

**Redefining fashion consumption and closing the gap of
circularity within the fashion supply chain.**

A Thesis

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Abstract

Sustainability and circularity within the retail sector have been spoken about and have gained traction within the private sector and industry-based research, they have yet to become mainstream topics in academia. Due to market conditions and consumer demand, a review of the circularity models of the fashion supply chain should be explored.

There has been a gap between academia research findings and the private sector of fashion in the research findings. The analysis results indicated there is currently a line drawn in the sand between private equity and open-source data when researching the current available texts. The most searched topics and areas of interest for both interests are (in no particular order) circularity, sustainability, eco-fashion, Covid-19, consumer behavior, market analysis', new textiles economy, micro-fiber waste, recycling, up-cycling, environmental impact, and fast fashion supply chain initiatives (Goni. et al., 2015). The results from the literature review show there are growing conditions and mountains of problems in the fashion industry with no straightforward evidence on how to fix the problem(s). Many of the previous studies provide recommendations for individual problems and hypotheses but no cut and dry solutions.

This research is grounded in pragmatism (Creswell, 2014) with a 29-question dichotomous, likert scale, and contingency quantitative survey and creative deck project (R2A) to identify possible solutions to seven research questions within this research project. There were 221 survey participants, including male, women, and non-binary. The creative deck project is made as a pitch deck (Loomis, 2015) to illustrate a possible venture and business model to start conversations and offer potential solutions around the problems located amongst current circular business strategies within the fashion industry.

Keywords: fashion; circularity; literature review; sustainability; climate change; market analysis; new textiles economy; recycling; consumer behavior; fast fashion; private sector.

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Dedication

This work is dedicated to my wife, Sarah, and my three daughters, Hattie, Eloise, and Violet.

I could not have done this without the support of my amazing wife. She is the strongest woman

I know and without her I would not have been able to accomplish everything I have done.

Throughout this research, all my girls provided me with love and support that was needed which

allowed me to continue to pursue my passions and this opportunity to continue my life-long

search for knowledge and answers.

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Glossary

TERM	DEFINITION
Assortment	An assortment involves the number and type of products that stores offer for purchase by consumers.
Circularity	A model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible that aims at tackling global challenges like climate change, biodiversity loss, waste, and pollution.
E-commerce	Commercial transactions conducted electronically on the internet.
Fast fashion	Inexpensive clothing produced rapidly by mass-market retailers in response to the latest trends.
Greenwashing	Expressions of environmentalist concerns especially as a cover for products, policies, or activities.
Omni-channel	An approach to sales that seeks to provide customers with a seamless shopping experience, whether they're shopping online from a desktop or mobile device, by telephone, or in a brick-and-mortar store.
Pragmatism	An approach that assesses the truth of meaning of theories or beliefs in terms of the success of their practical application.
Sustainability	Avoidance of the depletion of natural resources in order to maintain an ecological balance.
Value chain	A value chain is a business model that describes the full range of activities needed to create a product or service.

CHAPTER 1. INTRODUCTION

I have been fortunate enough to have been a part of the retail sector for over two decades. I started out at the ground level working sales and have worked my way through titles such as, retail associate, graphic designer, senior web designer, senior visual merchandiser, studio director, fashion photographer, creative director, corporate consultant, with most recent being University instructor, fashion designer, and owner/operator of my own fashion brand. I have taught fourteen different courses at two different Universities; University of Idaho and Washington State University. Course topics include the following: principles of retail, omni-channel merchandising, apparel promotion, merchandising math, advertising in fashion, product development, visual analysis & aesthetics, special event productions, portfolio development, store planning, fashion photography, creative direction, fashion styling, and fashion illustration.

I have been living and breathing fashion for as long as I can remember. I have worked across mass-market, ready-to-wear, and high fashion sectors within the U.S., European, Asian, and Australian markets. I am not expressing that I am an expert, of any topic within fashion, but that I am a life-long addict of the fashion supply chain. Because of my past experiences, my identity is strongly connected within the subject of this research text. I have worked very hard, every day, and continue to push myself to learn and navigate each topic that continues to excite myself and the fashion industry. This is not just written as another disinterested piece of scholarship to gain a piece of paper, but rather another stepping stone to my lifelong commitment to the fashion industry. My story and past-experiences have also contributed to the troubles located within this text. While I express my joy and love for my industry, I also realize the dangers my industry introduces to the world, and because of this I conducted this research. This research grows from my commitment to the fashion industry, my continued pursuit of knowledge, and my continued interest in improving the impact the fashion industry has on civilization.

Retailing in 2020 was nothing that anyone could have predicted. Despite the challenges retailers have been facing with Covid-19, the fashion industries supply chain had not changed much regarding environmental impacts and still endangers our way of human life and existence for the future. Physical in-store assortments were failing at alarming rates, because of COVID-19, and consumer preferences changed so rapidly it made it nearly impossible to stay caught up. The US Census Bureau estimated total retail sales for the third quarter of 2020 at \$1,468.9 billion, an increase of 12.0(\pm 0.4%) percent from the second quarter of 2020 (USCB, 2020). Supply chains were disrupted, public policies pivoted, and if retailers want to continue to operate, they need to change their policies to align with market conditions. Supply chain research and sustainability research has gained traction because sustainable consumption and restructuring the fashion production supply chain are key elements to: preserve natural resources, slow down climate change, improve energy consumption, 3-R principles (reduce, reuse, recycle), limit water use, improve chemical disposal procedures, reform poor working conditions for workers, and extend then lifecycle of textiles (EMF, 2017). These conditions are requiring retailers and consumers to change their perceived context of a circular economy.

In 2015, Goni et al. found 29,616 survey articles that had impact factor journals of four or more in sustainability, spanning a 24-year period from 1987 to 2001. These topics in articles have continued to grow year-over-year. The topics within their study included use of materials and technologies (waste minimization), green engineering/manufacturing, pollution control and prevention, sustainable energy management, and water research. The authors concluded that water research was the most reported topic being studied and that academic researchers should focus their studies on a more circular approach to sustainability research.

Textiles are worn by almost everyone on our planet, nearly every day, and for most humans, they are an integral part of how we express our individuality. Consumers expectations are becoming talking points in conversations and research; age-old industrial and national divides

are shrinking and becoming a global message toward transparency and circularity. Further, the Ellen MacArthur Foundation defined circularity as a set of principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems (2017).

According to the World Trade Statistical Review in 2020, there are more than 300 million people employed within the value chain of the clothing industry; value of the global fashion industry: 3,000 billion dollars, 2 percent of the world's Gross Domestic Product (GDP). In the past fifteen years, clothing production has approximately doubled outpacing the world GDP growth, but merchandise trade volume declined by 0.1 per cent in 2019, compared with 2.9 per cent growth in 2018. World GDP growth slowed to 2.3 per cent, down from 2.9 per cent the previous year. The US dollar value of merchandise trade fell year-on-year, dropping 3 per cent to US\$ 18.89 trillion in 2019 (WTSR, 2020). The doubling figure was mainly due to fast-fashion, e-commerce, and omni-channel retailing, with quicker turn-around of production lifecycles, styles available, and changing product assortments. Consumer demand for clothing continued to increase annually between 3.5 and 4.5% (IOME, 2018). This impact had increased mainly by three related factors: (1) Global demand for clothing was projected to increase due to millions of individuals in developing countries entering the middle classes and spending their increasing disposable income, (2) the shift of production towards emerging or developing countries with low labor costs, (3) and the development of the so-called "fast fashion" lifecycle and low-price guarantees (Jacometti, 2019). The fashion industry has been increasingly gaining attention of researchers (private and public sector) for decades due to the fast pace, growing complexity, and dynamic context of the inner working of the supply chain. Within the fashion and textiles industry, the market changes so rapidly that it requires retailers and brands to be agile and pivot on a moment's notice due to consumer demand and brand awareness. This literature review aimed to identify the following seven themes:

1. How is fashion addressing the topics of circularity?
2. What is being done to improve energy consumption and climate change?
3. Where does the fashion sector stand on reduce, reuse, recycle principles?
4. How are chemicals being disposed and what is being done to improve water consumption?
5. What is being done to improve lifecycle and supply chain metrics?
6. What are consumers perceptions about sustainability and circularity models?
7. What is a possible solution to sustainability and circularity gaps?

The literature pieced together the findings of private and public sector research providing guidance for practices and strategies for sustainable omni-channel retailing models for the future. Omnichannel strategy hinges on the backbone of providing an interlinked shopping experience through brick-and-mortar stores and a variety of digital channels, not only which, differentiates retailers from the competition, but also gives the retailer a competitive edge over the competition by leveraging their store assets and brands position within the marketplace (Sopadjieva et. al., 2017). While interpreting the current economic market of the fashion industry, I started to create Repair, Reuse, & Ateliering (R2A)[Appendix A]. R2A is a conceptual traveling fashion truck (POP-UP) franchise opportunity, that potentially could be used for educating college students and consumers about circulatory and global supply chain marketing/initiatives within the apparel industry and offer a new sustainable way to support consumers closet, wallet and aesthetic. While R2A did not continue as a tangible product of this study, the conceptual model can be found in Appendix A.

While completing R2A, I started to hypothesize potential research questions for a study to explore if current market conditions would support R2A; which can be found and explained in chapter three and four. The following research questions were created to help identify questions in the survey and guide the formality of the results:

QUESTION 1: Do demographics of consumer affect circularity and perception within fashion?

QUESTION 2: How do consumers interpret how is fashion addressing the topics of circularity?

QUESTION 3: How do consumers interpret reduce, reuse, recycle principles?

QUESTION 4: What are consumers doing to improve lifecycle and supply chain metrics?

QUESTION 5: What are consumers perceptions about sustainability and circularity models?

The goal of this study was to find out if there were relationships or themes among demographics, specifically age, and how then general population view(s) sustainability, circularity, and supply chain metrics within the fashion industry. Participants within this study were not widely distributed across all age groups, socio-economic demographics, or geographic region. Due to the limitations within the collection of data and small sample size, the results from this survey should not be applied to the consumer population as a whole.

CHAPTER 2. REVIEW OF LITERATURE

Circularity and Fashion Supply Chains

Circular business models are not common yet within the fashion industry but most companies and brands in fashion are talking about it. Currently, fashion has a detrimental environmental impact on the world surrounding it and consumers are continually wanting fashion products and services; involving an incredibly long and intricate supply chain that was currently recognized as one of the most polluting sectors in the world with the largest consumption of water (Bick, R. et al., 2020). The fashion value chain was also often associated with poor working conditions and systematic abuse of its workers. There was an abundance of definitions of what circular fashion means (Kirchherr, J. et al., 2017), but I would like to propose a concept of transparency: starting at the dirt and ending at the complete lifecycle of the garment until it can be re-shaped into a 3R-principle (reduce, reuse, recycle) that can be applied through the entire production cycle, consumption of materials by consumers, and ultimately the return of resources. In the fashion sector, a circular vision involves promoting the extension of the end of life of textile and clothing products, their recycling and re-use for other production cycles, on the one hand, and the use of ecological and sustainable raw materials, on the other. In other words, circular fashion aims to minimize waste and keep materials within the production and consumption loop as long as possible (Jacometti, 2019, p. 5).

Many fashion companies are not completely vertical, and they rely on external suppliers and vendors to produce raw materials, textiles, and finished goods (Jacobs, 2006). The finishing and production process of raw materials, in particular, the washing, dyeing, and drying phases are incredibly hard on our environment and natural resources because of chemical products and manufacturing processes (De Brito, et al., 2008; Caniato et al., 2012). In addition, the use of fibers, such as cotton, wool, and synthetics have a major environmental impact due to water

consumption and pesticides to grow raw materials; synthetic fibers are extracted from non-renewable resources, considerable amounts of energy to produce (Ingram, 2002) and these are polluting our oceans along with plastic microfibers from commercial and consumer washing machines. Synthetic fibers now account for almost two-thirds of global fiber production and for 14.5% of plastic production by mass (Suaria et al., 2020). With a market share of 24% and 15% growth from 2017 to 2018, cotton was the second most important fiber [27 metric tons (MT) year⁻¹ in 2018], followed by fabricated cellulose (e.g., viscose/rayon), which account for 6.2% of global fiber production (6.7 MT year⁻¹) (Suaria et al., 2020). Despite some of the modern progressive ideologies and marketing messages, fashion hasn't yet taken enough environmental responsibilities and delivers mixed messaging along with green washing tactics that pollute the impact and transparency that a very select few are doing.

Climate Change and Energy Consumption

Climate change is one of the most studied impact categories with the second most being energy use (Sandin et al., 2017). The fashion industry is consuming resources faster than the global ecosystem can regenerate them and consumerism is contributing to the creation of waste even faster (Bick et al., 2018). Energy was an essential component to the operational input within the industrial manufacturing supply chain of the textiles industry and is needed to make the fibers used in the yarn and to weave the yarns into a fabric. The energy yield needed to create yarn by wool, cotton, nylon or polyester, is consistent [thermal energy required 4,500-5,500 Kcal/meter of cloth and 0.45-0.55kWh/meter of cloth of electrical energy (comparison: the same electrical energy equivalent of a 13W light bulb being on for 34 hours)] (IOME, 2018). The textiles industry relies mostly on non-renewable resources – 98 million tons in total per year (EMF, 2017) – including oil to produce synthetic fibers, fertilizers to grow cotton, and chemicals to produce, dye, and finish fibers and textiles. In 2015, the GHG emissions from textiles production totaled 1.2 billion tons of CO₂ equivalent, i.e., more than the amount produced

by all international flights and maritime shipping combined (EMF, 2017, p. 20). According to Thred Up's Resale Report (2020), since the beginning of Covid-19, 70% of customers are seeing a greater need for fashion to address climate change than ever before (ThredUp, 2020). Based on these studies and the impacts to our environment the fashion industry needs to reduce the consumption of virgin, non-renewable materials, and the energy use to create them moving toward regenerative agriculture. Using lower-carbon based materials and re-inventing the manufacturing process of textile production including R-3 principles and renewable energy would also further reduce the greenhouse gas emissions during the manufacturing process.

3-R Reduce, Reuse, Recycle

Significant opportunities exist for an industry that has so much waste. From a 2018 article, Sandin et al. states the following:

Because of the strong research focuses on climate change within the fashion industry, there could potentially be a risk that the research may not be able to identify all the major environmental gains and losses of textile reuse and recycling. For example, as the potential avoidance of the production of virgin conventional cotton has been shown to be an important environmental gain of textile reuse (Dahlbo et al., 2017; Roos et al., 2017; Sahni et al., 2010; Woolridge et al., 2006) and recycling (Esteve-Turrillas and de la Guardia, 2017; Yasin et al., 2016; Ostlund et al., 2015; Muthu et al., 2012a; Allwood et al., 2006).

More than 500 billion USD in value is currently being lost annually due to clothing underutilization and lack of recycling (EMF, 2020). There has been growing interest and evidence that used, rentals, and upcycle will increase after the pandemic. A recent McKinsey study showed 20% of consumers want to reduce their clothing consumption following the

Covid-19 pandemic, and 71% of customers are expressing a greater interest in circular business models, such as rental, resale, and repair, and want to invest in higher quality apparel after the pandemic. (Roberts-Islam, B, 2020). Farfetch has recently used messages such as, “compared to buying new from virgin raw materials, one pre-owned purchased is said to save on average 1kg of waste, 3040 liters of water, and 22kg of CO₂ (EMF, 2020, p.4).

Increasing the number of times a garment is worn could be the most powerful way to capture value for the consumer, reducing pressure on our natural resources, and decrease the negative impact of consumers throwing away \$460 billion in clothing they have already purchased (EMF, 2020, p.19). A study by Euromonitor International Apparel & Footwear (EMIAF) found, if 100% of discarded clothing was collected, 22.2 million tons would be reused instead of 5.6 million tons as at present, meaning 16.6 million tons of new garment sales would be avoided (2015). In 2017, The Environmental Protection Agency (EPA) estimated Americans created 17 million tons of waste from textiles. Of that, roughly only 2,570 tons are recycled and 11.15 million tons end-up in landfills, up from 1.7 million tons in 1960. The San Francisco Goodwill noted that, in comparison, it would mean that one garbage truck of textiles was sent to a landfill every second (LMIM, 2020). A 2020 report found that 87% of clothing retailers were eager to trial resale models and 61% wanted to test rental models (thredUP, 2020).

Chemical Disposal and Water Consumption

The fashion industry relies heavily on H₂O and also results in extensive water pollution. In 2015, the fashion supply chain consumed 79 billion m³ (the equivalent of 32 million Olympic-sized swimming pools (IOME, 2020). It takes 6½ years for the average American residence to use 660,000 gallons of water that would be required to fill an Olympic-sized swimming pool. (FINA, 2020). The largest consumption of water happens during the production stage, especially cotton, a crop that has the largest water footprint. This is due to the irrigation processes and the

substantial amounts of pesticides and fertilizers. Globally, cotton accounts for approximately 30% of all textile consumption (Remy et al, 2016). According to the World Bank, dyeing and treatment of clothing accounts for 17-20% of all industrial pollution because chemicals leech into groundwater and infiltrate freshwater reserves (WB, 2014). Another study has estimated that two-thirds of China's river and lakes have been polluted by the nine billion liters of contaminated water discharge from textile factories in the regions. (GFA, 2018)

In 2011, a study on green washing found that the production of textile-based tote bags were being marketed as more sustainability friendly than that of the standard grocery plastic bags; which in fact were deemed more detrimental to the environment and were not more sustainable. The study found that re-using a single plastic bag, only 3 times, had the same environmental impact as using a virgin material made cotton tote bag 393 times (Edwards & Fry). These green washing marketing tactics are only adding to an increasingly rampant problem. Water consumption and pollution are strictly related to the manufacturing process but can also be evaluated during material choice or process design (e.g., organic fibers can be produced with less water). In addition, during most of the production steps, toxic substances and similarly harmful products are forbidden. These practices should be followed by both the parent companies and the whole supply chain. The use of chemical substances can be managed better during the product design (e.g., use of organic fibers or avoidance of polluting substances such as polyvinyl chloride, also known as PVC), more closely during the manufacturing process (e.g., use of alternative methods that do not require the use of toxic substances), and monitored along the whole supply chain (e.g., selection of suppliers according to environmental specifications)[Caniato et al., 2012, p.667].

Lengthening Lifestyles

Clothing is currently underutilized and there is a growing problem with consumers

buying products and then discarding them after minimal use and fast-fashion is a major contributor because products do not last and breakdown. Worldwide clothing utilization, the average number of times a garment is worn before the “potential lifetime” lifecycle of that garment has decreased by 36% compared to 15 years ago. (EMIAF, 2015) While many global low-income and emerging middle-class socio-economic demographics have a relatively high rate of clothing utilization, many countries, markets, and demographics have a much lower rate of clothing utilization. In the US, for example, clothes are only worn for around a quarter of the global average. The same pattern was emerging in China, where clothing utilization has decreased by 70% over the last 15 years (EMF, 2017, p. 19). Globally the value supply chain misses out on USD 460 billion of value each year by throwing away clothes that consumers could continue to wear, and some garments are estimated to be discarded after just seven to ten wears (Morgan et al., 2009). Consumers are starting to admit and beginning to acknowledge that this as a problem. For example, 60% of German and Chinese citizens admitted to owning more clothes than they need. (EMF, 2017, p. 36).

The global average of consumption for clothes was 11 lbs. per person, yet the average North American consumer bought 35 lbs. of new clothes in 2014—equivalent to 64 t-shirts or 16 pairs of jeans (Cobbing et al., 2016). Possible findings and solutions related to clothes mending and repairing to extend a products lifecycle include: (1) addressing barriers to the costs associated with clothing repair, (2) education opportunities for consumers to bridge the gap between necessary skills required to mend and repair and not having the skill, (3) workshops that could provide hands-on opportunities to break the assumption that clothing repair is overly time-consuming (Diddy et. al., 2019). The findings of this study provide important insight into the motivations and barriers toward clothes mending in the U.S. context. The same study provided important insight on some European consumers stating that approximately two-thirds (65%) of consumers have undertaken at least one mending or making task in 2017, while, U.S. consumers’ engagement in clothing repair was minimal (30%). Moreover, product waste can be

reduced using a lifecycle view during the design phase, considering even the end-of- life of each product: a best practice can be focusing on the complete or partial reuse of the product and even its packaging (Caniato et al. 2012).

Summary of Review of Literature

This review analyzed publicly published research articles and private sector fashion industry reports to review the global fashion supply chain to clarify possible solutions to re-thinking sustainability within fashion. Current studies, in different countries, show that there was a sustainability crisis in the fashion sector. Studies concluded that environmental problems, within the fashion supply chain, differ in every country and there was not one consumer that consumes fashion identically. There was a lack of sufficient research and studies that focus on models that tackle new approaches to sustainability and circularity within the fashion supply chain. More studies are required to examine consumer behavior within regards to sustainability retailing and ethical consumption. Although there seems to be progress in the fashion industry, most retailers and value chains within fashion are currently not doing enough or making changes fast enough in regard to circularity to keep up with demand and consumption. Finally, within my review of literature, I found that there seems to be a clear divide between industry partners and research facilities within literature. Future research could be conducted to explain why there is a lack in funding from the fashion industry and public research facilities.

CHAPTER 3. METHODS

Chapter 3 explains the procedures and methods used for data collection and analysis within this research project. A 29-question dichotomous, likert scale, and contingency quantitative survey (Trochim, 2021) was used to examine participant demographics, specifically age, and the relationships between fashion terminology, principles of circularity (Jacometti, 2019, p. 5), and consumer perception.

Survey Development

One pilot survey was used to test the Qualtrics survey time, with major Professor, Dr. Sonya Meyer, and to re-order survey questions to make sure that everything met the criteria that was approved through the Institutional Review Board. Every question was designed to collect the best possible data for the research question that was intended to address (Qualtrics, 2019).

Participant Recruitment

To obtain participants, recruiting started on social media by using the snowball method (Dusek, 2015).

Murphy et al. (2013) state that survey research is by definition “a social interaction between a researcher and a (potential) respondent – a ‘conversation with a purpose’” (p. 1). Additionally, they suggest that since the methods employed by individuals today to carry on such conversations have changed, so should the tools used for survey research. The conversation should take place using the tools the targeted population is currently using to carry on the conversation. Murphy et al. (2013) define social media as it relates

to survey research as “the collection of websites and web-based systems that allow for mass interaction, conversation and sharing among members of the network.” (p. 3).

I posted the survey on my personal Instagram story by using my flyer with a link to my on-line survey. Next, I posted on my stories and feeds located on my social networks through Facebook and LinkedIn asking for participants. Lastly, I arranged a brief introduction to my research study in front of three courses at University of Idaho, in the Family and Consumer Science program, asking for participants. Students could use the QR code generated by Qualtrics or by using the link provided by the instructors of the courses where I spoke. To be eligible to participate in the survey, participants needed to be 18 years of age or older. There was no personal information recorded within the survey.

Data Collection

At the data collection stage I found it valuable to use pragmatist ideation to guide my research choices including within the scope and sequence of data collection method. An on-line Qualtrics survey was created and distributed to collect data. A prominent theme in the literature on pragmatism is that it does not dictate choice of methods (Feilzer, 2010; Morgan, 2014a; Teddlie and Tashakkori, 2003). Instead, it provides a framework to help researchers choose which methods will be most appropriate. The first survey was recorded on August 21, 2021 and the 221st data sample was collected on September 27, 2021. Originally, only 100 participants were estimated to be needed for this research. The three speaking engagements at University of Idaho were planned ahead of time and I determined, after the last speaking engagement, I would close the Qualtrics survey to participants because market saturation had been reached by 221 survey participants. Saturation refers to gathering enough data to develop a model or theory (Creswell,

2013). The survey questions were developed to collect data based on the literature review themes. In total, there were 29 questions to the on-line survey, including the first question verify if participants were at least 18 years of age. All surveys were conducted anonymously using Qualtrics.

Data Analysis

Data analysis began by using Qualtrics and frequencies located within the platform. Qualtrics is a web-based survey tool to conduct survey research, evaluations and other data collection activities. There was a “Data & Analysis” section where all the responses were viewed from the survey. I first started by looking through the data and seeing if there were any patterns within the data that was collected. The importance of pattern matching for business and management studies -- Hodgkinson and Starkey (2011, p. 364) note that researchers in business and management studies (BMS) need to ‘re-evaluate their conceptual and methodological armory in order to ensure the field continues to be both scholarly and relevant to a diverse array of constituents’ (Sinkovics, 2018). Fundamentally, pattern matching involves the comparison of a predicted theoretical pattern with an observed empirical pattern. The underlying assumption was that human beings make sense of the world by comparing what they observe externally with internal mental models (Hammond, 1966a).

After reviewing the data collected, a pattern developed pointing to participant age as the defining factor for responding to research questions within the data collected. The aforementioned patterns will be explained in my results. Qualtrics has a report generator built into its platform which I used to generate and compare participant demographics with the data collected within the survey. I used the breakout category within Qualtrics to analyze demographics against survey questions that I deemed more appropriate to have demographics included within the results. These results can be found in APPENDIX D.

CHAPTER 4. RESULTS

Participant Demographics

Participants (n=221) completed an on-line 29 question dichotomous, likert scale, and contingency quantitative survey hosted through Qualtrics software on the world wide web. Twenty-two participants were rejected due to being under the age of eighteen. Completed survey participants included male (n=26), female (n=169), and 3 non-binary (n=3); ranging from ages 18-73 years of age (see APPENDIX D; Q2-3), totaling 199 participants (n=199). Age groups of 74-81 and 81+ were eliminated from data tables because there were no participants. Income ranges indicated a pattern associated with age that as someone ages, their income increases (Lewis, 1989). Question two represented age, question three represented gender, and question four represented data for income from the participants. [see APPENDIX D, Q4].

Table 1.

		Q2	Q3	Q4
N	Valid	199	198	197
	Missing	22	23	24
Mean		2.33	1.88	4.54
Std. Deviation		1.596	.366	3.632
Range		6	2	11
Minimum		1	1	1
Maximum		7	3	12

Discussion

The goal of this study was to find out if there were any relationships or themes between demographics, age, and how then general population view (s) sustainability, circularity, and supply chain metrics within the fashion industry. Each research question had an implication derived from

pragmatism allowing the person viewing this data to make their own conclusions. Survey questions were not directed solely toward one individual research question and were used to identify data for multiple research questions. The following research questions were created to help identify questions in the survey and guide the formality of the results:

QUESTION 1: Do demographics of consumer affect circularity and perception within fashion?

QUESTION 2: How do consumers interpret how is fashion addressing the topics of circularity?

QUESTION 3: How do consumers interpret reduce, reuse, recycle principles?

QUESTION 4: What are consumers doing to improve lifecycle and supply chain metrics?

QUESTION 5: What are consumers perceptions about sustainability and circularity models?

Table 2.

Five emergent research questions

RESEARCH	QUESTION 1	QUESTION 2	QUESTION 3	QUESTION 4	QUESTION 5
Survey	Q1	Q10	Q5	Q5	Q9
Questions	Q2	Q11	Q6	Q6	Q11
	Q3	Q12	Q7	Q7	Q14
	Q4	Q15	Q9	Q8	Q15
	Q6	Q16	Q18	Q17	Q16
	Q7	Q29	Q21	Q18	Q27
	Q11		Q24	Q19	Q29
	Q13		Q26	Q20	
	Q14		Q27	Q21	
	Q17		Q28	Q22	
	Q25			Q23	
	Q26			Q24	
	Q27			Q25	
	Q28				

After analyzing the survey data, each question was categorized to provide insight for each of these themes and data collected. Multiple survey questions were used to address more than one research question because the data targeted and aligned with the research question.

RESEARCH QUESTION 1: Do demographics of consumer affect circularity and perception within fashion?

According to the data collected from the survey (fig. 1, fig. 2, t. 3, t. 4, t. 5, t. 6, t. 7, t. 8, t. 9, t. 10, and t. 11) demographics can be said to have an affect on circularity principles and consumer perception within fashion. The data also suggests that demographics do not affect how consumers interpret circularity, the majority do not know what the term means. The majority of all participants were not interested in renting clothing versus owning clothing. All participants were using some sustainability measures within their lives. The data also suggested that a younger consumer was more aware of their sustainability impact (OECD, 2010).

Figure 1.

Gender:

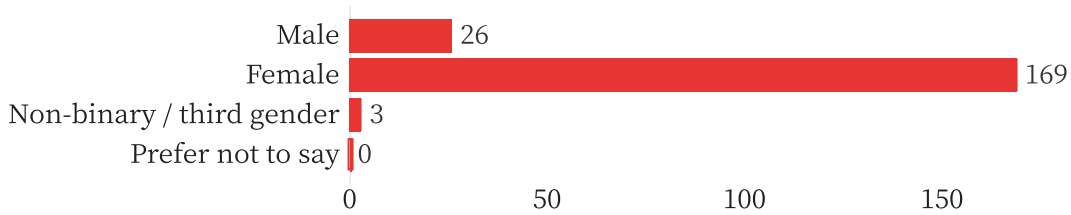


Figure 2.

What would you say your yearly income bracket is?

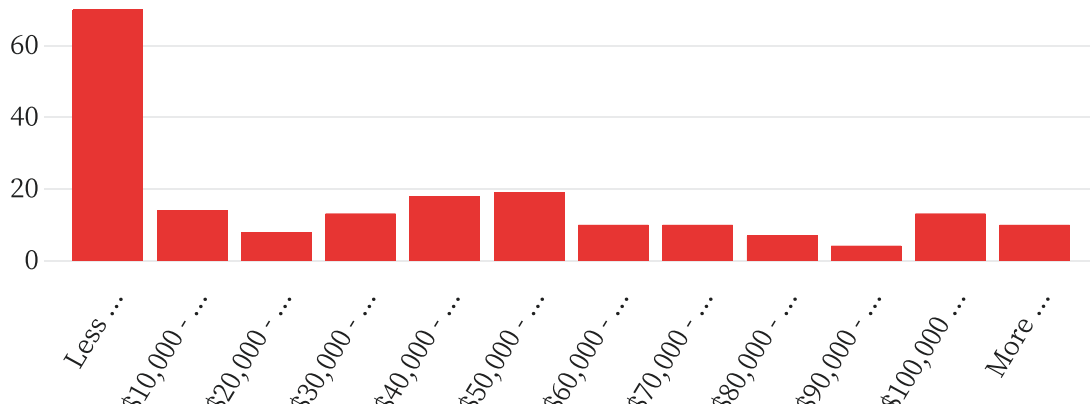


Table 3.

On average, how often do you buy used clothing?

AGE	18-25	26-33	34-41	42-49	50-57	58-65	66-73
Total	94	20	45	24	4	5	7

Table 4.

Have you ever borrowed clothing from someone?

AG	18-25	26-33	34-41	42-49	50-57	58-65	66-73
Yes	90% 85	90% 18	82% 37	79% 19	50% 2	0% 0	29% 2
No	10% 9	10% 2	18% 8	21% 5	50% 2	100% 5	71% 5
Total	94	20	45	24	4	5	7

Table 5.

How much do you want to know about a companies manufacturing process before purchasing their products?

AGE	18-25	26-33	34-41	42-49	50-57	58-65	66-73
A great deal	9% 8	5% 1	2% 1	4% 1	0% 0	0% 0	0% 0
A lot	14% 13	10% 2	16% 7	0% 0	25% 1	40% 2	29% 2
A moderate amount	41% 39	35% 7	24% 11	38% 9	50% 2	0% 0	29% 2
A little	19% 18	15% 3	22% 10	33% 8	0% 0	60% 3	43% 3
None at all	17% 16	35% 7	36% 16	25% 6	25% 1	0% 0	0% 0

Table 8.**What best describes when you wash your clothes?**

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
After one wear	33% 31	35% 7	51% 23	33% 8	50% 2	60% 3	29% 2
After multiple wears	64% 60	45% 9	44% 20	63% 15	50% 2	40% 2	71% 5
When they stink	3% 3	20% 4	4% 2	4% 1	0% 0	0% 0	0% 0
Total	94	20	45	24	4	5	7

Table 9.**If you could pay a small fee to upcycle or refresh current wardrobe pieces, would you be interested in this type of service?**

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
Yes	48% 45	60% 12	38% 17	29% 7	75% 3	20% 1	43% 3
Maybe	36% 34	30% 6	44% 20	54% 13	0% 0	80% 4	29% 2
No	6% 6	0% 0	13% 6	4% 1	25% 1	0% 0	14% 1
I do not know what upcycling is	10% 9	10% 2	4% 2	13% 3	0% 0	0% 0	14% 1
Total	94	20	45	24	4	5	7

Table 10.

I am interested in renting clothing instead of buying:

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
Yes	5% 5	10% 2	13% 6	4% 1	0% 0	0% 0	0% 0
Maybe	30% 28	45% 9	33% 15	8% 2	25% 1	40% 2	14% 1
No	65% 61	45% 9	53% 24	88% 21	75% 3	60% 3	86% 6
Total	94	20	45	24	4	5	7

Table 11.

If you had the option to rent clothing on a monthly basis...
what option would you choose?

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
6 pieces per week @ \$99/month	7% 7	0% 0	9% 4	4% 1	0% 0	0% 0	0% 0
4 pieces per week @ \$79/month	12% 11	10% 2	7% 3	0% 0	0% 0	0% 0	0% 0
2 pieces per week @ \$49/month	15% 14	35% 7	20% 9	13% 3	0% 0	20% 1	14% 1
Not interested	66% 62	55% 11	64% 29	83% 20	100% 4	80% 4	86% 6
Total	94	20	45	24	4	5	7

RESEARCH QUESTION 2: How do consumers interpret how is fashion addressing the topics of circularity?

According to the data collected from the survey (fig. 3, fig. 4, fig. 5, fig. 6, t. 12, and t. 13) consumers indicate that the fashion industry needs to do more to address the topics of circularity within their business models. A Net promoter®(NPS) score was used for question twelve on my survey. Qualtrics NPS score divides respondents into three categories based on a single 10 point scale from which they selected: Promoters (scale points 9 and 10), Passives (scale points 7 and 8), and Detractors (scale points 0 through 6). Promoters are typically enthusiastic and feel emotionally positive about their answer, passives are usually satisfied with a scenario but not do not feel happy enough to be considered a promoter, detractors are usually people who are unhappy with a result and might be discouraged in the future based on the scenario (Qualtrics, 2019). Based on the NPS score for question twelve, 37% of the respondents responded with fashion needs to manage their sustainable impact better. The data also suggests that the fashion industry does not do enough for their workers or the environment and 88% of respondents stated that they also want the fashion industry to use transparency within their supply chain as an educational tool. Table 13 was not broken down by age because demographics did not effect the outcome

Figure 3.

Is it important to know what country your clothes are manufactured in?

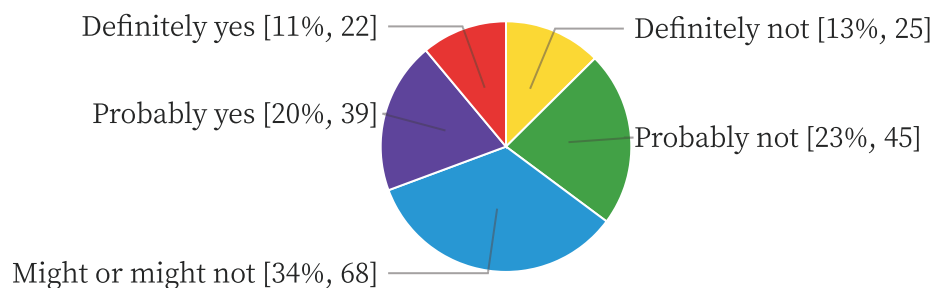


Table 12.

How much do you want to know about a companies manufacturing process before purchasing their products?

AGE	18-25	26-33	34-41	42-49	50-57	58-65	66-73
A great deal	9% 8	5% 1	2% 1	4% 1	0% 0	0% 0	0% 0
A lot	14% 13	10% 2	16% 7	0% 0	25% 1	40% 2	29% 2
A moderate amount	41% 39	35% 7	24% 11	38% 9	50% 2	0% 0	29% 2
A little	19% 18	15% 3	22% 10	33% 8	0% 0	60% 3	43% 3
None at all	17% 16	35% 7	36% 16	25% 6	25% 1	0% 0	0% 0
Total	94	20	45	24	4	5	7

Figure 4.

NPS GROUP - Please rate how you feel about the fashion industry and how sustainability is being managed:

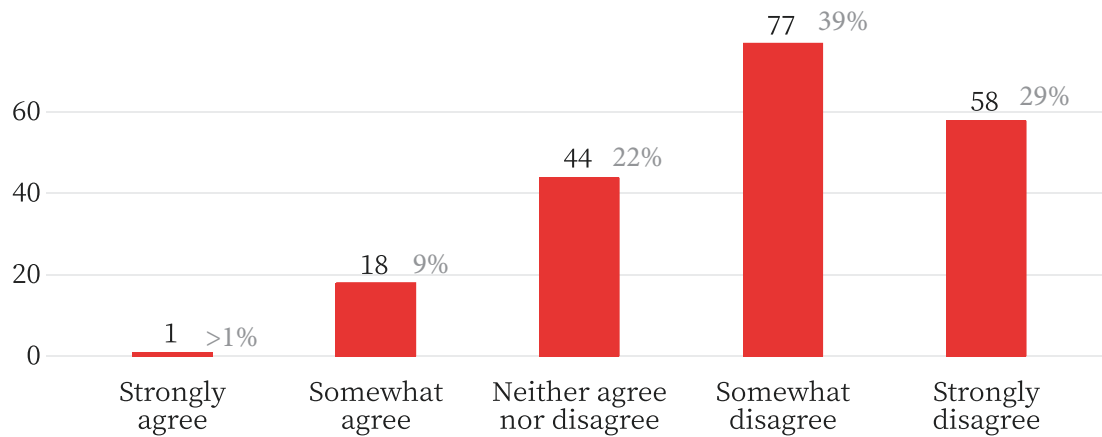
**Table 13.**

The retail industry cares about the environment:

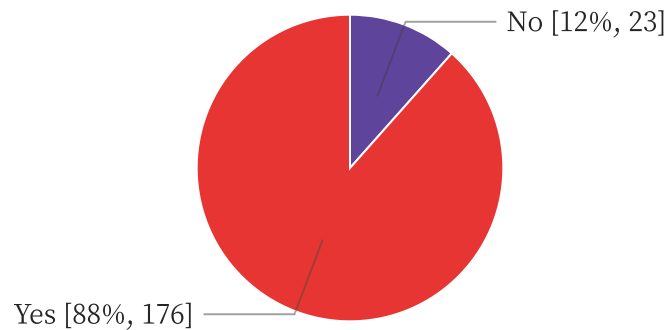
DO YOU?	Choice Count
Strongly agree	0% 0
Somewhat agree	11% 22
Neither agree nor disagree	21% 41
Somewhat disagree	43% 85
Strongly disagree	26% 51
Total	199

Figure 5.

The retail industry cares about their workers:

**Figure 6.**

I wish more fashion companies would use education as a tool for transparency, within their marketing:



RESEARCH QUESTION 3: How do consumers interpret reduce, reuse, recycle principles?

According to the data collected from the survey (fig. 7, fig. 8, fig. 9, fig. 10, t. 14, t. 15, t. 16, t. 17, and t. 18) participants indicated that they are interested in contributing more toward 3R principles. About 60% of respondents buy used clothing between once a month to a couple times a year while younger consumers are more opt to borrow clothing than older consumers. Younger participants indicated that they were more opt to thrift vs. purchase new clothing. 58%

of participants indicated that their clothing lasts three-five years before they are worn out or they discard them. The data also stated that 62% of respondents said they would be interested in learning how to repair their clothing, 44% said they are interested in upcycle services of their own personal wardrobe, and 64%-68% said they are not interested in clothing rental services.

Table 14.

On average, how often do you buy used clothing?

AGE	18-25		26-33		34-41		42-49		50-57		58-65		66-73	
Daily	3%	3	0%	0	0%	0	4%	1	0%	0	0%	0	0%	0
Once a week	1%	1	5%	1	2%	1	0%	0	0%	0	0%	0	0%	0
Once every couple weeks	23%	22	5%	1	4%	2	8%	2	0%	0	0%	0	0%	0
Once a month	35%	33	15%	3	13%	6	8%	2	0%	0	0%	0	14%	1
A couple times a year	30%	28	65%	13	51%	23	50%	12	50%	2	40%	2	43%	3
Do not buy used clothing	7%	7	10%	2	29%	13	29%	7	50%	2	60%	3	43%	3
Total		94		20		45		24		4		5		7

Table 15.

Have you ever borrowed clothing from someone?

AGE	18-25		26-33		34-41		42-49		50-57		58-65		66-73	
Yes	90%	85	90%	18	82%	37	79%	19	50%	2	0%	0	29%	2
No	10%	9	10%	2	18%	8	21%	5	50%	2	100%	5	71%	5
Total		94		20		45		24		4		5		7

Figure 7.

Do you prefer thrifting or buying new clothing?

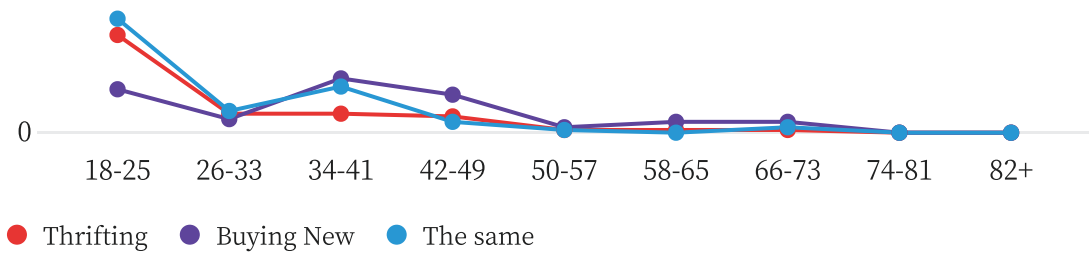


Figure 8.

On average, how many years would you say your clothes last before wearing out and you discard them?

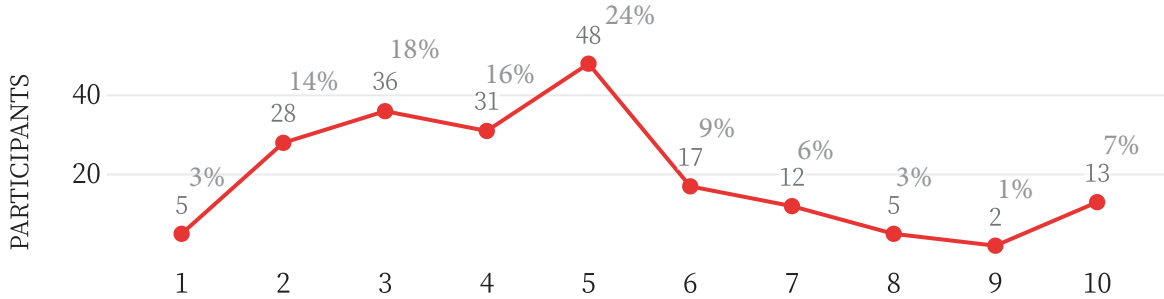


Figure 9.

Would you be interested in taking classes to learn how to properly repair your clothing?

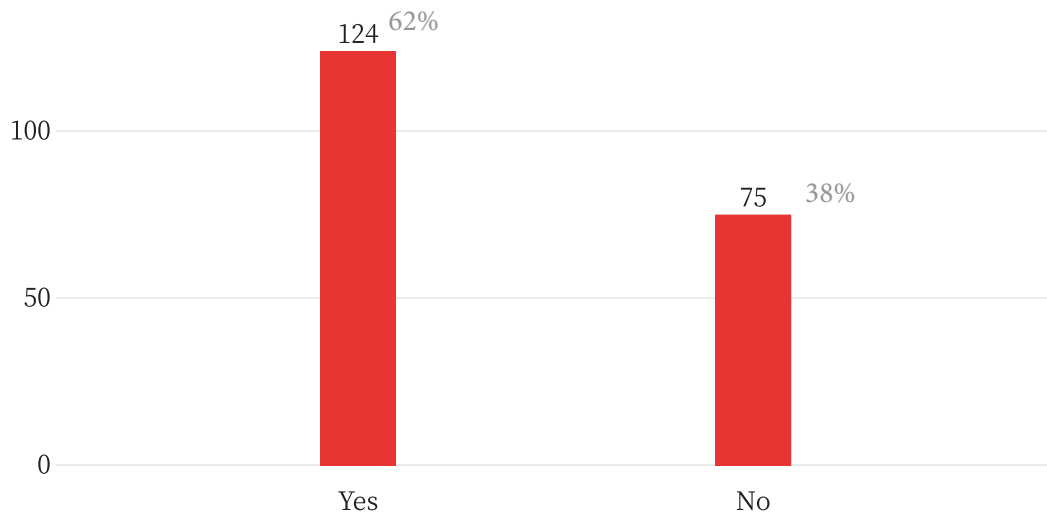


Figure 10.

How much would you pay to repair a damaged piece of clothing you love?

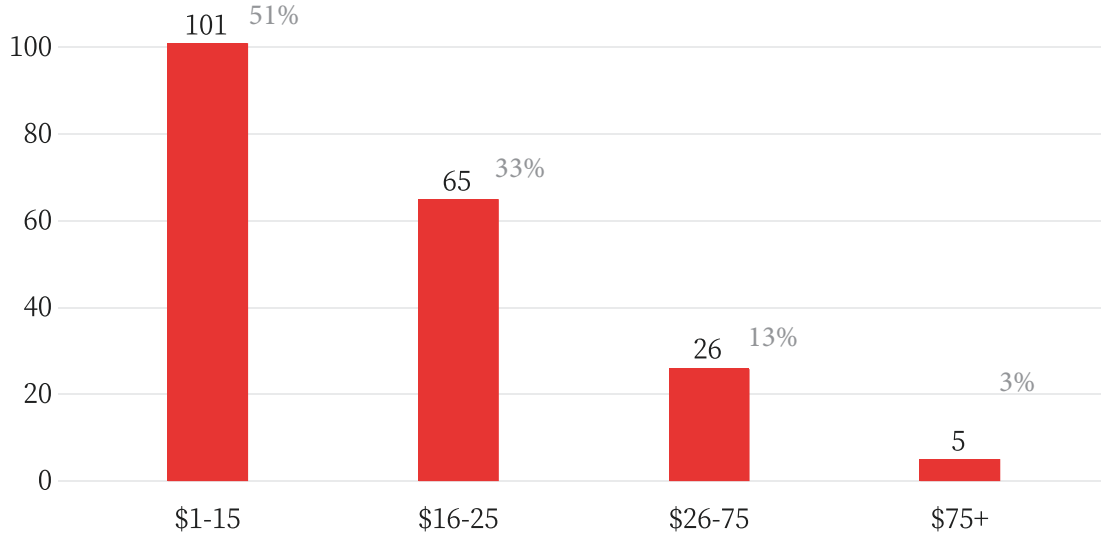


Table 16.

If you could pay a small fee to upcycle or refresh current wardrobe pieces, would you be interested in this type of service?

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
Yes	48% 45	60% 12	38% 17	29% 7	75% 3	20% 1	43% 3
Maybe	36% 34	30% 6	44% 20	54% 13	0% 0	80% 4	29% 2
No	6% 6	0% 0	13% 6	4% 1	25% 1	0% 0	14% 1
I do not know what upcycling is	10% 9	10% 2	4% 2	13% 3	0% 0	0% 0	14% 1
Total	94	20	45	24	4	5	7

Table 17.**I am interested in renting clothing instead of buying:**

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
Yes	5% 5	10% 2	13% 6	4% 1	0% 0	0% 0	0% 0
Maybe	30% 28	45% 9	33% 15	8% 2	25% 1	40% 2	14% 1
No	65% 61	45% 9	53% 24	88% 21	75% 3	60% 3	86% 6
Total	94	20	45	24	4	5	7

Table 18.**If you had the option to rent clothing on a monthly basis...
what option would you choose?**

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
6 pieces per week @ \$99/month	7% 7	0% 0	9% 4	4% 1	0% 0	0% 0	0% 0
4 pieces per week @ \$79/month	12% 11	10% 2	7% 3	0% 0	0% 0	0% 0	0% 0
2 pieces per week @ \$49/month	15% 14	35% 7	20% 9	13% 3	0% 0	20% 1	14% 1
Not interested	66% 62	55% 11	64% 29	83% 20	100% 4	80% 4	86% 6
Total	94	20	45	24	4	5	7

RESEARCH QUESTION 4: What are consumers doing to improve lifecycle and supply chain metrics?

According to the data collected from the survey (fig. 12, fig. 13, fig. 14, fig. 15, t. 19, t. 20, t. 21, t. 22, t. 23, t. 24, t. 25, and t. 26) 40% of participants are buying new clothing a couple times a year, while 28% of respondents are buying new clothing once a month. Of the participants, 82% indicated that they have borrowed clothing from another person, and 50% have traded clothing with someone. Most spend on average between \$11-75 on one piece of clothing. Of the respondents, almost half indicated that they own a sewing machine but would like training or classes to learn how to repair their clothing properly and 63% of respondents said that they repair their clothing when it becomes damaged; which 36% of respondents repair their clothing by hand. A minority (26%) of participants either donate their clothing to a thrift store or throw away their clothing when it becomes damaged, 87% of participants indicated that they would spend up to \$25 to repair a piece of clothing, and 57% of people wash their clothes after multiple wears. There was no significant difference of whom repairs their clothing based on age.

Table 19.

On average, how often do you buy new clothing?

Field	Choice Count
Daily	1.01% 2
Once a week	8.54% 17
Once every couple weeks	21.61% 43
Once a month	28.14% 56
A couple times a year	40.20% 80
Do not buy new clothing	0.50% 1
Total	199

Table 20.**On average, how often do you buy used clothing?**

AGE	18-25		26-33		34-41		42-49		50-57		58-65		66-73	
Daily	3%	3	0%	0	0%	0	4%	1	0%	0	0%	0	0%	0
Once a week	1%	1	5%	1	2%	1	0%	0	0%	0	0%	0	0%	0
Once every couple weeks	23%	22	5%	1	4%	2	8%	2	0%	0	0%	0	0%	0
Once a month	35%	33	15%	3	13%	6	8%	2	0%	0	0%	0	14%	1
A couple times a year	30%	28	65%	13	51%	23	50%	12	50%	2	40%	2	43%	3
Do not buy used clothing	7%	7	10%	2	29%	13	29%	7	50%	2	60%	3	43%	3

Table 21.**Have you ever borrowed clothing from someone?**

AGE	18-25		26-33		34-41		42-49		50-57		58-65		66-73	
Yes	90%	85	90%	18	82%	37	79%	19	50%	2	0%	0	29%	2
No	10%	9	10%	2	18%	8	21%	5	50%	2	100%	5	71%	5
Total		94		20		45		24		4		5		7

Table 22.**Have you traded clothing with someone?**

Field	18-25		26-33		34-41		42-49		50-57		58-65		66-73	
Yes	70%	66	65%	13	62%	28	42%	10	75%	3	20%	1	29%	2
No	30%	28	35%	7	38%	17	58%	14	25%	1	80%	4	71%	5
Total		94		20		45		24		4		5		7

Table 23.

On average, what price structure best describes your fashion consumption for one piece of clothing?

AGE	18-25	26-33	34-41	42-49	50-57	58-65	66-73	Total
\$1-10	16	1	2	2	0	0	0	21
\$11-25	54	9	13	11	0	2	1	90
\$26-75	38	12	26	9	4	2	5	96
\$50-150	15	3	8	3	0	1	2	32
\$100-500	5	0	1	0	0	0	1	7
\$500+	0	0	0	0	0	0	0	0

Figure 11.

On average, how many years would you say your clothes last before wearing out and you discard them?

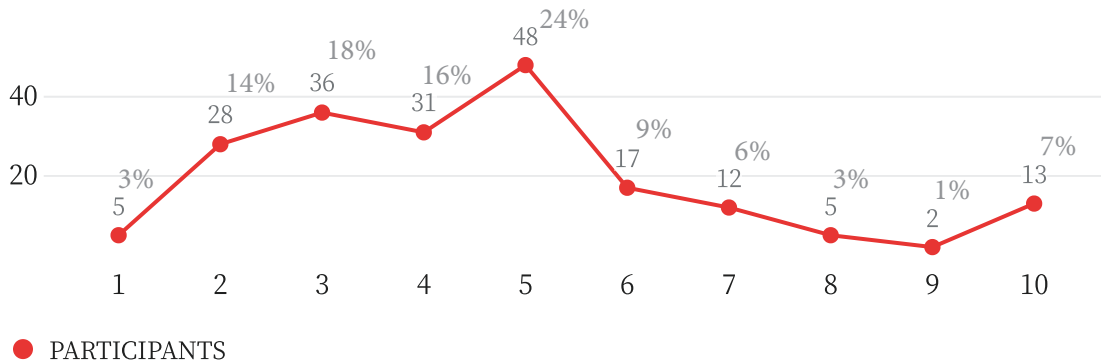


Figure 12.

Do you own a sewing machine?

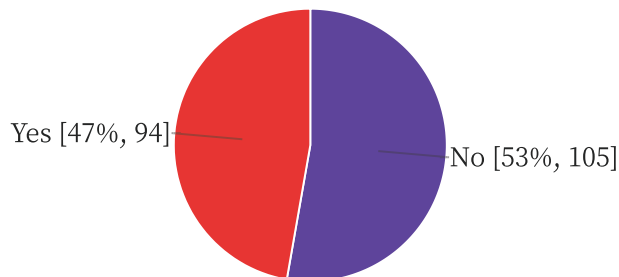


Table 24.**Do you know how to use a sewing machine?**

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
Yes	68% 64	60% 12	58% 26	79% 19	100% 4	80% 4	100% 7
No	32% 30	40% 8	42% 19	21% 5	0% 0	20% 1	0% 0

Table 25.**Would you be interested in taking classes to learn how to properly repair your clothing?**

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
Yes	74% 70	55% 11	62% 28	33% 8	50% 2	40% 2	43% 3
No	26% 24	45% 9	38% 17	67% 16	50% 2	60% 3	57% 4

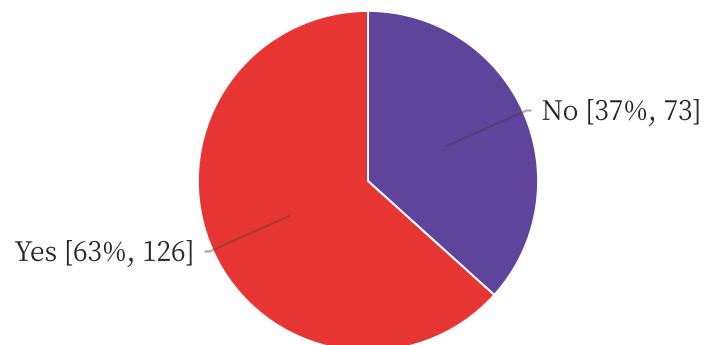
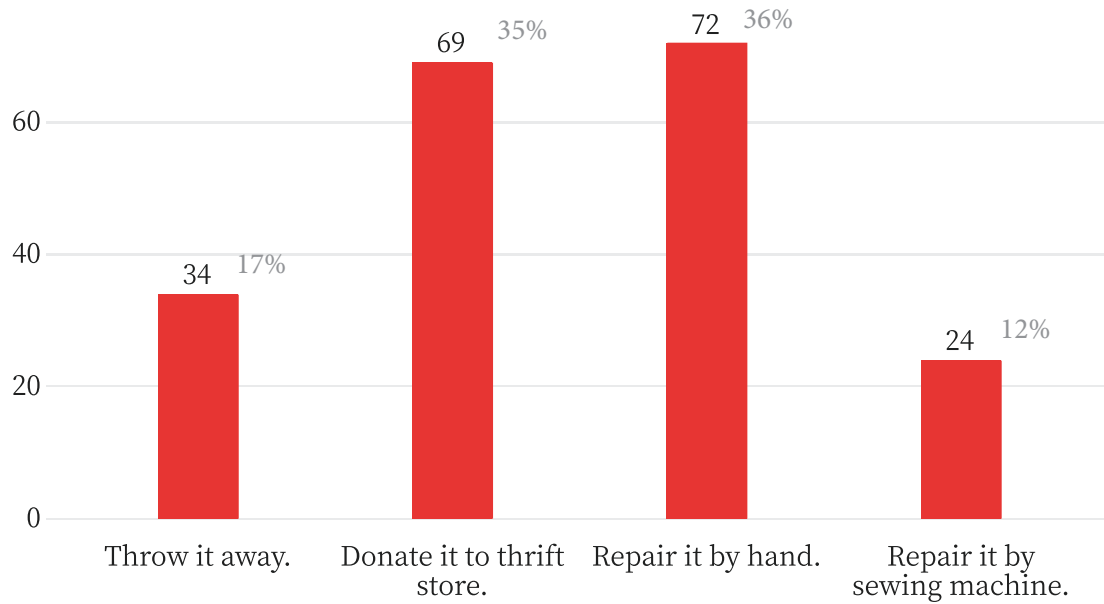
Figure 13.**Do you repair your clothing when it becomes damaged?**

Figure 14.

What do you do the most of when your clothing becomes damaged?

**Figure 15.**

How much would you pay to repair a damaged piece of clothing you love?

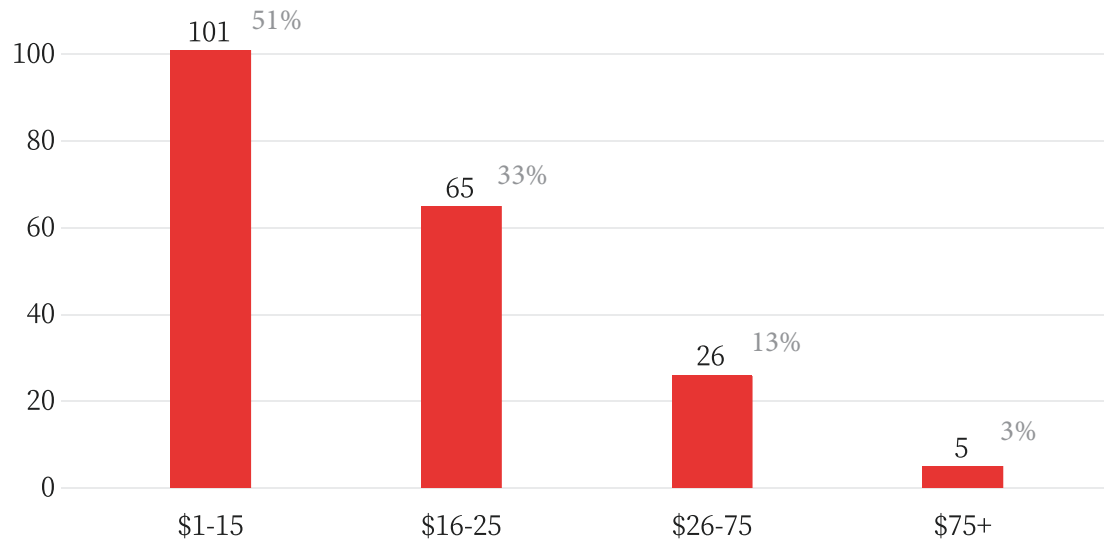


Table 26.**What best describes when you wash your clothes?**

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
After one wear	33% 31	35% 7	51% 23	33% 8	50% 2	60% 3	29% 2
After multiple wears	64% 60	45% 9	44% 20	63% 15	50% 2	40% 2	71% 5
When they stink	3% 3	20% 4	4% 2	4% 1	0% 0	0% 0	0% 0
Total	94	20	45	24	4	5	7

RESEARCH QUESTION 5: What are consumers perceptions about sustainability and circularity models?

According to the data collected from the survey (fig. 16, fig. 17, fig. 18, t. 27, t. 28, t. 29, and t. 30) consumers are slightly educated on the topics of sustainability and the majority want to know more about the manufacturing process before purchasing a product. 70% of respondents indicated that they do not know what circularity entails with the majority of participants responding that they do not think that the fashion industry cares about the environment nor the care of its workers. The majority of participants indicated that they are not interested in renting clothing versus purchasing and 88% responded that they want the fashion industry to be more transparent and the use of education as a tool for marketing.

Figure 16.

Do you prefer thrifting or buying new clothing?



Table 27.

How much do you want to know about a companies manufacturing process before purchasing their products?

AGE	18-25	26-33	34-41	42-49	50-57	58-65	66-73
A great deal	9% 8	5% 1	2% 1	4% 1	0% 0	0% 0	0% 0
A lot	14% 13	10% 2	16% 7	0% 0	25% 1	40% 2	29% 2
A moderate amount	41% 39	35% 7	24% 11	38% 9	50% 2	0% 0	29% 2
A little	19% 18	15% 3	22% 10	33% 8	0% 0	60% 3	43% 3
None at all	17% 16	35% 7	36% 16	25% 6	25% 1	0% 0	0% 0
Total	94	20	45	24	4	5	7

Table 28.

Do you know what circularity entails within the fashion chain?

Field	18-25	26-33	34-41	42-49	50-57	58-65
Yes	35.11% 33	25.00% 5	22.22% 10	12.50% 3	50.00% 2	0.00% 0
No	64.89% 61	75.00% 15	77.78% 35	87.50% 21	50.00% 2	100.00% 5
Total	94	20	45	24	4	5

Table 29.

The retail industry cares about the environment:

DO YOU?	Choice	Count
Strongly agree	0%	0
Somewhat agree	11%	22
Neither agree nor disagree	21%	41
Somewhat disagree	43%	85
Strongly disagree	26%	51
Total		199

Figure 17.

The retail industry cares about their workers:

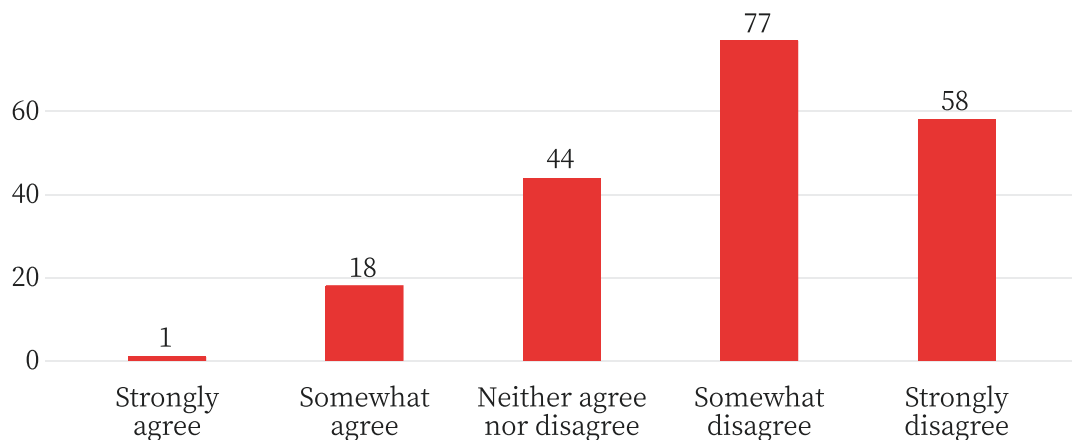


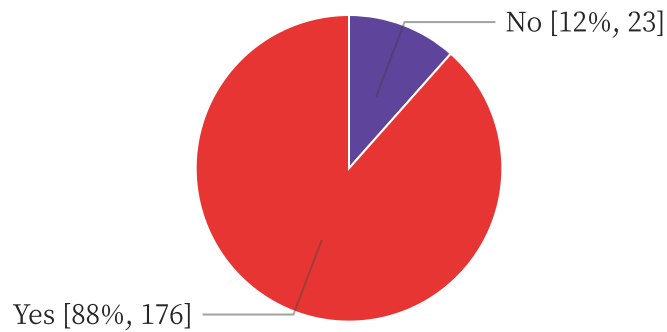
Table 30.

I am interested in renting clothing instead of buying:

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73
Yes	5% 5	10% 2	13% 6	4% 1	0% 0	0% 0	0% 0
Maybe	30% 28	45% 9	33% 15	8% 2	25% 1	40% 2	14% 1
No	65% 61	45% 9	53% 24	88% 21	75% 3	60% 3	86% 6
Total	94	20	45	24	4	5	7

Figure 18.

I wish more fashion companies would use education, as a tool for transparency, within their marketing:



CHAPTER 5. CONCLUSION

The practice of circularity within the fashion sector is focused on and grounded in the technosphere - a human construct designed to support the conversion of raw materials for human consumption beyond the simple survival needs of food and water (USCHAMBER, 2021). The proposed system was what makes the difference between sustainability and a circular business model. Consumers have indicated they would like more transparency and cross-sector collaboration within the fashion marketplace based on the response from this survey. Fashion needs to stop the promotional noise of their lifecycles just for the sake of consumerism because the environment is being sucked of its natural resources, global consumers are getting smarter, and many consumers are educating themselves on what companies are doing, what they are promising, and when they are green washing (Caniato et al., 2012). If we start the fashion design process at the beginning of the supply chain, by selecting the right materials, including choosing recycled and recyclable materials, throughout the product design lifecycle, we can begin to tackle the category of virgin materials and product waste (EMF, 2017).

Companies need to pay better attention to waste and scrap production, including and selecting suppliers and partners that have the same core values (Bick et al., 2018). Retailers and brands need to start paying closer attention at the opportunities that are currently being presented, outside of the traditional linear business models, and start creating services and retailing environments where each other's values align (De Brito et al., 2008). Common sense marketing tactics could help fashion brands pivot into new business models that might attract new consumers. For example, companies can pivot core values and marketing strategies from new production of fashion and sales tactics to circular supply chain strategies, circularity models, and environmental based marketing messages by adding reused, recycled, or upcycled garments to their core values. While there are many possible solutions to the lengthening of our clothing's

lifecycle, based on the participant responses from this study, the two most important factors point toward: (1) consumer education and (2) re-building the fashion supply chain that starts at design conception all the way to consumer consumption. According to my literature review, there also appeared to be a gap between younger demographics and older demographics in regards to sustainability practices and circular methodology (EMF, 2017). It could be hypothesized that as someone ages and their income increases, their purchasing power increases and are less apt to focus as much on circularity principles. The fashion supply chain needs to be demolished and re-built, starting from the ground-up, beginning with transparency, sustainability, and circularity at its core. This research also points out that consumers are not interested in clothing rental as a main source of clothing consumption. There has been current research published (McCoy et al., 2021) that contradicts my clothing rental data, so I suggest a larger undifferentiated study across a wider demographic and geographic region be conducted.

Implications

This study has implications that are beneficial to the academic community but also provides the apparel industry with data that could be used to implement global initiatives toward a more circular model of business. This study contributes to the academic community and apparel industry with quantitative numbers and hypothetical solutions that could start a conversation with key stakeholders in the fashion community. This study not only adds to the literature regarding sustainability and circular models of the fashion supply chain, it provides direct access to the data collected, which was often hard to find, gather, and interpret. R2A (APPENDIX A) is not a full-solution of any problem statement. I created R2A as a hypothetical solution to start the conversation of circularity within the fashion supply chain. Based on the review of literature and the responses from participants within this study, there is a proven disconnect between consumers, the fashion industry, and the academic community and with hope, R2A and this non-conventional research could bridge a gap.

Future Research

The fashion industry has been very keen on identifying problems; many consumers indicate such as green-washing, and the academic community has solidified by qualitative and quantitative research the many areas that are currently failing. This research could be expanded to a larger and diverse socio-economic demographic to provide more detailed research with potential problems the fashion industry is facing and data with consumers within the global fashion market. A parallel survey between the fashion industry, educators, and students could be a way to collect valuable data and insight that is currently missing.

For the future of retailing to make the global impact to save our planet in the future, I propose three areas the fashion industry can focus on: (1) creating a global agenda for sustainable value chain directives that can be applied to supply chain metrics within the fashion lifecycle, (2) increasing sustainable business practices that start at company/brand values that add to the availability and visibility of sustainable products and services within the marketplace, (3) increase the transparency of the lifecycles within the fashion industry sector as a global initiative for consumers. Results from this study indicated that consumers are not interested in clothing rental. Prior research had indicated that consumers are in-favor for clothing rental (McCoy et al. 2021), so I suggest a larger survey across many socio-economic demographics and global regions should be conducted in the future. Clothing rental research could be expanded to help bring a better understanding of circular business model options within formal rental wear, ready-to-wear, high fashion, and custom clothing markets.

Prior research also indicated that trust had been linked to transparency which states individuals are more apt to support leadership that is open and transparent about their decision-making process (Norman, 2010). Based on my study, current industry research, and academic research, the fashion industry could start to re-build their images by following sustainable and

circular business models. Participants within this study have indicated that the fashion industry is not trustworthy, as a whole. I suggest that the fashion industry can start partnering with public institutions for collecting, gathering, interpreting, and distributing research data. I also suggest that public research institutions and researchers start working toward collaborating with the fashion industry more and looking deeper into possible solutions for the fashion supply chain. My results indicated, fashion brands need to start by opening up their supply chain metrics by transparent means with direct-to-consumer conversations, public institutions, and admittance of failures within their supply chain to cut through the greenwashing tactics currently plaguing the fashion industry. Currently, the fashion industry is not doing a good enough job at educating consumers about the manufacturing process and providing transparent operating procedures. This topic could be researched in the future.

Survey participants indicated great interest in sustainable fashion practices and circular models within their own lives. Future partnerships between industry and higher education could provide direct access for consumers and also access for holding parties accountable. As indicated in this research project, R2A could be used for helping educate consumers and opening a channel of transparency between the fashion industry, educators in higher education, and direct-to-consumer relationships.

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APPENDIX A: R2A DECK PROPOSED SOLUTION



REPAIRING
R2A
REUSING
ATELLERING

This project is conceptual. The documents included within this pitch deck are hypothetical and could be used to start a business, enter a pitch competition, or seek funding.

R2A

REPAIRING REUSING ATELLIERING



R2A is a traveling fashion truck (POP-UP) franchise opportunity that can be used for educating college students and consumers about circulatory and global supply chain marketing/initiatives within the apparel industry and offer a new sustainable way to support consumers closet, wallet and aesthetic.



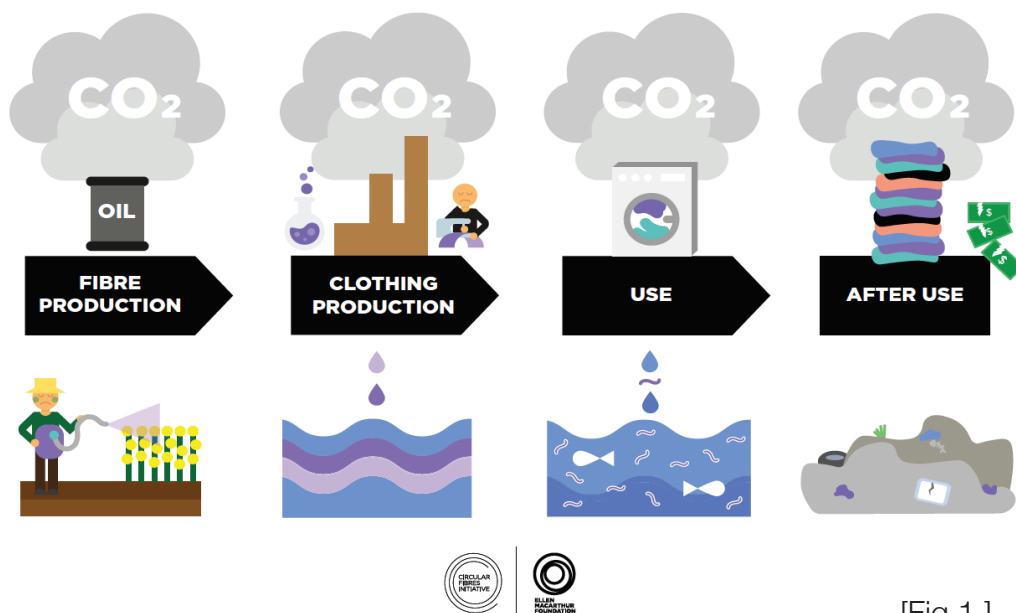
R2A will educate consumers through creative/design/hands-on application[on-site] by re-designing people's fashion from their closet, selling/re-using/designing deadstock, and repairing current fashion items while they wait, shop, or drop off for pick-up at a later date.

Project MISSION

MISSION: R2A is committed to educating humans through global supply chain transparency and improving the social, economic, and circular impacts of the fashion industry in which we can live and work by. The mission is to create cleaner, safer, and transparent operating procedures by partnering with our neighbors, customers, and business partners, positioning us to improve the environmental impact we create while **REPAIRING, REUSING, and ATELIERING** clothing.

Project IMPACT

Today's clothing supply chain puts pressure on resources, pollutes the environment, and creates negative societal impacts (EMF, 2020) [Ellen MacArthur Foundation, 2017, Fig 1].



[Fig 1.]

“Less than 1% of material used to produce clothing is recycled into new clothing,” Henrik Lampa (H & M’s development sustainability manager) stated during an interview with Newsweek in 2016.

This alarming number adds to the waste of more than USD 100 billion worth of materials each year within the entire fashion industry supply chain; estimate based on Circular Fibers Initiative analysis on the share of materials and a price of USD 2.8/kg for cotton yarn and USD 1.7/kg for polyester yarn, January 2017. R2A’s goal is to start with transparency and open up discussions, using grassroots programs

and messaging, with students, consumers, and communities on the way clothing is designed, sold, and used.

According to a 2017 survey commissioned by the London sustainability firm Hubbub, 41% of 18- to 25-year-olds feel pressured to wear a different outfit every time they go out. Fast fashion, then, appears to be the simple solution to appease our desire for novelty (Briars, 2020). Another survey, commissioned by the Barnado's charity in 2019, found that British people will spend up to 2.7 billion pounds on clothes during the summer that'll only be worn once. In a study by WRAP, SCAP textiles tracker survey (WRAP, 2016), 42% of consumers discarded their clothing because it didn't fit, 26% because they didn't like it, 19% was because it was damaged, 7% said they didn't need it anymore, and 6% reported other.

There are a multitude of studies available that conclude and prove we have a problem. We must start re-inventing the way we are educating our communities in order to change the broken system we live in today. Phase I, of R2A, could provide opportunities for local communities, college level impact, and regional demographic changes with new initiatives that can be used to continue conversations on environmental impact of the fashion sector but also how we can directly impact consumers fashion consumption.

Project OUTCOMES

Currently, R2A is seeking PHASE I (purchasing a Direct-To-Garment printer) funding for business development to start grass roots marketing and student/community educational program by holding an event, at University of Idaho, for the Moscow community.

R2A's long-term direct-to-consumer services will start with purchasing a direct-to-garment printer for up-cycling fashion and re-evaluating customers wardrobes for our students and local communities (PHASE I). We will continue to expand our program and services by the build-out of a mobile bus (PHASE II), corporate promotion/sponsorships from private sector (PHASE III), sewing/repair services for our customers (PHASE III), in-house custom design/up-cycle services (PHASE III), re-designing dead stock from corporate collaborations (PHASE III), custom fashion re-sale website/app (e-commerce) for all franchises and designers (PHASE III) [styleUP™, R2AUP™, recycleUP™, repairingUP™, reusingUP™, and atelieringUP™].

Project WHAT IS DIRECT TO GARMENT PRINTING?

Direct-to-garment printing (DTG) is a process of printing on textiles using specialized aqueous ink jet technology. DTG printers typically have a platen designed to hold the garment in a fixed position, and the printer inks are jetted or sprayed onto the textile by the print head. DTG typically requires that the garment be pre-treated with a PTM or

Pre-treatment machine allowing for the following:

- Stronger bond between garment fibers and the pigmented inks.
- Lays down loose fibers to provide for a smoother substrate.
- Chemically reacts with the inks to promote drying and curing.

Since this is a digital process the print is sharper and has a higher resolution, or DPI, than traditional printing methods such as screen printing. However, unlike screen printing, there is no long setup times, less clean-up processes, and DTG has the ability to print just one single shirt for minimal cost and dramatically reduce waste.

For more information on direct to garment printing: <https://www.youtube.com/watch?v=aXx8joAXM6c>.

Project OUTREACH

R2A's outreach goal is to give students a voice and the opportunity to solve real-world environmental problems, learn in a creative environment, educate consumers, and provide transparency about green washing tactics in the global fashion supply chain.

Project PARTICIPATION + SUPPORT

Students will be working interdisciplinary with other students; including designers, engineers, scientists, artists, and business professionals. They will be learning about the many facets of the fashion industry through applied, theoretical, and active learning environments. Students will have hands-on opportunity to run a business, collect college credit from supporting classes, and work in an interdisciplinary environment with other students in other majors and disciplines from around the globe. Students will be running day-to-day operations of this program.

The DTG Printer will be housed in the existing CAD (Computer-Aided Design) Lab in the Niccolls Building on the University of Idaho campus in Moscow, Idaho. The CAD Lab has work tables and five computer stations, is distance-delivery capable, and has student seating for up to 6 people (with COVID restrictions). Students will receive training in the operation of the DTG system including what garment types and areas are appropriate for DTG methods. The CAD Lab has card swipe access which would allow participants access after-hours and on weekends after appropriate training.

Participants and students will be recruited by faculty and staff members in FCS and CALS. See letters of support.

Educational programming related to the fashion industry and sustainability will be provided in the CAD Lab through a combination of in-person and remote delivery.

Project LONGEVITY

Short Term:

We will be holding a one-day community event, for students and the Moscow community to bring us a piece of fashion and have us R2AUP the garment. Apparel, Textiles, and Design (ATD) student club, faculty, and volunteers will be running the event. We plan on using social ATD social media channels, Family and Consumer Sciences and College of Agricultural & Life Sciences for public relations support.

Long Term:

We see R2A as a long-term mobile facility and high-impact project that can benefit the entire Vandal community near and far. With hope, the additional phases can benefit a global audience and continue to help our local community as R2A grows for years to come.

Please see timelines for more details located within this document on page.

PHASE I - Project R2AUP EVENT

The external reach would begin by holding a community event where students and community members can bring in a piece of fashion they do not wear often, from their wardrobe, and we will add a graphic using the direct-to-garment printer, onto the garment, saving the garment from being thrown away or discarded.

We also plan on producing visual aids to explain current waste, environmental impacts, and possible solutions to educate students and community members.



PHASE I - Project EVALUATION

We will be holding a community event where students and community members can bring in a piece of fashion they do not wear often, from their wardrobe, and we will add a graphic using the direct-to-garment printer, onto the garment, saving the garment from being thrown away or discarded. During our first event, consumers will fill out a short survey about their fashion consumption while we R2AUP™ their garment. We will create an impact report and findings of their current fashion consumption and socio-economic demographics after the event.


We also plan on producing visual aids to explain current waste, environmental impacts, and possible solutions to educate students and community members.

PHASE I - EVENT Visual Aids [Conceptual Partnerships]

COTTON INCORPORATED SUPPLY CHAIN

INSIGHTS

WHEN DOES SUSTAINABILITY MATTER



Global concern for environmental change is high, with 86% of consumers saying sustainability concerns are very real and require a change in our behaviors. Concern for the environment translates into action as 95% of consumers engage in sustainable practices and purchasing behaviors, such as recycling and seeking out sustainable food, appliances, and clothing. Brands can stand out by connecting with consumers' desire to "do the right thing" through protecting the environment with natural product offerings.

KEY INSIGHTS

- Consumers regularly engage in sustainable practices that are convenient, including their purchase behavior. Brands who can connect with consumers' interest in natural products can set themselves apart while still meeting traditional purchase drivers.
- Marketers may promote cotton products in line with consumer motivations to "do the right thing" or "live a balanced lifestyle."
- Consumers trust brands to produce sustainable clothing and see natural fibers as the clearest sign of an item's sustainability.

TOP ENVIRONMENTAL CONCERN (by Country)

CLIMATE CHANGE

- 50% GERMANY
- 45% INDIA
- 38% U.S.
- 36% U.K.

AIR POLLUTION

- 52% CHINA
- 49% ITALY

WATER SCARCITY

- 61% MEXICO

COMMON SUSTAINABLE ACTIONS

- 86% Recycle cans, bottles, paper, etc.
- 83% Purchase appliances that conserve energy
- 80% Use refillable water bottle
- 80% Use my own bags while shopping

MOTIVATION FOR SUSTAINABLE ACTIONS

- To protect the world for my children/grandchildren/future generations:
 - MEXICO: 69%
 - ITALY: 63%
- Simply because it is the right thing to do:
 - U.S.: 59%
 - U.K.: 59%
 - GERMANY: 57%
- To live a more balanced/healthier lifestyle:
 - INDIA: 56%
 - CHINA: 50%

Cotton Incorporated | INFO: MarketInformation@cottoninc.com | lifestylemonitor.cottoninc.com | © 2018

SUPPLY CHAIN INSIGHTS

WHEN DOES SUSTAINABILITY MATTER

Concern for sustainability influences over three-quarters of consumers when they shop for food and household appliances, and 61% say it influences their clothing purchases. Consumers connect the ideas of sustainability and naturalness, particularly when it comes to clothing, seeking items made of natural fibers. Brand trust and image influence consumers' sustainable clothing choices and 66% say they blame manufacturers, brands, or stores when clothing is not sustainably produced.

WHAT MAKES CLOTHING SUSTAINABLE?

TOP ANSWERS

- NATURAL: 56%
- 100% COTTON: 52%
- ORGANIC: 47%
- DURABLE OR LONG LASTING: 45%
- LESS IRRITATING TO SKIN: 44%
- HIGH QUALITY: 44%

INFREQUENT ANSWERS

- POOR QUALITY: 15%
- LESS STYLISH: 21%
- HARD TO CARE FOR: 22%

LEARN MORE about Sustainable Cotton Innovations at <http://cottontoday.cottoninc.com>

SUSTAINABLE PURCHASES BY CATEGORY

% saying sustainability influences purchase of products in the following categories

FOOD	77%
HOUSEHOLD APPLIANCES	76%
AUTOMOBILES	66%
ELECTRONICS	65%
PERSONAL CARE	62%
COSMETICS/BEAUTY	61%
CLOTHING	61%
HOME TEXTILES	59%
BABY CARE	54%
FOOTWEAR	52%

SUSTAINABLE CLOTHING INFLUENCE

% saying the following factors influence their clothing purchase decisions

- NATURAL FIBERS: 75%
- BRAND TRUST: 71%
- SUSTAINABLE BRAND: 61%
- MADE IN HOME COUNTRY: 59%

BLAME FOR NON-SUSTAINABLE APPAREL

% holding the following entities responsible for a piece of clothing that was produced in a non-environmentally friendly way*

- MANUFACTURER: 36%
- BRAND: 18%
- MYSELF: 14%
- STORE: 11%

*Excludes U.S. consumers

Sources: Cotton Council International & Cotton Incorporated 2017 Global Environment Survey – survey of 7,365 women & men, ages 18-60 in the U.S., U.K., India, China, Mexico, Germany, and Italy who have involvement in clothes shopping; Cotton Council International & Cotton Incorporated 2018 Global Lifestyle Monitor – survey of 6,000 women & men, ages 15-54 in the U.K., India, China, Mexico, Germany, and Italy.

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#ACTNOW FASHION CHALLENGE
un.org/ActNow

LOGO BRANDING [CONCEPTUAL]



**MY CLOTHES'
LIFECYCLE
AIN'T DEAD
YET**
REPAIRING | REUSING | ATELIERING

MAKE  DIFFERENCE



R2A
REPAIRING REUSING ATELIERING

REPAIRING | REUSING | ATELIERING



R2A

SERVICES BRAND MARKS [CONCEPTUAL]

STYLEUP™
R2AUP™
RECYCLEUP™
REPAIRINGUP™

REUSINGUP™
ATELIERINGUP™
TRADEUP™

R2A services (s)

Made especially for you

ENVIRO/ECO
Conscious

RECYCLEUP™
REPAIRINGUP™
REUSINGUP™

PRICE/ECO
Conscious

R2AUP™
TRADEUP™

TREND/ECO
Conscious

STYLEUP™
ATELIERINGUP™

RECYCLEUP™: Customers can donate to our program and know exactly where the clothing ended up (blockchain services).

REPAIRINGUP™: Customers will have the opportunity to have us repair their used clothing.

REUSINGUP™: Customers can buy from our re-designed dead stock/ collaborations.

R2AUP™: Direct-to-Garment printing services on customers clothing that they bring in.

Customers will be able to self-select design and location of printing.

TRADEUP™: Customers will be able to trade clothing.

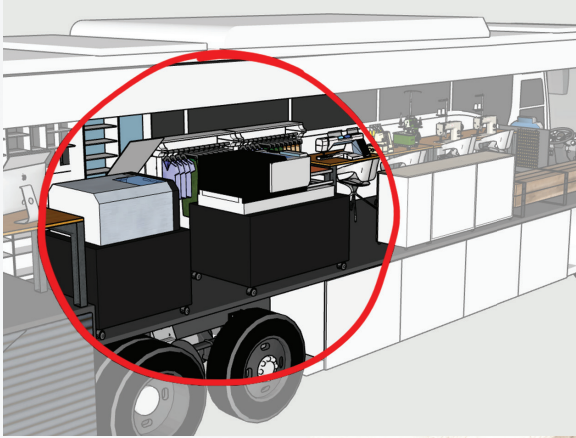
STYLEUP™: Customers can hire a stylist to pull directly from their closet and create one "new" one-of-a-kind pieces based on personal aesthetic and consultation services.

ATELIERINGUP™: Custom high-end one-off fashion design from our designers from donated and second-hand clothing market.

This background photo showcases models wearing denim that was found rotting away in a barn. It just needed cleaned and they are beautiful pieces of American denim history showcased here. Educational opportunities like this are endless.

Photography by Patrick Brown-Hayes.

PHASE I CONCEPT



FULL CONCEPT



People just forget what they buy or throw everything away and buy it again...
There is so much waste.

This oversized XXXL mens sweater in the background photo was re-designed into a women's dress in about 10 minutes. So much fashion is over-thought and over-designed.

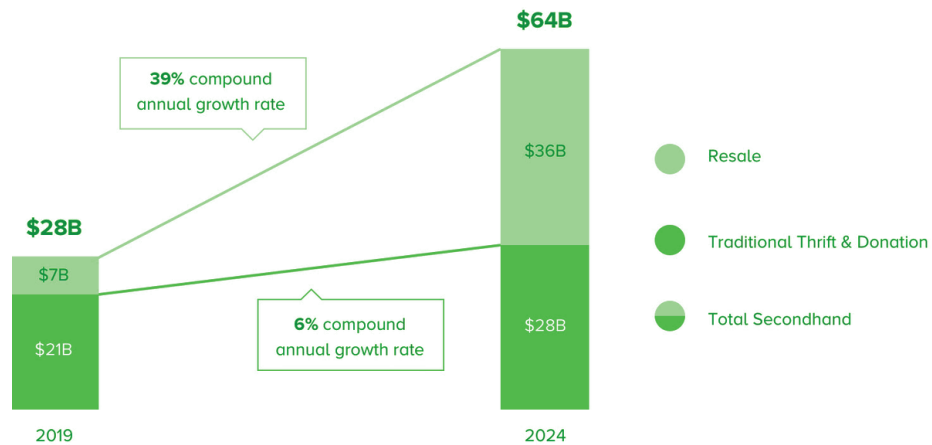
"I don't want to re-invent fashion, I want to re-define how we wear it."
-Patrick

Renderings and photography were created by Patrick Brown-Hayes.

MARKET Projections

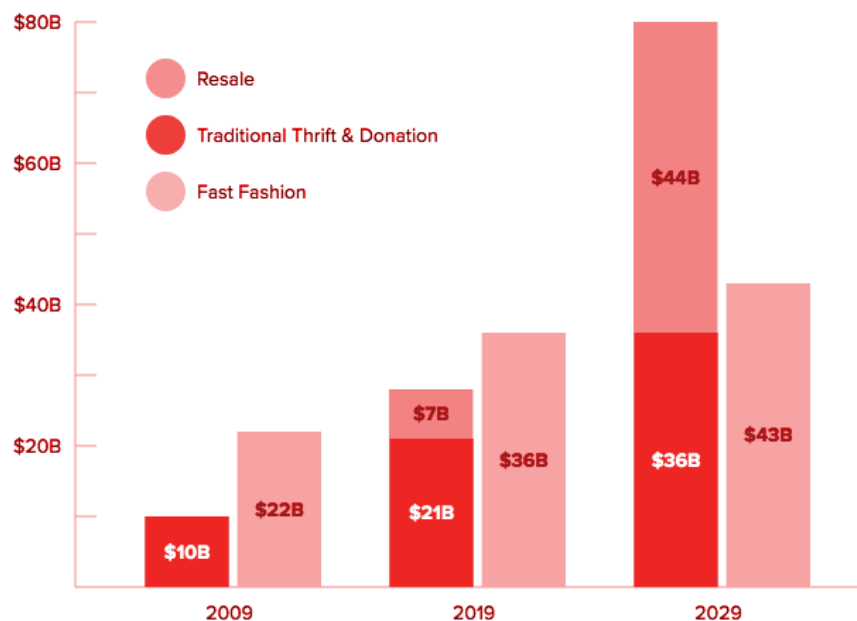
Our motivation and purpose

DATA GRAPHS were collected from <https://www.thredup.com/resale/#consumer-trends>.



Resale Expected to Be Bigger Than Fast Fashion by 2029

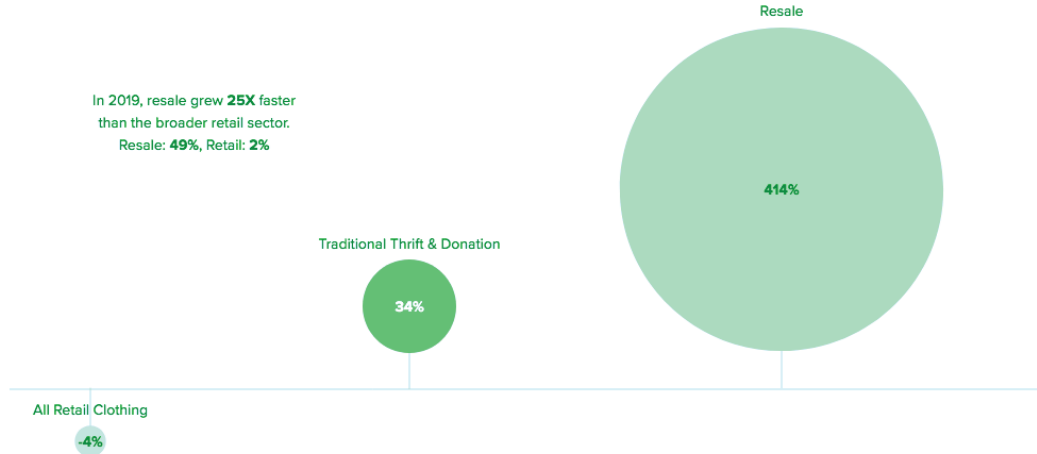
Total secondhand market projected to grow to almost twice the size of fast fashion by 2029.¹



Projections cont.

Resale is Poised to Accelerate

Resale is expected to grow 5X over the next 5 years, while retail is projected to shrink.



Consumers Prioritize Value & Online Shopping Over the Next 12 Months

WHERE SHOPPERS PLAN TO SHIFT THEIR SPEND IN THE NEXT 12 MONTHS³



About the founder

Patrick Brown-Hayes

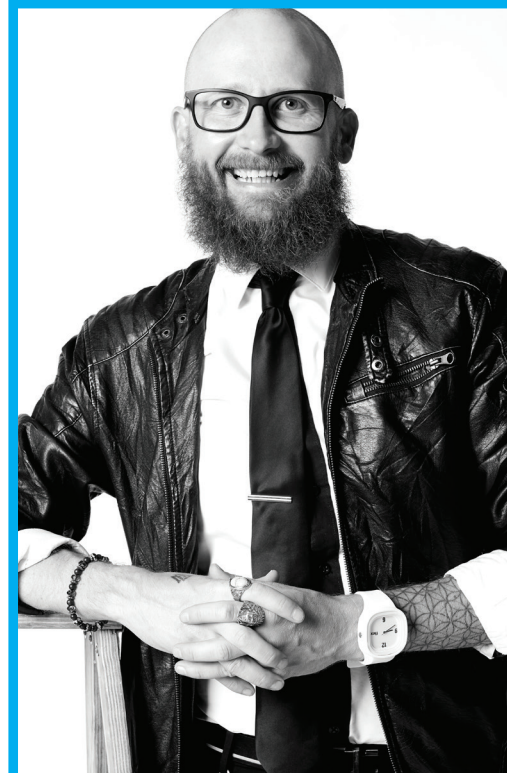
How do you create an amazing story?

People always say... "Live an awesome life and be the life of an organization."

It's easy to put on paper, but, almost impossible to accomplish in-person. I've watched people struggle, for the better half of my life, and realized one thing: most colleagues, managers, and mentors are all in the same petri-dish trying to not become a cultured bacteria of wasteful thinking. I've watched people and organizations self-destruct because of their own in-securities. People become more invested in what the next move is rather than living in the moment. Transparency is only because of bad public relations and CEO's say hire, "amazing people," yet so often ROI is more important and companies do not have deep meaningful discussions with the people they work with everyday. Paychecks become the driving force of an organization. The next promotion is the next discussion. We all have to live and work in the same petri-dish along with bad and good bacteria. The passion, that drives us all, is what we long to find, yet most people and organizations do not follow behind with what they promise.

It has taken me 20 years of working in the private sector to figure out what all this means and I continue to have to work everyday to evaluate my weaknesses in order to improve. Awesome organizations come from awesome people, yet so many people don't understand that a job title doesn't mean you are awesome. I have learned that showing up not because I have to, but, because I want to is a pretty awesome way of living life.

I have created R2A to change the way people think about fashion, work, environmental impact, and the global supply chain of what we wear.



Patrick Brown-Hayes is currently a graduate student, seeking a M.S. in FCS and currently holds the title of lecturer with the Margaret Ritchie School of Family and Consumer Sciences. Patrick was previously a full-time instructor for Washington State University for five years. Before WSU, Patrick worked in the private sector of fashion, for 15 years, in high fashion, ready-to-wear, and mass-market segments of fashion.




PHASE I BUDGET & JUSTIFICATION

CONSUMABLES BUDGET FOR PHASE I

	Pretreatment Brother GTX Optimized Firebird FBX-100 1 Gallon SKU: FB-GEN2.5-1G	\$50.00	2	\$100.00
	Two Sided Silicone Sheets (100pk.) SKU: NEO-PAPER-1620-BROWN-100	\$30.00	2	\$60.00
	Epson® UltraChrome® DG Ink Cartridges Black (600ml) SKU: EPSON-DG-SC-T725100	\$217.00	2	\$434.00
	Epson® UltraChrome® DG Ink Cartridges Cyan (600ml) SKU: EPSON-DG-SC-T725200	\$217.00	2	\$434.00
	Epson® UltraChrome® DG Ink Cartridges Magenta (600ml) SKU: EPSON-DG-SC-T725300	\$217.00	2	\$434.00
	Epson® UltraChrome® DG Ink Cartridges White (600ml) SKU: EPSON-DG-SC-T725A00	\$230.00	4	\$920.00
	Epson® UltraChrome® DG Ink Cartridges Yellow (600ml) SKU: EPSON-DG-SC-T725400	\$217.00	2	\$434.00

TOTAL: \$2,816.00

HARDWARE BUDGET FOR PHASE I

	ECOFREEN Mister-T1 Pretreatment Machine SKU: ECF-MISTERT1-PTM	\$3,495.00	1	\$3,495.00
	Epson F2100 Direct To Garment Printer SKU: EPSON-SCF2100WE	\$13,995.00	1	\$13,995.00
	Geo Knight DK - Clamshell 16" x 20" SKU: GK-DK20	\$1,325.00	1	\$1,325.00
				TOTAL: \$18,815.00

Business, Legal, State, and Filings PHASE I

Business, Legal, State, and Filings	\$1,500.00
	TOTAL: \$1,500.00

PHASE I TOTAL BUDGET : \$23,131.00

The items shown above are all materials needed for the Direct-To-Garment system. All items will be sourced from All American Print Supply Co. based in California. This vendor has the best non-profit pricing after receiving quotes from three other regional suppliers and Epson directly. The total requested funds amounts to \$2,816.00. (Images pulled from their website, 2021)

\$ LONG-TERM BUDGET & Investment phases

Phase I

DTG Printer, Platlets, Pre-Treat, & Heat Press, & Consumables (Inks + Shirts)	\$21,631.00
Business, Legal, State, and Non-Profit Filings	\$1,500.00
TOTAL:	\$23,131.00

PHASE II

Bus	\$15,000.00
Build-Out + Labor (Tables, Floor, Storage, & Furniture)	\$15,000.00
TOTAL:	\$30,000.00

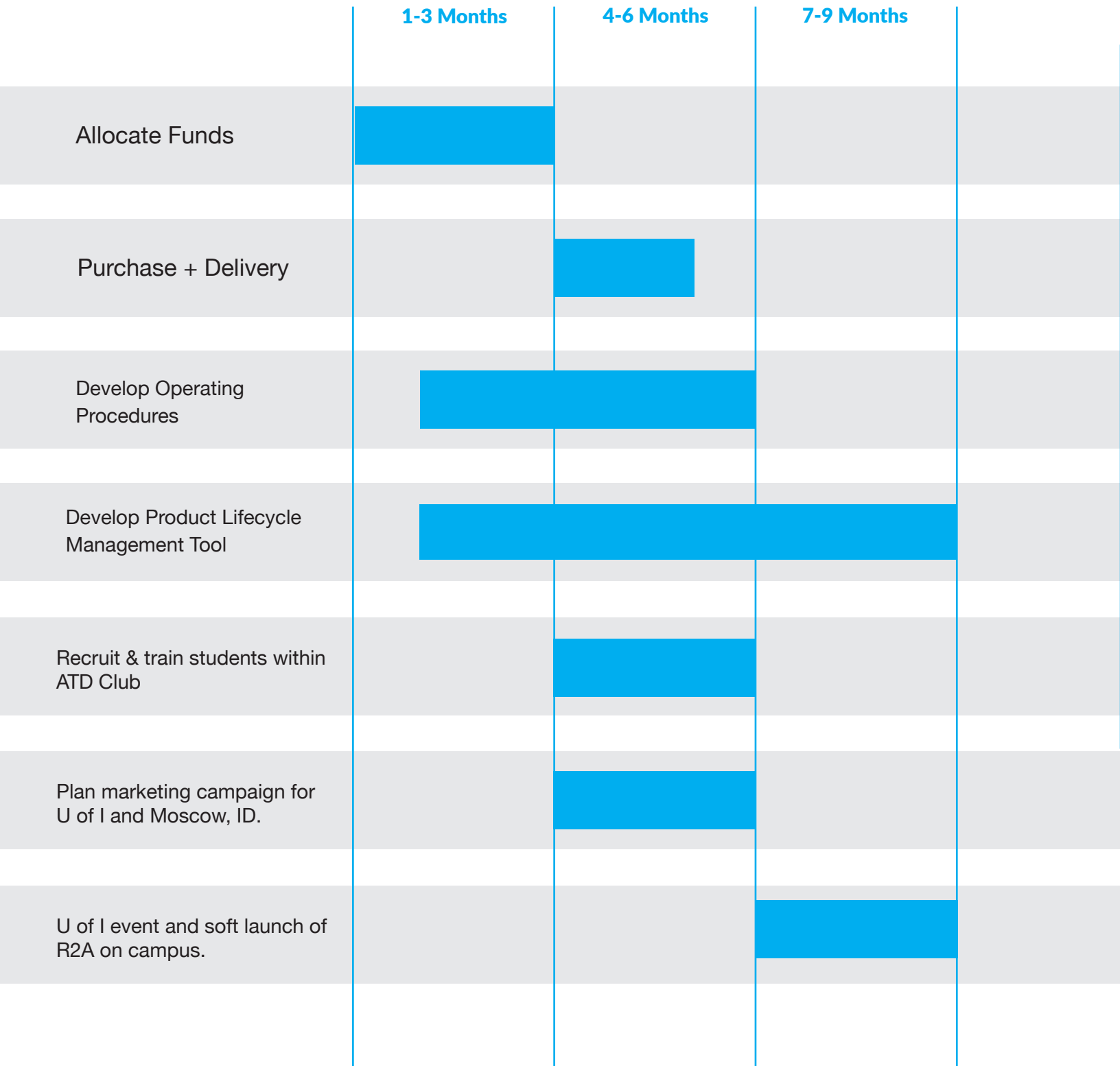
PHASE III

Juki Ddl-5550n Single Needle Industrial Machine & Table/servo	\$1,400.00
Janome MB-4S Four Needle Embroidery Machine	\$4,999.00
Singer 114w103 Chain Stitch Embroidery Machine	\$3,750.00
JUKI LU-1560N Industrial 2-Needle Walking Foot Sewing Machine	\$4,000.00
Juki MO-6814S - 4 Thread High-speed Overlock Industrial Serger	\$1,699.00
Apple iMac, 3.0GHz 10-core Intel Xeon W processor, Turbo Boost up to 4.5GHz	\$5,000.00
Wacom Cintiq Pro 32 with stand	\$5,000.00
SOFTWARE: Internet, POS, Website, & Adobe subscriptions	\$500.00/mo
Needles, thread, fabric, hangers, & storage	\$5,000.00
Outside stands, tags, stockholders, tent, bags after sale, & promotion.	\$7,500.00
TOTAL:	\$38,848.00

TOTAL CAPITAL INVESTMENT: \$91,979.00

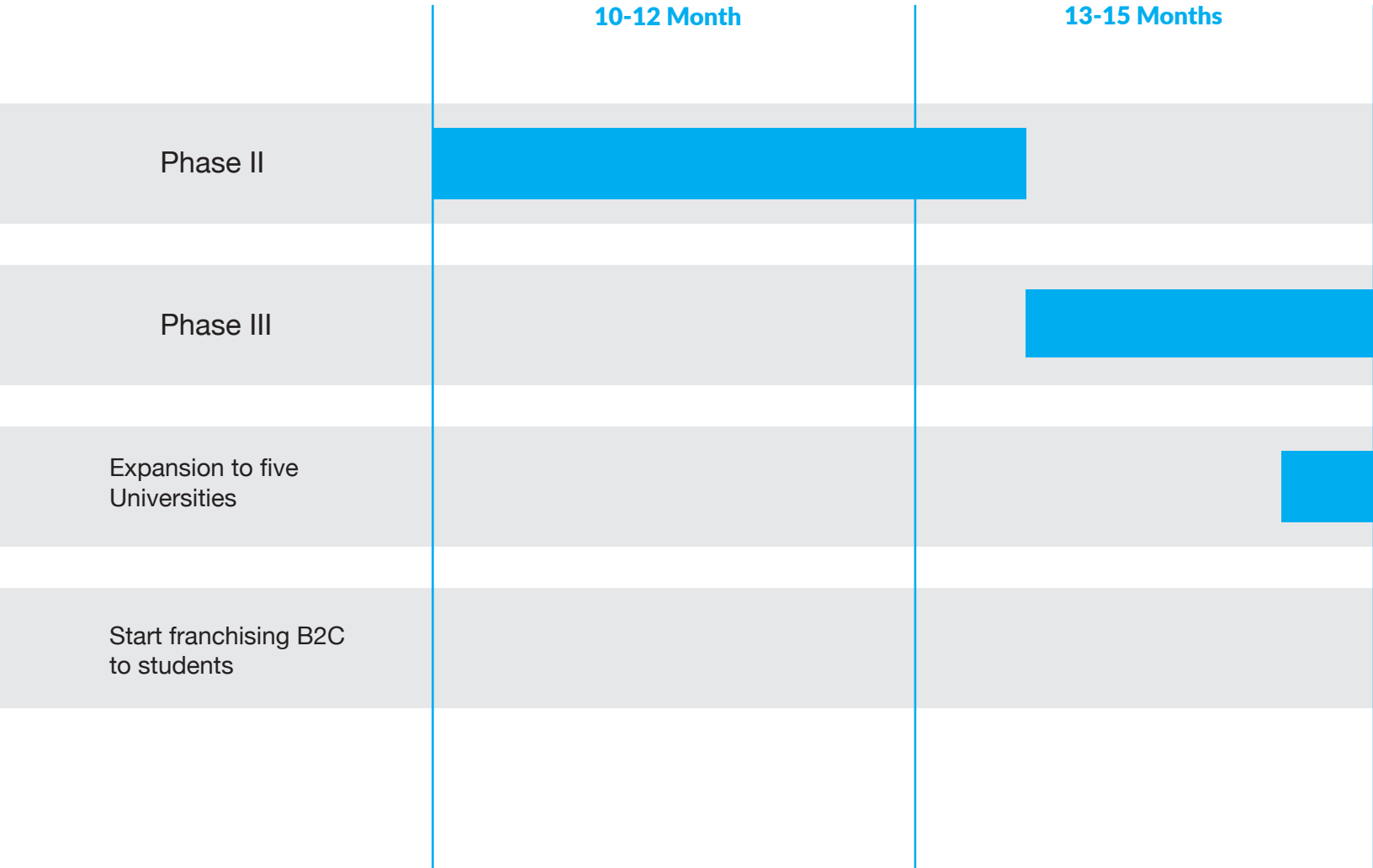
Short-Term Timeline

PHASE I



Long-Term Timeline

All project stages

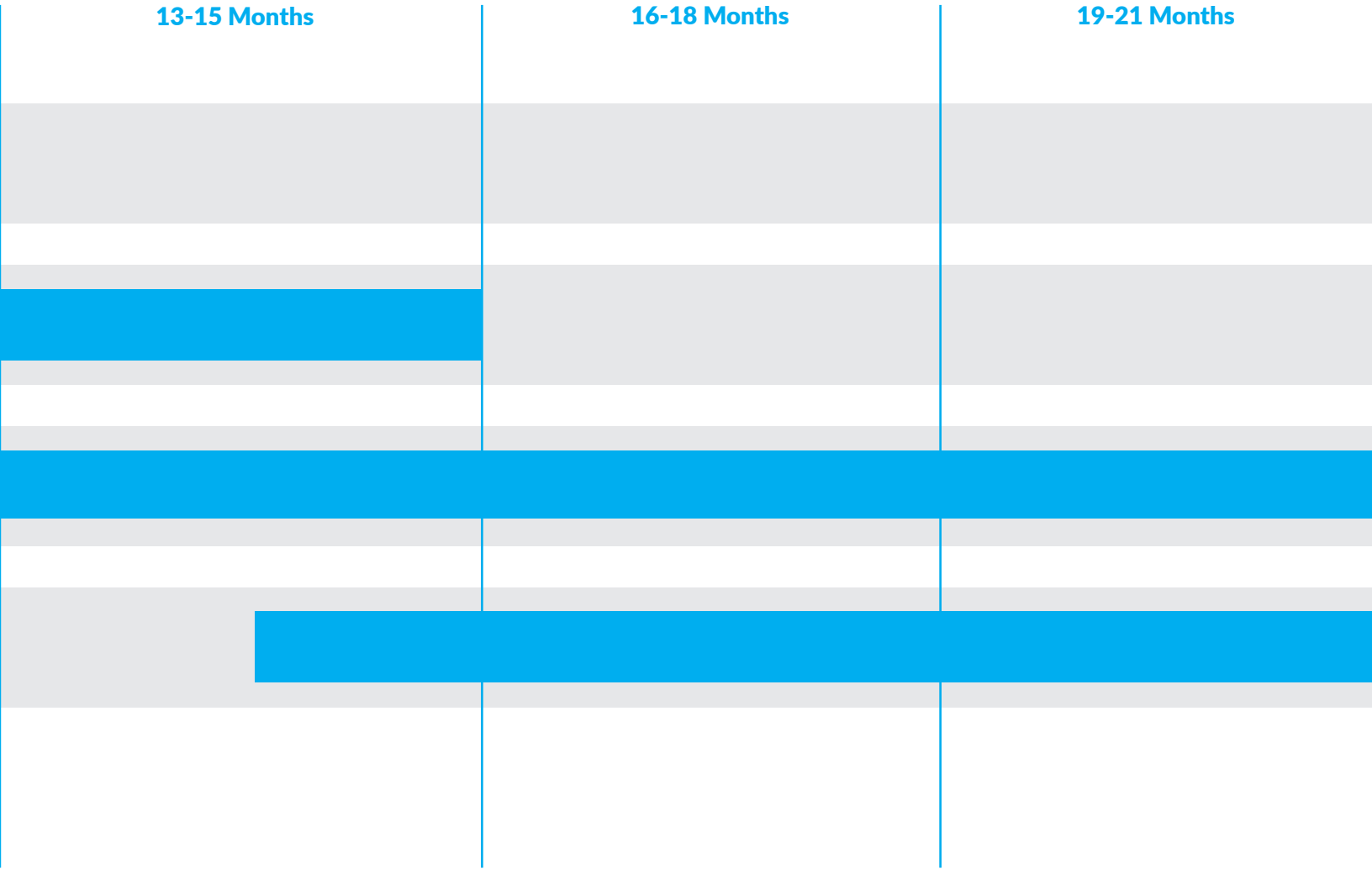


“Don’t let small minds convince you that your dreams are too big.”
-UNKNOWN

13-15 Months

16-18 Months

19-21 Months





**SCHOOL OF FAMILY AND
CONSUMER SCIENCES**

College of Agricultural
and Life Sciences
875 Perimeter Drive MS 3183
Moscow ID 83844-3183
208-885-6546
famcon@uidaho.edu
uidaho.edu/cals/fcs

October 17, 2020

To Whom it May Concern:

I write in strong support of Patrick Brown-Hayes's University of Idaho Sustainability Grant proposal, "R2A (Repairing, Reusing, Ateliring) Consumables for Direct To Garment Printer System." Patrick was initially hired as a part-time instructor, Spring 2020, for the Apparel, Textiles, and Design program in the Margaret Ritchie School of Family and Consumer Sciences. He was admitted to the School's graduate program during summer 2020. I serve as his major advisor for his Master's degree. Patrick's creativity, ability to complete projects, and business acumen continually impresses me. I can personally validate his strong work ethic, his capability to work cross-disciplinary, and be self driven to see this project through completion.

"R2A Consumables for Direct To Garment Printer System" proposal supports an initial phase of a much larger project and provides the foundation of a much more important initiative: educate our community about their clothing consumption and directly implement changes to help reduce our communities "negative" environmental impact and waste. Numerous Universities, throughout the US, provide opportunities for their students to gain valuable experience through "pop-up shops" or upcycling gently used apparel products. However, the pop-up opportunities focus mainly on retail and merchandising experience and not on the manufacturing/supply chain of our industry. Patrick's concept combines many aspects of the fashion industry: retail merchandising, product development, creative development, and sourcing; for which, provides an agent for change. This project is a platform for interdisciplinary work (students, teachers, and community members) that can provide a robust educational environment with applied research potential(s) and a message situated to become a more sustainable industry.

Patrick identified, through his literature review, strong evidence and a call for change in the textile and apparel industry. Much of the research and follow-up solutions to sustainability in the second largest industry in the world comes from outside of the United States, primarily from Europe. Textile and apparel scholars in the US have long recognized the advances being made by our international colleagues to address the environmental impacts of our field. Patrick's proposal provides a model for change, in the United States, that will

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result in long-term benefit to the Vandal community. Furthermore, this project has the possibility to continue to grow after PHASE I, become more vertical, and provide a plethora of additional opportunities for our students, communities, and the fashion industry.

I fully support Patrick's project and this proposal. It provides a model for change for an industry plagued by consumable waste.

Sincerely,



Sonya Meyer
Professor, Apparel, Textiles, and Design
Margaret Ritchie School of Family & Consumer Sciences



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and Life Sciences
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uidaho.edu/cals/fcs

I am a faculty member in Apparel, Textiles, and Design in the Margaret Ritchie School of Family and Consumer Sciences (FCS) at the University of Idaho. I am writing a letter of support for Patrick Brown-Hayes for his proposal *R2A (Repairing, Reusing, Ateliering)*. His project begins to tackle the wicked problem of over-production and over-consumption of apparel and textile products by educating the consumer and helping them see how to extend the life of what products they currently own through reprinting. This project is particularly timely as consumer spending on fashion and apparel products is down due the pandemic, and consumers are looking to make their existing clothing last longer and their dollar go farther on purchases.

I am offering support through space, equipment, expertise, and access to students. The Computer Aided Design (CAD) Lab in FCS has room for the Direct-To-Garment (DTG) printer as well as table space and computers. I teach two courses where access to a DTG printer can easily be integrated into student projects: FCS493 Design and Development for a Client and FCS494 Senior Capstone: Apparel Design. Student access to a DTG printer would not only increase their understanding and application of current printing methods but would also provide Patrick with access to students for this proposal and the remainder of his graduate project.

I strongly support Patrick Brown-Hayes proposal and encourage funding of this request.

Sincerely,

Lori Wahl
lwahl@uidaho.edu
208-885-6302
Senior Instructor
Apparel, Textiles, and Design
Margaret Ritchie School of Family and Consumer Sciences

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uidaho.edu/cals/fcs

October 16, 2020

To Whom it May Concern:

I am writing today in a letter of support for Patrick Brown-Hayes and his grant application for his graduate R2A project. His vision of repairing, reusing and “ateliering” (similar to upcycling) textiles is an incredible opportunity for educating the public about textile sustainability and the power we have as consumers to think twice about our purchases and to extend the life of our textiles for years to come.

Patrick’s project is near and dear to my heart. As a graduate student, my non-thesis project was to create a clothing alterations and repairs business in Moscow, Idaho. With the help of seed money from the VIEW Business plan, my business partner and I were able to open Altered Ego, LLC six years ago and I am proud to say that it serves our community in sustaining their wardrobes, aiding in environmental responsibility, and raising awareness of sustainable textile practices. What my business was not able to do, however, is to reach outside communities and extend the creative aspect of upcycling/ ateliering clothing. Patrick’s model and mission, without a doubt, make waves in our university/local/Idaho community and beyond. With the assistance of grant funding, his well thought out vision and business plan will give students the opportunity to learn entrepreneurial and environmentally sound ways to save our planet from excess waste and pollution from the fashion industry.

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APPENDIX B: INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL LETTER



April 08, 2021

To: Sonya Sue Meyer

Cc: Patrick Brown-Hayes

From: University of Idaho Institutional Review Board

Approval Date: April 08, 2021

Title: Rethinking Fashion Sustainability & Circularity

Protocol: 21-049, Reference: 012413

Exempt under Category 2 at 45 CFR 46.104(d)(2).

On behalf of the Institutional Review Board at the University of Idaho, I am pleased to inform you that the protocol for this research project has been certified as exempt under the category listed above.

This certification is valid only for the study protocol as it was submitted. Studies certified as Exempt are not subject to continuing review and this certification does not expire. However, if changes are made to the study protocol, you must submit the changes through [VERAS](#) for review before implementing the changes. Amendments may include but are not limited to, changes in study population, study personnel, study instruments, consent documents, recruitment materials, sites of research, etc.

As Principal Investigator, you are responsible for ensuring compliance with all applicable FERPA regulations, University of Idaho policies, state and federal regulations. Every effort should be made to ensure that the project is conducted in a manner consistent with the three fundamental principles identified in the Belmont Report: respect for persons; beneficence; and justice. The Principal Investigator is responsible for ensuring that all study personnel have completed the online human subjects training requirement. Please complete the *Continuing Review and Closure Form* in VERAS when the project is completed.

You are required to notify the IRB in a timely manner if any unanticipated or adverse events occur during the study, if you experience an increased risk to the participants, or if you have participants withdraw or register complaints about the study.

IRB Exempt Category (Categories) for this submission:

Category 2: Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: i. The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot



Institutional Review Board
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Moscow, ID 83844-3010
Phone: 208-885-6162
Fax: 208-885-6014
Email: irb@uidaho.edu

readily be ascertained, directly or through identifiers linked to the subjects; ii. Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or iii. The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by .111(a)(7).

APPENDIX C: INFORMED CONSENT DOCUMENT

University of Idaho Research Study Consent Form

Study Title: A Survey for Rethinking Fashion Sustainability & Circularity

Researchers: Sonya Meyer, [PI, Professor, University of Idaho]; Patrick Brown-Hayes [Co-Investigator, Graduate Student/Lecturer, University of Idaho]

KEY INFORMATION ABOUT THIS STUDY

What is the purpose of this study?^a

The purpose of the research is to learn more about your demographics, fashion consumption, sustainability practices, and knowledge of the fashion industry. You are being asked to participate because we are trying to provide better solutions for the fashion industry in regards to circularity within the supply chain. About 100 people will take part in this research.

What will I be asked to do if I am in this study?

If you agree to take part in this study, you will be asked in a quick survey, to answer 29 multiple choice questions. Taking part in the study will take about 2-3 minutes. Participants must be 18 years of age or older. There is no personal information being recorded. We will tell you about any new information that may affect your willingness to continue participation in this research. You may stop the survey at anytime.

Are there any benefits to me if I am in this study?

Although there is no direct or intended benefit from being in this study, your answers may help us identify potential areas for future research or programs regarding the questions provided in this survey.

Are there any risks to me if I am in this study?

IRB NUMBER: 21-049
IRB APPROVAL DATE: 04/08/2021

There are no identified risks for participating in this survey.

Will my information be kept private?

The data for this study is being collected anonymously. Neither the researcher(s) nor anyone else will be able to link the data to you.

Are there any costs or payments for being in this study?

There will be no costs associated with participation in this research study. You will not receive payment or any other form of compensation for taking part in this study.

Who can answer questions about this research?

If you have questions about this study or the information in this form, please contact the research team at: [Dr. Sonya Meyer, 208.885.6546 or sonyam@uidaho.edu] If you have questions about your rights as a research participant, or would like to report a concern or complaint about this study, please contact the University of Idaho Institutional Review Board at (208) 885-6340, or e-mail irb@uidaho.edu, or regular mail at: 875 Perimeter Drive MS 3010, Moscow, ID 83844-3010.

The University of Idaho Institutional Review Board has approved this project.

What are my rights as a research study volunteer?

Your participation in this research study is completely voluntary. You may choose not to be a part of this study. There will be no penalty to you if you choose not to take part. You may choose not to answer specific questions or to stop participating at any time.

APPENDIX D: SURVEY DATA & TABLES

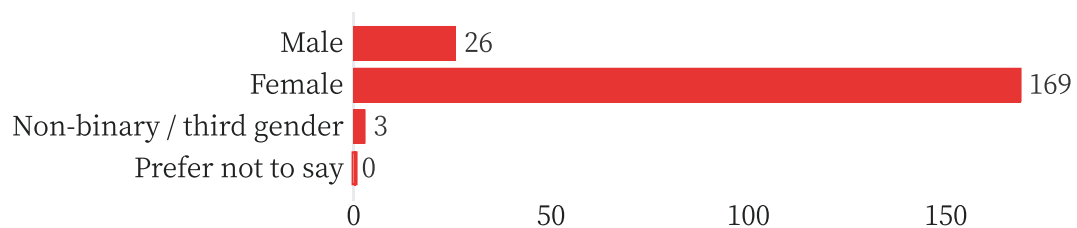
**Q1 - You must be 18 years of age to proceed in this survey.
Are you atleast 18 years of age?**

QUESTION	Responses
You must be 18 years of age to proceed in this survey. Are you atleast 18 years of age?	221

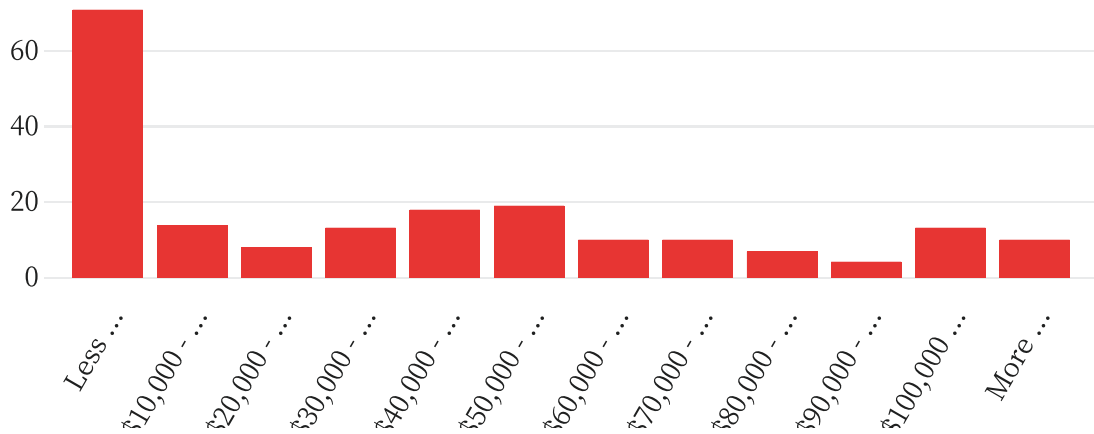
Q2 - How old are you?

AGE	Choice Count
18-25	94
26-33	20
34-41	45
42-49	24
50-57	4
58-65	5
66-73	7

Q3 - Gender:



Q4 - What would you say your yearly income bracket is?



Yearly Income	Choice Count
Less than \$10,000	71
\$10,000 - \$19,999	14
\$20,000 - \$29,999	8
\$30,000 - \$39,999	13
\$40,000 - \$49,999	18
\$50,000 - \$59,999	19
\$60,000 - \$69,999	10
\$70,000 - \$79,999	10
\$80,000 - \$89,999	7
\$90,000 - \$99,999	4
\$100,000 - \$149,999	13
More than \$150,000	10

Q5 - On average, how often do you buy new clothing?

Field	Choice Count
Daily	2
Once a week	17
Once every couple weeks	43
Once a month	56
A couple times a year	80
Do not buy new clothing	1

Q6 - On average, how often do you buy used clothing?

AGE	18-25	26-33	34-41	42-49	50-57	58-65	66-73	74-81	82+	Total
Daily	3	0	0	1	0	0	0	0	0	4
Once a week	1	1	1	0	0	0	0	0	0	3
Once every couple weeks	22	1	2	2	0	0	0	0	0	27
Once a month	33	3	6	2	0	0	1	0	0	45
A couple times a year	28	13	23	12	2	2	3	0	0	83
Do not buy used clothing	7	2	13	7	2	3	3	0	0	37

Q7 - Have you ever borrowed clothing from someone?

AG	18-25	26-33	34-41	42-49	50-57	58-65	66-73	74-81	82+
Yes	85	18	37	19	2	0	2	0	0
No	9	2	8	5	2	5	5	0	0

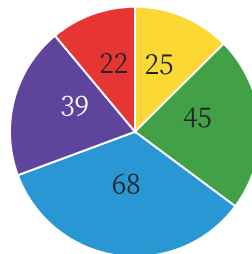
Q8 - Have you ever traded clothing with someone?

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73	74-81	82+
Yes	66	13	28	10	3	1	2	0	0
No	28	7	17	14	1	4	5	0	0

Q9 - Do you prefer thrifting or buying new clothing?



Q10 - Is it important to know what country your clothes are manufactured in?



- Definitely not
- Probably not
- Might or might not
- Probably yes
- Definitely yes

Q11 - How much do you want to know about a companies manufacturing process before purchasing their products?

AGE	18-25	26-33	34-41	42-49	50-57	58-65	66-73	74-81	82+	Total
A great deal	8	1	1	1	0	0	0	0	0	11
A lot	13	2	7	0	1	2	2	0	0	27
A moderate amount	39	7	11	9	2	0	2	0	0	70
A little	18	3	10	8	0	3	3	0	0	45
None at all	16	7	16	6	1	0	0	0	0	46

Q12_NPS_GROUP - By using the table provided, please rate how you feel about the fashion industry and how sustainability is being managed: - Group



● 72 ● 66 ● 59

Q12 - By using the table provided, please rate how you feel about the fashion industry and how sustainability is being managed:



Q13 - Would you consider yourself knowledgeable about the fashion industry?

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73	74-81	82+	Total
Far above average	10	3	2	0	0	0	0	0	0	15
Somewhat above average	27	2	6	3	2	0	4	0	0	44
Average	21	5	15	6	2	2	1	0	0	52
Somewhat below average	27	6	16	6	0	1	0	0	0	56
Far below average	15	5	8	9	0	2	2	0	0	41

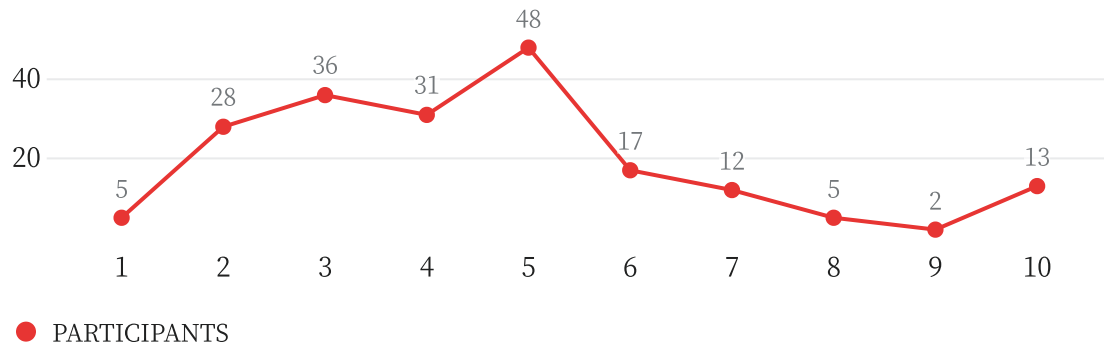
Q14 - Do you know what circularity entails within the fashion supply chain?

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73	74-81	82+	Total
Yes	33	5	10	3	2	0	2	0	0	55
No	61	15	35	21	2	5	5	0	0	144

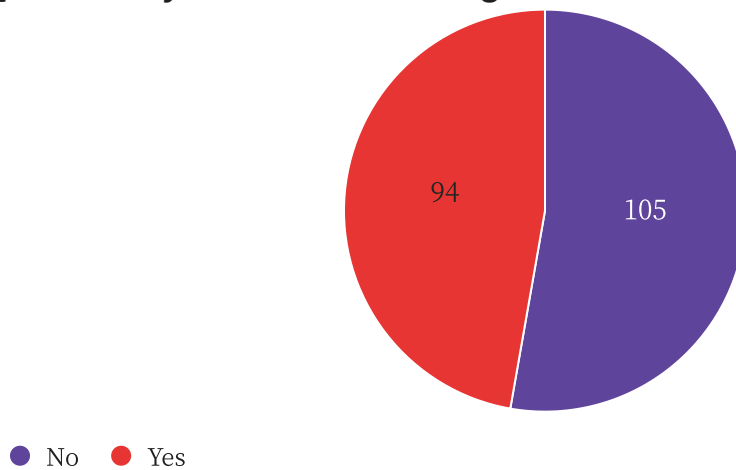
Q15 - The retail industry cares about the environment.

DO YOU?	Choice Count
Strongly agree	0
Somewhat agree	22
Neither agree nor disagree	41
Somewhat disagree	85
Strongly disagree	51

Q18 - On average, how many years would you say your clothes last before wearing out and you discard them?



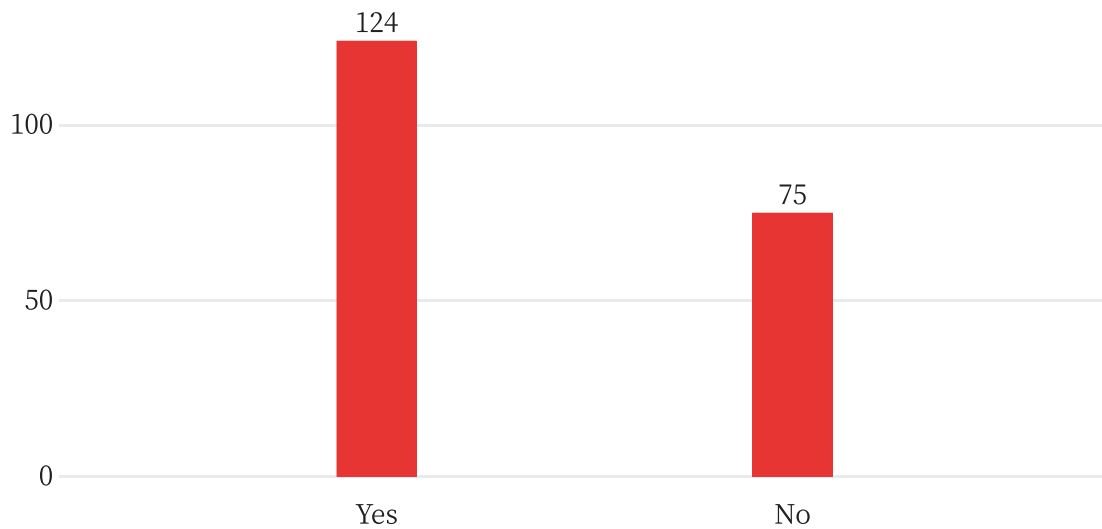
Q19 - Do you own a sewing machine?



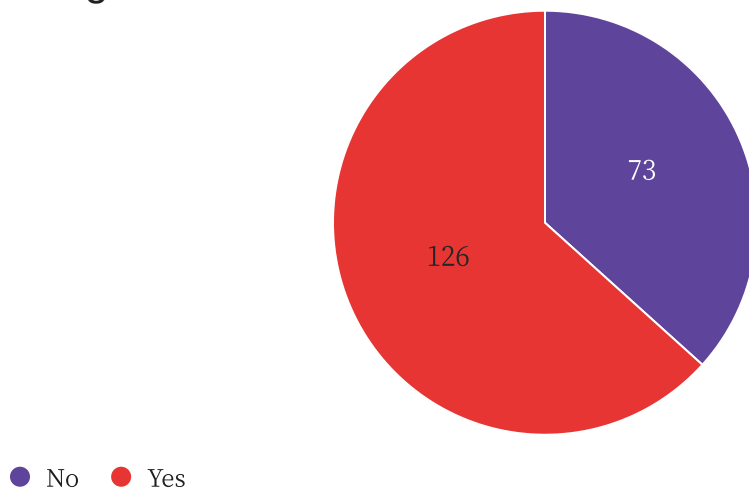
Q20 - Do you know how to use a sewing machine?



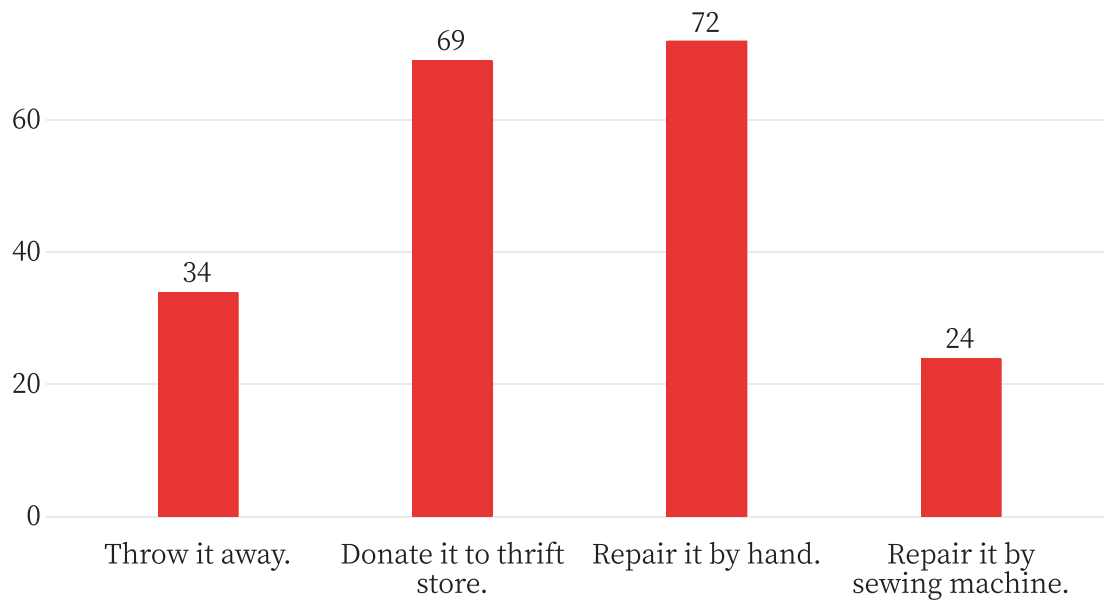
Q21 - Would you be interested in taking classes to learn how to properly repair your clothing?



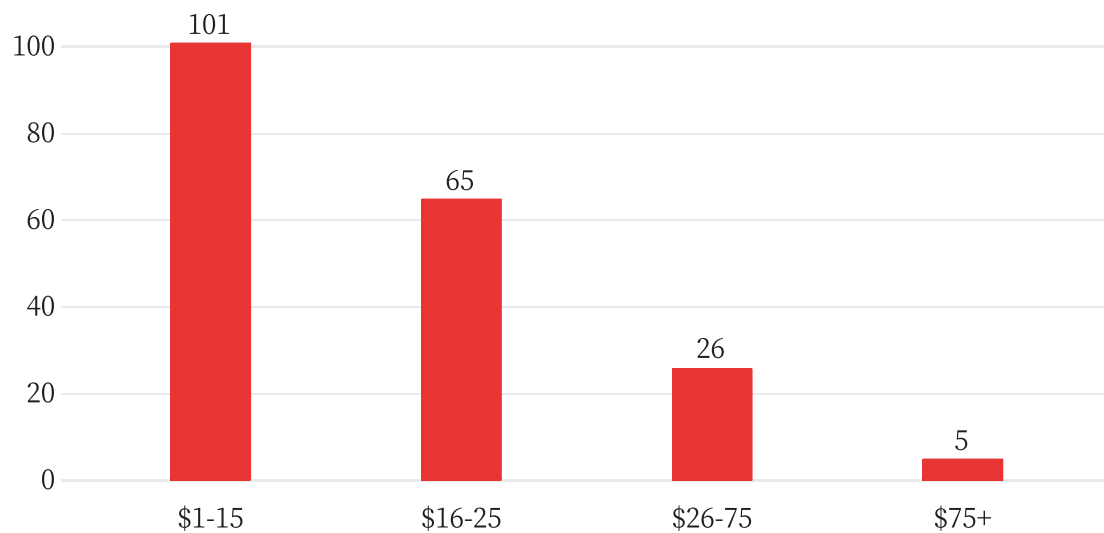
Q22 - Do you repair your clothing when it becomes damaged?



Q23 - What do you do the most of when your clothing becomes damaged?



Q24 - How much would you pay to repair a damaged piece of clothing you love?



Q25 - What best describes when you wash your clothes?

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73	74-81	82+	Total
After one wear	31	7	23	8	2	3	2	0	0	76
After multiple wears	60	9	20	15	2	2	5	0	0	113
When they stink	3	4	2	1	0	0	0	0	0	10

Q26 - If you could pay a small fee to upcycle or refresh current wardrobe pieces, would you be interested in this type of service?

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73	74-81	82+	Total
Yes	45	12	17	7	3	1	3	0	0	88
Maybe	34	6	20	13	0	4	2	0	0	79
No	6	0	6	1	1	0	1	0	0	15
I do not know what upcycling is	9	2	2	3	0	0	1	0	0	17

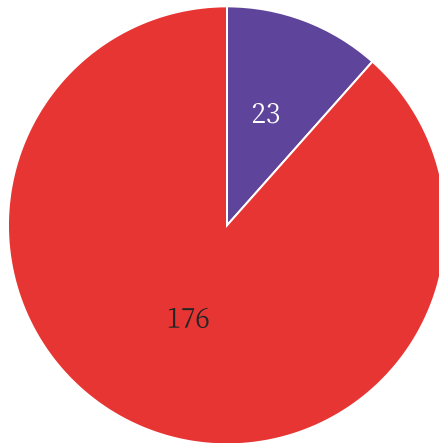
Q27 - I am interested in renting clothing instead of buying

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73	Total
Yes	5	2	6	1	0	0	0	14
Maybe	28	9	15	2	1	2	1	58
No	61	9	24	21	3	3	6	127

Q28 - If you had the option to rent clothing on a monthly basis... what option would you choose

Field	18-25	26-33	34-41	42-49	50-57	58-65	66-73	74-81	82+	Total
6 pieces per week @ \$99/month	7	0	4	1	0	0	0	0	0	12
4 pieces per week @ \$79/month	11	2	3	0	0	0	0	0	0	16
2 pieces per week @ \$49/month	14	7	9	3	0	1	1	0	0	35
Not interested	62	11	29	20	4	4	6	0	0	136

Q29 - I wish more fashion companies would use education, as a tool for transparency, within their marketing.



● No ● Yes