right direction, extensive energy and resources are still being used to create this apparel. According to Woolridge, Ward, Phillips, Collins, & Gandy (2006), reusing one ton of polyester only uses 1.8% of the energy used to produce virgin polyester and reusing one ton of cotton only uses 2.6% of the energy used to produce virgin cotton. Recycling textiles prevents additional waste from entering the landfills and it saves energy as well. Meanwhile, there is an excessive amount of second-hand clothing that exists as possible raw materials for repurposed apparel. Very little energy and resources are needed to re-create it into something more fashionable that consumers would be willing to purchase. According to Fletcher (2007), products should be kept in their most valued state for as long as possible and when the product is no longer valued it should be reused as it is, repaired or reconditioned, or recycled to its most basic state. Each of these levels requires slightly more energy than the previous level. For apparel, the most valued state would be the garment state (Fletcher, 2007). However, when the garment is considered to be out of style by the consumer, it is no longer valued and cannot be reused

as it is. Therefore, the garment should be reconditioned (or repurposed) to the fabric stage in order to gain the greatest possible value. While slightly more energy is required to recondition or repurpose the product than reusing it as it exists, much more energy is required to recycle the product to the fiber stage. Recycling to the fiber stage is referred to as down cycling, which refers to downgrading the quality of materials and creating an inferior product (Fletcher, 2007). While most of the research regarding sustainability and apparel has been focused on the consumer, the move toward more sustainable practices in the fashion industry needs to come from within, from the designers and producers of apparel. Domina & Koch (1998) suggested that the participation of retailers and manufacturers is critical to the success of incorporating sustainable practices into the fashion industry. Decisions made during the design process of a product account for 80% of a product's environmental impact (Fletcher, 1998). Change needs to occur with the products being designed and with the process of designing them. Therefore, this study will focus on the designers of repurposed apparel, their environmental awareness, and design process.

## Purpose Statement

There are designers who focus on design and production of repurposed apparel. However, it is mostly individually produced where each garment is unique, one of a kind, and therefore is sold at a premium price (Fletcher, 2007). Developing a system where repurposed apparel could be mass-produced on a small-scale could more efficiently utilize the excess of second-hand apparel and lower the selling price, making repurposed apparel more attractive to the consumer. The purpose of this study is threefold: 1) to identify the process apparel designers use to repurpose apparel and/or textiles into apparel and/or accessories; 2) to determine what perceived innovation characteristics influence the current and future usage of this process; and 3) to determine the differences in perceived innovation characteristics of the process and current and future usage of repurposing apparel and/or textiles in terms of the designer's level of opinion leadership and environmental awareness.

## Research Questions

Based on the aforementioned purposes of this study, the following research questions and hypotheses will be addressed:

1. How do designers of repurposed apparel create their products?

2. How do the design processes of designers of repurposed apparel and/or accessories differ based on their motivations for repurposing apparel and/or textiles?

3. How do the perceived innovation characteristics of the process of repurposing apparel and/or textiles influence the current usage of the process of repurposing?

H1: The designer's perceptions of the innovation characteristics will significantly predict their current usage of the process of repurposing.

4. How do the perceived innovation characteristics of the process of repurposing apparel and/or textiles influence the future usage of the process of repurposing?

H2: The designer's perceptions of the innovation characteristics will significantly predict their future use of the process of repurposing.

5. How do the designer's levels of opinion leadership and environmental awareness influence the perceived innovation characteristics of the process of repurposing apparel and/or textiles?

H3a: There will be a significant difference between the levels of opinion leadership on the perceptions of the innovation characteristics

H3b: There will be a significant difference between the levels of environmental awareness on the perceptions of the innovation characteristics.

H3c: There will be a significant difference on the levels of opinion leadership and environmental awareness on the perceptions of the innovation characteristics

6. How do the designer's levels of opinion leadership and environmental awareness influence their current usage of repurposing apparel and/or textiles?

H4a: There will be a significant difference between the levels of opinion leadership on the current usage of repurposing

H4b: There will be a significant difference between the levels of environmental awareness on the current usage of repurposing

H4c: There will be a significant difference between the levels of opinion leadership and environmental awareness on the current usage of repurposing

7. How do the designer's levels of opinion leadership and environmental awareness influence their future usage of repurposing apparel and/or textiles?

H5a: There will be a significant difference between the levels of opinion leadership on the future usage of repurposing

H5b: There will be a significant difference between the levels of environmental awareness on the future usage of repurposing

H5c. There will be a significant difference between the levels of opinion leadership and environmental awareness on the future usage of repurposing

Working Definitions

This section includes the definitions of terms as used in this study.

1. Repurposing apparel and/or textiles: The process of recycling apparel and/or textiles to the fabric stage and using the fabric to create a new product.

2. Repurposed apparel and/or accessories: An apparel or accessory product created from fabric that had previously been a different apparel or textile product.

3. Innovation Characteristics: Five characteristics, as introduced by Rogers (1983), that help to explain the rate of adoption of an innovation. These are relative advantage, compatibility, complexity, trialability, and observability.

4. Opinion Leadership: The degree to which an individual is able to influence other individual's attitudes or behaviors informally with relative frequency (Rogers, 1983).

5. Environmental Awareness: An individual's worldview as it pertains to the environment and humans' relationship to the environment (Dunlap & Van Liere, 1978).

## Assumptions

Designers of repurposed apparel are reusing apparel and/or textiles to develop their products. Because there is a lack of research regarding repurposing apparel and/or textiles, it can only be assumed that the process of designing repurposed apparel and/or accessories, and therefore the final product is environmentally-friendly. One of the purposes of this study is to further understand the process that designers of repurposed apparel and/or accessories go through when designing their products. The assumptions for this study are as follows:

1. Designing repurposed apparel and/or accessories is beneficial for the environment.

2. The designers of repurposed apparel and/or accessories have a design process that they follow and can explain that process.

## Limitations

Due to geographical constrictions, this study focused on designers of repurposed apparel and/or accessories who sell their products online and only included apparel and/or accessory products that were previously an apparel or textile product. Therefore, the results cannot be generalized to designers of any other type of environmentally-friendly apparel, such as organic cotton apparel. The results also cannot be generalized to designers of other types of repurposed products, for example, t-shirts used to make rugs or polyester apparel made from recycled plastic. Since this study focused on designers who sell repurposed products online, designers who do not sell their products online could have a very different design process and the results of this study cannot be generalized to designers who do not sell their products online.

# CHAPTER II

# LITERATURE REVIEW

This section will examine the existing literature as it relates to this study. It will begin with a review of environmental awareness in general followed by environmental awareness as it relates to apparel. An explanation of textile recycling is included to understand why repurposing is important and beneficial to the environment. Because this study will examine the process of designing repurposed apparel and/or accessories, literature is included regarding other sustainable design and product development processes. Finally, the theoretical framework will be reviewed including sections regarding innovation characteristics in general, innovation characteristics in apparel literature, opinion leadership, and research over fashion opinion leadership.

## Environmental Awareness

A major change in society in the last two decades has been increase

environmental awareness on the part of the consumer. It is clear that increased environmental awareness is not just a fad, but has become an accepted part of our society (Domina & Koch, 1998). For the purposes of this study, environmental awareness will be defined as an individual's world view as it pertains to the environment and humans' relationship to the environment (Dunlap & Van Liere, 1978). Research has primarily focused on consumer's environmental awareness and concern as it influences their behavior, specifically their environmental behaviors. This includes purchasing behavior as well as disposal behavior. Research, dating back to the early 1970's, has identified the demographic and psychographic variables used to predict environmentally-conscious behavior, with mixed findings. Studies have indicated that environmentally-concerned consumers tend to be female (Fernandez-Manzanal, Rodriguz-Barreiro, & Carrasquer, 2007; Zelezny, Chua, & Aldrich, 2000; Koch & Domina, 1997), have a higher social class (Webster, 1975; Tucker, 1981) and receive a higher income (Tucker, 1981). Tucker (1981) also found that age was not a significant predictor of a consumer's environmentally-conscious behavior. In contrast, Balderjahn (1988); Kinnear, Taylor, & Ahmed (1974) and Butler & Francis (1997) found that there was no clear picture of the environmentally-concerned consumer. They also found that demographic, socioeconomic, and cultural variables were not good indicators of environmental behavior as a whole and that each specific environmental behavior had its own set of predictors. In addition, Balderjahn (1988) found that consumers who have a positive attitude toward environmentally-conscious living are more likely to participate in environmental behaviors. Domina & Koch (1997) suggested that psychographic variables, rather than demographic variables were better predictors of environmentally-

friendly behaviors. These variables included level of environmental awareness and knowledge about environmental issues in general. Domina & Koch (1997) also found that consumer behavior can change based on the type of product. For example, consumers behave differently when purchasing or disposing of apparel and textile products than they do other products.

In terms of apparel, there are few studies regarding general environmental awareness and apparel consumption. A majority of the research is focused on specific behaviors and is related to either environmentally-friendly apparel purchasing behavior or disposal behavior. Environmentally-friendly apparel behaviors need to be studied separately from other products because of the wide range of variables that must be considered when purchasing apparel, such as style and fit. However, Butler & Francis (1997) found that consumer's general environmental awareness influenced their environmentally-friendly clothing attitudes, which in turn influenced their environmentally-friendly clothing purchasing behavior. Butler & Francis (1997) found that education was not a good predictor of environmental awareness or environmental purchasing behavior, but that age was. They found that older consumers were more environmentally aware and considered the environment more in purchase decisions than younger consumers. This contradicts findings by Tucker (1981) that age is not a significant predictor of environmental behavior. Kim & Damhorst (1998) found that consumer's environmental awareness was not linked to their knowledge of the environmental effects of apparel products or to environmentally- responsible apparel consumption. Research by Butler & Francis (1997) found that consumer's environmental awareness does influence their clothing purchasing behavior. Regarding apparel disposal behavior, Shim (1995) found that environmental

awareness had a positive influence on two environmentally-friendly disposal methods; donation to a thrift or charity shop and reuse. While the existing research over environmental awareness focuses mainly on the consumer, this study will measure the environmental awareness of the designers of repurposed apparel. This could help to explain their motivation for designing repurposed apparel, which could be considered an environmentally-friendly behavior. As previously discussed, research has shown that each behavior should be studied individually as predictors differ for each type of environmentally-friendly behavior. Therefore, this study will measure the designer's environmental awareness to determine if it affects their usage of the process of repurposing, as well as their perceptions of the characteristics of the process.

## Textile Recycling

To understand why repurposing is an important and viable way to incorporate sustainability into apparel design, it is necessary to understand the other ways in which textiles can be recycled. According to Domina & Koch (1998), textiles and apparel provide a largely untapped resource with great reusing or recycling potential. Textiles can be recycled at the fiber stage, at the garment stage, or at the fabric stage. Recycling at the fiber stage involves grinding used apparel and/or textiles into fiber fluff where it can then be used as stuffing for other products or re-spun into new yarn. Recycling at the garment stage involves re-using the garment as it exists, which can include donation to a second-hand store and made available for resale. Recycling to the fabric stage requires that the garment be deconstructed into fabric and the fabric redesigned into a new product.

Garments can be recycled to the fiber stage if the fabric is too stained or damaged to be reused as a whole garment or as fabric. Second-hand clothing can be re-sold as is if it is still in good condition and is still desirable to the consumer. If it is not desirable to the consumer, but the fabric is still in good condition, it can be deconstructed to the fabric stage and redesigned into a new, more desirable product.

Textile Recycling at the Fiber Stage

Numerous studies have been conducted regarding the first method of textile recycling, mechanically or chemically reducing textiles to the fiber stage. This includes physically or chemically reducing apparel or textiles to their most basic state, a fiber. Research consists of textile testing on recycled fibers and possible end-use markets for recycled fibers. Chang, Chen, & Francis (1999) conducted a study of market applications for post-consumer fibers including cotton, polyester, acrylic, wool, nylon, and silk. They found eight possible market applications for these fibers: carpet cushion, home insulation, fiber stuffing for furniture and automobiles, clean-up products, mattress pads, geotextiles, concrete reinforcement, and landscaping. These applications were selected because shredding of the fabrics could be done without sacrificing the performance characteristics of the products, the price was comparable, and no re-processing was needed. This agrees with research by Wang, Wu, & Li (2000) that recycled carpet fibers are a viable material for concrete reinforcement. Additionally, paper-making has been identified as a possible end-use for recycled silk fibers (Ruoyan, Haruhiro, & Teruo, 2009 and Ruoyan, Teruo, & Haruhiro, 2010).

Numerous studies have been conducted over various fiber qualities of recycled fibers. These include water retention and absorbency of recycled spherical fiber assemblies (Higuchi, Kondou, Shimizu, & Takatera, 2010), thickness changes of pre-consumer sweater product waste (Yokura, Sukigara, & Fujimoto, 2007), durability of woven fabrics made from recycled polyester fibers (Inoue & Yamamoto, 2004), sound absorption of recycled polyester and polypropylene (Lou, Lin, & Su, 2005), tensile properties of recycled cotton (Merati & Okamura, 2004), and nylon (Meyabadi, Mojtahedi, & Shoustari, 2010), and recycled wool for absorbing dye house effluents (Radetic, Radojevic, Ilic, Mihailovic, & Jovancic, 2009). There are no studies to date over the possibility of recycling fiber blends and the qualities of these fibers. Therefore, more research on this level of textile recycling is important.

There is a lack of research regarding consumer purchase behavior of products made from recycled fibers. However, the research is in agreement that consumers are unwilling to pay a higher price for a product simply because it is recycled. Grasso, McEnally, Widdows, & Herr (1995) found that price was an indicator of consumer purchase behavior of sweatshirts, t-shirts, and socks made from recycled fibers. Consumers were only willing to purchase the recycled products when the price was equal to or lower than the non-recycled products. This agrees with findings by Hines and Swinker (1996). The researchers also found that consumers were more willing to purchase apparel products made from recycled fibers if they view the recycled products as not inferior to products made from virgin fibers. Future research needs to be conducted to determine if this holds true for repurposed apparel as well.

Textile Recycling at the Garment Stage

Regarding the second method of textile recycling, making garments available for resale through second-hand or thrift stores, research exists on the consumer disposal of clothing to second-hand stores, as well as the consumer's purchase behavior of second-hand clothing. Birtwistle & Moore (2007) reported that there has been an increase in the amount of donations to thrift stores due to increased consumption of fashion products and faster changing of trends. Consumers are disposing of their clothing sooner in order to keep up with trends. There is an increased amount of second-hand clothing available for resale or other purposes. The most popular method of textile disposal is to a thrift store or charity shop, such as the Salvation Army (Birtwistle & Moore, 2007; Domina & Koch, 1999; and Koch & Domina, 1999). The least used methods of textile disposal are sale to a consignment/ resale shop, and modifying/reusing textiles (Domina & Koch, 1999; and Koch & Domina, 1999). These methods should be encouraged because while they may require more time and effort, they provide economic incentives, and extend the value of the product (Domina & Koch, 1999).

Various studies have been conducted regarding consumer's purchase behavior of second-hand clothing. Steinbring & Rucker (2003) found that 77% of thrift store shoppers were female, 88% were over age 35, and 47% stated that they would like more fashionable second-hand items to be available. Fifty-seven percent of the thrift store shoppers had an annual family income of under $19,000, which supports research by Shim (1995) that resale shopping behavior was not related to environmental attitudes or recycling behavior, but was related to economic necessity. Steinbring & Rucker (2003) researched how to increase the attractiveness of thrift store apparel and improve the thrift store

shopping experience. They found that consumers wanted the merchandise to be clean and well organized and were open to purchasing repurposed items in thrift stores. They also suggested that thrift stores should increase promotional efforts and offer alteration services to their customers (Steinbring & Rucker, 2003). Consumers need to be educated that donating old clothing to second-hand stores or purchasing second-hand clothing is an environmentally-friendly behavior. Repurposing of second-hand clothing could serve as a viable option for those consumers who expressed an interest in more fashionable second-hand clothing.

Textile Recycling at the Fabric Stage

Regarding the final method of textile recycling, using second-hand clothing as raw material for new, repurposed products; very little research has been identified. Young, Jirousek, & Ashdown (2004) researched apparel using post-consumer recycled clothing in which they created a line of functional garments and presented them in a gallery format to measure consumer responses to the garments. The participants in this study found the garments very appealing, valued the design and uniqueness of the garments, and the environmental principles. In addition, it was found that the reconstruction of second-hand clothing into new garments made the wear of second-hand clothing more socially acceptable. It is important to determine whether or not this holds true for fashion-forward clothing, as well as functional clothing. In an exploratory study by Dunn (2008) a line of clothing was developed using post-consumer recycled clothing in which the individual garments were one-of-a-kind and could be considered wearable art. The researcher suggested that repeatability of designs would be feasible if production was more standardized (Dunn, 2008). This suggests a need to develop a standardized system

for the production of repurposed products, whether for apparel products or other types of products.

Repurposed apparel products are currently available, but the companies typically producing and selling these types of apparel are individual designers producing on a small-scale. According to Fletcher (2007), there has been a revival of interest in sewing as a creative practice by a small group of designers and producers of repurposed apparel. They use techniques such as restyling, reshaping, embellishing, and overprinting to give the discarded fabrics a new life and divert waste from landfills (Fletcher, 2007). The types of designers/producers who are selling this merchandise operate through online sites such as Etsy. More established companies and designers, such as Urban Outfitters through their Urban Renewal line and designer Gary Harvey, have begun to explore selling repurposed apparel. The Urban Renewal line is made from repurposed vintage and salvage materials and every item is one-of-a-kind (urbanoutfitters.com, 2011). Designer Gary Harvey's fall 2007 couture collection was entirely created from repurposed materials such as wedding dresses, denim jeans, and sports uniforms (garyharveycreations.com, 2011). Because there are very few established companies selling repurposed apparel, further research is needed to determine how these products are designed and produced. Other companies who are interested in designing and selling repurposed products can better incorporate these methods into their own design processes, utilizing the existing resources of second-hand clothing and keeping it out of landfills.

Two studies were identified in which repurposing has been incorporated into educational settings, namely in apparel design courses. Dragoo (2009) used repurposing to aid

students understanding of sustainability through two projects. The first project required students to redesign damaged samples from an overseas apparel manufacturer and the second project required students to redesign two thrift store garments into various other apparel products. Gam & Banning (2011) incorporated sustainability into a fashion show planning course. The apparel design students chose how to incorporate sustainable principles into their designs. For example, they could choose to use organic fabrics, or fabrics dyed with environmentally-friendly dyes. Thirty-four percent of the students chose to use repurposed post-consumer clothing as the raw materials for their designs. Incorporating the practice of repurposing apparel or textiles into the apparel design curriculum is an important step towards expanding acceptance of the need for repurposing apparel and textiles as apparel design students are the future of the fashion industry.

Textiles and apparel can be recycled at the fiber stage, the garment stage, or the fabric stage. Recycling to the fiber stage is important for the clothing and textiles that are too stained or no longer functional, but this does require extra energy and processing, which is not beneficial to the environment. Repurposing to the fabric stage is the method of textile recycling that the researchers focused on for this study. Post-consumer clothing and textiles provide the raw materials for repurposed apparel. This method of textile recycling requires very little additional chemical or mechanical processing, but can be very time-consuming because of the deconstruction required and therefore, is sold at a premium price. Given that research has shown that consumers are not willing to pay a higher price for apparel products made from recycled fibers, future research needs to address whether or not this holds true for repurposed apparel as well. Identifying the

process used by designers of repurposed apparel and/or accessories can help identify ways to lower the selling price of repurposed products making these products more affordable to consumers.

## Sustainable Apparel Product Development

Varied research exists over the product development processes of traditional apparel and it is important to include this as a basis of comparison for the sustainable product

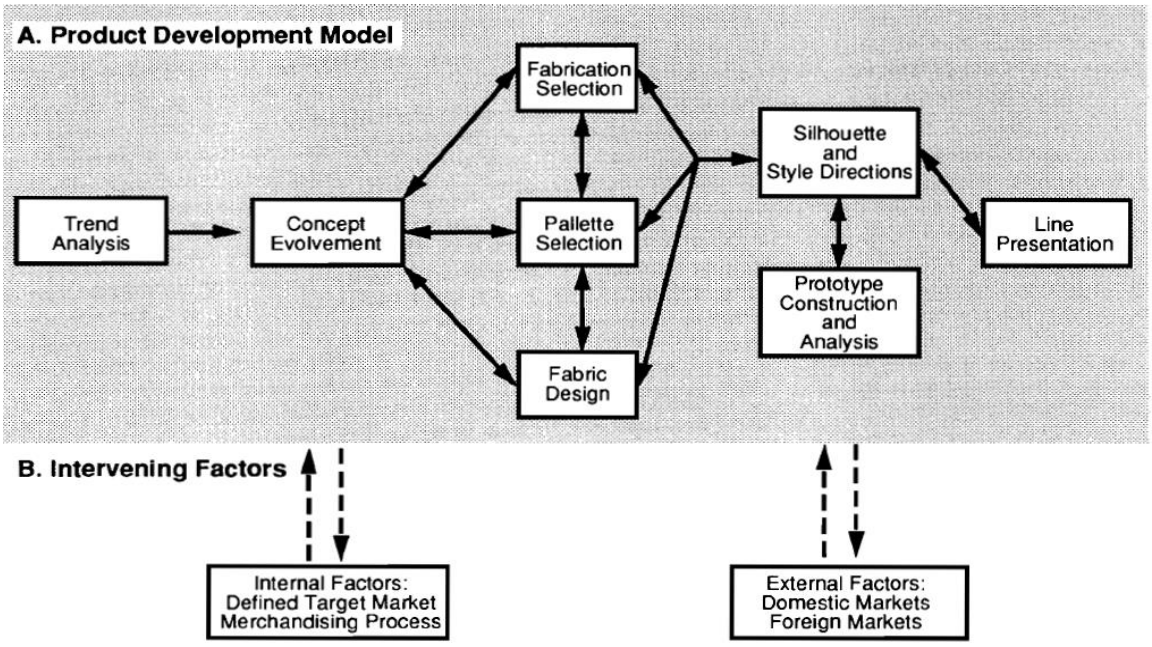



Figure 1: Basic Apparel Product Development Model (Gaskill, 1992)

development models and for the development of a process of repurposing. Gaskill (1992) developed a basic retail product development model based on the investigation of specialty retailers carrying private label merchandise. Figure 1 displays this model.

While no product development process has been developed regarding repurposed apparel, research exists on other product development methods, which incorporate sustainable principles. These stem from McDonough and Braungart's Cradle to Cradle philosophy (2002). The C2C (Cradle to Cradle) philosophy considers the afterlife of a product and is based on the idea that products are either biological or technical nutrients. Biological nutrients can safely biodegrade and return to the earth while technical nutrients are non-biodegradable materials that can be recycled completely and continually (McDonough & Braungart, 2002). This has also been referred to as a closed loop production method. Several companies have incorporated the idea of closed loop production into their business practices. Morana & Seuring (2003) conducted a case study on the Ecolog recycling network, which is a collaboration of producers, retailers, consumers, and recyclers of polyester. The goal of the collaboration is to develop a cycle where polyester clothing is produced, sold, returned to the retailer, melted into granulate, and recycled into new polyester. The outerwear company, Patagonia, through their Common Threads initiative, has created a closed loop for their products. They take any Patagonia merchandise back from the consumer, recycle what they can, and repurpose what cannot be recycled (patagonia.com, 2011).

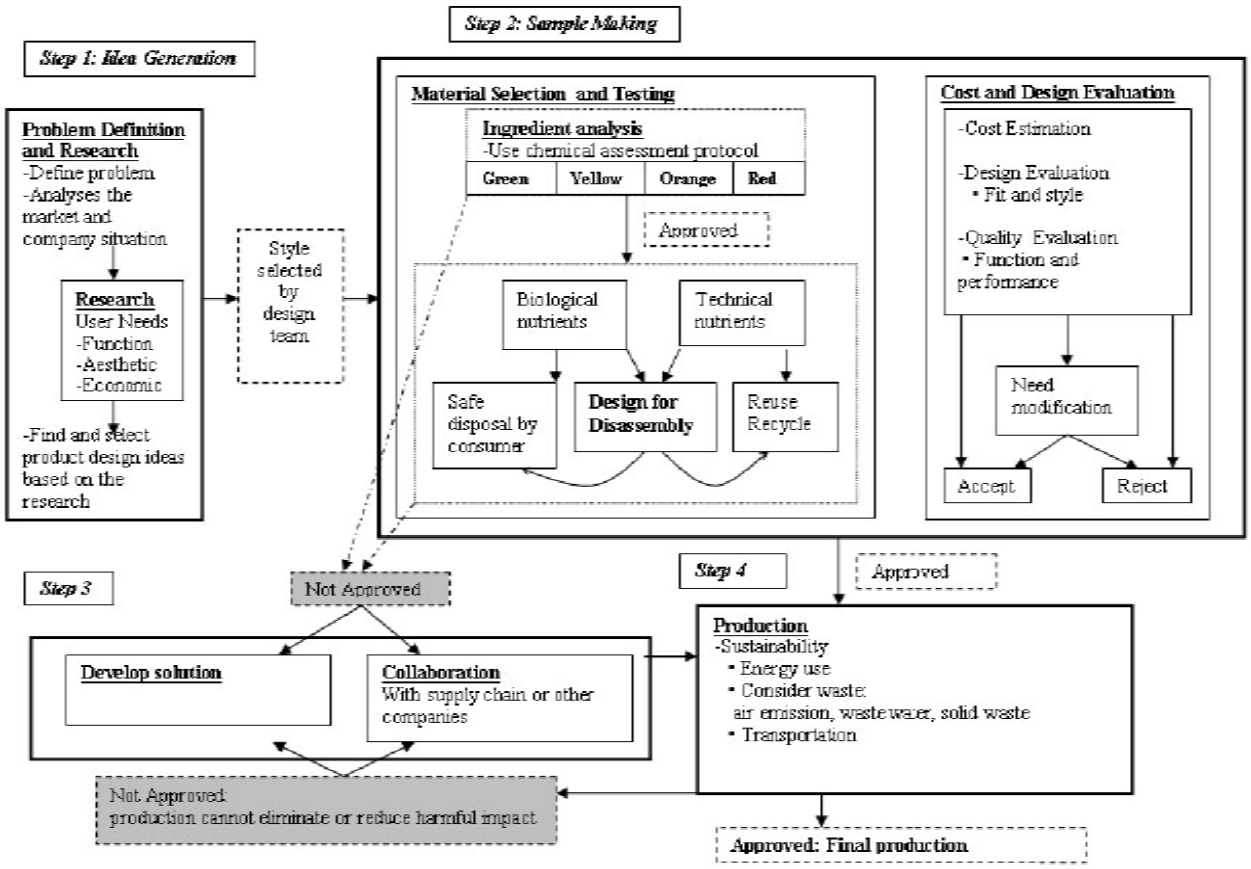



Figure 2: C2CAD Product Development Model (Gam et al., 2009)

The Cradle to Cradle philosophy has also been the basis for several other apparel production models. Gam, Cao, Farr, & Heine (2009) developed the C2CAD (Cradle to Cradle Apparel Design) model by combining existing product development models with the Cradle to Cradle philosophy (see Figure 2). In step 2 of the model, sample making, chemical assessment protocol is used to determine the environmental threat of the materials being used. In this step, the designer must also consider the end life of the product. The options given for end of life were; safe disposal by the consumer, design for disassembly, or reuse/recycling. Sustainable principles have also been incorporated into the production step of the model where energy used, waste created, and air emissions are considered (Gam, et al., 2009). This model was tested using organic cotton knitwear, but

needs to be tested with other types of sustainable apparel, such as repurposed apparel. The idea of design for disassembly is an option provided in the sample- making phase of the C2CAD model and considers what will happen at the end life of the product. Design for disassembly is defined as "designed products with multiple components to be separated at the end of their life into appropriate components for recycling" (McDonough & Braungart, 2002).

This idea requires the designer of the product to think about the product's end of life from the initial stages of planning. The concept has been tested using a man's suit jacket as proof of concept (Gam, Cao, Bennett, Helmkamp, & Farr, 2011; Rumsey, 2008). Gam et al. (2011) found that using a blind hemming stitch in place of fusible interfacing on the collar and lapels and using a larger stitch size could reduce the amount of time for disassembly. Rumsey (2008) suggested using buttons to help with disassembly, which also provided for additional internal support of the jacket. Design for disassembly could be helpful in the production of repurposed apparel by reducing the amount of time needed to deconstruct the garments in order to repurpose the fabric and other components. Because there is no established product development process for repurposed apparel and/or accessories, it is important to look at other existing sustainable apparel product development models to determine how other forms of sustainable apparel are being produced. Sustainable principles present in these existing models can be incorporated into a new model for repurposed apparel and/or accessories to ensure that this apparel is as sustainable as possible. Developing a product development process for repurposed apparel could also lower the selling price of repurposed apparel, making it more affordable and attractive to consumers.

## Theoretical Framework

Diffusion of Innovations theory has been cited in the literature to study everything from fashion diffusion to adoption of technological innovations. Rogers' (1983) Diffusion of Innovations theory identifies four main elements in the diffusion of innovations: 1) the innovation, which includes five innovation characteristics of the innovation; 2) the communication channel or how information about the innovation is exchanged; 3) the rate of adoption; and 4) how the innovation diffuses through a social system (see Figure 3). The five innovation characteristics as identified by Rogers (1983) are relative advantage, compatibility, complexity, trialability, and observability, which help to explain the innovation's rate of adoption. The second element of Diffusion of Innovations Theory, the communication channel, is defined as "the method by which messages about the innovation get from one individual to another" (Rogers, 1983, p. 18).

Typically, these messages about the innovation are communicated through either mass media channels or interpersonal channels. The third element of Diffusion of Innovation Theory is the rate of adoption. Rate of adoption refers to the earliness or lateness that an individual moves from initial knowledge of an innovation to its adoption or rejection, as compared with other members of a social system (Rogers, 1983). The final element of this theory is how the innovation diffuses through a social system. This element includes how the structure of the social system affects diffusion, including the roles of opinion leaders and change agents within the social system (Rogers, 1983). This study will focus on the section of Diffusion Theory that refers to the innovation characteristics, as well as the role of opinion leaders within a social system as related to the rate of adoption of innovations.

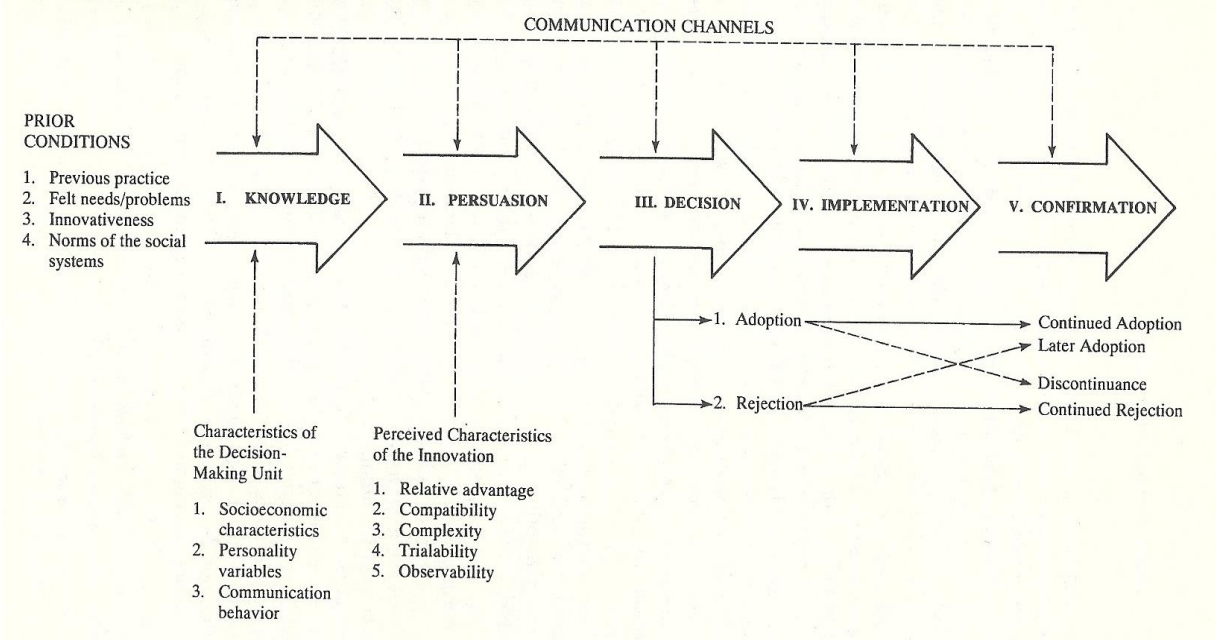



Figure 3: Rogers' Diffusion of Innovation Theory (1983)

Innovation Characteristics

Traditionally, innovation characteristic research has looked at the characteristics of the actual innovations, which are intrinsic to the individual products. However, Moore & Benbasat (1991) developed an instrument to measure the perceived characteristics of using an innovation. It is important to understand how individuals perceive the innovation characteristics because that will affect their rate of adoption of the innovation. It is important to note that Rogers' characteristics refer to the perception of the innovation itself, not the perception of using the innovation, which differs. Therefore, the definitions of the innovation characteristics as defined by Rogers have been slightly altered to reflect the perception of using the innovation rather than the innovation itself. Because this study analyzed the process of designing repurposed apparel, understanding the perceptions of using the innovation is beneficial. In this study, the usage of the process as the innovation

was studied. This has not been researched before and is considered exploratory. These five innovation characteristics are defined as follows:

> **Relative Advantage:** the degree to which using an innovation is perceived as better than the idea that it supersedes.
>
> **Compatibility:** the degree to which using an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.
>
> **Complexity:** the degree to which using an innovation is perceived as difficult to understand and use.
>
> **Trialability:** the degree to which using an innovation may be experimented with on a limited basis.
>
> **Observability:** the degree to which the results of using an innovation are visible to others.

Relative advantage can be measured in economic terms, but also includes social prestige, convenience, and satisfaction with using the product (Rogers, 1983). An innovation must also be compatible with the social values and norms of the social system in order for it to be adopted within the social system. Complexity, also referred to as ease of use by some researchers, affects the rate of adoption because the more complex the innovation is to understand or to use, the less likely it is to be adopted (Rogers, 1983). In addition, new innovations that can be tried out prior to adoption are more likely to be adopted than those that cannot be tried out. Observability refers to how visible an innovation is within

a social system. The more visible the results of an innovation are to the members of a social system, the more likely they are to adopt it (Rogers, 1983). Innovations that are perceived by individuals within a social system as having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly than other innovations.

In addition to the five innovation characteristics identified by Rogers (1983), Tornatzky & Klein (1982) identified five more characteristics; cost, communicability, divisibility, profitability, and social approval or image. In their analysis, it was determined that communicability is very similar to observability, and divisibility was similar to trialability. Image was identified by Moore & Benbasat (1991) to be different enough from relative advantage to be included as a separate characteristic. Image is defined as follows:

**Image:** The degree to which the use of an innovation is perceived to enhance one's image or position in a social system (Moore & Benbasat, 1991).

Because recycled apparel has been shown to have an inferior image, it is important to determine how using the process of repurposing improves the designer's image and therefore, their position in the social system. So, image will be included and measured as a separate characteristic. Cost and profitability were not related to any of the five innovation characteristics identified by Rogers (1983). Moore & Benbasat (1991) found cost and profitability to be very closely related; therefore they will be combined into one characteristic for the purposes of this study. Cost is defined as follows:

**Cost:** The degree to which the use of an innovation is cost effective to the user (Tornatsky & Klein, 1982).

Because this study is analyzing designers producing and selling repurposed apparel and/or accessories, cost and profitability could affect the adoption and continued use of the innovation because it could ultimately affect the consumer's willingness to purchase the product. Therefore, cost and profitability will be combined into one characteristic and will be included in this study.

Innovation Characteristics and Apparel Research

The majority of research based on diffusion of innovations theory has focused on the adopters or the rate of adoption of technological innovations. In recent years, as new technology has infiltrated the apparel industry, various studies have been based on Diffusion of Innovations Theory as it relates to apparel technology. Beaudoin, Lachance, & Robitaille (2003) studied the number of males and females in each adopter category regarding brand sensitivity. Eastlick & Lotz (1999) researched potential adopters of electronic shopping and found that relative advantage over other shopping mediums and compatibility with lifestyle were significant predictors of adoption. Johnson, Lennon, Jasper, Damhorst, & Lakner (2003) found that adopters of internet shopping found it to be less complex, more trialable, and more observable. Similarly, the general innovativeness of the consumer was found to influence their adoption of internet shopping (Ha & Stoel, 2004 and Lu & Rucker, 2006) as well as other channels such as catalogs (Lu & Rucker, 2006). This theory has also been used to test sensory enabling technologies in conjunction with internet shopping, such as 2-D and 3-D modeling and

virtual try-on technology. Perceived usefulness and perceived entertainment value of the technologies, which were considered to be part of the relative advantage innovation characteristic, were found to predict adoption behavior (Kim & Forsythe, 2008; 2009). Kim & Forsythe (2008) found that the innovativeness of the consumer also predicted adoption of virtual try-on technology.

In addition to research regarding the innovation characteristics of apparel technology or the adoption of this technology by consumers, research has been conducted using diffusion of innovation theory in relation to manufacturing technology. Shen, Hawley, & Dickerson (2004) found that out of five selected innovation characteristics, compatibility, complexity, and cost significantly influenced the adoption of e-commerce technology for apparel manufacturers. Sullivan and Kang (1999) researched adopters of quick response technology in the apparel manufacturing industry in relation to characteristics of the firm such as size, chief executive officer age, and location of production. They also measured the relative advantage of quick response in relation to the firm's characteristics and found that smaller firms and those who produced off-shore found quick response technology more advantageous. There was no relationship between chief executive officer age and relative advantage. There has been little research to date that combines innovation characteristics and any type of environmentally-friendly apparel, this includes repurposed apparel and/or accessories. Therefore, Diffusion of Innovations Theory and specifically, innovation characteristics have been selected as the theoretical framework for this study. Previous research has shown that recycled apparel; which includes apparel made from recycled fibers and repurposed apparel, has been sold at higher selling prices, is more expensive to produce than traditional apparel due the labor intensive process, and has a

negative social image. It is important to determine if this holds true for repurposed apparel specifically. These issues directly relate to the innovation characteristics of cost, complexity, and image. Therefore it is important to test the process of repurposing using the Diffusion of Innovations Theory. The other four innovation characteristics: relative advantage, compatibility, observability, and trialability must also be measured to determine if the process of repurposing is innovative and whether or not it will diffuse through the social system. If the innovation characteristics are not significant predictors of the usage of repurposing, then this needs to be considered in the development of a process for repurposing. The development of a process of repurposing that will efficiently diffuse through the social system can save precious natural resources and serve as a potential solution to apparel overconsumption.

Opinion Leadership

In Rogers' Diffusion of Innovations Theory (1983), the role of opinion leaders is included in the final element of the theory, helping to explain how an innovation diffuses throughout a social system. Opinion leaders influence others attitudes or behaviors informally. This leadership role is not a function of the opinion leader's formal position or status in the social system, but rather their influence on the other members of the social system. Opinion leaders are not necessarily the most innovative individual in the social system, but instead follow closely to the norms of the social system and therefore, maintain their credibility. The most important characteristic of opinion leaders is that they are highly visible in the social system's communication structure, so that their behavior can easily be imitated by their followers (Rogers, 1983). This theory has been

beneficial in explaining how fashions diffuse throughout a social system and the part that opinion leaders play in the fashion diffusion process.

Research over fashion opinion leadership has shown that fashion opinion leaders are typically young, female, active in fashion-related behaviors, and value fun and excitement (Goldsmith, Heitmeyer, & Freiden, 1991). In contradiction, Huddleston, Ford, & Bickle (1993) found that age was not a predictor of fashion opinion leadership and that in mature consumers being a positive thinker, having a desire to shop, and being socially active were predictors of fashion opinion leadership. Income and education were found to be unrelated to fashion opinion leadership (Goldsmith et al., 1991; Huddleston et al., 1993; MacGillvray, Koch, & Domina, 1998). Occupation has also been found to be independent of fashion opinion leadership. Whether an individual has high or low level occupational status has no effect on their fashion opinion leadership (MacGillvray et al., 1998). Research shows that fashion opinion leaders have a need for uniqueness (Bertrandias & Goldsmith, 2006; Goldsmith & Clark, 2008) and increased attention to social information cues (Bertrandias & Goldsmith, 2006). Chan & Misra (1990) found that personal involvement and familiarity with the product combined with public individuation separated opinion leaders from non-opinion leaders. Goldsmith & Clark (2008) found that fashion opinion leaders are more likely to participate in status consumption, meaning that they consume products with the hopes that it will increase their social status. If fashion opinion leaders tend to participate in conspicuous consumption, it would make sense that they do not value environmentally-friendly behaviors. Domina & Koch (1997) found that fashion opinion leadership is not related to environmental awareness or textile recycling. They suggested that fashion opinion

leadership implies a desire for newness and a practiced form of purposeful obsolescence, which may conflict with a desire to be environmentally friendly. It is important to determine if designers of repurposed apparel and/or accessories are opinion leaders to understand how the innovation of repurposing apparel and/or textiles will diffuse through the social system. Previous research has shown that opinion leadership is not related to environmental awareness or textile recycling, but has never been researched in conjunction with repurposed apparel. Therefore, it is important to determine if this holds true for repurposed apparel. The interaction effect of opinion leadership and environmental awareness was also measured to determine if this affected the process of repurposing.

The purpose of this study was threefold: 1) to identify the process apparel designers use to repurpose apparel and/or textiles into apparel and/or accessories; 2) to determine what perceived process innovation characteristics influence their current and future use of this process; and 3) to determine the differences in perceived innovation characteristics of the process, the current and future usage of repurposing apparel and/or textiles in terms of the designer's level of opinion leadership, and environmental awareness. It was important to understand whether this process was perceived as innovative and how and to what extent it would diffuse through a social system. The development of a design process for repurposed apparel and/or accessories would be beneficial to the environment by creating an outlet for used, unwanted apparel and textiles. This would help prevent waste and save precious natural resources for future generations.

# CHAPTER III

# METHODOLOGY

## Research Design

The purpose of this study was threefold: 1) to identify the process apparel designers use to repurpose apparel and/or textiles into apparel and/or accessories; 2) to determine what innovation characteristics of the process influence their current and future usage of this process; and 3) to determine the differences in innovation characteristics of the process, current and future usage of repurposing apparel and/or textiles in terms of the designer's level of opinion leadership and environmental awareness.

To collect these data, a link to an internet-based questionnaire was e-mailed to designers of repurposed apparel and/or accessories. An internet keyword search was performed to find designers selling repurposed apparel and/or accessories online, which served as the sample for this study. A combination of qualitative and quantitative methods was used in data analysis. The design process of repurposed apparel and/or accessories was determined by a series of open-ended questions analyzed using content analysis. NVivo software was used to code the responses of the open-ended questions. The responses were

sorted into classifications and themes derived from the survey questions. To examine innovation characteristics of the process of repurposing apparel and/or textiles, current and future usage of the process, and the levels of opinion leadership and environmental awareness of the designers, Likert-type scale questions were utilized and analyzed using a combination of Multiple Regression and Multivariate Analysis of Variance (MANOVA).

## Population and Sample

The target population for this study was apparel designers selling apparel and/or accessories made from repurposed apparel and/or textiles. Due to geographical constrictions, the accessible population for this study was apparel designers selling repurposed apparel online. An internet keyword search was performed to find designers selling repurposed apparel and/or accessories online. Therefore, the sample for this study was a convenience sample of designers of repurposed apparel who meet the following criteria:

1. They are selling repurposed apparel online.
2. The original product they are repurposing is apparel and/or textiles.
3. The final product they are selling is an apparel or accessory product.

Websites were identified based on the keyword search and a website analysis was then conducted to select the sample and ensure the sample meets the selected criteria. The designers who were selected as part of the sample were sorted into categories based on the results of the questions in the personal characteristics section of the questionnaire,

specifically the questions regarding their motivations for repurposing apparel and/or textiles. Preliminary analysis of the sample showed that there may be several different motivations for repurposing apparel and/or textiles and therefore, several different categories into which the sample could be divided. For example, the designers could be motivated by financial profit, by a need to for artistic expression, or by environmental concern.

## Data Collection

A survey was used to collect the data. The purpose of using a survey design was to be able to generalize from the sample of designers selling repurposed apparel online to the population in order to make inferences about the designers. Advantages of survey design include economy of the design of the survey and rapid turnaround in data collection (Creswell, 2003). The survey was cross-sectional with the data collected at one point in time. The survey was developed using Qualtrics software and a link to the survey was sent to the subjects via e-mail. The link to the questionnaire was sent to the subjects three times at two weeks intervals. After the third wave, the number of responses received was unacceptably low. In order to increase the response rate, the questionnaire was sent to the subjects an additional two times, for a total of five times. The link to the questionnaire was first sent to the subjects with a cover letter informing them about the study. The cover letter was also included on the opening page of online questionnaire. Many designers notified the researcher after they had taken the survey and their names were removed from the list to avoid multiple contacts. A few designers notified the researcher that they did not want to participate in the study and their names were removed from the list.

Questionnaire Development

The questionnaire consisted of 68 written questions divided into four sections: personal characteristics, the process of designing repurposed apparel and/or accessories, innovation characteristics, and usage of the apparel and/or textile repurposing process. Each section had individual instructions for the subjects. A variety of formats of questions were used in this questionnaire including closed-ended or multiple-choice, open-ended, and those with responses on a Likert-type scale. According to Warde (1990), the advantages of closed-ended or multiple-choice questions are that they are easy to administer, easy to code, easy to analyze, and are beneficial when the researcher is knowledgeable of the range and types of responses to be expected. Multiple choice questions were used for the demographic questions and the questions regarding design experience in the personal characteristics section.

Open-ended questions are beneficial when the researcher has a limited knowledge of the range and type of responses to be expected or a large range of responses is expected (Warde, 1990). Because a large range of responses were expected regarding the process of designing repurposed apparel and/or accessories, open-ended questions were used in this section. The responses were measured using a seven-point Likert-type scale with the responses ranging from strongly disagree (1) to strongly agree (7). These questions were used in the personal characteristics section for the questions regarding opinion leadership and environmental awareness, and innovation characteristics and usage.

**Personal characteristics:** This section consisted of questions regarding demographic characteristics, experience, opinion leadership, and environmental awareness. The

demographic characteristics measured were age, gender, and education. Age was measured using an open-ended question. Gender and education were measured using closed-ended, or multiple choice questions with a limited number of possible responses.

All five questions in the experience section were closed-ended, or multiple choice questions due to the limited number of responses possible. The items measuring experience included questions regarding the length of time the subjects had been designing apparel in general, as well as designing repurposed apparel and/or accessories. Three questions asked about the subject's motivations for designing repurposed apparel and/or accessories. For example, did they view it as a source of profit, as a form of artistic expression, or were they motivated by environmental concerns? The majority of repurposed apparel products on the market, is one-of-a-kind, considered wearable art, and is sold at a premium price (Fletcher, 2007). The way the designers view repurposed apparel influenced their product development process. It was necessary to determine why the designers were motivated to design repurposed apparel and/or accessories and responses were analyzed, for comparison purposes, based on responses to three questions about motivation.

The experience section of the questionnaire also included sub-sections measuring opinion leadership and environmental awareness. The items in these two sections were adapted from Reynolds and Darden (1971) and Dunlap and Van Liere (1978) respectively. Reynolds and Darden (1971) developed a scale of five items to measure opinion leadership as it relates to fashion clothing. According to Rogers (1983), opinion leaders are highly visible within their social system, so that their behavior can be imitated. It was important to determine if designers of repurposed apparel and/or accessories were

opinion leaders to better understand how the innovation of repurposing would diffuse through a social system. Dunlap and Van Liere (1978) developed twelve items to measure a subject's general environmental awareness. These items were intended to measure the subject's world view as it pertains to the environment and man's relationship to it, more specifically whether or not man should adapt to the environment or try to control it (Dunlap & Van Liere, 1978). The subjects were asked to indicate their level of agreement with statements regarding their opinion leadership and their environmental awareness. Both concepts were measured using a 7-point Likert-type scale ranging from strongly disagree (1) to strongly agree (7). Table 1 shows the measurement statements for opinion leadership and environmental awareness.

**Process:** The ten items in this section covered the design process that the designers go through in order to create the repurposed apparel and/or accessories they sell. These questions were helpful in establishing a method through which apparel and textiles can be repurposed and sold on a small-scale. Because of the lack of research on repurposing apparel and textiles, the researcher had little knowledge of the range of possible responses and a large variety of responses were expected. According to Warde (1990), using open-ended questions in this situation is more beneficial than using a closed-ended format. Therefore, only open-ended questions were used in this section to allow the subjects to explain the process they go through when repurposing apparel and textiles and the reasoning behind their design decisions.

Table 1: Measurement Statements for Opinion Leadership and Environmental Awareness

| **Opinion Leadership** |
|---|
| *1. My friends and co-workers often ask my advice about clothing fashions.* |
| *2. I sometimes influence the types of clothes my friends buy.* |
| *3. My friends come to me more often than I go to them for information about clothes.* |
| *4. I feel that I am generally regarded by my friends and co-workers as a good source of advice about clothing fashions.* |
| *5. I can think of at least two people whom I have told about some clothing fashion in the last six months.* |
| **Environmental Awareness** |
| *1. We are approaching the limit of the number of people the earth can support.* |
| *2. The balance of nature is very delicate and easily upset.* |
| *3. Humans have the right to modify the natural environment to suit their needs.* |
| *4. Mankind was created to rule over the rest of nature.* |
| *5. When humans interfere with nature it often produces disastrous consequences.* |
| *6. Plants and animals exist primarily to be used by humans.* |
| *7. To maintain a healthy economy we will have to develop a "steady state" economy where industrial growth is controlled.* |
| *8. Humans must live in harmony with nature in order to survive.* |
| *9. The earth is like a spaceship with only limited room and resources.* |
| *10. Humans need not adapt to the natural environment because they can remake it to suit their needs.* |
| *11. There are limits to growth beyond which our industrialized society cannot expand.* |
| *12. Mankind is severely abusing the environment.* |

**Innovation Characteristics:** This section consisted of varying numbers of questions for each of the seven innovation characteristics previously discussed in the literature review; relative advantage, compatibility, trialability, complexity, observability, cost, and image. The items measuring these seven characteristics were adapted from Moore & Benbasat (1991), who built on the five original innovation characteristics as defined by Rogers (1983) by adding cost and image. The five original characteristics as defined by Rogers (1983) are relative advantage, compatibility, trialability, complexity, and observability. Cost was determined by the researcher to be an important aspect of repurposing apparel and/or textiles because research has shown that current products on the market sell at a premium price (Fletcher, 2007). Image had originally been included as a segment of

relative advantage by Rogers (1983); however, Moore & Benbasat (1991) determined that image was different enough to be included as a separate characteristic. The subjects were given statements regarding the seven different innovation characteristics of the process of designing repurposed apparel. They were asked to indicate their level of agreement with the statements. The level of agreement for each item within each of the seven innovation characteristics was measured using a 7-point Likert-type scale ranging from strongly disagree (1) to strongly agree (7). Table 2 shows the measurement statements for the seven innovation characteristics.

**Usage:** This section consisted of two sub-sections measuring current usage and future usage intention of the process of designing repurposed apparel and/or accessories. The subjects were given statements regarding their usage of a process for designing repurposed apparel and/or accessories, as well as their intent to continue using that process. Three statements were included to measure both current and future usage. They were asked to answer to their level of agreement with the given statements. These variables were measured using a 7-point Likert-type scale ranging from strongly disagree (1) to strongly agree (7). The given statements used to measure current and future usage were adapted from Agarwal & Prasad (1997) who researched the effect of the innovation characteristics of using the World Wide Web on the current and future usage of the World Wide Web. Table 3 shows the measurement statements for current and future usage.

Table 2: Measurement Statements for Innovation Characteristics

| |
|---|
| ***Relative Advantage*** |
| *1. Repurposing apparel is quicker than creating apparel from traditional materials.* |
| *2. The process of repurposing apparel improves the quality of the products I create.* |
| *3. Repurposing apparel is easier than creating apparel from traditional materials.* |
| *4. The advantages of repurposing apparel outweigh the disadvantages* |
| *5. Repurposing apparel gives me greater control over my work* |
| *6. Repurposing apparel increases my productivity* |
| ***Compatibility*** |
| *1. Repurposing apparel is compatible with all aspects of my work* |
| *2. Repurposing apparel is compatible with my world view* |
| *3. Repurposing apparel fits into my work style* |
| ***Trialability*** |
| *1. I have had the opportunity to experiment with various methods of repurposing apparel* |
| *2. I did not have to expend very much effort to try out repurposing apparel* |
| *3. I am able to experiment with repurposing as necessary* |
| ***Complexity*** |
| *1. Repurposing apparel is not cumbersome to me* |
| *2. Repurposing apparel does not require a lot of mental effort* |
| *3. Repurposing apparel is not frustrating* |
| *4. It is easy to get the result I want from repurposing apparel* |
| *5. The method of repurposing apparel I use is clear and understandable* |
| ***Observability*** |
| *1. I am aware of the process other designers use to repurpose apparel* |
| *2. I know of other methods of repurposing apparel* |
| *3. It is easy for me to compare my method of repurposing apparel to other designer's methods* |
| ***Cost*** |
| *1. The method of repurposing apparel I use is cost effective* |
| *2. I have a method for setting a selling price for my repurposed apparel designs.* |
| *3. I consider the cost of the materials when setting a selling price.* |
| *4. I consider the labor that went into a product when setting a selling price.* |
| *5. My products usually sell at a premium price point.* |
| ***Image*** |
| *1. Repurposing apparel improves my image* |
| *2. Repurposed apparel is a status symbol* |

Table 3: Measurement Statements for Current and Future Usage

| |
|---|
| ***Current Usage*** |
| *1. All of my designs are created through repurposing.* |
| *2. I repurpose whenever possible.* |
| *3. I repurpose whenever appropriate.* |
| ***Future Usage*** |
| *1. I intend to continue designing repurposed apparel in the future.* |
| *2. I intend to increase the amount of repurposed apparel I design in the future.* |
| *3. I intend to continue using my current method for repurposing in the future.* |

The first draft of the questionnaire was tested to reduce ambiguity and determine face validity. Based on the recommendation by Warde (1990), the researcher should have as many experts as possible review the proposed instrument, which can be construed as establishing face validity of the instrument. So, the questionnaire was sent to a panel of experts including apparel design professors, students, and local designers of repurposed apparel and/or accessories. The results received from the panel of experts were not analyzed as part of the results of this study.

## Data Analysis

A combination of descriptive statistics, inferential statistics, and content analysis were used to analyze the data in this study. To analyze the characteristics of the sample, descriptive statistics were used. The descriptive statistics focused on frequencies and central tendencies of the subject's personal characteristics and experience.

To determine the design process, content analysis was used to analyze the open-ended questions regarding the process of designing repurposed apparel. Content analysis

consists of identifying categories that emerge from the textual data and then organizing the data into sub-categories or themes (Rubins & Rubins, 2005). NVivo software was used to sort and code the data. Three coders were used, including the researcher, and interrater reliability was determined using the NVivo software.

The inferential statistics used were a combination of multiple regression and MANOVA. The first analysis, multiple regression, focused on the relationship between the independent variable of perceived innovation characteristics of the process of designing repurposed apparel and/or accessories and the dependent variables of current and future usage intention of the process. Multiple regression allows the simultaneous test of multiple independent variables with one dependent variable (Keppel & Wickens, 2004). The independent variables in this phase of analysis were the innovation characteristics based on Rogers' Diffusion of Innovation Theory (1983) and expanded by Moore & Benbasat (1991). The dependent variables in this phase of analysis were current usage of repurposing apparel and/or textiles and future usage intention of repurposing apparel and/or textiles.

In the second phase of inferential statistical analysis, MANOVA was used to determine the differences in innovation characteristics of the process, and the current and future usage intention of repurposing apparel and/or textiles in terms of the designer's level of opinion leadership and environmental awareness. MANOVA is used when there are two or more dependent variables and is beneficial to show the interactions among the dependent and independent variables (Keppel & Wickens, 2004). The independent variables of this phase of analysis were the subject's opinion leadership and their environmental awareness. The designers were divided into two groups, low and high, for

opinion leadership and environmental awareness. The researcher looked at the median scores for opinion leadership and environmental awareness taking out 5% below the median and 5% above the median to get two distinctive groups. For opinion leadership, the 'low' group consisted of the designers who had an average score of 1-5.4. The 'high' group consisted of the designers who had an average score of 5.8-7.0.

For environmental awareness, the 'low' group consisted of designers who had an average score of 1-4.48 (n=34). The 'high' group consisted of designers who had an average score of 4.58-7.0 (n=35). The dependent variables for this phase of analysis were the innovation characteristics of the process of repurposing apparel and/or textiles and the current and future usage of repurposing apparel and/or textiles.

The purpose of this study was threefold: 1) to identify the process apparel designers use to repurpose apparel and/or textiles into apparel and/or accessories; 2) to determine what perceived process innovation characteristics influence their current and future usage of this process and 3) to determine the differences in perceived innovation characteristics of the process, current and future usage of repurposing apparel and/or textiles in terms of the designer's level of opinion leadership and environmental awareness. Designers of repurposed apparel and/or accessories were surveyed using an e-mail questionnaire to obtain this information. It was important to understand whether this process was perceived as innovative and how and to what extent it would diffuse through a social system. The development of a design process for repurposed apparel and/or accessories would be beneficial to the environment by creating an outlet for used, unwanted apparel and textiles. This would help prevent waste and save precious natural resources for future generations.

# CHAPTER IV

# RESULTS

The results of the study are provided in five sections. The first section presents the demographic characteristics and experience of the sample. The second section discusses the designer's motivations for repurposing. The third section describes the results of the content analysis regarding the designer's process of repurposing. The fourth section includes the results of the Multiple Regression presenting the effect of the innovation characteristics on the designer's current and future usage intention of the process of repurposing. The final section describes the results of the MANOVA, which was used to analyze the effect of the designer's level of opinion leadership and environmental awareness on the designer's perceptions of the innovation characteristics and their current and future usage of their process of repurposing.

## Characteristics of the Sample

A total number of 243 questionnaires were distributed via an e-mail internet survey. The contact information of the designers was obtained from an internet search and the questionnaire was sent to the designers who met the pre-determined criteria. The

convenience sample consisted of 94 completed, usable responses for a response rate of 39%. According to Warde (1990), a response rate above 30% is excellent for the social sciences. The questionnaire was e-mailed to the designer's five times at intervals of at least two weeks to increase response rate. The designers were not sent the questionnaire after they had already completed it. A Cronbach's Alpha was conducted to measure the overall survey reliability, as well as the survey reliability for the individual scales. The results of the Cronbach's Alpha were as follows: Environmental awareness $\alpha$=0.593; Opinion leadership $\alpha$=0.896; Relative advantage $\alpha$=0.705; Compatibility $\alpha$=0.831; Complexity $\alpha$=0.713; Trialability $\alpha$=0.622; Observability $\alpha$=0.732; Cost $\alpha$=0.536; and Image $\alpha$=0.712. The overall Cronbach's Alpha for all survey items was 0.704. All of the values for the survey reliability were considered acceptable. According to Laerd.com (2013), a high level of internal consistency is 0.70 or above; a moderate level of internal consistency is 0.50-0.70, and low level of internal consistency is below 0.50. All measurements of internal consistency for this study were above 0.50.

Personal and Professional Characteristics

The sample of designers consisted of 94 females ranging in age from 19-67 with a mean age of 42 years. Table 4 includes the results of the characteristics of the sample. The designers were asked to give their highest level of education and 9.57% (n=9) had only a high school education; 20.21% (n=19) had some college education; 18.09% (n= 17) had an associate's degree; 34.04% (n=32) possessed a bachelor's degree; and 18.09% (n=17) possessed a graduate degree. The designers were also asked how long they had been designing apparel and/or accessories in general and how long they had been specifically

designing repurposed apparel and/or accessories. Regarding the designers general design experience, 2.13% (n=2) had been designing for less than one year; 18.09% (n=17) between 1 and 3 years; 20.21% (n=19) between 4 and 6 years; 17.02% (n=16) between 7 and 10 years, and 42.55% (n=40) had been designing for 11+ years. Regarding designing

Table 4: Characteristics of the Sample

| Characteristic | | |
|---|---|---|
| Age Range 19-67 Mean Age= 42 n=94 | | |
| Education | Frequency | Percentage |
| High school | 9 | 9.57% |
| Some College | 19 | 20.21% |
| Associate's Degree | 17 | 18.09% |
| Bachelor's Degree | 32 | 34.04% |
| Graduate Degree | 17 | 18.09% |
| Length of time designing Apparel and Accessories | | |
| Less than 1 year | 2 | 2.13% |
| 1-3 years | 17 | 18.09% |
| 4-6 years | 19 | 20.21% |
| 7-10 years | 16 | 17.02% |
| 11+ years | 40 | 42.55% |
| Length of time designing Repurposed Apparel and Accessories | | |
| Less than 1 year | 4 | 4.26% |
| 1-3 years | 29 | 30.85% |
| 4-6 years | 26 | 27.66% |
| 7-10 years | 13 | 13.83% |
| 11+ years | 22 | 23.40% |
| Location | | |
| United States | 65 | 69.15% |
| Great Britain | 10 | 10.64% |
| Canada | 3 | 3.19% |
| Other | 16 | 17.02% |

repurposed apparel and/or accessories, 4.26% (n=4) less than one year; 30.85% (n=29) for between 1 and 3 years; 27.66% (n=26) for between 4 and 6 years; 13.83% (n=13) for between 7 and 10 years, and 23.40% (n=22) for 11+ years. For country of business location, the majority, 69.15% (n=65) indicated the United States, while 10.64% (n=10) were in Great Britain, and 3.19% (n=3) were in Canada.

The designers were given an "other" option and 17.02% (n=16) were located in another country including; the Netherlands, Lithuania, Latvia, Ireland, Poland, Turkey, Australia, and New Zealand.

## Motivation for Repurposed Design

To answer research question 2: How do the design processes of designers of repurposed apparel and/or accessories differ based on their motivations for repurposing apparel and/or textiles, the designers were asked why they participate in repurposing apparel and textiles. Financial profit, artistic expression, and environmental reasons were given as motivations for repurposing (see table 5).

Financial profit was given as motivation by 81.91% (n=77) of the designers. Artistic expression was given as motivation by 100% (n=94) of the designers. Environmental reasons were given as motivation by 85.11% (n=80). A majority of the designers (n=66) selected all three options as motivations for repurposing. Three of the designers selected only artistic expression as their motivation; 14 designers selected artistic expression and environmental reasons as motivations; and 11 designers selected artistic expression and financial profit as motivations. None of the designers chose only financial profit or only

environmental reasons as motivation and none of the designers chose the combination of financial profit and environmental reasons as their motivations for repurposing.

Table 5: Motivation for Repurposing

| Motivation | Frequency | Percentage |
|---|---|---|
| Artistic Expression | 94 | 100% |
| Artistic Expression Only | 3 | 3.19% |
| Artistic Expression + Environmental Reasons | 14 | 14.89% |
| Artistic Expression + Financial Profit | 11 | 11.70% |
| Artistic Expression + Environmental Reasons + Financial Profit | 66 | 70.21% |
| Financial Profit | 77 | 81.91% |
| Environment Reasons | 80 | 85.11% |

## The Repurposed Design Process

Content analysis was conducted over the seven open-ended questions to answer research question 1: How do the designers of repurposed apparel design their products? NVivo software was used to sort and code the data. Three coders were used to code the data, including the researcher. The NVivo software was used to determine interrater reliability using percent agreement and the Kappa Coefficient. NVivo compares the responses between two coders at a time and gives the percent agreement as well as the Kappa Coefficient. Kappa coefficient is a statistical measure, which takes into account the amount of agreement that could be expected to occur through chance (qsrinternational.com, 2013). A Kappa Coefficient below 0.40 is considered to be poor agreement; 0.40-0.75 is considered to be a good level of agreement; above 0.75 is considered to be excellent agreement (qsrinternational.com, 2013). The percent agreement across the three coders was at least 75% for each classification with a Kappa Coefficient of $K \geq 0.48$ for each classification. The range for the percent agreement was

75%-98% across coders and classifications and the range for the Kappa Coefficient was 0.48- 0.86. This was an acceptable level of interrater reliability. The analysis resulted in seven classifications derived from the survey questions. These were Design Inspiration, Materials, Categories Repurposed, Categories Created, Price, Deconstruction Method, and Sizing. Within each of these classifications several themes were extruded from the data. Additionally, the designers were asked a series of yes/no questions about their process. Descriptive statistics were used to analyze these data. Each of these process classifications will be discussed separately.

Design Inspiration

Within the classification Design Inspiration the themes identified were pop culture (44 references coded), materials (28 references coded), nature (22 references coded), internal (19 references coded), historical/cultural (17 references coded), and end user (17 references coded). Many of the subjects listed several sources of inspiration for their designs.

The theme of pop culture as a source of inspiration received the most references. Included in this theme are movies, music, TV, books, magazines, the internet, and art, as well as street style and current trends. For example, designers stated that "pop culture, other fashion, film, music, TV, and print media", "fashion magazines, internet, and TV", "rock and roll", and "abstract art" served as inspiration. One designer stated that inspiration was derived from "all over, from the rave scene, from cartoons, from other Etsy designers, and from music festivals." Regarding street style and current trends, designers stated the following:

> *I see a new trend, costuming being my favorite and my mind imagines it in a new way* (Participant 28).

> *I get inspiration for my designs by examining the modern world. From sidewalks to the runway, I am constantly thinking of an idea and the construction that will be needed for that piece* (Participant 39).

Many of the designers stated that they took inspiration from the materials that they were repurposing. This included the colors, prints, textures, and trims of the garments and/or fabric. The designers stated they took inspiration from "the garments that I come across in the thrift stores and want to work with depending on style, fit, and fabric" (Participant 9), "the fabric and findings from thrift stores" (Participant 67), "from the colors and textures of the wool I find" (Participant 35), and "from unique patterns and fabric, vintage designs, vintage lace, and from experimenting with color combinations" (Participant 14). One designer stated the following:

> *The materials I use inspire my designs. No two pieces are alike and the material 'talks to me' about what new thing it can be* (Participant 73).

Nature was also cited as a source of inspiration for the designers. Many of the designers simply stated nature in general as a source of inspiration. A few designers did specify certain elements in nature from which they drew inspiration. These primarily included taking inspiration from colors of natural elements. The designers included "colors of nature" (Participant 75) and "colors, especially natural colors from flowers" (Participant

61) as sources of inspiration. One designer stated that inspiration was derived from "what I see around me, my environment, seasons, colors" (Participant 49); while another designer stated the following:

> *Our natural environment is key to inspiration, what we let in and filter in guides our design decisions* (Participant 52).

Internal inspiration refers to those designers that stated that they don't take inspiration from external sources, but find inspiration within themselves and from their own creativity. For example, the designers stated inspiration comes from "my own imagination" (Participant 41), "within my own creative mind" (Participant 66), and "from the creativity given to me from within" (Participant 21). Additionally, the designers found inspiration internally through "dreams" (Participant 23), "emotions" (Participant 76), and one designer stated the following

> *Even a feeling I get could inspire me to make a design* (Participant 29).

The theme of historical/cultural inspiration refers to those designers who take inspiration from past decades or other cultures. These time periods specified included the 1920's, 1960's, and 1970's, while other designers simply stated that they looked to "past decades" (Participant 57) or "vintage designs" (Participant 47) for inspiration. Additionally, one designer cited "other cultures such as those in Mexico, Africa, and Asia" (Participant 73) as sources of inspiration. More specifically, "Japanese shibori patterns and Japanese kimonos" (Participant 3) and "traditional Chinese literature and arts" (Participant 54) were cited as sources of inspiration by two other designers.

The theme of end user refers to those designers who create custom designs and take direction from the consumer or those designers who create their designs with a specific consumer in mind. For example, the designers stated the following

> *Each tee is different. I like something about it first and then I design it with the demographic I think it fits. So, if it is a rock tee, I will cut more into it than if it says 'blessed' on it* (Participant 32).

> *I love playing with color combinations and often look to a person's natural coloring (eyes/hair) for inspiration* (Participant 48).

Materials Sourcing

The classification of Materials Sourcing refers to where and how the designers source the materials they repurpose. Within the classification of Materials nine themes were identified. These were: purchased second-hand (88 references coded), donation (41 references coded), their own closet (11 references coded), wholesale (7 references coded), factory remnants (6 references coded), on-line auction (5 references coded), traded (4 references coded), trash (3 references coded), and developing countries (2 references coded).

The majority of designers (n=88) stated that they purchased materials from second-hand sources. This included thrift stores, garage sales, and antique stores. A couple of designers pointed out that they utilize a variety of second-hand sources to obtain materials stating the following:

> *I get them at second-hand or charity shops, flea markets, yard sales, and vintage shops* (Participant 45).

> *I typically get my materials from traveling to different thrift stores, yard sales, and flea markets around the west coast and southwest* (Participant 39).

Another designer stated the following about where and when she purchases her second-hand materials:

> *I get them at a local thrift store 'Outlet.' On Thursdays, they have a new shipment come in from their main store. On Thursdays, all clothing and purses (the only things they sell) are $1.75 each. Fri. - $1.50; Sat.- $1.25; Sun. - $1.00; Mon. - $.75; Tues. - $.50; and finally Wed. $.25. I usually go on Sundays and Tuesdays at least 2 times a month* (Participant 32).

The second most popular method of obtaining materials for repurposing was through donation (n=41). The designers stated that they receive donations or freebies, from friends and family. One designer stated the following:

> *I encourage pretty much everyone I know to hand over all their old, unwanted household linens and fabrics, even buttons, zippers, and other bits* (Participant 92).

The designers also stated that they often repurpose materials from their own closet or their own homes. For example, designers stated the following:

*I repurpose my high brand clothes that I used to wear myself (Participant 72).*

*I use my own clothing in my closet (Participant 84).*

The theme of wholesale refers to those designers who stated that they source their materials from "rag houses" (Participant 77), "recycling centers" (Participant 88), or "used clothing wholesalers" (Participant 63). The theme of factory remnants refers to designers who used leftover or scrap materials as their materials for repurposing. These included "rejected items from factories" (Participant 49), "upholstery store seconds" (Participant 52), or "leftover materials from interior designers" (Participant 73). Online auctions websites such as "eBay" (Participant 37, 77) or "eBay type websites" (Participant 13) were also used to source materials.

Trading was another option for the designers to procure materials. The designers obtained materials for repurposing through "clothing swaps" (Participant 78), "the online website TradeMe" (Participant 86), and through "swapping with creative friends" (Participant 94).

Two designers stated that they source materials globally from developing countries. For example, one designer stated:

*We source our upcycled materials from all over the globe, usually developing countries* (Participant 6).

Several designers also stated that they did not purchase their materials, but got them from the trash. For example, one designer stated they find materials "in the trash, off the sides of the road, or from walks in the woods" (Participant 76).

Merchandise Categories Repurposed

The classification of Merchandise Categories Repurposed resulted in nine merchandise categories: tops (82 references coded), fibers and fabrications (51 references coded), bottoms (21 references coded), dresses (20 references coded), household linens (18 references coded), accessories (14 references coded), outerwear (10 references coded), whatever is available (8 references coded), and lingerie (5 references coded). This classification refers to the original garment the designers repurposed.

Tops received the most references. While only eight of the eighty-two references cited "tops" or "shirts" in general, the majority were to a specific kind of top. Many designers cited t-shirts and/or sweaters only as the materials they use for repurposing. Some specified a fiber content preference for the t-shirts and sweaters such as "wool, angora, or cashmere sweaters" (Participant 18) and "t-shirts, most all are cotton, but some contain 5% spandex" (Participant 32). Other designers included t-shirts and/or sweaters in addition to other tops, such as "t-shirts, polo shirts, and turtleneck shirts" (Participant 48) and "t-shirts, thermal, shirts, polo, and golf shirts" (Participant 49). Some designers also referenced gender specific tops, such as "men's shirts and women's blouses" (Participant 3) and "men's dress shirts" (Participant 25).

Many of the designers did not specify a type of merchandise that they used in repurposing, but listed a fiber or fabrication preference. The fibers included cotton, linen,

silk, and wool garments. The fabrication methods referenced included denim, jersey knit, tulle, and wovens. Two of the fifty-one references were not to a specific fiber or fabrication, but to "anything organic" (Participant 33) and one designer stated the following:

> *I use 100% natural fibers* (Participant 88).

Bottoms included any references to skirts, pants, or shorts. Most of the designers stated that they use skirts, pants, or shorts in general, but one designer specified the use of "high-waisted shorts" (Participant 8). Another designer referenced the fabrication, stating they used "denim and corduroy pants" (Participant 10).

Dresses was coded as its own category even though many of the designers who cited dresses as sources for repurposing also stated that they use skirts. Three references of the twenty coded were specific to "vintage dresses" (Participants 14, 28, 45), while the majority of the designers simply referenced dresses in general. Two of the designers referenced the size of dresses, stating that they use "oversized dresses" (Participant 39) and "large dresses" (Participant 78). Also included within this theme were special occasion dresses, such as "wedding dresses and prom dresses" (Participant 28) and "special occasion gowns" (Participant 1).

Household linens were also used as materials for repurposing. The designers stated that they used "sheets and curtains" (Participant 44) and "sheets, tablecloths, doilies, and pillowcases" (Participant 75). Three of the eighteen designers coded specified the use of lace household items in their designs such as "lace doilies" (Participant 22) and "lace curtains and tablecloths" (Participant 14). Fourteen designers also repurposed accessories

in their designs. These included scarves, neckties, and handbags. The category of outerwear refers to those designers who specified that they use jackets, coats, hoodies, blazers, and suit coats in repurposing. One designer even specified the use of "leather jackets" (Participant 23). Several designers stated that they don't focus on any specific type of merchandise for repurposed garments. These designers stated that they use, "anything and everything" (Participant 50), "anything that is cheap/free" (Participant 30) and "whatever comes my way" (Participant 11). The category of lingerie refers to those designers who stated that they used lingerie in general for repurposing or specified slips, vintage slips, or nightgowns as their materials for repurposing.

Merchandise Categories Created

There were nine categories of merchandise created; tops (47 references coded), bottoms (42 references coded), accessories (35 references coded), dresses (34 references coded), outerwear (17 references coded), household items (8 references coded), children's clothing (8 references coded), anything (3 references coded), and lingerie (2 references coded). Many of the categories from the classification of Categories Created are also categories in the classification of Categories Repurposed. Sixteen of the designers gave the same answers for the Category of Merchandise Repurposed and the Category of Merchandise Created.

The category of tops refers to any references to tops or shirts in general including t-shirts, sweaters, tunics, blouses, and vests. One designer specified "plus-size tunics" (Participant 26), while another specified "boho tops" (Participant 23). Bottoms refers to any references to skirts, pants, or shorts created by the designers. Other than pants, shorts, and

skirts in general, “capris” (Participant 30), “jeans” (Participants 23, 42, 52, 58, 71, 72 & 94), and “leggings” (Participant 29) were referenced. One designer stated that “skirts are the easiest to make” (Participant 16). The designers referenced a wide variety of accessories. These included hats, bags, mittens, “bow ties and hair bows” (Participant 67), and “bracelets” (Participants 23 & 82). One designer specified “hand-dyed silk scarves and nuno-felted scarves” (Participant 3) indicating the techniques used to create the scarves. Many designers referenced that they created dresses in general. One designer stated that they create “special occasion dresses” (Participant 1), while another specified the following:

> *Dresses are my main focus when I’m repurposing* (Participant 29).

Outerwear refers to those designers who cited that they create coats, jackets, or hoodies. One designer specified that they create “women’s jackets” (Participant 12), while another specified that they create “jean jackets” (Participant 72). Eight designers referenced household items that they created in addition to other apparel items. The household items included rugs, blankets, and three of the eight specified that they create “aprons” (Participant 34, 66, & 86). One theme of the Categories Created that was not in the previous classification of Categories Repurposed is children’s clothing. Several designers stated that they create children’s clothing including “baby dresses” (Participants 22 & 75), “baby booties” (Participant 35), and “diaper covers, toddler sweaters, onesies, and dresses” (Participant 18). The theme of anything refers to the three designers that did not cite any specific category of apparel. These designers stated that they create “all kinds” (Participant 47) or “all different” (Participant 38) and “most any type of garment,

whatever strikes me at the time" (Participant 43). Two designers stated that they create lingerie in general, but didn't specify the type of lingerie they create.

Repurposed Pricing Strategies

The classification of Price resulted in six themes. These were: labor and cost (74 references coded), market price (32 references coded), quality and uniqueness (13 references coded), designer preference (7 references coded), customer expectations (6 references coded), and pre-set pricing (3 references coded).

The most referenced theme in the Pricing category is labor and cost, referring to those designers that include the time it takes to create a product and/or the cost of materials when setting prices. Many designers simply stated they base prices on "cost of supplies and time/effort put into the design" (Participant 29), "how long it takes to sew the garment, materials and tags factor into the pricing" (Participant 4) or "time invested and cost of product and overhead to operate equipment" (Participant 40). Other designers specified that they use a formula for how they set prices. For example, "cost of goods x 45%" (Participant 12) or the following:

> *I have a set formula of hours of labor plus cost of materials, if any, and a percentage tacked on as sort of a buffer* (Participant 65).

> *I use a formula I found online, I think it was on Etsy. It's something like take your cost of materials and labor and double it. This is your wholesale price. Double this again and that's your retail price. I don't charge more than $50 though. I'm not sure why, it just seems to be a barrier for me* (Participant 92).

The theme of Market Price refers to those designers who price their product in line with the current market and their competitors. When setting price, these designers mentioned that they "compare to similar items online" (Participant 5), "investigate competitor's products to see what they are priced at" (Participant 25), and "research similar designers or brands and gage their price point" (Participant 39). One designer stated the following:

> *I have tried to apply craft pricing formula suggestions, but due to the time it takes to create large crochet projects, this makes prices far too expensive. So, I look at what other people are charging for similar items and position my pieces similarly* (Participant 91).

Many designers also stated that they base prices on the uniqueness or quality of the product. For example, designers referenced "the uniqueness of the garment" (Participant 69) and "their 'WOW' factor" (Participant 74) when setting prices. Other designers stated the following:

> *A few checkpoints help determine price. Quality, technique, and originality add value* (Participant 52).

> *This is very difficult because the items are handmade, so I never recoup all of my labor cost. I try to calculate the value of the design and uniqueness of the article* (Participant 73).

Those designers who based price points on their own experiences were coded as designer preference. This included the designers who referenced "intuition" (Participant 88) or

"what I would pay for it" (Participant 20) when setting prices. One designer stated the following:

> *Often when I am working on a piece, a price point will come to me and I will usually go with that* (Participant).

The theme of customer expectations includes those designers who consider what the consumer would be willing to spend on an item. Designers stated that they want prices to be "affordable for the customer" (Participant 94) and "equivalent to what people expect to spend" (Participant 3). One designer stated the following:

> *I also keep in mind that if X item is vintage yet similar to brand new Y item which is selling for A amount of money, how much will the consumer be willing to spend on an exclusive X item* (Participant 39).

The theme of pre-set pricing refers to the designers who stated that they have a set price for specific merchandise. For example, one designer stated the following

> *I generally have a set price per merchandise category and then my go up or down depending on how many 'extras' I do* (Participant 36).

Deconstruction Method

Four methods were extruded from the classification of Deconstruction Method: scissors (58 references coded), seam ripper (22 references coded), no deconstruction (12 references coded), and workable pieces (12 references coded).

The scissors method was the most cited deconstruction method. The designer stated the following:

> *Scissors are a girl's best friend* (Participant 11).

> *I cut apart the seams saving collars, cuffs, and keeping the interesting pieces whole* (Participant 5).

The seam ripper method includes those designers that use a seam ripper to deconstruct garments for repurposing. One designers stated the following:

> *I deconstruct with a seam ripper, so I am maintaining a lot of the garment* (Participant 14).

The method of no deconstruction refers to the designers that did not take apart garments before repurposing. Designers stated the following:

> *I start with a base garment (such as a sweater) and then cut parts of it off (sleeves or collar) and add sleeves or collar from another garment, then add applique designs, ruffles, vintage buttons, lace, or other embellishments* (Participant 71).

> *I do the least amount of deconstruction as possible as this is the most cost effective method. First I take off any hardware* (Participant 7).

The method of workable pieces refers to the designer that cut out just the pieces that they need from the original garment or textile. This included cutting smaller pieces out of larger garments or large textiles. For example:

> *I just cut out what I need if I am using small pieces* (Participant 14).

> *I usually draw the pattern right on whatever I am using and then cut it out* (Participant 22).

Repurposed Sizing

The final classification of sizing resulted in eight themes. These were: comparative size (31 references coded), original size (20 references coded), custom made (14 references coded), measurements (9 references coded), size chart (7 references coded), pattern size (7 references coded), one or no size (7 references coded), and mannequin size (6 references coded). The most popular form of sizing was the theme of comparative sizing. This refers to the designers who compare the size of the final product to a standard and adjust the size up or down accordingly.

> *I determine the size in comparison to RTW* (Participant 40).

Within the theme of original size, designers based the size of the final product on the size of the original garment being repurposed. For example:

> *I go by the size it originally said on the tag. If there's no size listed then I compare to my size and go from there* (Participant 8).

*I base it on the original size of what I have repurposed. I try not to change the size of the original garment unless it is very small* (Participant 33).

The theme of custom made refers to those designers who don't need to determine a size because their products are made to fit a specific customer. Designers stated the following:

*I mainly do custom work, so I am given a size and I work to make the final product that size* (Participant 29).

*The size of the final piece is often determined by the customer's request* (Participant 34).

The theme of actual measurements refers to those designers that do not list an actual size when selling their products, but instead include the actual measurements. For example:

*I show the item on a dress form and list the dress form measurements and flat measurements* (Participant 5).

Seven designers stated that they use a size chart to determine the size of products, either a chart they acquired from the internet or one they created. The designers stated the following:

*We consult average bust/waist/hip measurements and convert them into our own sizing chart, generally small, medium, and large* (Participant 47).

*I always use the same table from the internet* (Participant 60).

The theme of pattern size refers to those designers that use a basic pattern to create products and size items from the pattern size. For example, designers stated the following:

> *I have a basic pattern that I use to determine the size. It can be adapted to make the most of my findings* (Participant 92).

> *I devise patterns with sizing prior to the development and working with the recycled materials* (Participant 52).

The theme of one or no size refers to those designers that either do not specify a size or sell 'one size fits all' products. Designer stated the following:

> *I tend to use free sizes as I like to make items that can fit a range of body types such as my capelets, ponchos, etc.* (Participant 91).

> *We prefer free sizes that encompass a 2-4 size variation* (Participant 12).

> *I use drawstrings. I try to make my clothes fit most sizes* (Participant 31).

Six designers stated that they create products to fit mannequins and use the size of the mannequin for the size of the product. For example:

> *The amount of fabric tends to dictate the size made then I fit it on a mannequin to determine the size* (Participant 65).

Following the open-ended questions regarding the design process, the designers were given a chance to make any additional comments about repurposing. Four themes were extruded from these comments and included; environmental concerns, process, profitability, and creativity. Within the theme of environmental concerns the following statements were made:

> *My product is hand dyed as well as re-designed. I do not use the words re-purpose, I use the term Upcycled as per William McDonough and his book "Cradle to Cradle." I let the customer know the product is designed from existing materials. My goal is to have the garment be as main stream as possible, so that Upcycled is not seen as a fringe item* (Participant 3).

> *Some of my designs are simple (maybe just adding a hand drawn applique to a perfectly fine thrift store skirt) and some of my creations are complex (completely deconstructing a garment, or more to create another garment). I'm glad I can do my part to help the environment doing something I love* (Participant 10).

> *Not all repurposed garments are "green." For example, the 3 heavy-duty super-agitation hot water cycles I use to full the vintage sweater pieces into wool felt is energy intensive* (Participant 28).

> *We are very committed to having no waste in our process. We do not feel that we can use recycled clothing and then have a ton of waste at the end of our process. Every scrap that is produced by the production of our other products is used in*

*some way. Most of it is used to embellish our garments. Some of the smaller scraps are shredded and used to stuff teddy bears that are made from old socks* (Participant 57).

Within the theme of process, the following statements were made:

*I'm terrible at planning. I just "go for it" and it usually ends in throwing out the entire product and telling myself, "never do that again." It's frustrating to see something you worked on for hours be ruined by a wrong cut, but that's how I work. Impatiently* (Participant 9).

*I usually alter vintage clothing to make them more fashionable. It helps them sell to update them whether it's changing a hemline, or bleaching or some other alteration* (Participant 16).

*I don't use any kind of patterns, the garments evolve organically as I piece things together* (Participant 50).

*As goofy as it sounds - the materials will pop out straight away to me as what it wants to be* (Participant 90).

*Outsourcing has involved working with a local designer/maker. This collaborative process and meeting of minds has led us to have more experience*

*and confidence in manufacturing for ourselves, so this is now happening* (Participant 94).

Within the theme of profitability the following statements were made:

*I enjoy repurposing clothing, but I have to admit that it has not been profitable in the long run* (Participant 11).

*Because of the limited supply of each fabric, most pieces are one of a kind. We believe that increases the value of our products, but we aim to keep our price-points affordable and competitive* (Participant 47).

*Fast fashion is everywhere. With so much cheap, foreign-made, mass-produced clothing to choose from, customers are not willing to pay enough to support the made-in-US goods* (Participant 51).

Within the theme of creativity the following comments were made:

*Because I am using thrift store finds I never know what I will have so the fabric "tells" me what to be. It is very different than going to a fabric store and buying yard goods. You have to be flexible and creative* (Participant 27).

*Most of the time I work free with a thought of how I want it and start the project and watch it grow and then keep adding or subtracting. I like working with freedom to create as I go along* (Participant 43).

> *My products are primarily made as textile art with a purpose. It is satisfying to create a beautiful new article from discarded goods that still have many years of wear* (Participant 93).

Additional Repurposed Design Process Information

In addition to the open-ended questions regarding the design process, the designers were asked a series of yes/no questions about their process. Table 6 shows the results of these questions. Eighty-one or 86.17% of the designers label products as repurposed. Eighty-three or 88.30% repurpose notions such as buttons and zippers in their designs. Forty-two or 44.68% sketch designs before production. Fifty-five or 58.51% conduct research on fashion trends when developing designs. Thirty-six or 38.30% create a sample garment during the design process. Forty-nine or 52.13% use draping to develop designs. Seventy-eight or 82.98% of the designers develop their own patterns for designs. Thirty-four or 36.17% designers stated that they do purchase existing patterns. However, thirty-one designers or 32.98% develop their own patterns and purchase existing patterns. Twelve or 12.77% do not develop their own pattern or purchase existing patterns. Seven of those twelve or 7.45% do not use draping, nor develop their own patterns or purchase existing patterns. Eighty-nine or 94.68% of the designers sew the repurposed products themselves. Only ten or 10.64% of the designers outsource the manufacturing of the products. Eight designers or 8.51% stated that they sew the products themselves and outsource the manufacturing, while three designers or 3.19% neither sew the products themselves nor outsource the manufacturing.

Table 6: Design Process

| Step in the Process | Frequency | Percentage |
|---|---|---|
| Label Products as Repurposed | 81 | 86.17% |
| Repurpose Notions | 83 | 88.30% |
| Sketch Designs prior to Repurposing | 42 | 44.68% |
| Research Current Fashion Trends | 55 | 58.51% |
| Create a Sample Garment | 36 | 38.30% |
| Drape the Designs | 49 | 52.13% |
| Develop a Pattern | 78 | 82.98% |
| Purchase a Pattern | 34 | 36.17% |
| Sew the Designs | 89 | 94.68% |
| Outsource the Manufacturing | 10 | 10.64% |

## Relationship between Innovation Characteristics and Usage of Repurposing

The relationship between perceived innovation characteristics and the usage of the process of designing repurposed apparel and/or accessories was analyzed for current and future usage to answer research question 4: How do the perceived innovation characteristics of the process of repurposing apparel and/or textiles influence the future use of the process of repurposing? To assess the relationship, multiple regression was used to find out which perceived innovation characteristic is the best predictor of current or future usage. In this study, the independent variables were perceived innovation characteristics such as relative advantage, compatibility, complexity, trialability, observability, cost, and image. The dependent variable is the usage of the process of designing repurposed apparel and/or accessories. Table 7 shows the mean scores for the multiple regression analysis for both the current usage and future usage of the process of repurposing.

Table 7: Current and Future Usage of Repurposing

| Innovation Characteristics | Mean Score | Standard Deviation |
|---|---|---|
| Relative Advantage | 5.057 | 1.14 |
| Compatibility | 6.06 | 1.14 |
| Trialability | 5.259 | 0.95 |
| Complexity | 4.232 | 0.81 |
| Observability | 4.835 | 1.45 |
| Image | 4.659 | 1.35 |
| Cost | 5.635 | 0.85 |
| Current Usage | 5.6790 | 1.292 |
| Future Usage | 6.238 | 1.109 |

Innovation Characteristics and Current Usage

To determine what perceived innovation characteristics influence the adoption of the process of repurposing, the researcher tested H1: The designer's perceptions of the innovation characteristics will significantly predict the current usage of the process of repurposing. Multiple regression was conducted to predict the current usage based on the designers perceptions of the seven innovation characteristics; relative advantage, compatibility, complexity, trialability, observability, cost, and image.

Prior to the multiple regression analysis, the following six assumptions were analyzed; independence of errors, linearity of the relationship between the dependent and independent variables, homoscedasticity, multicollinearity, significant outliers or influential points, and the normality of error distributions. All six assumptions were met. The assumption of independence of errors was met with Durbin Watson statistic of 2.392. The Durbin Watson statistic should be as close to 2 as possible to indicate that there is no correlation between residuals. The assumption of a linear relationship was assessed using

partial regression scatter plots and the plots for all seven independent variables presented a linear relationship. The assumption of homoscedasticity was assessed using the same scatterplots; the errors were spread across the predicted values, therefore the assumption of homoscedasticity was met. The assumption of multicollinearity was assessed using the Pearson's Correlation Coefficient; no multicollinearity was found as no correlations were above 0.70 and all of the tolerances in the collinearity statistics were greater than 0.10. No significant outliers were found, none of the standardized residuals were greater than ±3 standard deviations. However, one case exhibited high leverage with a value of 0.33. This case was left in the dataset because no influential points were found using Cook's distance values. All of these values were below 1.0. The determination of assumption of normal distribution was met through visual assessment of the P-P Plot.

Multiple Regression analysis resulted in an $R=0.458$, an $R^2= 0.210$, and an adjusted $R^2=0.146$ (see table 8). Therefore, the independent variables of innovation characteristics moderately predict the dependent variable of current usage and approximately 15% of the variance of current usage is explained by the designer's perceptions of the innovation characteristics. The model was statistically significant, $F(7,86)=3.262$, $p=0.004$, meaning that the designer's perceptions of the innovation characteristics significantly predict the designer's current usage of repurposing. Therefore, the researcher fails to reject H1: The designer's perceptions of the innovation characteristics will significantly predict their current usage of the process of repurposing.

The model is useful for predicting current usage of the process of repurposing. However, when analyzing the individual innovation characteristics, the characteristic of compatibility was the only variable that was statistically significant. A t-test was

conducted for the model and the contributions of each of the seven innovation characteristics were analyzed using beta weights and the t-values for significance. The standardized regression coefficients (beta weights) for each variable show which independent variable has the most effect on the dependent variable, showing the degree of difference in the dependent variables in response to difference in the independent variable, as measured in standard deviation units. The t-value represents whether the relationships of each independent variable with the dependent variable are statistically significant or not. If the t-value is bigger than the critical t-value, the result is significant. Results are included in Table 8. Compatibility was the only significant innovation characteristic suggesting that the process of repurposing is compatible with the designer's current lifestyle.

Innovation Characteristics and Future Usage

To determine what perceived innovation characteristics influence the future usage of the process of repurposing, the researcher tested H2: The designer's perceptions of the innovation characteristics will significantly predict their future use of the process of repurposing. Multiple regression was conducted to predict the future usage based on the designers perceptions of the seven innovation characteristics; relative advantage, compatibility, complexity, trialability, observability, cost, and image.

Table 8: Innovation Characteristics and Current Usage

| | R | $R^2$ | Adjusted $R^2$ |
|---|---|---|---|
| Effect Size | 0.458 | 0.210 | 0.146 |
| F-Ratio | 3.262 p=0.004 | | |
| Degrees of Freedom | 7, 86 | | |
| Innovation Characteristic | Beta Weights | t-statistic | P-value |
| Relative Advantage | 0.206 | 1.864 | 0.066 |
| Compatibility | 0.278 | 2.634 | 0.010* |
| Trialability | 0.135 | 1.178 | 0.242 |
| Complexity | 0.107 | 1.063 | 0.291 |
| Observability | 0.007 | 0.067 | 0.946 |
| Image | -0.086 | -0.828 | 0.410 |
| Cost | 0.023 | 0.224 | 0.823 |

*Significant at 0.05 alpha level

Prior to the multiple regression analysis, the following six assumptions were analyzed; independence of errors, linearity of the relationship between the dependent and independent variables, homoscedasticity, multicollinearity, significant outliers or influential points, and the normality of error distributions. All six assumptions were met. The independence of errors assumption was met with a Durbin-Watson score of 1.802. The Durbin Watson statistic should be as close to 2 as possible to indicate that there is no correlation between residuals. Partial regression scatter plots assessed the assumption of a linear relationship and the plots for all seven independent variables presented a linear relationship. The assumption of homoscedasticity was assessed using the same scatterplots. The errors were spread across the predicted values, therefore the assumption of homoscedasticity was met. The assumption of multicollinearity was assessed using the Pearson's Correlation Coefficient. No multicollinearity was found as no correlations were above 0.70 and all of the tolerances in the collinearity statistics were greater than 0.10. There was one case identified as an outlier because it had a standard residual greater than

±3 standard deviations. However, it was decided not to remove the outlier because that individual case did not have a leverage value above the safe value of 0.20. Three other cases were found to have leverage values above 0.20, but it was decided not to remove them because they were not influential points according to their Cook's distance values. None of the dataset had Cook's distance values above 1.0, therefore none of the cases are influential. The assumption of normal distribution was determined to be met through visual assessment of the P-P Plot.

The Multiple Regression analysis resulted in an $R=0.603$, an $R^2=0.363$ and an adjusted $R^2=0.311$ (see table 9). Therefore, the independent variables of innovation characteristics moderately predict the dependent variable of future usage and approximately 31% of the variance of future usage is explained by the designer's perceptions of the innovation characteristics. The model was statistically significant, $F(7,86)=7.006$, $p=0.000$, meaning that the designer's perceptions of the innovation characteristics significantly predict the designer's future usage of repurposing. Therefore, the researcher fails to reject H2: The designer's perceptions of the innovation characteristics will significantly predict their future usage of the process of repurposing.

The model is useful for predicting future usage of the process of repurposing. However, when analyzing the individual innovation characteristics, the characteristics of relative advantage and compatibility were the only variables that were statistically significant. A t-test was conducted for the model and the contributions of each of the seven innovation characteristics were analyzed using beta weights and the t-test for significance. The

Table 9: Innovation Characteristics and Future Usage

| Effect Size | R | $R^2$ | Adjusted $R^2$ |
|---|---|---|---|
| | 0.603 | 0.363 | 0.311 |
| F-Ratio | 7.006 p=0.000 | | |
| Degrees of Freedom | 7,86 | | |
| Innovation Characteristic | Beta Weights | t-statistic | P-value |
| Relative Advantage | 0.310 | 3.119 | 0.002* |
| Compatibility | 0.286 | 3.021 | 0.003* |
| Trialability | 0.121 | 1.169 | 0.246 |
| Complexity | -0.075 | -0.825 | 0.412 |
| Observability | 0.084 | 0.957 | 0.341 |
| Image | -0.153 | -1.648 | 0.103 |
| Cost | 0.143 | 1.536 | 0.128 |

*Significant at 0.01 alpha level

standardized regression coefficients (beta weights) for each variable show which independent variable has the most effect on the dependent variable, showing the degree of difference in the dependent variables in response to difference in the independent variable, as measured in standard deviation units. The t-value represents whether the relationships of each independent variable with the dependent variable are statistically significant or not. If the t-value is bigger than the critical t-value, the result is significant (see table 9). Relative advantage and compatibility were the only significant innovation characteristics suggesting that the process of repurposing is compatible with the designer's current lifestyle and provides an advantage over other methods.

## Effect of Opinion Leadership and Environmental Awareness

The effects of designer's opinion leadership and environmental awareness on perceptions of the innovation characteristics and their current and future usage of the process of repurposing were analyzed for this study. This answers research questions 5-7. MANOVA was used to determine the differences in perceived innovation characteristics of the process, current and future usage of repurposing apparel, and/or textiles in terms of the designer's level of opinion leadership and environmental awareness. MANOVA allowed determination of the interaction effects of opinion leadership and environmental awareness. In this analysis, the independent variables were the designer's opinion leadership and environmental awareness. The dependent variables were the seven perceived innovation characteristics and the current and future usage of the process. MANOVA was used to analyze the effect of designer's opinion leadership and environmental awareness on their perceptions of the innovation characteristics and their current and future usage of the process of repurposing. The designers were given a Likert-type scale ranging from 1-7 (Strongly disagree- Strongly agree) to measure opinion leadership and environmental awareness. The designers were divided into two groups, low and high, for opinion leadership and environmental awareness. The researcher looked at the median scores for opinion leadership and environmental awareness taking out 5% below the median and 5% above the median to get two distinctive groups. Opinion leadership had a median score of 5.6. The 'low' group consisted of the designers who had an average score of 1-5.4 (n=30). The 'high' group consisted of the designers who had an average score of 5.8-7.0 (n=39). Environmental

Awareness had a median score of 4.53. The 'low' group consisted of designers who had an average score of 1-4.48 (n=34). The 'high' group consisted of designers who had an average score of 4.58-7.0 (n=35).

Before running the MANOVA, the assumptions of univariate outliers, normality, multicollinearity, multivariate outliers, linearity, and homogeneity of variance were assessed. The assumption of univariate outliers was assessed using box plots; one outlier was found for environmental awareness, and one outlier was found for opinion leadership. The outlier for environmental awareness was on the dependent variable of future usage in the "high" level. The outlier for opinion leadership was on the dependent variable of current usage in the "high" level. Outliers were not removed or transformed because this would not materially affect the results. Additionally, the assumption of normality was visually assessed using Normal Q-Q Plots and was satisfied for all combinations of the independent and dependent variables. Because the data were normally distributed, the outliers did not need to be removed or transformed. There was determined to be no multicollinearity as assessed by Pearson's Correlation Coefficient. All correlations were below 0.70. The highest correlation was 0.471 between relative advantage and future usage. Mahalanobis distance was used to assess multivariate outliers. No multivariate outliers were found at 9 degrees of freedom and a critical value of 27.88, $p>0.001$. There was a linear relationship between the seven innovation characteristics and current and future usage on each level of opinion leadership and environmental awareness as assessed by scatterplots. The assumption of homogeneity of variance-covariance matrices was assessed using Box's test of equality of covariance matrices and was satisfied, $p=0.057$. The assumption of homogeneity of variance was

assessed using Levene's Test of Equality of Error Variances. All p-values were greater than 0.05, so this assumption was met.

Effect of Opinion Leadership

The results of the MANOVA showed no statistically significant differences at $\alpha=0.05$ between the two levels of opinion leadership on the nine combined dependent variables, $F(9,29)=0.381$, $p=0.935$; Pillai's trace= 0.106; Wilks' $\Lambda=0.894$; partial $n^2= 0.106$ on the multivariate tests. Pillai's Trace and Wilks' Lambda were both included in the analysis, which are both multivariate generalizations of the F-statistic (laerd.com, 2013). Pillai's Trace is a better statistic for a smaller sample size, but Wilks' Lambda is the usual statistic analyzed for the multivariate tests (laerd.com, 2013). Table 10 shows the results of opinion leadership for the multivariate tests. This included the combined seven innovation characteristics and the current and future usage of the process.

Individually, none of the innovation characteristics were statistically significant for any of the levels of opinion leadership. So, there is no significant difference between the three levels of opinion leadership on any of the individual innovation characteristics. Therefore, there is no difference in the designer's perceptions of the innovation characteristics based on their level of opinion leadership. The researcher rejects H3a: There will be a significant difference between the levels of opinion leadership on the perceptions of the innovation characteristics.

Table 10: Multivariate Test for Opinion Leadership

| Effect | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Pillai's Trace | 0.106 | 0.381 | 9 | 29 | 0.935 | 0.106 |
| Wilks' Lambda | 0.894 | 0.381 | 9 | 29 | 0.935 | 0.106 |

The dependent variables of current usage and future usage were not individually statistically significant at $\alpha=0.05$. There is no significant difference between the levels of opinion leadership on the current and future usage of the process. Therefore, the researcher rejects H4a: There will be a significant difference between the designer's levels of opinion leadership on the current usage of repurposing and H5a: There will be a significant difference between the designer's levels of opinion leadership on the future usage of repurposing. Table 11 shows the results of the MANOVA Between Subjects Effects tests of opinion leadership on the perceptions of the innovation characteristics and the current and future usage of the process.

Table 11: Between subject's Effect Test for Opinion Leadership

| Dependent Variables | F-statistic | P-value | Partial $n^2$ |
|---|---|---|---|
| Relative Advantage | 0.854 | 0.361 | 0.023 |
| Compatibility | 0.106 | 0.746 | 0.003 |
| Trialability | 0.795 | 0.378 | 0.021 |
| Complexity | 0.548 | 0.464 | 0.015 |
| Observability | 0.918 | 0.344 | 0.024 |
| Image | 0.725 | 0.400 | 0.019 |
| Cost | 0.065 | 0.800 | 0.002 |
| Current Usage | 1.168 | 0.287 | 0.031 |
| Future Usage | 0.649 | 0.426 | 0.017 |

Effect of Environmental Awareness

There was no statistically significant difference between the three levels of environmental awareness on the nine combined dependent variables, $F(9,29)=0.834$, $p= 0.591$; Pillai's trace= 0.206; Wilks' $\Lambda=0.794$; partial $n^2=0.206$ for the multivariate tests. Pillai's Trace and Wilks' Lambda were included in the analysis, which are both multivariate generalizations of the F-statistic (laerd.com, 2013). Pillai's Trace is a better statistic for a smaller sample size, but Wilks' Lambda is the usual statistic analyzed for the multivariate tests (laerd.com, 2013). Table 12 shows the results of environmental awareness for the multivariate tests. This included the combined seven innovation characteristics and the current and future usage of the process.

Individually, none of the innovation characteristics were statistically significant for any of the levels of environmental awareness. So, there is no significant difference between the three levels of environmental awareness on any of the individual innovation characteristics. Therefore, there is no significant difference in the designer's perceptions of the innovation characteristics based on their level of environmental awareness. The researcher rejects H3b: There will be a significant difference between the designer's levels of environmental awareness on the perceptions of the innovation characteristics.

The dependent variables of current usage and future usage were also not individually statistically significant at $\alpha=0.05$. There is no significant difference between the levels of environmental awareness on the current and future usage of the process. Table 13 shows the results of the MANOVA Between Subjects Effects tests of environmental awareness on the perceptions of the innovation characteristics and the current and future usage of the process. Therefore, the researcher rejects H4b: There will be a significant difference

between the designer's levels of environmental awareness on the current usage of repurposing and H5b: There will be a significant difference between the designer's levels of environmental awareness on the future usage of repurposing.

Table 12: Multivariate Test for Environmental Awareness

| Effect | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Pillai's Trace | 0.206 | 0.834 | 9 | 29 | 0.591 | 0.206 |
| Wilks' Lambda | 0.794 | 0.834 | 9 | 29 | 0.591 | 0.206 |

Table 13: Between subject's Effect Test for Environmental Awareness

| Dependent Variables | F-statistic | P-value | Partial $n^2$ |
|---|---|---|---|
| Relative Advantage | 0.023 | 0.880 | 0.001 |
| Compatibility | 2.583 | 0.117 | 0.065 |
| Trialability | 0.033 | 0.857 | 0.001 |
| Complexity | 0.156 | 0.695 | 0.004 |
| Observability | 2.355 | 0.133 | 0.060 |
| Image | 0.114 | 0.737 | 0.003 |
| Cost | 0.016 | 0.899 | 0.000 |
| Current Usage | 1.604 | 0.213 | 0.042 |
| Future Usage | 0.391 | 0.536 | 0.010 |

Interaction Effect of Opinion Leadership and Environmental Awareness

The interaction effect of opinion leadership and environmental awareness showed no statistically significant difference on the nine combined dependent variables, $F(9,29)=0.624$, $p= 0.767$; Pillai's trace= 0.162; Wilks' $\Lambda=0.838$; partial $n^2=0.086$ for the multivariate tests. Pillai's Trace and Wilks' Lambda were both included in the analysis, which are both multivariate generalizations of the F-statistic (laerd.com, 2013). Table 14

shows the results of the interaction effect of opinion leadership and environmental awareness for the multivariate tests. This included the combined seven innovation characteristics and the current and future usage of the process.

Individually, none of the innovation characteristics were statistically significant for the interaction effect of opinion leadership and environmental awareness. There is no significant difference for the interaction effect on any of the individual innovation characteristics and no significant difference in the designer's perceptions of the innovation characteristics based on the interaction of opinion leadership and environmental awareness.

Table 14: Multivariate Test for the Interaction Effect of Opinion Leadership and Environmental Awareness

| Effect | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Pillai's Trace | 0.162 | 0.624 | 9 | 29 | 0.767 | 0.162 |
| Wilks' Lambda | 0.838 | 0.624 | 9 | 29 | 0.767 | 0.162 |

The researcher rejects H3c: There will be a significant difference on the levels of opinion leadership and environmental awareness on the designer's perceptions of the innovation characteristics.

The dependent variables of current usage and future usage were not statistically significant at $\alpha=0.05$. There was no significant difference for the interaction effect of opinion leadership and environmental awareness on the current and future usage of the process of repurposing. Table 15 shows the results of the MANOVA Between Subjects

Effects tests of the interaction of opinion leadership and environmental awareness on the perceptions of the innovation characteristics and the current and future usage of the process. The researcher rejected H4c: There will be a significant difference between the designer's levels of opinion leadership and environmental awareness on the current usage of repurposing and H5c: There will be a significant difference between the designer's levels of opinion leadership and environmental awareness on the future usage of repurposing.

Table 15: Between Subjects Effects Test for Interaction Effect of Opinion Leadership and Environmental Awareness

| Dependent Variables | F-statistic | P-value | Partial $n^2$ |
|---|---|---|---|
| Relative Advantage | 0.076 | 0.784 | 0.002 |
| Compatibility | 0.040 | 0.842 | 0.001 |
| Trialability | 0.334 | 0.567 | 0.009 |
| Complexity | 0.408 | 0.527 | 0.011 |
| Observability | 0.058 | 0.812 | 0.002 |
| Image | 0.092 | 0.763 | 0.002 |
| Cost | 0.065 | 0.800 | 0.002 |
| Current Usage | 1.417 | 0.241 | 0.037 |
| Future Usage | 0.921 | 0.343 | 0.024 |

This chapter has included the results of several methods of data analysis. Descriptive statistics were used to analyze the characteristics, experience, and motivations of the sample of designers. Content analysis was used to analyze the open-ended questions over the designer's process of repurposing. Multiple Regression was used to predict the current and future usage of the process of repurposing using the innovation characteristics as the predictor. A MANOVA was used to analyze the effect of the designer's levels of

opinion leadership and environmental awareness on their perceptions of the innovation characteristics and current and future usage of the process. In the next chapter, an in-depth discussion of the results and an explanation of the meaning of the results are included.

# CHAPTER V

# DISCUSSION

This chapter includes a discussion of the results as stated in the previous section. Included is a discussion of the designer's motivations for repurposing, their design process, the effect of the innovation characteristics on the usage of the process, and their levels of opinion leadership and environmental awareness in relation to their perceptions of the innovation characteristics and usage of the process of repurposing. Additionally, this chapter includes a discussion of the levels of repurposing that emerged from the content analysis and a proposed model for repurposing apparel and textiles into apparel and/or accessories.

## Designer Motivations

It seems there were various motivations for the designers to participate in repurposing. Previous research has shown that there could be three possible motivations for repurposing; financial profit, artistic expression, and environmental reasons. A majority of the designers chose all three options as the motivations for repurposing. This suggests that there is not much difference in the processes based on motivation or there are other

motivations that have not been considered. Therefore, all three motivations need to be considered in the development of a process of repurposing.

All of the designers selected artistic expression as at least one of the motivations for repurposing, some in combination with environmental reasons and financial profit. This suggests that artistic expression is the most important motivation for repurposing. However, Dunn (2008) proposed that even though designs are artistic in nature, repeatability of designs is feasible if production were more standardized. Many designers stated in the content analysis section that they enjoy the creative freedom that the process of repurposing allows them and that they consider their designs to be works of art. This needs to be considered and retained when developing a process for repurposing. It is important that the creative freedom is not lost in the process. Future research could determine if designers who value artistic expression would be interested in participating in a standardized process for small-scale manufacturing.

Financial profit was the least selected motivation, but a majority of the designers did select it. Previous research by Grasso, McEnally, Widdows, & Herr (1995) and Hines & Swinker (1996) showed that consumers were only willing to purchase recycled products when the price was equal to or lower than the non-recycled products. Repurposed apparel and accessories can be considered recycled products. Repurposed apparel has traditionally been sold at a premium price point because the labor-intensive process increases costs, and the selling price. Designers stated in the content analysis section that it is difficult to earn a profit selling repurposed apparel and accessories due to the labor intensity of the process, but this is still an important consideration of the designers. When developing a standardized process for repurposing, lessening the labor involved in the

process could lower the overall cost of production. This would allow for a lower selling price to the consumer.

A majority, 85%, did select environmental reasons as one of the motivations for repurposing suggesting that this is an important aspect of repurposing and that the designers recognize the environmental impact of using repurposed materials. Previous research has shown that environmental awareness has become an accepted part of our society (Domina & Koch, 1998), so it is not surprising that so many designers selected environmental reasons as a motivation. However, one designer did suggest that her process is not environmentally-friendly because she uses several energy-intensive hot water cycles to prepare the wool that she repurposes. Additionally, the results of this study showed that the designer's environmental awareness did not influence the usage of the process of repurposing or their perceptions of the innovation characteristics even though a majority of the designers selected environmental concern as a motivation for repurposing. This was a surprising and contradictory finding to the researcher. If a process for repurposing is developed, it must be ensured that all steps in the process are environmentally-friendly. This includes the steps in production, as well as any dyeing or finishing processes.

## The Process of Repurposing

The subjects were asked a series of open-ended questions to determine their process for repurposing so it could be compared to the product development process for traditional apparel. Results of this study have shown that, depending on the level of repurposing in which the designer participates; the process of repurposing is labor intensive and many times not cost effective. Determining the best practice of repurposing and streamlining

the process of producing repurposed apparel for small-scale manufacturing could lower costs and lessen the time commitment from the designers. The three motivations selected by the designers, especially artistic expression, also need to be considered in the development of a process for repurposing.

Designer Inspiration

Most of the sources of inspiration cited by the designers could be considered typical sources of inspiration for designers in the traditional apparel product development process. These include historical/cultural influences, nature, internal, end user, and pop culture. The themes of end user and pop culture should be addressed in terms of repurposing. It seems these two forms of inspiration differ in the repurposing process as compared to how they appear in the traditional apparel design process. Additionally, the theme of original garment was the only theme specific to repurposing and therefore needs to be discussed.

The theme of end user as a source of inspiration differs in its usage from the traditional apparel design process. Traditionally, apparel designers will have a pre-determined target market for which they are designing. The participants in this study, who cited the end user as a source of inspiration, either created custom designs or created designs with a specific customer in mind. Obviously, the designers creating custom repurposed garments must consider the needs of the individual consumer for whom they are designing and that acts as a main source of inspiration. Many designers stated that they design with a customer in mind. While this sounds very similar to how traditional designers produce a line for a general target market, the repurposing designers may design each individual garment with a different subset of consumer in mind, not a general target market. The

original garment may determine how and for whom they design the repurposed apparel or accessory. For example, a designer repurposing a rock t-shirt may do so with a different consumer in mind versus if they were repurposing a vintage wedding dress. While consumers who purchase repurposed apparel could be considered a target market on their own, there could still be subsets of consumers that would purchase different categories of merchandise. This suggests that each individual design could be designed for a different subset of repurposed consumer. The original garment the designer is repurposing could determine who the end user is, which relates to the theme of gaining inspiration from the original garment.

Many designers stated that they get inspiration from the original garment or from the materials they repurposed. This source of inspiration seems like it would be specific to repurposing as there is often a limited amount of fabric available and possibly limited colors, patterns, textures, etc. The participants who cited this as a source of inspiration suggested that the original garment "spoke" to them to tell them what it should become. These designers really take into account the materials available to them for repurposing and this is an important consideration in the repurposing process. This could explain why it was the second most referenced source of inspiration. Pop culture was the most referenced inspiration, followed by materials used, which suggests that designers are influenced by the media, current trends, etc., but must consider the materials available to them. This differs from the traditional process of designing apparel and accessories because the repurposed designers may start with one idea and have to alter it based on the availability of materials. There may be primary and secondary sources of inspiration. For example, pop culture may spark the initial idea for a design, but the materials available

may serve as the secondary source of inspiration. The original design may have to be changed based on available materials.

Pop culture was the most popular source of inspiration as cited by the participants. This included any references to media such as movies, television, magazines, and internet, as well as art and current trends seen in retail establishments or street style. Many of the designers who cited pop culture as a source of inspiration stated that they see a current trend and attempt to replicate it. Some designers simply replicate existing trends, while others take current trends and attempt to improve upon them. This is a way to make repurposed apparel more fashion-forward so that the consumer does not view it as inferior. This finding agrees with previous research by Young et al. (2004) that repurposing apparel can make it more acceptable to the consumer and Steinbring & Rucker (2003) that recycled apparel must be viewed by the consumer as not inferior to traditional apparel.

Material Sourcing

The most popular method for sourcing second-hand materials to use for repurposing was purchasing the materials at second-hand stores. Included in this classification were thrift stores, garage sales, yard sales, antique stores, flea markets, etc. This seems like the most obvious and readily available method of obtaining second hand materials. Separate themes included the designers who obtain the materials wholesale, purchase from online auction sites, and source them globally from developing countries. It was unclear from the participant's responses where they obtained second-hand materials in developing countries. It was not specified if the second-hand materials were donations from

developing countries, were purchased at second-hand stores in developing countries, or if they were purchased wholesale in developing countries. Further research would be needed to investigate this. Obtaining second-hand materials through wholesale methods or online auction sites, such as eBay, still requires the designers to purchase materials. This may be less expensive than purchasing materials from second-hand stores, thus lowering the costs and selling price.

Many designers used other sources that did not require them to purchase the second-hand materials. These included the trash, donations, swapping with friends, and obtaining the materials from their own closets. When purchasing second-hand materials for repurposing, the cost of the materials must be calculated into the selling price of the garment. If designers could obtain the materials free of charge, then this could lower costs and allow them to sell products at a lower price point. It would need to be determined if enough second-hand materials could be obtained through free methods to accommodate the designs being produced. A cost comparison could be completed to determine the difference between purchasing second-hand materials wholesale, from online auction sites, through second-hand stores, and obtaining free materials to see how this influenced the selling of the products.

Merchandise Category Repurposed

Tops were the most referenced category of merchandise repurposed. Most of the designers who cited tops specified a certain style of top, such as t-shirts or sweaters. Some even specified the fiber content of the tops they prefer to repurpose. The second most popular category of repurposing was not actually a merchandise category, but those

designers that referenced a fiber or fabrication. The fibers included cotton, linen, silk, and wool garments. The fabrication methods referenced included denim, jersey knit, tulle, and wovens. A majority of the designers cited multiple categories of merchandise that they repurpose. A few designers even stated that they do not limit themselves to a specific category of merchandise and use whatever materials are available. This makes sense because one of the most referenced sources of inspiration by the designers was from the materials themselves. The availability of materials must be a primary consideration for designers in the process of repurposing.

Merchandise Category Created

Similarly to the classification of categories of merchandise repurposed, the designers referenced various categories of merchandise created. A few designers stated that they do not limit designs to a specific merchandise category. This is not surprising because it was referenced in the previous classification of Categories of Merchandise Repurposed. If the designers don't limit themselves on what categories of merchandise they repurpose because they utilize whatever materials are available, then they may not limit themselves on what categories of merchandise they create.

Tops were the most referenced category of merchandise created as well as the most referenced category of merchandise repurposed. This suggests that designers may be creating tops from repurposed tops, not completely deconstructing the original garment, but simply altering or embellishing the original garment. One category of merchandise that was referenced in categories created, but not in categories repurposed, was children's clothing. Children's clothing requires much less fabric, and could be a good way to

utilize smaller pieces of repurposed materials. Sixteen designers gave the same answer for the Category of Merchandise Repurposed and the Category of Merchandise Created. These designers are creating products in the same category as what they are repurposing. It is possible that these designers are not altering the original garment as much as those with end products in a different category of merchandise.

Repurposed Pricing Strategies

Six themes were extruded from the classification of pricing and all six should be addressed. Four of the six methods of setting prices; pre-set pricing, customer expectations, designer preference, and market price did not include any consideration of the materials, process, or quality that went into the production of the repurposed apparel and accessories. These methods included setting prices according to the merchandise category, the designer's perception of what the customer would pay, what the designer would pay, and what competitors were charging for their merchandise.

The theme of pre-set pricing included the designers who have a pre-set price per category, but may raise the price depending on the techniques used to create the product. In that case the designer is considering the extra work that goes into a garment, but not all designers who referenced pre-set pricing, specified taking this into consideration. It seems for the methods of setting pricing based on customer expectations and designer preference that this would be very difficult to judge because there was no set formula for prices. Although, it is important to consider what the customer is willing to pay. This agrees with previous research by Grasso et al. (1995) and Hines & Swinker (1996) that consumers were only willing to purchase recycled products when the price was equal to

or lower than non-recycled counterparts. For the method of setting prices based on market prices, it was unclear what competitors the designers were using as a benchmark. For example, were the competitors other businesses selling repurposed products or were they traditional retailers? If the designers were comparing repurposed products to traditionally produced products, then the comparisons may not be equivalent, but previous research suggests that consumers will make that comparison. The designers suggested that because of fast fashion companies, consumers are not willing to pay the extra amount for an environmentally-friendly, one-of-a-kind product. This also agrees with the research by Grasso et al. (1995) and Hines & Swinker (1996) that consumers are not willing to pay a higher price for recycled apparel products. Further research could include more specific questions about price setting and what kind of businesses the designers were using as benchmarks.

The designers who referenced the themes of quality and uniqueness and labor and cost took into consideration the materials, quality, and labor that goes into their products when setting a price. This is very important for repurposed apparel as it is very labor and time-intensive to produce. While the designers who referenced the theme of quality and uniqueness did take into consideration the "Wow factor" of the repurposed garments, they don't necessarily use a formula for setting prices. However, many of the designers did reference a specific formula. Because the process of repurposing is time intensive, it is imperative for the designers to consider the labor and the cost of materials. Several designers said they can't charge high enough prices to recoup labor costs. Perhaps, if the process were more streamlined, labor costs could be lower, and the prices charged would be indicative of the actual labor and materials that went into the product. Designers need

to have an established formula for setting prices, which should include labor and material costs, competitor's prices, and customer expectations.

Deconstruction Method

Two of the four themes extruded from the classification of deconstruction method suggested that the designers are not utilizing all the fabric possible from repurposed materials and therefore, not being as environmentally-conscious. The two themes were workable pieces, where the designers cut out only the pieces that are needed; and scissors, where the repurposed items are cut apart. The use of scissors suggests that the designers are not utilizing the seam allowance and therefore, creating more waste. This was the most referenced method of deconstruction. The second most referenced method of deconstruction was the use of a seam ripper, which suggests that the designers are utilizing as much fabric as possible by using the seam allowance. The designers who referenced no deconstruction, meaning that they alter the original repurposed garments rather than taking them apart, are also utilizing most of the repurposed material available. Designers stated that they cut off sleeves and collars and add ruffles and other embellishments. This agrees with research by Fletcher (2007) who found that there are groups of creative designers using techniques such as restyling, reshaping, embellishing, and overprinting to give discarded fabrics a new life and divert waste from landfills. Further research would be needed to determine if the designers who are cutting out workable pieces and cutting off design details, like collars and sleeves, are utilizing the excess pieces or if those pieces go to waste. One designer did state that she uses scraps to embellish the repurposed garments and/or as stuffing for teddy bears. In the development

of a process for repurposing, the designers may want to consider outsourcing the deconstruction of the original garments into workable pieces. The outsourcing could be completed by members of the local community, which would also increase community involvement. This could potentially lower the labor costs of the process and allow for a lower selling price. The designers may also want to consider some sort of mechanized process for deconstruction and sorting of the repurposed materials.

Repurposed Sizing

Similar to the classification of pricing, there seems to be no standard amongst the designers for determining the size of garments. This is not surprising as sizing standards are an ongoing issue with traditionally produced apparel as well. While some of the designers use size charts or actual measurements of the garments, others determine the sizes of the garments by comparison to other garments or to their own size. These seem like unreliable methods for determining sizes. With two of the themes; original size and custom-made, the designers do not have to worry about setting sizes. The theme of original size refers to those designers who are not completely deconstructing the original garment, but altering or embellishing it. Therefore, they use the size of the original garment as the size of the final repurposed garment. The theme of custom-made refers to those designers who design for a specific customer, therefore the labeled size is irrelevant. The garment is the size of the customer for which it is made. Designers need to have a set method of sizing their garments whether it is using a sizing chart or actual measurements. The only exceptions are the designers creating custom-made garments and one-size-fits-all garments or accessories.

The designers were also given a chance to make any additional comments about their process. Four themes were derived from these comments; environmental concerns, process, profitability, and creativity. Several of these comments gave relevant insight into the designer's repurposing process. The designers suggested that they don't go through an actual product development process or at least, it is different every time. They suggested that they do not plan the garments prior to production. The end result is very much based on creativity and the materials that are available for repurposing. They do consider the environmental impact of their process and try not to create additional waste. The designers also suggested that profitability is a concern. It is difficult to recoup labor costs and still charge a price that consumers are willing to pay.

In addition to the open-ended questions about the design process of repurposing, the designers were asked a series of yes/no questions about the design process. The majority of the designers labeled products as repurposed; repurposed notions, such as zippers; did not sketch designs before production; did not conduct research on current design trends; and did not create sample garments. Concerning pattern development, a majority of designers signified that they use draping and/or develop their own patterns. It was unclear if they develop patterns through draping or flat pattern techniques. A majority of the designers also signified that they do not purchase existing patterns. However, thirty-one of the designers develop their own patterns and purchase existing patterns. Twelve neither develop patterns nor purchase existing patterns and seven of those twelve do not drape their designs. So, the question becomes, how are they developing designs if they're not draping, developing patterns, or purchasing existing patterns? It's possible that these designers are the same ones that are simply altering and/or embellishing the repurposed

garments and not actually reconstructing the original garment into something different. Perhaps they are producing accessories that don't require a pattern. The majority of the designers sew their own products and do not outsource any manufacturing. One designer did state in the additional comments section that she has partnered with a local producer to help with the manufacturer of her products. Additional research is needed to determine if this is a viable option for other repurposed designers or if any other steps in the repurposed process could be outsourced.

In summary, the research shows that there is no set process for repurposing and many designers do not start the process with a plan of what the end product will look like. Their motivation is artistic, financial, and environmental, so all three must be considered in the development of a process. The designer's inspiration is varied, but the results suggest that the designers may have primary and secondary sources of inspiration. The primary source of inspiration follows along the lines of traditional sources of inspiration, while the secondary source is the materials being repurposed. The majority of designers sourced materials from second-hand stores, but it may be more economically viable to source them from wholesalers or to receive materials as donations. The categories repurposed and the categories created were various and really depended on the designer's inspiration and the materials available for repurposing. Few of the designers used a formula for setting prices. Several things need to be included in the development of a formula such as, cost of labor and materials, competitor's prices, and customer expectations. The most popular deconstruction method was using scissors, but that is not the most environmentally-conscious method. Using a seam ripper to deconstruct the original garment allows for the most fabric to be utilized. Designers also need to have a set

method of sizing garments, whether this is using a sizing chart or actual measurements. The only exceptions are the designers creating custom-made garments, one-size-fits-all garments, accessories, and using the size of the original garment.

Additionally, the designers labeled their products as repurposed, repurposed notions, did not sketch designs before production, researched current trends, did not develop sample garments, draped and/or developed their own patterns, did not purchase patterns, sewed the garments themselves, and did not outsource the manufacturing. The research suggests a need for a standardized process for producing repurposed apparel that achieves the following goals based on the designer's motivations: 1) It lowers labor costs, therefore lowering the selling price, but still allows the designers to earn a profit; 2) It allows designers creative freedom to express themselves artistically; and 3) It is environmentally friendly.

## Levels of Repurposing

The results of this study suggest that there may be different levels of designing repurposed apparel and/or accessories based on the complexity of the process. There are a few aspects in the process of repurposed design that are not specific to the different levels of repurposing. These include inspiration, sourcing materials, labeling the product as repurposed, sketching the designs, and researching fashion trends. These elements in the design process would not change according to the level of repurposing in which the designers are participating. The motivations of the designers also would not vary based on the level of repurposing. Table 16 shows the details of the three different levels of repurposing.

Table 16: Levels of Repurposing

| Step in the Process | Level 1: Redecorating and Repurposing | Level 2: Subtractive Repurposing | Level 3: Additive Repurposing |
|---|---|---|---|
| Categories Repurposed | Various categories repurposed | Can vary, but original garment will be a larger garment or textile | Will vary, but original garment will be smaller pieces |
| Categories Created | Same as category repurposed | Will vary, may or may not be the same as the original category | Will vary, smaller pieces combined to create a larger garment |
| Selling Price | Requires the least amount of labor cost; low selling price | Slightly more labor cost than level 1; slightly higher selling price | Requires a lot of labor, highest selling price of all three levels |
| Deconstruction | Least amount of deconstruction-outsourcing not necessary | Requires a moderate amount of deconstruction-possible outsourcing | Requires a major of deconstruction-possible outsourcing |
| Sizing | Able to use the size of the original garment | Size would have to be determined | Size would have to be determined |
| Use of pattern | No pattern-making or use of pattern required | Requires a pattern or draping | Requires a pattern or draping |
| Draping | Possible draping of original garment for alteration or embellishment | Requires a pattern or draping | Requires a pattern or draping |
| Construction | Least amount of construction, only alteration and embellishment of original garment | Requires much more construction than level 1 | Requires combining of smaller pieces as well as construction of garment |

Level 1: Redecorating and Repurposing

Level one is the least complex in terms of repurposing and very little change is occurring between the original garment and the repurposed garment. In this level, the category of merchandise repurposed is the same as the category of merchandise created. Therefore, little or no deconstruction is taking place. The designer may just be altering or embellishing the original garment to produce the final garment being sold. The designer

also may not need to develop or purchase a pattern. Also, very little sewing of the final product would have to take place. Because less labor is going into the product, the selling price could be lower compared to higher levels of repurposing. Determining the size of the repurposed garment would not be as difficult compared to the other levels. The designers could use the original size of the garment, which many designers stated as their method for determining the size.

Level 2: Subtractive Repurposing

Level two is slightly more complex than level one, but also has some similarities to the traditional design process. This level consists of designers who are repurposing large pieces of fabric into smaller products. The category repurposed and the category created may or may not be the same. For example, several designers stated that they repurpose household items such as curtain and tablecloths into apparel items such as dresses and skirts. Also included in this level would be designers repurposing larger apparel items into either smaller apparel items or into accessories. For example, a few designers stated that they used adult-sized clothing to create children's wear. In either case, slightly more deconstruction is necessary than in level one and the designers could cut out only the pieces that were needed. However, the designers may want to consider outsourcing the deconstruction of the original garments into workable pieces. This level would require the designers to either drape designs, develop their own patterns, or purchase existing patterns. Compared to level one, more sewing would be required, which means more labor costs. Therefore, the selling price would be higher than compared to level one

products. The designers would also have to determine the final size of the garments by using actual measurements or a size chart.

Level 3: Additive Repurposing

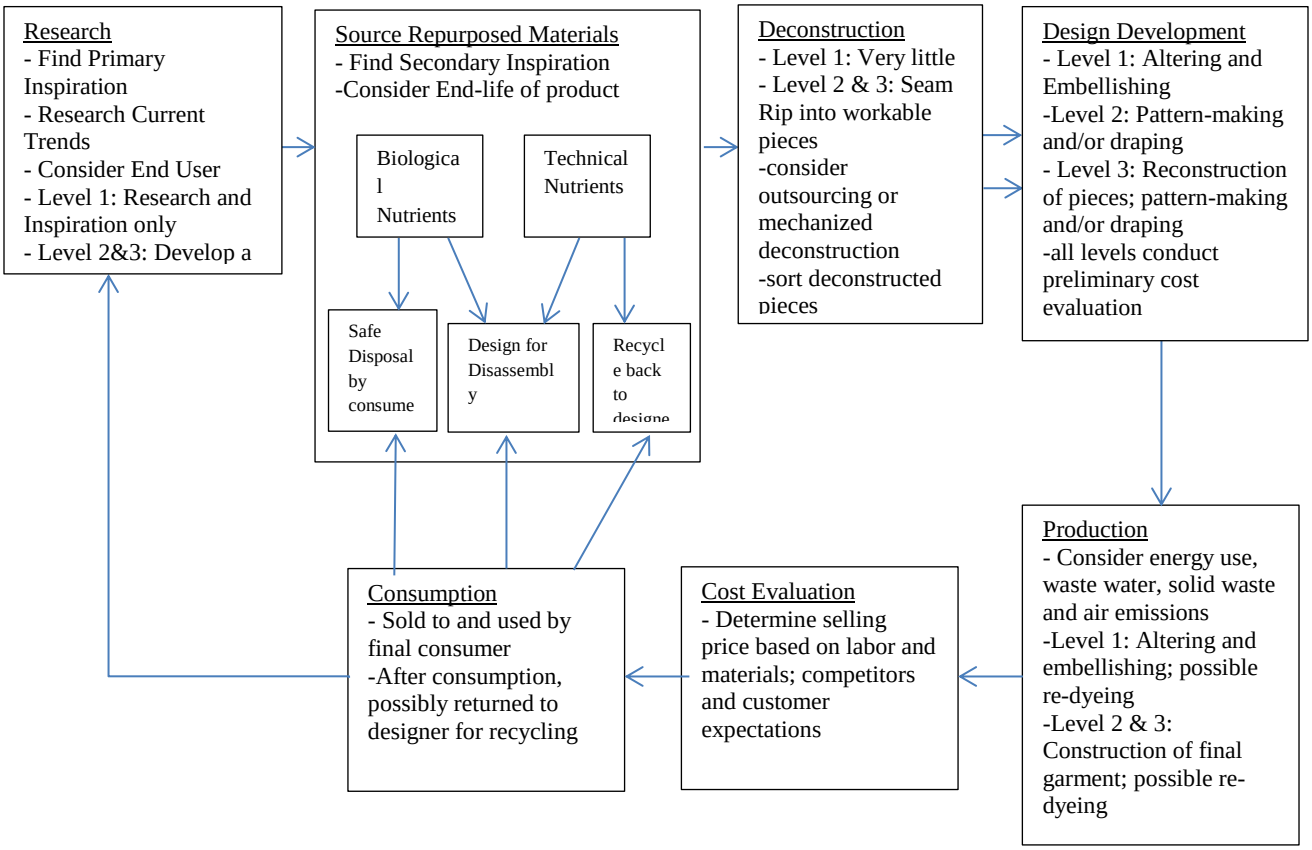
This is the most complex level of repurposing. This level involves deconstructing the repurposed materials into workable pieces and then reconstructing them into a completely new garment. The resulting garment may have a patchwork effect, and the categories repurposed and categories created would be completely different. When deconstructing the materials, using a seam ripper would allow for the most fabric and the least amount of waste. Outsourcing of the deconstruction may be a viable option for lowering the labor costs. There is a great amount of deconstruction and sewing required at this level of repurposing. This must be taken into consideration when determining the selling price. This level requires the highest amount of labor and therefore, would have the highest selling price of the three levels. At this level, the designers must drape designs, develop their own patterns, or purchase existing patterns. Similarly to level two, the designers would have to determine the sizes of the final products using measurements or a sizing chart

## Development of a Process of Repurposing

The results of this study suggest that there is no standardized process for the production of repurposed apparel and/or accessories. The development of a process could help eliminate second-hand apparel and textiles from the solid waste stream and provide a possible solution to the problem of apparel overconsumption. It seems that the biggest

problem facing designers with their current methods of repurposing is that it is not profitable due to high labor costs. This will be considered in the development of a standardized process. The process for producing repurposed apparel needs to achieve the following goals based on the designer's motivations: 1) It lowers labor costs, therefore lowering the selling price, but still allowing the designers to earn a profit; 2) It allows designers creative freedom to express themselves artistically; and 3) It is environmentally friendly. This process was developed based upon the traditional apparel product development model of Gaskill (1992) and the C2CAD model by Gam et al. (2009). Figure 4 shows the proposed process for repurposing.

Figure 4: Proposed Process for Repurposing



The stages in the process are as follows:

**Research:** Includes researching current trends and end user needs and finding primary inspiration. The primary inspiration could come from a variety of traditional sources such as nature, pop culture, or historical/cultural influences. This step combines the first step of trend analysis and the step of silhouette and style direction in Gaskill's (1992) product development model as well as the idea generation step in Gam, et al. (2009) C2CAD model. The end result of this step for repurposing levels two and three should be a variety of possible designs in which smaller pieces of fabric could be utilized. This would allow the designers to mix and match fabrics, so the end product could still be unique. This could possibly satisfy the designers need for artistic expression. For level one repurposing, developing designs would not be necessary because they are simply embellishing or altering the original garment.

**Sourcing Repurposed Materials:** Includes finding secondary inspiration from the materials and determining the best location from which to purchase materials in order to keep costs as low as possible. This step combines the step of fabrication selection from Gaskill (1992) and aspects of the step of material selection and testing from Gam et al. (2009). This will help satisfy the motivation of financial profit for the designers. In order for the repurposed product to be recyclable, the designers could consider what fibers and/or fabrics they are combining into one garment. For example, if a repurposed product is made of completely of repurposed polyester, there is better potential for it to be recycled as

a whole at the end of its second life. This would help satisfy the motivation of environmental concerns for the designers.

**Deconstruction:** Involves taking apart the original garment while preserving as much fabric as possible for repurposing. This step is specific to the process of repurposing. Level one repurposing designers skip this step and continue to design development. Levels two and three may consider outsourcing the deconstruction of repurposed apparel and textiles to lessen the labor involved and lower the selling price. Another option for deconstruction could be a type of mechanization to aid the designers in the deconstruction process. Either of these options for deconstruction could help satisfy the motivation of financial profit. Also involved in this step is the sorting of the repurposed fabric pieces. The designers may want to consider sorting the pieces by fiber type, color, or size.

**Design Development:** For level one repurposing designers, this involves altering and embellishing the original garment. For levels two and three designers, this involves pattern development and or draping. This step is adapted from the design evaluation step in Gam et al. (2009). The designers may want to consider design for disassembly at this stage so the repurposed product could be easily taken apart at the end of its life and recycled. At this stage, a preliminary cost evaluation should be completed with estimated labor costs to ensure the selling price will not be too high for consumers to pay.

**Production:** In this phase, the designer should consider the environmental impact of the product such as air emissions, waste water, solid waste, and energy use, which is another way the motivation of environmental concern can be satisfied.

This step is adapted from the production step of Gam et al. (2009). For level one designers this includes continued altering and embellishing. For level two and three designers this includes construction of the final garment. For all three levels, this phase could include re-dyeing of the product.

**Cost Evaluation:** Designers should use a pre-determined formula for setting selling prices. This formula should include consideration of the labor and materials costs of the product, the prices of the competitors, and the customer expectations. This step is adapted from the cost and design evaluation step in Gam et al. (2009). For the repurposed design process, cost evaluation has been included as a separate step and a preliminary cost evaluation was included as part of the design development step. This is important because of the premium price repurposed apparel typically requires to recoup labor costs.

**Consumption:** This phase includes the sale of the product to the final user and the use of the product by the final consumer. After this phase, the product could be safely disposed of by the consumer, recycled by the consumer, or returned to the designer for recycling. This step was not included in either the Gaskill (1992) model or the Gam et al. (2009) model, but it is important to consider the end of life of the product to not create additional waste.

## The Usage of the Process of Repurposing

Previous research over innovation characteristics has primarily focused on a product as the innovation. However, this study focused on the process of repurposing as the innovation. Rogers' (1983) Diffusion of Innovations Theory was the theoretical basis for

this study. Generally, the diffusion of innovations theory was a good fit to predict the current and future usage of the process of designing repurposed apparel and accessories. The model was significant for predicting the current and future usage of the process. However, the only individual innovation characteristic that was significant for current usage was compatibility. Two innovation characteristics were significant for future usage, compatibility and relative advantage.

Compatibility was a good predictor of the designer's current and future usage of repurposing and relative advantage was a good predictor of future usage, but not current usage.

Innovation Characteristics and Usage

The results of this study showed that the designer's perceptions of the innovation characteristics as a group did predict the current usage and future usage of the process of repurposing apparel and textiles into apparel and/or accessories. Compatibility was the only individual characteristic that was a significant predictor of the current usage of the process. This implies that the process of repurposing is compatible with the lifestyles of the designers. However, all six other innovation characteristics were insignificant. These included relative advantage, complexity, trialability, observability, cost, and image.

For the future usage of the process of repurposing, compatibility and relative advantage were significant predictors. This implies that the designers believe that the process of repurposing will be compatible with their future needs. Whether or not the designers perceive the process to be advantageous will influence future usage of the process, but not the current usage of the process. This seems contradictory. If the process is not

advantageous to the designers currently, how would it be advantageous to them in the future? Further research may be needed to answer this question. Perhaps the designers are hopeful that something will change for the better in the future.

The innovation characteristics of complexity, trialability, observability, cost, and image were not significant predictors of either current usage or future usage. Depending on the level of repurposing in which the designer participates, their process could be very complex. In general, the process of repurposing is more complex than the traditional process of designing apparel and/or accessories. In many cases, repurposing adds additional steps of deconstructing the materials before constructing the new product and sorting the deconstructed pieces. This is true for levels two and three of repurposing as previously stated. So, it makes sense that complexity would not be a good predictor of current and future usage. The development of a streamlined process could create ease of use for the process of repurposing, making it less complex.

The innovation characteristic of trialability was not a significant predictor of current and future usage of repurposing. This is surprising due to the experimental nature of repurposing and the fact that there doesn't seem to be an established process amongst the designers. Perhaps the experimental nature of the process is what makes the designers not want to try the process of repurposing currently or in the future.

Observability was not a significant predictor of current and future usage. This could be because repurposing is not yet a widely spread or widely accepted process. The process that designers go through when repurposing may not be visible to other designers. Also, the process may not be easily comparable to other designer's processes. Similarly to trialability, this could be because the process of repurposing is still experimental. The

development of a streamlined process could enhance both the trialability and observability of the process and therefore, increase the current and future usage of the process.

The innovation characteristic of cost was not a significant predictor of current and future usage. This is understandable because the process of repurposing is very labor-intensive and therefore, time-consuming. This makes the cost of producing repurposed apparel and accessories higher compared to traditional apparel and accessories. This is in agreement with research by Fletcher (2007) that repurposed apparel demands a premium price point. However, it was important to include this variable in this study to understand how the cost of production influences the designer's usage of the process. Lowering the production costs of repurposed apparel and accessories could potentially increase the current and future usage of repurposing. This needs to be considered in the development of a process of repurposing.

The innovation characteristic of image was another insignificant predictor of current and future usage. Similarly to cost, this is understandable. Traditionally, recycled apparel and accessories have had a negative social image. Recycled and second-hand products have typically been viewed as inferior by consumers (Young et al., 2004), but it was important to understand if this holds true for repurposed apparel specifically. If repurposed apparel also has a negative social image, it is understandable that it would inhibit the designer's current and future usage of the process.

In summary, compatibility was a significant predictor of the current usage of the process of repurposing. Compatibility and relative advantage were significant predictors of the future usage of the process of repurposing. None of the five other innovation

characteristics were good predictors of either current usage or future usage including complexity, trialability, observability, cost, and image. These results were understandable due to the nature of the process, but because there is very little research regarding the production of repurposed apparel, these variables needed to be included in the study. If a more streamlined process is developed, these issues could be addressed.

## Effect of Opinion Leadership and Environmental Awareness

The results of the MANOVA showed no statistically significant results. There was no statistically significant difference on the combined dependent variables of innovation characteristics or current and future usage of the process between the three levels of opinion leadership and environmental awareness. Therefore, the designer's levels of opinion leadership and environmental awareness do not significantly influence their perceptions of the innovation characteristics of the process of repurposing or current and future usage of the process of repurposing. Analysis of the individual innovation characteristics also showed no significant difference between the designer's levels of opinion leadership or environmental awareness.

### Opinion Leadership

The results of the MANOVA suggest that the designer's level of opinion leadership does not affect their perceptions of the innovation characteristics or current and future usage of the process. This was a surprising result to the researcher. A majority of the designers scored high on the opinion leadership scale and very few scored low. This suggests that

most of the designers would be considered opinion leaders and there may not be a distinctive difference between the levels of opinion leaders. Chan & Misra (1990) found that opinion leaders typically have personal involvement and familiarity with the product. It makes sense that the designers would score high on the opinion leadership scale. They are very personally involved and familiar with their designs and with their process of repurposing. It is possible that the designers are too close to the products and the process and therefore cannot be objective. This would effect perceptions of the innovation characteristics and current and future usage of the process. It seems the designers were a very homogenous group based on their opinion leadership. According to the Rogers' Diffusion of Innovations theory (1983), opinion leaders help innovations diffuse through the social system. So, even though the designer's level of opinion leadership did not influence their usage of the process or perceptions of the process, they could still help the process of repurposing diffuse and become more widespread.

Environmental Awareness

The effect of the designer's level of environmental awareness on the perceptions of the innovation characteristics and the current and future usage of the process was statistically insignificant. It seems that the designer's perceptions of the innovation characteristics have a greater effect on current and future usage of the process of repurposing than their level of opinion leadership or environmental awareness. This was surprising because a majority of the designers selected environmental reasons as motivation for repurposing and because the process of repurposing has environmental implications. It would make sense that environmental awareness would affect perceptions of the innovation

characteristics and usage of the process. Similar to opinion leadership, the designers were a very homogenous group based on environmental awareness. Perhaps there was just not enough of a difference between the low and high groups of environmental awareness for a significant result.

Opinion Leadership and Environmental Awareness

The results of the MANOVA for the interaction effect of opinion leadership and environmental awareness showed no significant effect on the designer's perceptions of the innovation characteristics and current and future usage of the process. While the results of the individual independent variables of opinion leadership and environmental awareness were surprising, the insignificant interaction effect was not as surprising. Research has shown that fashion opinion leaders value status and participate in conspicuous consumption (Goldsmith & Clark 2008) and have a desire for newness (Domina & Koch, 1997). Conspicuous consumption and environmentally-friendly behaviors are on opposite ends of the spectrum, so it makes sense that there would be no interaction effect for these two variables. This is in agreement with research by Domina & Koch (1997) who found that fashion opinion leadership is not related to environmental awareness or textile recycling. Furthermore, they suggested that fashion opinion leadership implies a desire for newness and a practiced form of purposeful obsolescence, which may conflict with a desire to be environmentally-friendly.

In summary, the research found no significant effect of the levels of opinion leadership or environmental awareness on the designer's perceptions of the innovation characteristics or current or future usage of the process of repurposing. Both of these results were

surprising. The interaction of opinion leadership and environmental awareness did not affect the designer's perceptions of the innovation characteristics and their current and future usage of the process of repurposing. This was not as surprising because opinion leadership and environmental awareness involve contradicting behaviors.

This chapter included the discussion and explanation of the results of this study. The first section discussed the designer's motivations for repurposing, followed by their design process. A suggestion for three different levels of repurposing and a proposed model for the process of repurposing were then included. These were based on the results of the content analysis of the designer's processes of repurposing. The next section explained the effects of the designer's perceptions of the innovation characteristics on the current and future usage of the process of repurposing. The final section explained the insignificant effect of opinion leadership and environmental awareness on the perceptions of the innovation characteristics and current and future usage of the process of repurposing.

# CHAPTER VII

# CONCLUSIONS

This study analyzed designer's motivations and process for repurposing apparel and textiles into apparel and/or accessories, the innovation characteristics in relationship to the usage of the process, and the effect of the designer's opinion leadership and environmental awareness on the innovation characteristics and usage of the process. It was concluded that designer's motivations varied and there was not a standardized process for repurposing. Also, the designer's perceptions of the innovation characteristics were good predictors of current and future usage of the process of repurposing. Levels of opinion leadership and environmental awareness did not affect perceptions of the innovations characteristics or current or future usage of the process of repurposing. This chapter includes a summary of the study and implications for future research.

## Summary and Conclusions

In summary, research has shown that an overconsumption of fashion products has led to

an abundance of second-hand apparel and used textiles. Many times second-hand apparel and textiles end up in the landfill, but they can be recycled in a variety of ways. Repurposing them into new products is less energy-intensive than recycling them to the fiber stage and can give the consumer a more fashion-forward product than re-selling the second-hand apparel and textiles as they exist.

Little research has been conducted over repurposed apparel and accessories in general. It can be considered within the overarching research of textile recycling and sustainable product development. Repurposing apparel and textiles into apparel and/or accessories falls into one of the levels of textile recycling; recycling to the fabric stage. The afterlife of apparel products has also been considered in a sustainable product development model, but no process has been developed for the production of repurposed apparel and accessories. For example, the model gives design for disassembly and reuse/recycle as options for the afterlife of the product, but does not consider how the product is redesigned, reused, or recycled.

The theoretical basis of this study was Rogers' Diffusion of Innovations Theory. Seven innovation characteristics were included for analysis for this study. These were: relative advantage, compatibility, complexity, trialability, observability, cost, and image. Additionally, the designer's opinion leadership and environmental awareness were measured to determine their effects on their perceptions of the innovation characteristics and the current and future usage of the process of repurposing.

The purpose of this study was threefold: 1) to identify the process apparel designers use to repurpose apparel and/or textiles into apparel and/or accessories; 2) to determine what

perceived innovation characteristics influence current and future use of this process; and 3) to determine the differences in perceived innovation characteristics of the process, current and future usage of repurposing apparel and/or textiles in terms of the designer's level of opinion leadership and environmental awareness. Designers of repurposed apparel and/or accessories were surveyed using an e-mail questionnaire. It was important to understand whether this process was perceived as innovative and how and to what extent it would diffuse through a social system. Content analysis was used to analyze the open-ended questions regarding the designer's process of repurposing apparel and textiles. Multiple Regression was used to analyze the influence of the innovation characteristics on the designer's current and future use of the process of repurposing. MANOVA was used to analyze the differences in the designer's perceptions of the innovation characteristics of the process and the current and future usage of the process based on the designer's levels of opinion leadership and environmental awareness.

The results of the content analysis gave the researcher a glimpse into the designer's process of repurposing apparel and textiles into apparel and/or accessories. Three levels of repurposing were revealed based on the complexity of the process. Level one was the least complex and involved the designers embellishing and making slight alterations to the original garment. Level two involved the designers starting with larger repurposed garments or a larger second-hand textile and cutting out the pieces they needed. Level three involved the designers cutting apart the repurposed garments into smaller, workable pieces and using those pieces to construct a new garment.

The results of the multiple regression analysis showed that Rogers' Diffusion of Innovations Theory is a good predictor of current and future usage of the process of

repurposing. Specifically, compatibility was a good predictor of current usage and compatibility and relative advantage were good predictors of the future usage of the process of repurposing. This suggests that the current process is compatible with the designer's current lifestyle and for their continued usage of the process it must be both compatible and advantageous for the designers.

The results of the MANOVA showed that there was no statistically significant difference between the two levels of opinion leadership on the perceived innovation characteristics. The designer's levels of opinion leadership had no significant influence on the current or future usage of the process of repurposing. The designer's environmental awareness also had no significant influence on their perceptions of the innovation characteristics or their current or future usage of the process of repurposing.

Implications

It was suggested by the designer's that the current process of repurposing is labor-intensive and therefore difficult to make a profit. Streamlining the process of repurposing could potentially decrease the labor required, lowering the labor costs and making the process more profitable. This would benefit the designers of repurposed apparel and/or accessories financially. If the designers outsourced the deconstruction of original garments to the local community, this could financially benefit the members of the local community. Additionally, the development of a design process for repurposed apparel and/or accessories could be beneficial to the environment by creating an outlet for used, unwanted apparel and textiles. This could serve as a potential solution to the problem of

overconsumption of fashion products, prevent waste, save energy, and save precious natural resources for future generations. The assumptions for this study were as follows:

1. Designing repurposed apparel and/or accessories is beneficial for the environment.

2. The designers of repurposed apparel and/or accessories have a design process that they follow and can explain that process.

For the majority of the designers included in this study, the assumptions were correct. Regarding the first assumption, the environmental aspects need to be considered in any additional processing that is conducted on the repurposed materials. The second assumption was correct. Designers do have a process, but the process seems to be individual to the designer. There was no standardized process for repurposing, but as a result of this study a process has been proposed.

This study focused on designers of repurposed apparel and/or accessories who sell products online due to geographical constrictions and only include apparel and/or accessory products that were previously an apparel or textile product. Therefore, the results cannot be generalized to designers of any other type of environmentally-friendly apparel, such as organic cotton apparel. The results also cannot be generalized to designers of other types of repurposed products, for example, t-shirts used to make rugs or polyester apparel made from recycled plastic. Since this study focused on designers who sell repurposed products online, designers who do not sell their products online could have a very different design process and the results of this study cannot be

generalized to designers who do not sell products online. Future research could include other types of repurposed products, such as non-apparel items.

## Recommendations for Future Research

Future research should include testing and further development of the proposed process for producing repurposed apparel and/or accessories. This should include production of a line of repurposed apparel and/or accessories including all steps in the process. The purpose of this would be to evaluate the end product with actual consumers to determine their willingness to purchase at a given selling price. The selling price would be set based on the actual labor and cost of materials involved in creating the end product. Involved in this analysis could be a cost comparison between the different methods of repurposed material sourcing to determine how this affects the selling price. It would be interesting to determine how to best label products as repurposed. A majority of designers in this study stated that they do label their products as repurposed, but this could be expanded upon. Labeling products as repurposed could present challenges for the designers due to the variety of fabrics used. Additionally, future research could focus on the production of other types of repurposed products, such as non-apparel products. Because the effect of the designer's opinion leadership and environmental awareness were not significant, it would be interesting to make a comparison between designers of traditional apparel and repurposed designers to see if there was a difference.

The results of this study prompted additional questions the researcher had of the designers. Follow-up interviews with the designers could be completed to obtain the following information:

1. Do the designers have an educational background in apparel design?
2. Do the designers consider the after-life of a product while they are designing it?
3. For the designers that sourced repurposed materials globally, where and how do they come across these materials?
4. What companies/retailers/designers do they consider to be their competition?
5. What do the designers do with the scraps left over from repurposed designs?
6. Because all the designers selected artistic motivation, would they be interested in a process for small-scale production? Or would that detract from artistic expression?

In conclusion, the impetus of this study was to understand the process for designers of repurposed apparel and/or accessories to determine if there was an existing standardized process for repurposing or if one could be developed. Repurposing could potentially be a solution to the problem of apparel overconsumption and could help utilize the abundance of second-hand clothing and textiles, keeping used apparel and textiles out the landfills. Additionally, less energy is necessary to produce repurposed apparel and/or accessories compared to other kinds of sustainable apparel and traditionally-produced apparel. It is imperative to the future of our planet that we preserve precious natural resources and reduce our environmental impact for the sake of future generations. Repurposing is a step

in the right direction and could seriously be considered as a viable option for sustainable product development.

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# APPENDICES

Survey Instrument

**Personal Characteristics**

1. What is your age in years? (Please write in your answer)

For questions 2 and 3 circle the response that best answers the question.

2. What is your gender?

a. Male b. Female

3. What is your highest level of education?

a. high school b. some college c. associates degree d. bachelor's degree e. graduate degree

**Experience**

Please circle the response that best answers the question.

1. How long have you been designing apparel?

a. less than one year b. 1-3 years c. 4-6 years d. 7-10 years e. 10+ years

2. How long have you been designing repurposed apparel?

a. less than one year b. 1-3 years c. 4-6 years d. 7-10 years e. 10+ years

3. Do you consider repurposing apparel to be a source of profit?

a. yes b. no

4. Do you consider repurposing apparel to be a form of artistic expression?

a. yes b. no

5. Do you design repurposed apparel and/or accessories for environmental reasons?

a. yes b. no

Please circle the number that represents your level of agreement with the statement.

1= Strongly Disagree 2=Somewhat Disagree 3= Mildly Disagree 4= Neutral 5= Mildly Agree 6=Somewhat Agree 7=Strongly Agree

| **Environmental Awareness** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. We are approaching the limit of the number of people the earth can support. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. The balance of nature is very delicate and easily upset. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Humans have the right to modify the natural environment to suit their needs. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. Mankind was created to rule over the rest of nature. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. When humans interfere with nature it often produces disastrous consequences. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Plants and animals exist primarily to be used by humans. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. To maintain a healthy economy we will have to develop a “steady state” economy where industrial growth is controlled. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. Humans must live in harmony with nature in order to survive. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. The earth is like a spaceship with only limited room and resources. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. Humans need not adapt to the natural environment because they can remake it to suit their needs. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. There are limits to growth beyond which our industrialized society cannot expand. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. Mankind is severely abusing the environment. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| **Opinion Leadership** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. My friends and co-workers often ask my advice about clothing fashions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. I sometimes influence the types of clothes my friends buy. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. My friends come to me more often than I go to them for information about clothes. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I feel that I am generally regarded by my friends and co-workers as a good source of advice about clothing fashions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. I can think of at least two people whom I have told about some clothing fashion in the last six months. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**Process**

For the next set of questions please write your answer in the space provided.

1. Where do you typically get the materials that you repurpose?

2. What styles of apparel do you typically repurpose?

3. What types of repurposed products do you sell?

4. Where do you get inspiration for your designs?

5. How do you determine the selling price for your products?

6. Why do you choose to use repurposed materials?

7. How do you label your products?

8. How do you deconstruct the textiles/apparel that you are repurposing?

9. How do you size the products that you sell?

10. List the steps in your product development process in regards to repurposing apparel.

For the remainder of the questions, please circle the number that represents your level of agreement with the statement.

1= Strongly Disagree 2=Somewhat Disagree 3= Mildly Disagree 4= Neutral 5= Mildly Agree 6=Somewhat Agree 7=Strongly Agree

| **Relative Advantage** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Repurposing apparel is quicker than creating apparel from traditional materials. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. The process of repurposing apparel improves the quality of the products I create. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Repurposing apparel is easier than creating apparel from traditional materials. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. The advantages of repurposing apparel outweigh the disadvantages | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Repurposing apparel gives me greater control over my work | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Repurposing apparel increases my productivity | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| **Compatibility** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Repurposing apparel is compatible with all aspects of my work | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Repurposing apparel is compatible with my world view | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Repurposing apparel fits into my work style | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| **Trialability** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. I have had the opportunity to experiment with various methods of repurposing apparel | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. I did not have to expend very much effort to try out repurposing apparel | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. I am able to experiment with repurposing as necessary | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| **Complexity** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Repurposing apparel is not cumbersome to me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Repurposing apparel does not require a lot of mental effort | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Repurposing apparel is not frustrating | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. It is easy to get the result I want from repurposing apparel | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. The method of repurposing apparel I use is clear and understandable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| **Observability** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. I am aware of the process other designers use to repurpose apparel | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. I know of other methods of repurposing apparel | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. It is easy for me to compare my method of repurposing apparel to other designer's methods | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| **Cost** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. The method of repurposing apparel I use is cost effective | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. I have a method for setting a selling price for my repurposed apparel designs. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. I consider the cost of the materials when setting a selling price. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I consider the labor that went into a product when setting a selling price. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. My products usually sell at a premium price point. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| **Image** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Repurposing apparel improves my image | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Repurposed apparel is a status symbol | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| **Current Usage** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. I currently design apparel using repurposed materials. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. All of my designs are created through repurposing. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. I repurpose whenever possible. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I repurpose whenever appropriate. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| **Future Usage** | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. I intend to continue designing repurposed apparel in the future. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. I intend to increase the amount of repurposed apparel I design in the future. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. I intend to continue using my current method for repurposing in the future. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Dear Designer,

My name is Erin Irick and I'm a doctoral student at Oklahoma State University. I'm conducting a research study regarding the use of repurposed materials in the designing of apparel and accessories. I would greatly appreciate your help in this study. As a designer of repurposed apparel or accessories, I believe you have a unique perspective that I would like to better understand.

Please click the following link which will connect you to a survey.

[insert link here]

The survey will include questions over your demographic information, environmental awareness, opinion leadership, design process, current and future usage of repurposing apparel and the innovation characteristics of the process. The survey will be conducted using Qualtrics software and no identifying information will be collected with the survey. The survey should take you no more than 20 minutes. If you wouldn't mind filling it out it would be very beneficial to my research. Any information you provide in the survey will be completely confidential. Your name will not be included with the survey. Data collected from the survey will be kept on the computer of the primary investigator for one year. No one else will have access to the data. There are no known risks associated with this study and there is no compensation for participation in this study. Your participation in this study is completely voluntary and your completion of the survey indicates your willingness to participate. Please see below for more information about the study.

**Title:** Evaluation of the Design Process of Repurposed Apparel and Accessories: An Application of Diffusion of Innovations Theory

**Purpose:** 1) to identify the process apparel designers use to repurpose apparel and/or textiles into apparel and/or accessories

2) to determine what perceived innovation characteristics influence their adoption and continued use of this process

3) to determine the differences in perceived innovation characteristics of the process, current and future usage of repurposing apparel and/or textiles in terms of the designer's level of opinion leadership and environmental awareness.

**Investigators:**

If you have any questions about the study, please contact either of the listed investigators below:


Erin Irick
Oklahoma State University
erinmi@okstate.edu
(405)744-5036

Dr. Mihyun Kang
Oklahoma State University
mihyun.kang@okstate.ed
(405)744-5628


If you have questions about your rights as a research volunteer, you may contact the Oklahoma State University Institutional Review Board (IRB) Chair, Dr. Shelia Kennison at 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu.

Thank you in advance for your participation in this study, it is greatly appreciated!

Sincerely,

Erin Irick

## Oklahoma State University Institutional Review Board

| | | | |
|---|---|---|---|
| Date | Wednesday, April 18, 2012 | **Protocol Expires:** | **3/14/2013** |
| IRB Application | HE1220 | | |
| Proposal Title: | Examination of the Design Process of Repurposed Apparel and Accessories: An Application of Diffusion of Innovations Theory | | |
| Reviewed and Processed as: | Exempt<br>**Modification** | | |

Status Recommended by Reviewer(s) **Approved**

Principal Investigator(s) :


Erin Irick
109 E. Eskridge
Stillwater, OK 74075

Mihyun Kang
442 HES
Stillwater, OK 74078


The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed. The IRB office MUST be notified in writing when a project is complete. All approved projects are subject to monitoring by the IRB

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

Signature :

Sheila Kennisen, Chair, OSU Institutional Review Board — Wednesday, April 18, 2012 Date

VITA

Erin M. Irick

Candidate for the Degree of

Doctor of Philosophy

Thesis: EXAMINATION OF THE DESIGN PROCESS OF REPURPOSED APPAREL AND ACCESSORIES: AN APPLICATION OF DIFFUSION OF INNOVATIONS THEORY

Major Field: Design, Housing and Merchandising

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Human Sciences at Oklahoma State University, Stillwater, Oklahoma in December, 2013.

Completed the requirements for the Master of Science in Apparel and Textiles at Kansas State University, Manhattan, KS in 2006.

Completed the requirements for the Bachelor of Science in Apparel and Textiles at Kansas State University, Manhattan, KS in 2000.

Experience: Graduate Teaching Associate, Oklahoma State University, 2008-2013

Graduate Teaching Associate, Kansas State University, 2004-2006

Professional Memberships: International Textile and Apparel Association, 2008-present