**APPAREL MASS CUSTOMIZATION:
Exploring Canadian Consumer Attitudes**

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A thesis submitted to the
Faculty of Graduate and Postdoctoral Affairs
In partial fulfillment of the requirements for the degree of
Master of Design
In
Industrial Design

Carleton University
Ottawa, Ontario

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ABSTRACT

Apparel mass-customization is a relatively new service and product concept, which engages consumers in co-designing clothing online for a tailored product. This study explores Canadian consumers' attitudes towards clothing, custom clothing, and co-design apparel online, and assesses the potential for the adoption of this concept in Canada.

This study is guided by multi-component attitude model, where attitudes are formed by cognitive, affective, and prior experiences. The findings indicate that Canadian participants have a positive attitude towards custom clothing, and the co-design process. Results show that the sample was ready to adopt co-designing clothing online, provided they trusted the service, had access to good interactive and efficient online tools, a variety of design options, and design help. The majority of the sample was willing to pay more, and willing to wait longer for their co-designed clothing. Each of these findings is examined by a multi-layer consumer segmentation of gender, social tendency and shopping behaviour.

The study uses two sets of sources, and two data collection methods. Sources included 13 adult Canadian consumers, and 11 industry experts from Canada, United States, Western Europe, and Australia. Data collection methods included a semi-structured interview, and a questionnaire. Consumer responses are compared with industry experts for validity and to provide a 360° perspective. Consumer and expert responses are compared and contrasted with relevant academic literature.

The study contributes to the understanding of Canadian consumer motivations, and the potential for adopting apparel mass-customization in specific contexts. Findings are discussed in light of their relevance to apparel and user experience designers, marketers, and academic researchers.

Key Words: Apparel Mass Customization, RTW Clothing, Custom Clothing, Co-design, Consumer Behaviour.

ACKNOWLEDGMENTS

First of all, I would like to thank my mom Fatima and dad Taha who continue to inspire me long after their passing. Their memory helped me undertake this study, which made it a personal and professional journey. Thank you for being my pillars of strength, always encouraging me to pursue higher learning, and go beyond my comfort zone.

Gratitude and warm thank you to my supervisor Professor Bjarki Hallgrimsson and co-supervisor Dr. Steven Murphy, for your warm encouragement and invaluable advice without which this paper would not have been possible.

Special thanks to faculty members at Carleton and Ryerson University for providing valuable feedback, and references, during the early stages of this study. From Carleton University, School of Industrial Design: Professors Dr. Thomas Garvey and Dr. Lois Frankel, and former Professors Brian Burns and Dr. Tim Moore, and for program administrator Valerie Daley for her unwavering support. From Ryerson University, Professor Dr. Hong Yu, at Ted Rogers School of Retail Management; and Professor Robert Ott, at the School of Fashion.

Special thank you to all consumer participants whose participation was crucial to the completion of the study. Gratitude and thanks to all industry expert participants for sharing their knowledge with me, Helene Day Fraser, Mitra Vaezi, Catherine Harding, Dr. Chang Shu, Jamal Motlagh, Francis Bitoni Studio, Professor Susan Ashdown, Mary McFadden, Daniel Seo, Kae Woei Lim, Dr. Hein Daanen and Dr. Frank Piller.

Last but not least a big thank you to my family members and close friends for their understanding, cooperation and support. Special thanks to my sister Salam for being my sounding board and writing mentor, and my husband Denis for his patience, understanding and support throughout.

I would not have been able to complete this long, challenging yet very rewarding personal and academic journey without all of your support.

Thank You!

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1

INTRODUCTION

Until recently consumers have been offered the possibility of purchasing clothing that has either been mass-produced as ready-to-wear (RTW), or custom-made by a tailor. Although there have been some academic consumer studies that showed that men (Sindicich, 2008; Sindicich & Black, 2011) and women (Goldsberry et al., 1996; Alexander et al., 2005; Al-Mousa, 2005) equally experienced problems with the fit of RTW clothing, most have shown little interest in gauging consumer attitudes towards custom-tailored clothing available at retail and /or online. This may be because it is generally a service provided by small businesses that focus on niche markets, such as men's business attire and bridal-wear.

Pine and Gilmore (1999) argue that after the agricultural, industrial and service economy, the latest transformation in the West is the 'experience economy'. It is so called, as it is led by businesses that succeed in competitive markets as they provide a unique *consumer experience* that differentiates them from the competition. These businesses rely on mass customization (MC) concept that requires a collaborative process to exist between the brand and the consumer to design tailored products / services using interactive computerized tools (Pine, 1993, p. 48). During such a collaborative process the consumer experiences the brand as a unique / memorable event (Pine and Gilmore, 1999). In addition, MC process applies flexible manufacturing and mass production efficiencies, which result in low cost customized products.

In the last thirty years advances in digital technologies have facilitated the introduction and online accessibility of mass-customized products to markets around the world. The objective of applying the MC process to the apparel industry is very similar to that of other

industries, namely to garner brand loyalty and remain competitive. During the 1990s Apparel market leaders Levis and Nike were the first to apply the MC process to their apparel (clothing, shoes) in retail spaces and more recently online (Lee et al., 2011). This suggests that the apparel MC concept has the potential to increase consumer access to custom clothing, locally and globally.

“Co-design” is a major part of the MC process. The view of business management has identified four approaches to engage consumers in the MC process, three of which apply to apparel MC. These include “collaborative customization” (professional & standard design modules) for consumers who need help; adaptive customization (standard design modules) for those with sufficient product knowledge, and “cosmetic customization” (embellishment of a standard design) for those who want to personalize the end product. In all these approaches, businesses and consumers collaborate and communicate using the help of technology such as design tool and Internet (Gilmore & Pine, 1997). A study in the US about female consumer’s attitude was the first to use the term “co-design” in the context of apparel MC. It was the first study to propose a consumer-based model as a business strategy. It was also the first to use the term “co-design” to describe the collaboration between manufacturer and consumer, and to specify and produce customized apparel with the help of a professional using a computer system. The authors defined it as “co-design, a process that provides professional assistance in assessing fashion selections, making design choices, and facilitating image depictions on a computer screen” (Anderson-Connell et al., 2002).

When apparel MC was first introduced at retail, customers interacted with an on-site professional who helped them co-design their apparel using a digital system (software). As computer aided design (CAD) became accessible to customers online, it facilitated the collaborative communication between business and customer by visually simulating the

customized end product (Ulrich et al., 2003). This study uses Fiore et al.'s (2004) definition of “co-design” to express customers’ perspective: “in co-design the consumer, generally with the aid of CAD technology and/or professional assistance, creates an individualized product design from a company’s style, fabric, colour, surface design, and size alternatives,” and then “the product is manufactured for the consumer” (Fiore, et al., 2004, 838).

The apparel “co-design” activity requires that consumer and designer co-operate through a physical or virtual medium. Today advances in digital technologies make it possible for consumers to participate in making design decisions using an online design toolkit previously developed by the designer(s) (Ulrich et al, 2003; Fiore et al 2004; Ross, 2012). An example of the process of co-designing a man’s shirt online is illustrated in Figure 1 below, represented in three screen shots taken from the apparel MC website *tailor4less*. This figure illustrates a series of co-design options to customize a shirt. Screen (a) presents the consumer with the shirt style design options that include its cut, collar and cuffs; screen (b) presents design options for fabric, colour and pattern; and screen (c) presents design options to personalize the shirt such as monogram content and coloured lining and trimming details (button, button hole etc.). This website provides its users with the ability to view a 3D simulation of the co-design changes they make to the shirt in real time.

Figure 1: Customize Your Shirt: Style, Material, Details, (Source www.tailor4less.com)

Beyond the “co-design” experience that brings together consumer and designer, there is also the experience of co-design in a multi-disciplinary team that includes apparel and user experience designers (UX) who collaborate with other experts (marketers, developers) to create the online design toolkit. The development of online apparel co-design therefore calls for an exceptional level of collaboration that covers the development process from end to end. On the one end, studies need to identify the target consumer and acquire a deep understanding of their needs and motivations. On the other end, there is the need for a multi disciplinary team of apparel and UX designers, and marketers to collaborate in interpreting these findings and their implications in order to establish a system that works for the target consumer. This study focuses on the front end (first phase) in its attempt to identify the consumers’ attitudes and adoption needs in the context of apparel MC.

While limited studies have examined consumer behaviour and reaction to the apparel MC concept in Europe, Asia, and the United States (US), this author did not find any studies for Canada. As a leading member of the G8 with a growing multicultural population (over 200 ethnicities) (Statistics Canada, 2011), Canada’s apparel market poses challenges and would benefit greatly from the MC concept. Canada is a multicultural society (over 200 ethnicities), with the majority of its population residing in major urban areas. It is likely that this cultural heterogeneity puts pressure on the Canadian apparel market that caters to consumers who would require a large variety of sizes and styles of clothing within a relatively small market – Canada’s population is 35.9 million (Statistics Canada, 2015) with a modest growth of 1.2 percent (World Population View, 2015). The challenge lies in the fact that generally companies in the apparel industry sell standardized mass-produced ready-to-wear clothing, which limits Canadian consumers’ access to a larger variety of products. Another reason to consider the Canadian consumers for this study is the rise in their apparel online shopping. Canada’s clothes

online sales are estimated at 4.5% of its total retail e-commerce sales, and the latest figures showed a growth of 9.9% (Statistics Canada, 2012).

The aim of this study is to examine Canadian consumers' attitudes towards, and potential adoption of apparel MC and clothing co-design. This study is unique in many ways. Aside from being the first to consider Canadian consumers, it develops a contextual baseline that contributes to the understanding of consumers' motivation behind adopting co-designing clothing online. This baseline includes consumers' current attitudes toward, and experiences with RTW and custom clothing, and clothes shopping online. To identify the potential target consumer who is willing to adopt co-designing clothing online, this study uses a multi-level segmentation (ML) approach, which includes gender, social tendency and shopping behaviour. Although limited, studies on apparel MC tested for lifestyle segmentation, including shopping behaviour, fashion leadership, and gender (Park, 2004; Ou, 2011), but none has tested for social tendency as lifestyle segmentation. In addition, this study is the first to examine the personal impact of wearing co-designed clothing, and its contribution to the wearer's wellbeing. Due to the novelty of clothing co-design online, and the fact that most consumers tend to be unfamiliar with the concept, this study investigates and compares industry experts' perspective on this topic with that of consumer participants. It does so for two reasons: to validate consumer responses, and to fill gaps in consumer participants' data.

To assess the potential of Canadian consumers' uptake of the concept of apparel MC and co-design, the study examines key themes in consumer behaviour that include: attitudes, personal impact, priorities, adoption needs and willingness to pay and to wait for co-designed clothing. As design and financial success of a new product/service occurs when consumer priorities are met, the study takes a consumer prioritization approach to apparel MC. This is a qualitative study that applies two research methods: in-depth interview and a questionnaire, and

two sources for data collection: Canadian consumers and Canadian and international industry experts.

The findings are of interest to apparel and UX designers and marketers in the apparel industry. The results of this study contribute to expanding existing academic literature on consumer attitude towards apparel, and apparel shopping, and contribute new findings on Canadian consumer behaviour and segmentation in the context of apparel MC.

This document is divided into five chapters. Chapter 2 introduces the concept of apparel MC, and reviews consumer attitudes towards clothing and its co-design available in literature. It identifies gaps addressed in this study, and outlines the research objective and questions. Chapter 3 provides a detailed description of the study's methodology and conceptual framework. Chapter 4 undertakes in-depth analysis of the results. Chapter Five offers a comprehensive discussion of the major findings, makes concluding remarks, sets out the study's limitations, and suggests topics for future research.

LITERATURE REVIEW

This chapter provides background on clothing and its role in society, introduces apparel MC, identifies gaps in the literature on consumers' attitudes towards clothing in general and apparel MC and co-design in particular.

2.1 Clothing and Social Psychology

This section addresses the important role clothing plays in the area of consumers' social psychology. It reviews elements that demarcate one's identity, social class and wellbeing. It addresses consumer use of clothing to fulfill a social tendency of belonging to, or rejecting a social group, and addresses consumer clothes shopping behaviour based on motivation and gender.

2.1.1 Identity and Wellbeing

Clothing plays an important role in expressing an individual's identity, social class, and wellbeing. Apparel MC and co-design have the potential of meeting consumers' needs and wants, and therewith contribute to their overall wellbeing. According to Edwards (2011), personal identity can be defined as the process through which we present or express our individuality in society. It is the result of a dynamic tension between the individual and the social, between the tendency to blend in or stand out. The author argues that fashion in clothing plays a strong role in shaping and presenting one's identity and social tendency within society (IBID, 2011, 105). The link between clothing and identity is also highlighted by Brescia (2014, 9): "Clothing more than any other possessions has the power to define our identity". Furthermore, clothing above and beyond protecting oneself from the environment, is a physical representation of one's core cultural values, and as such is similar to language (Bernard, 2014).

As with language, it gives an immediate impression of the wearer, and plays an important role in influencing their mood (Brescia, 2014). For Raunio (1995), clothing influences one's emotions, energy level, and how one feels about oneself (Niinimäki, 2010). This is further supported by Smathers & Horridge (1978-79) who found that well-fitted clothing has the potential to contribute to one's psychological and social wellbeing (Goldsberry et al., 1996). As such, the closer clothing fits one's personal and social needs and wants, the more it contributes to improving the individual's overall wellbeing.

2.1.2 Social Tendency

According to Georg Simmel (1971) fashionable clothing is a tool that expresses status in a complex class society where there is a 'differentiating impulse', i.e. a social tendency to isolate one from others. For Simmel fashion does not exist in a classless society with a 'socialization impulse' where the social tendency is to blend-in, and where the need for differentiation does not exist. Commenting on Simmel's analysis, Bernard (2014) points to the change in social conditions where fashion is used less now to differentiate classes, but agrees that there is a strong relation between fashion and identity. For Bernard fashion highlights and communicates the politics of difference of individuals and sub-cultures, as they pit themselves against mainstream society (Bernard, 2014, 34). Similarly, 'in-group' and 'out-group' are social categories that have a strong link to self-identification. A 'dress-code' is considered as one of the elements that delineate a member's identity within any of these two categories. As a communication tool, clothing is used by a member to affirm his/her belonging to the 'in-group', or to declare one's self as part of the 'out-group' (Giles & Giles, 2011).

The above literature provides a useful commentary on the link between social tendency and apparel.

2.1.3 Shopping Behaviour

Shoppers do not always purchase a product to fulfill a task or a utilitarian need, they do so to fulfill a variety of psychological needs and emotionally triggered motives. These are personal (role playing, diversion, self-gratification, new trends, physical activity, sensory stimulation), and social (experiences, intercommunication, peer group, status, authority, pleasure of bargaining) (Tauber, 1972).

Studies show that hedonic behaviour is motivated by the value derived from the shopping experience. It is associated with fun and pleasure, and stimulated by multisensory, fantasy and emotive aspects of product use. Recent studies describe it as seeking new experience/stimulus, therapy to improve mood, fashion trend; and/or enjoying: social, gift giving and/or thrift shopping (Arnold & Reynolds, 2003). Other studies build on the understanding of hedonic behaviour and focus on its connection with fashion and self-presentation. Their findings show hedonic shoppers as confident, fashion conscious, and highly involved with apparel (Bahng et al., 2013). Several studies show a relation between ‘fashion leaders/followers’ and apparel shopping behaviour. ‘Fashion leaders’ (early adopters) tend to be hedonic shoppers (Ou, 2011). Another study shows female consumers with ‘fashion leadership’ have a positive relation with hedonic shopping, and to shopping behaviour preferences related to enjoyment, excitement, and fun (Kim & Hong, 2011).

Utilitarian shoppers tend to be cost, time and convenience conscious, catalogue and / or bargain apparel shoppers (Bahng et al., 2013). Utilitarian behaviour is triggered by a need, or to fulfill a functional task; it is a characteristic of those interested in shopping as a means to an end. ‘Fashion followers’ tend to be utilitarian shoppers as they shop based on need (Ou, 2011). As this relates to apparel online shopper orientation, studies show it can be either hedonic or utilitarian (Seock & Bailey, 2008; Bahng et al., 2013).

Although this was not generalized and is limited to Korean adult female participants, a study by Park et al. (2009) shows a relation between a female's body type and apparel shopping behaviour. Its finding show that hedonic behaviour is positively correlated with slim body type, and utilitarian behaviour with large body type (Park et al., 2009).

2.1.4 Gender

Numerous studies agree there is a gender difference in apparel shopping behaviour. O'Cass (2004) has found that females in the US are much more involved with fashion than males (Sullivan et al., 2012); and more than males, females enjoy and consider apparel shopping as a fun activity (Kim & Hong, 2011). In the US, the male apparel shopper traditionally tends to be brand loyal, cost sensitive, values comfort, and chooses fit over fashion (Sindicich & Black, 2011). Compared to previous generations, 'Generation Y' males show higher tendency for recreational shopping, and shopping enjoyment. Compared to females of the same generation, they spend more money on jeans and slacks, and spend less time shopping (Sullivan et al., 2012). Males in general exhibit more utilitarian behaviour than females (Kim & Hong, 2011). In South Korea according to A.C. Nielsen (2010) consumers are tech savvy, and have been rated as the highest online consumers in the world. Sung and Jeon (2006) found males more likely to buy clothing online than females (Lee et al., 2012). These findings suggest gender and cultural differences in apparel shopping behaviour on and offline.

On the topic of body image and appearance management, past studies have shown that females used clothing in general (not specific to custom clothing) to manage their appearance (Rudd & Lennon, 2000) and that their attitude towards clothing are related to attitude towards their body image (Firth & Gleeson, 2004). They tend to use clothing as a tool to flatter their figure by hiding and/or accentuating areas of their body (Firth & Gleeson, 2008). Female appearance management seems to influence their behaviour, as their choice in clothing is driven

by comfort, assurance and fashion (Tiggemann & Lacey, 2009). Most recent studies show that females who suffer from body image anxiety and self-identified as over-weight, manage their body appearance by choosing clothing for the purpose of assurance, comfort and camouflage (Tiggemann & Andrew, 2012).

While available literature shows female's clothing has played a key role in managing their body image, this is not the case for males who do not use clothing to manage their appearance. Rather, males manage their appearance by altering their body weight, muscularity, and make body alterations to fit the ideal cultural body image. Shim, Kotsiopulos & Knoll (1990) have found that short males are least satisfied with their body, while tall males are most satisfied (Oliver et al., 1993). By contrast, more recent study by Firth & Glesson (2004) in the UK have concluded that males care about their body image, and use clothing strategically to manage their appearance. However, males' choice of clothing for appearance management differs from that of females, as males tend to choose clothing principally for practicality and functionality, not to be fashionable. They use clothing strategically to manage their appearance and to display and hide parts of their body to match the ideal image within their culture (Firth & Glesson, 2004). Similarly, males' preference for clothing fit is related to their body satisfaction. As males' body weight increases so does their preference for looser fitted dress shirts, and higher waistline khaki pants (Chattaraman et al., 2013). Overall, the more recent studies show males are similar to females in the way they strategically use clothing to manage their appearance.

The above literature provides an initial background on gender and apparel shopping. Gender based consumer behaviour is discussed further in this chapter under various headings.

2.2 Clothing and Mass Customization

Technology has a tremendous impact on many areas in the apparel industry. In the last thirty years, digital technology advancements in the Internet and e-commerce, along with

business and production process automation, opened opportunities for gaining insight into consumer behaviour and preferences. These advances coupled with the digitization of manufacturing, and flexible production processes, made product mass customization (MC) possible (Ou, 2011, Park, 2004). The following gives an overview of MC, a brief history of apparel MC, and provides examples of co-designing clothing online.

Advances in digital technology in the last thirty years have had a profound impact on business and production strategies, in many major industries. Among such impacts is the implementation of product MC that brought customization and personalization to mainstream markets. The MC concept is defined by Pine (1993, 48) as “the mass production of individually customized goods and services.” MC is a *pull strategy* where consumers initiate product orders, versus *push strategy* where orders are initiated by management. This strategy engages consumers in the co-designing process by allowing them to participate in selecting the end product specifications at various stages of its production. Consumers thereby specify their own tailor-made products to suit their needs and wants. MC brings tailored products to niche markets that benefit from economies of scale (Gilmore & Pine, 1997).

Lampel & Mintzberg, (1996) have identified five customization strategies that a product-manufacturing firm can introduce to its value chain at any, or all of its four stages: design, fabrication, assembly and distribution, as illustrated in figure 2 below (Lampel & Mintzberg, 1996). These strategies form a continuum from pure standardization to pure customization. In the middle are three strategies: segmented standardization, customized standardization and tailored customization, which are applied in MC to maximize mass production efficiency while allowing for consumer customization.

Figure 2: Product Customization Strategies (Lampel & Mintzberg, 1996)

Chris Anderson (2004, 2006) put forward a concept that shows the potential for MC to achieve economies of scale. As the MC concept is based on a made to order process, its production / final assembly happens after the customer orders it. This concept requires low production (no inventory of finished products), low distribution (delivered after its production / assembly), and no bricks and mortar (online display). Anderson (2004) introduced the concept of “long tail” effect (figure 3) to illustrate the potential for a new economy based on MC products, and argued that it could rival the current economy of mass-production. In figure 3, Anderson portrays the mass production as the “head”, while the “long tail” refers to economies of scale that are achieved through the sale of customized products globally to niche markets. E-commerce (via the Internet) made it possible for mass customized products to reach its target consumers no matter where they are located (Anderson, 2015).

Figure 3: Chris Anderson's Long Tail Graph (Source <http://www.longtail.com/about.html>)

A study by Senanayake & Little (2010) identified the consumer involvement in the MC process introduced earlier by Lampel & Mintzberg (1996) as the “consumer order decoupling point” (CODP) per customization stage (Figure 4) (Senanayake & Little, 2010). The un-shaded area shows three MC levels: “Segmented standardization”, “customized standardization”, and “tailored customization”. The triangle in this figure represents the customers’ involvement point in the customization process, and it is the point where they collaborate in the “co-design”.

Figure 4: Points and extent of customization (Senanayake & Little, 2010)

The MC design and business concept was first implemented by the automotive, computer

and entertainment industries to garner and maintain consumer brand loyalty. This was achieved by engaging consumers in making limited design decisions that defined the final product, which in turn led to higher consumer satisfaction (Lee et al., 2011).

As with automobiles and computers, apparel customization and personalization have become available to the average consumer since the 1990s. Levis and Nike, considered apparel market leaders, pioneered various aspects of apparel MC in retail spaces. Ten years later (2000s), digital technology advancement of the Internet and e-commerce made it feasible for Nike, Adidas and Lands End to pioneer apparel MC online (Lee et al., 2011). An example of this would be for a consumer to customize and purchase a tailored Nike shoe online (Nike.com, 2015).

There are two broad types of apparel customization: occupational and customization for individual consumers. Occupational apparel customization has long been used to brand uniforms within particular professions. Apparel customization for individual consumers is applied to fit, and/or design (Senanayake & Little, 2010). Prior to MC, the consumer and traditional tailor would meet in person to start the apparel customization process that included one of two customization strategies, bespoke and made-to-measure (Ross, 2010, Ross 2007). Bespoke customization fits into the “pure customization” strategy (Lampel and Mintzberg, 1996; Senanayake & Little, 2010) and cannot be considered MC, as its process starts from scratch with a unique design, size, material, and colour, specific to suit a particular customer. By contrast, made-to-measure customization process includes the same stages of the bespoke process, but uses an existing design that is then tailored to fit the client’s body and personal taste (Ross 2007; Ross 2010), and as such adheres to the “tailored customization” MC strategy (Lampel and Mintzberg, 1996; Senanayake & Little, 2010). The difference between the bespoke and made-to-measure is the point at which the consumer is involved in the product design and

fabrication process (Figure 4). When technology was first used to communicate and make the garment, it was referred to as “demi-bespoke” (Ross, 2007), but was later modified to “semi bespoke” (Ross, 2012). In describing this new hybrid between bespoke and made-to-measure garments Ross (2012) writes:

The term “semi-bespoke” is now used in parallel with “made-to-measure” and is loosely defined as having handcrafted components in the tailoring process but with the use of some, or all, 3D technology for measurements, design, pattern-cutting, and manufacture. The key difference identified in this study between “made-to-measure” and “semi-bespoke” is the emphasis on technology being faster and more economical but enabling a better fit, design, and manufacture (Ross, 2012).

The term “semi bespoke” applies to men’s luxury wear, and the parallel term for this in women’s luxury wear is referred to as “demi couture” (Ross, 2012). Both these processes fit into the MC strategy of tailored customization (Lampel and Mintzberg, 1996; Senanayake & Little, 2010).

According to Fiore et al. (2004) apparel MC can deliver added consumer value. It does so by engaging consumers at a deeper level, as it allows them to specify various details of their clothing using a co-design tool. This has the potential of engaging them in an enticing and memorable experience (Fiore et al., 2004). The following examples describe two different levels of apparel MC offered online. The first is “semi bespoke” concept that offers its potential consumers the possibility of making decisions at the prefabrication stage. An example of this is *itailor.com*, which provides an apparel design *tool kit* allowing its users to easily co-design men’s clothing online. Their co-design process starts with its users selecting a desired piece of clothing, such as business suit, from a series of silhouette options. They then proceed with selecting design options for collar, pockets and cuffs etc., and continue with making design decisions about the desired fabric material and colour; they can also add other personal touches to further personalize it, such as their monogram. Unlike other similar websites *itailor.com*

allows its potential consumers to see the visual impact of their co-design choices simulated in a 3D image, and thereby engages more of their senses in a creative exercise, allowing them to visualize their design choices in real time. Figure 5 below shows 4 screen shots illustrating co-designing of a business suit online.

Figure 5: Customizing a Suit Online (source <http://itailor.com>)

The second example involves digital printing, which demonstrates a lower level of apparel customization that engages potential consumers at the post fabrication stage. This is referred to as “customized standardization” MC strategy (Lampel and Mintzberg, 1996; Senanayake & Little, 2010). An example of this is *Zazzle.com*, a website that provides its users with an apparel design *tool kit*, allowing them to select t-shirt style and colour, and to customize and visualize desired text/image to be printed on the selected t-shirt. Figure 6 below illustrates two screen shots of this process.

Figure 6: Customizing a T-shirt Online (source http://www.zazzle.com/good_vibes_only_160_styles_to_choose_from_tanktops-235172633403598979)

Consumer studies in various countries such as the US (Kamali & Loker, 2002; Lee et al., 2011), Saudi Arabia (Al Mousa, 2005), Taiwan (Cho & Wang, 2010), Korea (Park et al., 2009), and China (Ou, 2011) show that the interest in apparel MC online is global. More recently, a study in retail trends in the US predicted an increase in product customization and personalization, including clothing (Spaulding & Perry, 2013). Recently, *The customization 500* (2012) published a review of small, medium and large MC companies that categorized online apparel MC under digital printing and made-to-measure. The majority of these companies offer custom digital printing for t-shirts, and a smaller number of companies offer made-to-measure clothing that primarily target men's business attire, while a much smaller number offer custom shoes (Walcher & Piller, 2012).

This review shows that apparel MC has been taken up in the market place on a relatively small scale, and that the MC of digital printing process is more prevalent online than made-to-measure. Also, Germany and US lead in the implementation of the apparel MC concept on a global scale.

2.3 Clothing and Consumer Attitude

Attitude is defined by Thurstone (1946) as the degree of positive or negative affect associated with some psychological object (Edwards, 1957). From a consumer perspective, Perner (2015) states that attitudes are “a composite of a consumer’s (1) beliefs about, (2) feelings about, (3) and behavioral intentions toward some object within the context of marketing, usually a brand or retail store” (Perner, 2015). In the interest of learning about apparel MC consumer potential, the following subsections discuss literature about consumer attitudes towards three areas related to clothing: mass-produced clothing better known as Ready-To-Wear (RTW); custom clothing; and co-designed clothing.

RTW Clothing

Although there are no studies comparing attitudes toward RTW and custom clothing in Canada, the studies conducted in the US on the topic focused primarily on *clothing fit* issues experienced by consumers and their *online shopping* behaviour. The following sections discuss the literature in these two areas.

Clothing Fit: RTW clothing in the western world is available to mainstream consumers at various channels (retail, e-tail, TV, catalogues). Studies in the US show that consumers in general, and females in particular, are dis-satisfied with RTW clothing. The main reason is due to unmet expectations in fit, personal taste, and quality, with fit scoring the highest consumer dissatisfaction. Several studies showed that females, especially as they age, face challenges in finding clothing that fit their bodies comfortably and match their style. They experienced bad fit at a number of body areas including the shoulders, back, waist, bust, arms and abdomen (Goldsberry et al., 1996). According to an article by DesMarteau (2000) 50% of females in the US were dissatisfied with the fit of clothing purchased, and 50% of catalogue clothing purchases were returned due to poor fit (Ou, 2011). Similarly Giovis (2007) showed that female

dissatisfaction with RTW clothing fit reached as high as 84%, resulting in loss of sales of approximately \$11M US dollars (Chattaraman et al, 2013). Moreover, this issue is not unique to US consumers; Other countries such as Saudi Arabia (Al Mousa, 2005), South Korea (Park et al, 2009), Taiwan (Cho & Wang, 2010), China (Ou, 2011) and Sweden (Larsson, 2012) all report similar levels of consumer dissatisfaction.

The majority of studies on apparel focus primarily on females, although the few that focus on males indicate that they face similar challenges with the fit of RTW clothing. Shim & Kotsiopulos (1991) found short and large males were dissatisfied with RTW clothing sizes, and the number and quality of stores that carry them, while large and tall males were relatively dissatisfied with clothing sizes, styles and colours/prints available (Oliver et al., 1993). The DesMarteau (2000) industry report concluded that approximately 50% of men were unable to find clothing that fit them well (Chattaraman et al, 2013). Poor clothing fit for males was experienced in a number of body areas including neck, shoulders, arms, legs (Sindicich, 2008), chest, waist, and torso (Sindicich & Black, 2011).

One of the main reasons behind consumer dissatisfaction in RTW clothing fit / size is the inaccuracy of body measurement, and shapes across clothing sizes (Bye et al., 2008). Studies showed that most of the RTW clothing standard sizing and grading patterns in the US are based on one ideal body type for females, the hourglass, which does not represent the majority of local or global consumer markets (Ashdown & Loker, 2010).

Online Shopping: Various indicators show that clothes online shopping in the US is on the rise. Forrester Research (2013) reported that the category of apparel, accessories and footwear, which forms the largest online sales, it would reach \$40.3 billion in 2013 (Yu & Damhorst, 2015). Their estimate was realized and surpassed by 4.7 billion. According to *eMarketer*, sales of apparel online for this category reached \$44.7 billion in 2013, forming 17.6% of all online

sales in the US, and is expected to reach \$86 billion in 2018 (Jackson, 2015). Earlier studies in the US showed females shopped for apparel online more than males (referenced by Kim & Hong, 2011; Park et al., 2009), however, male apparel shopping online is fast growing (Kim & Hong, 2011). Similar to the US, indicators show that Canada's online apparel shopping is on the rise; for its clothing market which forms 4.5% of its total retail e-commerce, has shown an increase of 9.9% in 2012 (Statistics Canada, 2012).

A study by Seock et al. (2008) examined college students who shop online in the US, and found them to be confident and price sensitive shoppers. It highlighted that female students tend to show higher price sensitivity, confidence, brand/fashion consciousness and shopping enjoyment (hedonic) than male students. By contrast, males tend to show more sensitivity towards convenience and saving time when shopping online. Its findings suggested that male online shoppers had a more functional attitude (utilitarian) towards shopping than the females (Seock et al., 2008). This suggestion appears to generalize the shopping attitude per gender, however it would have been more accurate to limit its results to college students, who do not represent the total population in the US. Another relatively recent study found that, in apparel shopping, female shoppers have a higher need for touch than male (Cho & Workman, 2011). This finding suggests that online shopping is more of a challenge for females than for males.

In conclusion, the RTW clothing industry in the US has experienced, and continues to face a challenge in clothing fit, which translates into loss of sales and diminished consumer satisfaction. In addition, academic studies of the industry have focused predominantly on females. One way to increase consumer satisfaction in RTW clothing would be to develop an accurate universal sizing and grading system; which remains a challenge for the apparel industry. Another way would be to consider consumer attitudes towards adopting apparel MC; which has the potential to address some of these issues.

Custom Clothing

Custom clothing is designed and produced to fit consumer's personal preferences and specifications. These key design requirements include body dimensions to establish clothing size; style/silhouette to establish the cut and shape; material; colour; and print (Kamali & Loker, 2002; Calderin, 2011). Academic studies on consumer attitudes towards custom clothing are limited, and what is available is often undertaken from the business understanding of the consumer.

2.4 Co-designed Clothing and Consumer Attitude

When consumers make design decisions to customize their clothing to fit their body and taste, their involvement in the process goes beyond purchasing RTW clothing. This section reviews key areas in academic literature that influence and/or impact consumers' attitude towards co-designed clothing. These areas include their attitude towards co-designing, the personal impact of wearing such clothing, and their apparel co-design priorities.

Attitude

As a relatively new concept, literature on consumer attitudes toward co-designing clothing retail and/or online is limited. Various studies show that consumers, even though some are unaware of it, are interested in the concept of apparel co-design online (Ulrich et al., 2003; Al-Mousa, 2005; Kamali, & Loker, 2002; Ou, 2011). Although there is an interest in apparel MC and co-design, Kaplan, Schoder & Haenlein (2007) argue that the value is in the end product itself. This can vary, as not all apparel companies are able to provide 100% apparel customization, due to the wide variety and levels of product customization (Ou, 2011). Such variety includes custom silhouette, size, colour, material and graphics (print).

Other important aspects that influence consumer attitudes towards online apparel co-

design are their computer skills, and confidence in their own design ability. In the US, Kamali, & Loker (2002) tested the use of an online co-design *tool kit*, for customizing a t-shirt, with university students. Their findings showed that computer savvy students enjoyed the co-designing experience, because they found it convenient and fun. Also in the US, Ulrich et al. (2003) examined the attitudes of female college students towards co-designing three-piece career outfits. Her findings show that, students who are confident in decision-making find the co-design process easy, and are satisfied with their creations; those who are less confident usually required assistance.

Consumer shopping behaviour plays a key factor in the uptake of apparel MC. This was supported by a study by Ou, (2011) on Chinese university students in the US. His findings show that hedonic consumer participants, who shop for pleasure and lead or follow fashion were interested in apparel MC. However, those who were identified as utilitarian and were considered as followers, were neither interested in clothing nor with apparel MC (Ou, 2011). Another study on *fashion leaders* and *followers* show that both are highly interested in apparel co-design options (Cho & Workman, 2011). Both studies agree with the interest of *fashion leaders* and *followers* in apparel MC, however unlike Ou (2011), Cho & Workman (2011) did not consider examining them by shopping behaviour (hedonic/utilitarian).

Adult females in the US showed interest in apparel MC only when they perceived the provider's website as useful and competent; they also valued the website's co-design competency more positively than its simplicity, and ease of operation. In addition, they were concerned with the security of their personal information on the website (Cho & Fiorito, 2009). By comparison, adult consumers in Sweden expressed a positive co-designing experience at retail, after receiving sales help in body measurement and co-designing knitted garments before purchase. They were impressed with the service and described it as a "great experience"

(Larsson, 2012, 190).

Clothing and Personal Impact

Several studies discussed the relation between self, self-presentation and the use of clothing in managing one's appearance in society. Sontag (1985, 10) states that a "Psychological comfort can be derived from a sense of being dressed in a manner congruent with, or expressive of, one's self-concept". Similarly, Stone (1965) argues that clothing is related to one's self-concept and self esteem; it communicates one's mood and values to its audience, and the audience's perception of it has an impact on its wearer's feelings of self worth (Joyner, 1993). In addition, Smathers & Horridge (1978-79) made a positive relation between clothing, good fit and the wellbeing of its wearer as they state, "Good fit of clothing is vital to an individual's psychological and social well-being" (Goldsberry et al., 1996).

In the context of apparel MC, literature appears to lack studies that examine the impact of how one feels when wearing a piece of co-designed clothing. The closest to this in literature was found in a study conducted in Germany where university students took part in co-designing a t-shirt. The findings show them expressing feelings of "pride" in taking part in creating the end product. The reason for this was attributed to the feeling that product characteristics closely matching the participants' personal preferences (Franke et al. 2010).

Studies that provide a designer's perspective on this topic were also limited. For example, a graduate student of apparel design in Finland conducted a study where she co-designed a mass customized fashion collection with the help of four young women. As a result, and to accommodate the mass customization concept, she learned to design an apparel fashion collection based on the concept of modularity. Her findings showed a high level of participant satisfaction, which led her to change her attitude towards apparel design. On this, She writes:

At first I wanted to present a ready collection only after my own design ideas, which can

be later customized by the consumer in colour, fabric, and size. But, after I got more and more information about this subject, my personal goal became to figure out how much power I could give the potential consumer in the design process, without losing too much of my freedom of creativity (Kusnezov, 2012, 48).

The above studies highlight a positive relation between well-fitted clothing and the wellbeing of its wearer. In addition, they signal the possibility for a shift in designers' attitudes, from holding on, to letting go of a certain level of 'control' over the creative process.

Prioritization

Consumers' attitudes towards apparel customization priorities provide insights into their motivation to engage in apparel MC co-design activity. In addition, it further informs apparel designers and marketers of consumers needs and wants in this realm. The following reviews literature on prioritization divided into three areas: clothing details, clothing types, and clothing categories.

a) Clothing Details

In this study clothing details refer to the level of customization of aspects such as size, silhouette, fabric, colour, and graphic (print). Results have shown that the consumers' intention to buy custom clothing rises according to its customization level(s) (Kamali & Loker, 2002). However, to date few studies have considered investigating the consumers' priority per level. In the US, during the early days of apparel MC (2002), female focus groups identified 4 ways they wished apparel customization could be offered: (1) clone pre-owned clothing; (2) 100% customization or bespoke; (3) a co-design tool (*tool kit*); and (4) standard sizes with customizable design options (Anderson-Connell et al. 2002). Subsequent studies that examined a prioritization approach showed that the top priority for female college/university students was to customize the fit/size of clothing (Park, 2004; Kamali, & Loker, 2002), however their findings of subsequent priorities differed.

For one study, the second priority was customizing ‘material’ for Jeans (Park, 2004); while for another it was customizing the ‘colour’ for t-shirts (Kamali, & Loker, 2002). Although these findings indicated consumer priorities for custom clothing details, they focus mainly on female college/university students in the US, and did not examine male priorities, nor did they correlate their results with consumer life style. They also neglected to include data on Canadian consumers.

b) *Clothing Type*

Clothing Type in this study refers to garment type such as suit, dress, skirt and pants. The literature focused on this aspect of apparel customization is limited. In the US, one study found the customization priority of clothing type among female university students to be first t-shirts, second bottoms, and third tops (Kamali, & Loker, 2002).

The above provides consumer priorities within custom clothing type, but leaves a gap in providing more specification about them, and has focused primarily on female college/university students in the US.

c) *Clothing Category*

Clothing category in this study refers to the function / activity for which the clothing would be worn, such as business, casual, evening, leisure, artistic performance, among others. However, literature that discusses this aspect of apparel customization is limited. The available data has focused primarily on cultural differences related to custom clothing. For example, in Saudi Arabia female college students were interested in customizing evening wear; while in the US their counter parts were interested in customizing Jeans (Al-Mousa, 2005).

The above information provides limited data on consumer priorities in the custom clothing category. Similar to the previous section on clothing details and type described above, the research focused on female college/university students.

2.5 Clothing Co-design Adoption and Consumer Attitude

The following section reviews literature about consumer: adoption and willingness to uptake apparel co-design.

Adoption Needs

Literature on the topic identified various factors that could help facilitate the adoption of apparel MC and co-design. These include *Trust* and *Computer Skills*. *Trust* is a universal key success factor for adopting online shopping in general across cultures. However, the concern with *trust* may differ by culture. For example a study with US college students, who shop online for custom Jeans, showed that their *trust* was based on the performance of a website. In comparison, Taiwanese college students only trusted websites, if they were familiar with their brands (Cho & Wang, 2010). In addition, another study on adult females in the US, who also were online-shoppers, identified two major *trust* concerns: privacy of personal information and competency of the online co-design *tool kit* (Cho & Fiorito, 2009). While each of these studies revealed important motivations behind consumer *trust* of online shopping, they did not examine consumer life style segmentation. Because clothing is a personal item and is part of one's lifestyle, this makes lifestyle data an important input in further identifying target consumer segment(s) for apparel MC (Park, 2004; Ou, 2011).

In addition to *trust*, *computer skills* were another apparel co-design adoption need that was identified in the literature. The co-design process requires that online consumers manipulate and navigate the providers' website, review and choose design options to co-design a piece of clothing, before ordering it online. Computer aided design (CAD) is one of the

applications used for this process. Several studies showed that the co-design process appealed to technology-savvy consumers who were: confident in their own design abilities, skilled in surfing the web, and felt comfortable in purchasing products online (Ulrich et al., 2003; Kamali, & Loker, 2002). This skill will also be discussed later in this chapter as a precursor to consumer co-design experience. Similarly, consumers who felt less confident in their computer skills tended to abort the co-design process before its completion (Franke et al., 2008). The studies above highlight consumers' need to *trust* the provider and to have the necessary *computer skills* to adopt the clothing co-design currently process offered online. In addition, *trust* is culturally dependent, while computer savviness is individual capability-dependent.

In addition to *trust* and *computers skills* literature identified other factors consumers need to further facilitate their adoption of apparel MC and co-design. These are co-design *options*, *experience* and *uniqueness*.

Co-design Options: Co-design options represent consumer preferences in the design of the end product/service. Although studies on apparel co-design are limited, one critical aspect to its adoption has been identified as the “*paradox of choice*”, a term coined by Schwartz (2000, 2005). This term describes a consumers' state of mind when they are faced with variety of complex options to choose from, causing them to become overwhelmed and unsure of their own abilities, which finally leads them to abort the co-design process (Ender, 2010; Lee et al., 2011). A study focused on adult females in the US, showed them to more positively value website's co-design competency (design variations/ complexity), than its simplicity and ease of operation (less design variations/complexity) (Cho & Fiorito, 2009). Similarly in the US, *fashion leaders and followers* among college students looked for more variety in co-design options (Park, 2004). Another study tested a co-design *tool kit* for children's clothing with parents, and showed that although they valued more variety of co-design options, they tended to return and

shop at websites with less variety and simpler options (Lee et al., 2011). This finding supports the approach of simplicity in navigating co-design options, as part of the website design. It is therefore a key element needed in adopting co-designing online.

As a compromise and to mitigate the “*paradox of choice*” phenomenon, Enders (2010) proposed the concept of “micro communities”. This concept makes use of the “*long tail*” effect, identified previously by Anderson (2006), which offers customization for niche markets. Spread shirt, an online t-shirt mass customizer operating globally, mitigated the “*paradox of choice*” by providing a customized online platform per seller. The seller in-turn offers a controlled number of co-design options relevant only to their niche market (Enders, 2010). The findings reviewed above point to the challenge of providing consumers with the right balance between variety and simplicity of co-design options. More research is needed to identify co-design strategies in terms of achieving such a balance.

Experience: As consumers become more involved in co-designing their clothing, they are immersed in an experience that is connected to the self. As stated above, Pine and Gilmore (1999) identified the *experience economy* as the latest transformation in the Western world. Clothing co-design belongs to this economy as its main aim is to attract and keep consumers by engaging them in an authentic, and memorable *experience* (Fiore, 2002). According to Gentile et al. (2007) “The *consumer experience* originates from a set of interactions between a consumer and a product, a company or part of its organization, which provoke a reaction. This *experience* is strictly personal and implies the consumers’ involvement at different levels (rational, emotional, sensorial, physical, and spiritual)”. In the realm of marketing, a *consumer experience* is the personal perspective of contact with a brand presence (Larsson, 2012).

This said, however, enjoyable *consumer experience* demands certain expectations and capabilities. Solomon (2006) identified the need to educate consumers on the demands of the

co-design activity, relative to their time and effort (Ou, 2011). Similarly as part of the customization process, a *knowledge transfer* is expected to occur when consumers specify design details of a custom garment (Larsson, 2012). In addition, an online co-design process requires *computer skills*, where consumers need to feel comfortable navigating the Internet, and co-design *tool kit* applications. For example, when college students attempted to customized their t-shirt online, only those who were technology savvy enjoyed their experience, and found it convenient and fun, and the online co-design tool easy to use (Ulrich et al., 2003). In a recent study, the findings showed that as consumer co-designers gained more expertise in co-designing, they looked for and enjoy advanced co-design *tool kits*, and a wider *solution space*. In contrast, novice co-designers preferred less or limited options matching their decision-making capability (Hermans, 2014). Some consumers may experience stress during product co-design processes. Product knowledge coupled with knowing their own preference plays a key role in developing confidence in their own abilities (Franke et al., 2008). Various studies showed potential apparel consumer co-designers needed design help. For example, sportswear female consumers in the US, expressed concern with their design ability, and their interest in having access to a design coach (Anderson-Connell et al., 2002). Similarly, female college students expressed a need for design coach to fill a gap in their knowledge of apparel customization (Ulrich et al., 2003). However, *fashion leaders and followers* among university students, predominantly female, liked the co-design recommendation option, and did not express a need for coaching or design help (Park, 2004). These findings showed various adoption needs including product knowledge, computer skills and the need for coaching.

The need for coaching is further supported by Franke et al., (2008), who argued that most consumers lacked experience in developing products, and would benefit from external design advice. According to the authors an *online community* of expert consumer co-designers

may fulfill the co-design knowledge gap for those who are novice. In their view this could help novice consumer co-designers at two stages: the idea development, and design evaluation stage (Franke et al., 2008). Similarly Wu (2010) recommended providing consumer co-designers access to an *online community*, as this concept has the potential of fostering multi dimensional relationships among its users, and contributing to brand loyalty. The author provided examples of innovative t-shirt mass customizing companies such as *Zazzle* and *Threadless*, which were noted for providing an *online community* platform, for consumer co-designers to communicate and interact with one another, separate from that of the enterprise. The author suggested that using such a concept has several benefits as: it allows novice co-designers to be helped by others who have more experience; expert consumer co-designers to share creative work with like-minded *community*; and the enterprise to benefit from timely feedback from an *online community* they helped create (Wu, 2010).

The studies brought several points to light. This included consumer co-designers varying skill and confidence levels, which impacted their co-designing experience and adoption. Therefore relevant coaching is needed to close knowledge gaps, and to this end various authors recommended peer coaching via online communities. While these findings are very valuable, most were examined from the female perspective in the US. More research is needed to close a gap in consumer adoption needs across gender (male and female) and lifestyle segmentation, from a Canadian perspective.

Willingness

In comparison to RTW clothing that is mass-produced and ready to purchase at retail or online, apparel MC and co-design processes require longer time to design, produce, and deliver to consumers. The consumers' degree of willingness to sacrifice their time, and money, to own a personal piece of clothing they co-designed, signals their willingness to adopt it. The

following section discusses literature about consumers' willingness to pay extra and wait longer for apparel customization.

a) Willingness to pay Extra

Students who have co-designed personal items, such as clothing and accessories indicated their willingness to pay more for their creations. In the US, 88% of university students were willing to pay more for t-shirts they co-designed online. Their willingness to pay more increased proportionally with higher customization levels (Kamali & Loker, 2002), and higher creative freedom available in the co-design *tool kit* (Franke et al., 2010). Similarly college students who co-designed a cell phone cover online, were willing to pay more for it than its retail price. The reasons behind this were attributed to the *uniqueness* of the product, a value add second only to *aesthetics* and *functional fit*, (Franke et al., 2008). A qualitative study of Chinese students in the US showed only those with hedonistic behaviour and *fashion leadership* were willing to pay more for apparel customization. However, those with hedonistic behaviour, and were *fashion followers*, although they would have liked to have it, were not willing to pay more for it; and those with utilitarian behaviour were neither interested in apparel MC, nor willing to pay more for it (Ou, 2011). In contrast, a study involving US university students, predominantly female, found that *fashion leaders* and *followers* were both willing to pay more for custom jeans, with *fashion leaders* willing to pay a higher amount (Park, 2004).

The findings above provided a positive indication of consumers' willingness to pay more for custom apparel. However *fashion followers* in Ou's (2011) study of Chinese students, differed from that of other studies (Park, 2004; Kamali & Loker, 2002; Franke

et al., 2008) who focused on college student in the US. This observation suggests that willingness to pay more for customized may vary by culture.

b) Willingness to wait for customization

In the US two studies were undertaken to examine, predominantly female, university students' willingness to wait longer for co-designed custom clothing. Their results showed *fashion leaders*, and *followers* were willing to wait up to 2 weeks (Park, 2004; Kamali & Loker, 2002). Earlier study by Kurt Salmon Associates (1996) showed participants were willing to wait up to 3 weeks; and most recently, a study of Chinese university students in the US showed those interested in apparel MC were early adopters, and were willing to wait 1-2 weeks. On the other hand, those who were not interested in apparel MC were followers, and were not willing to wait (Ou, 2011). These findings show inconclusive data on willingness to wait for custom clothing (1, 2 or 3 weeks), and focused on discrete consumer segments: gender, lifestyle, and country of origin.

2.6 Summary

This chapter reviewed literature on RTW, custom and mass customized apparel, and identified opportunities for this research study. Firstly, this review highlighted the important role clothing plays in consumer social psychology, as it tends to act as social indicators for an individual's identity, social class, and wellbeing; it also addressed consumer use of clothing to fulfill a social tendency and their shopping behaviour, based on motivation and gender. Secondly, it discussed the impact of technology on apparel production, including custom-made, mass produced and mass customized apparel co-design online. Thirdly, it discussed key areas related to consumer attitude that included ready to wear (RTW) and clothes shopping online, custom and co-designed clothing, clothing impact on the wearer, custom clothing across

clothing detail, type and category, adoption issues for clothing co-designed online, and consumer willingness to pay extra and wait for co-designed clothing.

This review showed that literature focusing on consumer attitude towards apparel MC is limited in several areas, and lacks studies in others. There are few studies that provide qualitative data that reflect the voice of consumers interested in apparel co-design; male consumer perspective on apparel MC and co-design; life style consumer segmentation based on shopping behaviour; apparel customization priority; and apparel MC adoption issues. There is however an absence of a comprehensive qualitative studies that measure consumer attitudes towards apparel MC and co-design, which are cross-referenced with the view of industry experts on the topic. Similarly, there are no studies of the Canadian market, which would provides a unique opportunity, since Canadian consumers experience many challenges in finding the right fit for their varied body types and tastes. In addition, studies that used consumer segmentation did not consider the following: social tendency as influencing attitude towards clothing; assessed the personal impact of wearing co-designed clothing; examined consumer apparel customization priorities, or determined apparel MC and co-design adoption needs. These limitations and gaps are illustrated in Figure 7 below.

Figure 7 Apparel MC Literature Review

Based on the literature review findings above, this study aims to explore Canadian consumers' attitudes towards apparel MC and co-design and their willingness to adopt it. To do so, it establishes a contextual baseline by examining consumers' past experience with clothing (RTW and custom) and online shopping, which provides insights into consumers' motivations for adopting apparel MC and co-design. The study uses qualitative methods to listen to the voice of the consumer and elicit their deeply rooted attitudes (feelings, likes and dislikes). It addresses consumer attitudes towards apparel co-design, the impacts it has on the wearer, and their apparel customization priorities (clothing type, detail, and category). It examines consumer intentions to adopt apparel MC and co-design by seeking to reveal their needs, and willingness to pay and wait for clothes they co-design online. To identify potential target markets, the data analysis in this study takes into consideration multilevel (ML) consumer segmentation, which

includes gender, social tendency and shopping behaviour. Figure 8 below provides a graphical illustration of this study's research themes, context, and consumer segmentation.

Figure 8: Research Themes, Context and Consumer Segmentation

Based on the gaps identified in the Literature review, the overarching question explored in this study is the following:

“What are the attitudes of Canadian Consumers towards apparel mass customization?”

This is explored through the 6 sub-questions listed below:

1. What is consumer attitude towards RTW clothing, fit issues and online shopping?
2. What is consumer attitude towards custom and co-designed clothing?

3. What is the personal impact of custom co-designed clothing on the wearer?
4. What is the consumer's priority for custom clothing across clothing detail, type and category?
5. What are the consumer adoption needs for clothing co-designed online?
6. What is the consumer willingness to pay extra, and wait for co-designed clothing?

The following chapter on Methods outlines the study's design, process and procedures.

METHODS

This study examines Canadian consumers attitudes and potential for adopting clothing co-design online, a by-product/service of apparel MC. This study applies the theories of reasoned action, and consumer segmentation using a qualitative approach. The theory of reasoned action is concerned with predicting future human behaviour based on individual intentions. In turn intentions are a by-product of attitudes towards a behaviour, and perception of the importance of that behaviour (Ajzen & Fishbein, 1980). Since apparel MC, including co-design, is a combination of a product and a service, together they form a total experience. Applying the theory of reasoned action to consumer attitudes may help predict their intentions towards adopting it. To gauge attitudes, this study applies a psychological approach guided by Edwards (1957) that is associated with positive (like) or negative (dislike) feelings; on this he wrote:

In the literature of psychology, the terms affect and feeling are used interchangeably. An individual who has associated positive affect or feeling with some psychological object, is said to like that object or to have a favorable attitude toward the object. An individual who has associated negative affect with the same psychological object would be said to dislike that object or to have an unfavorable attitude toward the object (Edwards, 1957, 2).

Consumer segmentation is a technique that identifies characteristics common to a certain group that distinguish its members from others. A distinct group has members who exhibit similar behaviour, have similar needs, and respond in a similar manner towards a certain stimulus, product, or service (Curedale, 2013). The consumer segmentation method applies only to the consumer sample, as its sole purpose is to identify who is interested in apparel MC and co-design. Since clothing is a personal item and has strong connection to one's identity, this

study considers gender (male, female) and lifestyle as indicators of behaviour. Within lifestyle, it takes into consideration clothes shopping behaviour, and social tendency. Shopping behaviour is categorized into two types, one motivated by need (utilitarian), and the other by pleasure (hedonic). Social tendency is categorized into two types: a) in-group exhibits a tendency for blending-in with peers, referred to in this study as ‘Group’ (G), and b) out-group that exhibits a tendency for standing out from peers, referred to in this study as an ‘Individual’ (I).

The study uses a qualitative approach that includes two sources: consumers and industry experts, and two research methods: semi-structured in-depth interview, and a questionnaire. The in-depth interview method is chosen for its ability to collect rich qualitative data, appropriate for gathering consumer insights on adopting a personalized product/service. Comparing consumer data with that of industry experts is appropriate, as it brings added insight to a relatively novel concept. Expert responses are used to validate consumer responses, and broadening the understanding of consumer potential for apparel MC. The sequential questioning and prioritization approaches are applied to the design of the interview guide (Appendix B.1 & B.2) and questionnaire (Appendix C.1 & C.2). The prioritization approach is chosen to provide better understanding, and clarity of consumers’ most important aspect of a product and/or service. The sequential approach is chosen to provide consumer attitude towards past/present experience leading to future intentions.

The sequential questioning approach, starts with attitudes towards past/present practices leading to future intentions. Past experiences provide a contextual baseline regarding behaviour towards clothing, and include clothes shopping (RTW and custom clothes). Future intentions are explored through attitudes towards willingness to adopt co-designing clothing online. Guided by this approach, the following research questions are used to gauge consumer’s attitude and potential adoption of apparel MC and co-designing clothing online:

Questions to establish contextual baseline:

- What attitudes do consumers hold towards RTW clothing? What body clothing fit issues do they typically experience?
- What are their attitudes towards clothes online shopping?
- What attitudes do consumers hold towards custom clothing?

Questions to explore attitudes towards co-designing clothing:

- What attitudes do consumers hold towards co-designing clothing online?
- What are their personal impacts when wearing clothing they co-designed?
- What are their apparel customization priorities?

Questions to explore potential adoption of co-designing clothing:

- What needs to happen for consumers to feel comfortable adopting co-designing clothing online?
- What elements do consumers need to consider adopting co-designing clothing online?
- How much are consumers willing to pay extra for clothing they co-designed? And How long are they willing to wait for them.

The detailed interview guide can be found in Appendix B.1. The consumer participants' interview and questionnaire plan is illustrated in Figure 9 below:

Numbers 1-21 = Interview question, Appendix B.1. Letter a-c = Questionnaire section, Appendix C.1

Figure 9: Consumer Interview and Questionnaire Plan

Industry experts' perspective on consumer attitudes on the topic of apparel co-design is considered as a secondary data source; its purpose is to validate and fill gaps in consumer responses. Questions for experts focus on their knowledge of consumers' attitudes, and needs to adopt, co-designing clothing online. The full interview guide is in Appendix B.2, and is designed to obtain the experts' perspective on consumer attitudes. The questionnaire to the experts in Appendix C.2 is designed to provide their knowledge of consumer priorities in custom clothing. It should be noted that the questionnaire applies only to experts in tailoring. A diagram that illustrates the interview and questionnaire plan for expert participants is shown in Figure 10 below:

Figure 10: Expert Interview and Questionnaire Plan

Participants chosen for this study are Canadian consumers and Canadian and international industry experts. The choice of Canadian consumers was undertaken to fill the gap found in literature in the context of apparel MC, and for its convenience. A total of thirteen (13) adult consumer participants residing in Ottawa, Canada, participated in this study. This sample was composed of 8 females and 5 males with an age range of 21- 65yrs., and an average BMI of “normal weight” (Health Canada, 2015). All have completed and/or are in the process of completing a graduate or undergraduate university degree, 9 out of 13 are employed full or part-

time. They were recruited from two environments: nine (9) from Carleton University, and four (4) from local professional networks. A total of twelve (12) industry experts participated in this study: four (4) Canadian and eight (8) international. Their recruitment method included Internet searches and academic referrals. Internet search techniques used key search words that included apparel mass customization, custom made clothing, made to measure clothing, bespoke, 3D printed clothing, 3D knitting, fashion software, digital tailor, body scanning and avatars. The experts' domains include independent tailors, apparel academic researchers, software providers of fashion design/production. The number of experts per country of origin is as follows: five from the US, four from Canada, two from Western Europe (Germany and Holland), and one from Australia. Some of these experts work directly in the apparel industry; others supported it through research and digital technology. The selection criterion was their diverse background in serving the apparel industry and their knowledge of MC technologies. Details are listed in Table 9 Appendix E.

Communication materials prepared and used in this study include formal invitation letters to consumers (Appendix A.1), and expert (Appendix A.2 & A.3) participants, consent forms (Appendix D.1 & D.2), interview guides (Appendix B.1 & B.2), and questionnaires (Appendix C.1 & C.2). The interviews and questionnaires were conducted during the months of February and March 2015. Following the interview, the interviewer/researcher transcribed and validated the interview data with the participant prior performing data analysis. The steps considered in the interview transcript data analysis are as follows:

1. Apply content analysis approach to each interview transcript (Martin B., & Hanington B., 2012, 40). Create category codes per participant's response, for example "great" represents similar positive responses such as "great, very good, happy".
2. Identify consumer segment(s) by extracting applicable data from interview transcripts, after it was reviewed and accepted by the consumer participant. These segments are:

social tendency (Group, Individual) and shopping behaviour (Utilitarian, Hedonic), as described in Table 1 below.

Table 1: Consumer Multi Segmentation Categories

Category	Code	Acronym	Description
Shopping Behaviour	Hedonic	H	Shop for pleasure
	Utilitarian	U	Shop based on need
Social Tendency	Group	G	Blends in peer group
	Individual	U	Stands out from peer group

3. The primary result represents what is most important, and overall result represents all that is important to a participant, as described in Table 2 below. Category codes in step 1 above are used to identify primary and overall results per response.

Table 2: Data Analysis Approach

Data Analysis	Description	Total	Graph Representation
Primary Result	First answer / question (most important)	100%	Pie Chart
Overall Result	All answers / question (including primary)	>100%	Bar Chart

4. Examine primary and overall results, identified in the step 3 above, by consumer segment(s).
5. Examine overall consumer results with expert results. This provides two values: first, it validates consumer responses; second, it fills gaps in consumer responses.
6. Cross-examine results of step 5 above with literature discussed earlier in Chapter 2. This activity confirms, contrasts or adds new information to existing academic literature on the topic.

The steps considered in the questionnaire data analysis are as follows:

1. Tabulate and apply mean analysis method to consumer responses by gender, and to expert responses.
2. Compare the consumer and expert results from step 1 for the purpose of validating the consumer results.
3. Compare the personal data (gender, age, BMI (height and weight)) to that of the interview data per consumer participant, for the purpose of identifying consumer segment (gender, social tendency and shopping behaviour) per question response.
4. Where applicable, compare the results of the questionnaire to that of the interview. The purpose is to test for confirmation and / or obtain complimentary data.

This chapter introduced the methods for the present study, described its methods, participants, procedures, material, and its approach to data analysis. Results of this study along with its findings are discussed below in chapter 4.

4

DATA ANALYSIS

This chapter identifies the major results of data analysis, and preliminary findings and insights per key theme previously identified, and collectively it seeks to explore the attitudes and potential adoption of apparel co-design by the Canadian consumer. These preliminary findings are relevant to apparel / UX designers, marketers and researchers, as they provide insights to consumer motivations. Needs and wants. The results of data analysis are set out in the following order: Participants, Contextual Baseline, Attitude, Adoption, and Summary.

4.1 Participants

Participants in this study consisted of two sources, consumers and experts. Following is a description of each.

Consumer Participants

The consumer participants sample study and /or work in various industries that include computer technology, science, business, engineering, geography, arts and human resources. They have a diverse cultural background that includes Canada, India, Middle East, Asia, Africa, Europe, and the Caribbean. Details are illustrated in Table 3 below.

Table 3: Profile of Consumer Sample

NO	Age (Yr.)	Male	Female	BMI	Industry	Education	Employment	Cultural Background
1	28	X		Normal Weight	Engineering	Graduate Student	NA	India
2	25	X		Normal Weight	Science	Graduate Student	NA	Europe
3	21	X		Overweight	Business	Undergraduate Student	Tech. Sales	Canada
4	22	X		Normal Weight	Business	Undergraduate Student	Tech. Sales	Canada
5	33	X		Overweight	Computer	Graduate Student	Tech. Sales	Middle East
6	41		X	Normal Weight	Computer	Graduate Student	Tech Product Development	Canada
7	29		X	Normal Weight	Science	Bachelors Degree	Tech. Sales	Asia
8	24		X	Normal Weight	Computer	Bachelors Degree	Tech Product Management	Middle East
9	24		X	Normal Weight	Science	Graduate Student	Teaching	Canada
10	41		X	Overweight	Science	Masters Degree	Research	Canada
11	24		X	Underweight	Arts	Undergraduate Student	NA	Canada
12	25		X	Normal Weight	Computer	Graduate Student	NA	Africa
13	65		X	Normal Weight	Human Resources	Masters Degree	Consulting	Caribbean
Total		5	8					

Interview results of Question # 1-5, Appendix B1, show that shopping behaviour included both “Utilitarian” and “Hedonic” (H) behaviours among the consumer participants. More than two thirds of them fell in the “Utilitarian” (U) segment (9/13). Results are illustrated in Table 4 below.

Table 4: Shopping Behaviour Segmentation

	Utilitarian	Hedonic	Total
Male n=5	4	1	5
Female n=8	5	3	8
Total n=13	9	4	13

Interview results of Question # 7, Appendix B1, show that “Group” (G) and “Individual”(I) social tendencies are present among the consumer participants. More than half of them fell in the “Group” segment (8/13). Results are illustrated in Table 5 below.

Table 5: Social Tendency Segmentation

	Individual	Group	Total
Male n=5	2	3	5
Female n=8	3	5	8
Total n=13	5	8	13

Once combined, the participants’ social tendency and shopping behaviour results identified four multi-layer (ML) consumer segmentations: G/U, G/H, I/U and I/H. The G/U segment was the most popular forming 6/13 (46%); this segment used clothing to blend-in with peers, and purchased clothing based on need. The I/H segment was the second most popular forming 4/13 (31%); it used clothing to blend-in with peers, and was motivated to shop based on enjoyment. The G/H segment was third forming 2/13 (15%); it used clothing to blend-in with peers, and shopped based on enjoyment. Finally, the I/U segment was the least prevalent forming 1/13 (8%) clothing to standout among peers and shopped based on need. Figure 11 below illustrates these segments in a pie chart.

Figure 11: Multi-Layer Consumer Segmentation Chart

Expert Participants

A total of 12 industry experts participated in the interview, however results of only 11 are included in this study, due to the relevancy of the responses provided concerning consumer behaviour. Their expertise include custom apparel at retail 2/12 (17%), apparel applied research 1/12 (8%), apparel MC academic research 4/12 (33%), apparel design computer software 3/12 (25%) and 3D printed apparel design 2/12 (17%). These experts have responded only to questions related to their expertise. Further details on expert segmentation are illustrated in Appendix E. The experts were asked their perspective on consumer attitudes towards apparel co-design as per questions listed in Appendix B2 (interview) and C2 (questionnaire). Their responses were compared to those asked of the consumers for validation and additional data, and are discussed below along with consumer responses where applicable.

4.2 Contextual Baseline

Since the concept of consumers co-designing clothing online is relatively new, it was necessary to form a contextual baseline based on a related experience familiar to them. To do so, consumer participants' were asked questions to help reveal their attitudes and motivations towards an alternate product /service such as that of RTW and custom clothing. Since the new apparel MC is accessed online, it was equally important to understand their experience in online shopping for clothing. Following are the results and findings of each.

To learn about consumer participants' attitudes towards RTW clothing, they were asked during the interview (Q. # 9) how they felt, and what they liked and disliked about it and why (Q #10, Appendix B.1). The data analysis of their responses is shown in Table 10, Appendix F.1. In summary, the affective results of Q #9 showed most participants felt positive about RTW clothing, and males expressed more positive feeling than females. While all males felt

“good/ like it”, most females felt it was “convenient / okay”. Only one female characterized it as of “poor quality”. The cognitive results of Q #10 showed most participants liked its “convenience”, followed by “price/value”; they liked the fact that it was an “easy” way to purchase and try on clothing and experience “immediate results”. However, what they disliked the most was not being able to find the right body “fit”, followed by the fact that styles were “common”, lacking individuality and uniqueness; few disliked its poor “quality” of material and craftsmanship, and considered as “branded” messages affixed onto clothing.

To further understand consumer participants’ satisfaction with RTW clothing “fit”, they completed section (a) in Appendix C.1, where they were asked to identify the body part(s) they typically found hard to fit in RTW clothing. Their responses showed problems in a minimum of 1 area of their body, and a maximum of 5 out of 7 identified. Complete results are listed in Table 11, Appendix F.1, and are graphically illustrated in figure 12 below.

Figure 12: RTW Clothing Fit Issues Chart

When comparing these results with the results of their attitude towards RTW clothing, the findings showed that although all male participants felt it was “great”, more than half reported problems with fit at the waist. While most female participants felt it was “okay”, more than half reported problems with fit for chest and hips, and half reported issues at shoulders and waist.

This analysis shows that among the consumer participants, females experienced more problems with fit than males. This observation may explain why females had less positive attitude (felt okay) towards RTW clothing than male (felt great). This finding suggests that both genders are potential consumers for custom clothing, with females showing a higher need.

In Question #5 of the interview consumer sample was asked about their shopping behaviour, motivation and attitude towards on-line shopping (Table 12, Appendix F.2). The results showed that consumer participants already shop online, and that 9 out 13 (69%) already have purchased clothing online. The latter's reasons for online shopping included: feeling "lazy, tired, too busy and / or to avoid bad weather". When asked how they felt about the process, they expressed both positive and negative feelings. Their positive feelings included "like it", "time saver" and "convenient"; their negative feelings were related to receiving the wrong "fit", and some were disappointed with its "colour" as it was misrepresented on screen; others said that although they shopped online for clothing they preferred the retail experience. However, the 4 out 13 (31%) who did not shop for clothing online did so because they were uncertain of clothing "size" and "quality". However, other factors and variables were likely at play, as one G/U male mentioned that he liked to shop for "shoes and accessories" online when he knew his "size", and he liked it because of the variety of "price", value, and "option". When these results were examined by consumer ML segments they showed the following: those who shopped online for clothing were present across all ML segments; however, those who did not shop online for clothing were 3 out of 4 (75%) who self-identified as part of the G/U segment. This is an interesting observation, but needs to be conducted on a larger sample.

To assess consumer participants' attitudes towards custom clothing, they were asked during the interview (Appendix B.1) in Question #11 how they felt, and Question #12 what they liked and disliked about it (Table 13, Appendix F.3). The results of this analysis provided

insights on their related experience and difficulties. The affective responses to Q #11 showed that most participants (10/13) across ML segments expressed positive feelings towards custom clothing; these included feeling “great”, followed by it being a “neat idea” for those who did not try it. Few expressed concerns with its “expensive” price, and cautioned that the experience is “tailor” dependent. Details of their results are illustrated in figure 13 below.

Figure 13: Custom Clothing: Consumer Primary Feelings Chart

To verify consumer participants’ responses, industry experts were asked during the interview (Appendix B.2) in question 7 if they were aware how consumers felt about custom clothing. The majority of responses validated consumers’ positive attitude towards custom clothing. Some said that custom clothing makes consumers feel “happy”, and similar to consumers, a few cautioned that consumer experience was ‘tailor dependent’. In addition, they offered added insights related to the customization process not expressed by consumer participants. For example, most said that consumers would “need help” with the customization process, while others felt consumers would find it “easy” to customize their clothing. Details of

their results are illustrated in figure 14 below, and are also shown relative to that of the consumers in Table 13, Appendix F.3.

Figure 14: Custom Clothing: Overall Consumer Attitude – Expert Perspective

The cognitive primary responses of consumer participants to Q #12 showed that the most-liked aspect of custom clothing was its “fit” (8 /13), followed by “realization” of their idea and having “control” over design decisions. The most disliked aspects were “price” (6 /13), followed by “time” required for the customization process, and the “uncertainty” of the end product. Detailed results are illustrated in figure 15 below.

Figure 15: Custom Clothing: Consumer Primary Liked and Disliked Aspects Charts

When considering the all consumer responses to Q #12 per participant, the results showed that the “fit” of custom clothing continued to be the most-liked aspect; having “control” over design decisions was the second liked aspect, closely followed by clothing becoming more “personal”. In comparison, the top three overall disliked aspects remained unchanged starting

with “price”, followed by “time” and “uncertainty”. When analyzing the data by ML segments, and as the results show (Table 13 Appendix F.3) there are possible differences and variations within the segments. For example, most of the *hedonic* female segment disliked its “price”. Although the sample size is small, this remains an interesting observation that warrants verification in future research.

In summary, the contextual baseline approach informed the researcher of the consumer participants’ attitudes towards RTW and custom clothing, and shopping for clothing online. It also revealed their online shopping practices with focus on clothes shopping. Results show that finding the right clothing fit or size is the customers’ main pain point in RTW clothing; cost is the main deterrent from custom clothing; and uncertainty is the main dislike and / or barrier to clothes shopping online. Knowing these results helps the researcher understand consumer participants’ main pain point, and motivation to use an alternate product/service such as apparel MC, and co-design online.

4.3 Consumer Attitude

To fulfill the objective of this study of exploring consumer attitudes towards apparel MC and co-design, consumer participants were asked questions about their feelings, likes and dislikes, personal impact, prioritization of clothing co-designed by, and customized for, them. Expert participants were asked about their perspective on these topics. The following describes the results and findings of consumer and expert participants’ responses on each of these topics.

Consumer attitude towards co-designing clothing was examined in interview Questions #13, #14 and #15 (Appendix B.1). Responses by consumer participants measured their attitude as ‘positive’ or ‘negative’ (Table 14, Appendix F.4). The responses to Q # 13 about prior experience in co-design showed that 8/13 (62%) of consumer participants have some clothing co-design experience across gender. However, while males and females reported having co-

design experience at equal ratio, the type of experience varied. Males primarily had co-design experience with a professional tailor and online co-design tools, while females had more experience with physical co-design tools such as paper patterns, and made / sew the apparel they co-designed. In response to Q #14 on how they felt about co-designing their own clothing, the consumer participants expressed positive feelings, and that they felt “great”, “rewarded”, and ‘in control’ of design decisions. Although expert participants validated consumers’ interest in co-designing their clothing, they emphasized that consumers did so with limited involvement and time commitment. The responses to Q #15, on what they liked and disliked about co-designing their own clothing, revealed that most consumer participants across ML segments liked making design decisions. However, most disliked spending “time” on the co-design and customization process, and those who did were identified as G/U and I/H segments.

There were 3/5 male consumer participants who had experience in custom clothing, and only 2 of these 3 had experience in co-designing a men’s shirt online. However, each of these consumers used a different online provider, and described a different experience. The younger of the two was a novice in custom clothing, and the online co-design experience was his first. He expressed highly positive feelings and excitement towards his first experience co-designing his shirt online using a design toolkit application on his cellular smart telephone. He was happy with the ease of using the co-design tool kit, the options, variety, and the end product (shirt’s fabric, fit and colour), and the “no risk” two-way free shipping service (2 weeks). He enjoyed the online video application for body measurement (1 minute duration), and seamless online ordering process. He expressed pride in his achievement, was thrilled to share his success story with his friends, and highly recommended it. He described his experience as follows:

They [the provider] actually fit the shirt to you using a phone app, it is absolutely great, it is awesome. It allows you to pick the collar, pick your cuffs, whether it is one button or two buttons, to pick the bottom of the shirt whether it is long or straight, and

pick the fabric and the pattern as well. They give you a mock up of what is going to look like, and then you actually you get to see when it comes in the mail. The choices I love to make the different cuffs, the collar... the pattern. ...To be honest nothing to dislike really because it is so new, may be if I kept using it I wouldn't. Their consumer service is phenomenal, it is delivered to my door in good time and it could have taken for ever, umm to be honest the experience was really good (22 yrs. I/U male).

In contrast a male participant who had extensive co-design experience with a traditional tailor, expressed a different perspective of the online process. Similar to the participant above, he liked making design decisions and personalizing clothing to fit his body and personality, which he summed as “The designing experience is I get what I want. ...What I enjoy is I get what I want, and I design what I want, and it is totally my personalization”. Although he liked the outcome of the co-designing process he expressed issues encountered at retail and online. His retail co-designing experience was related to the challenge of finding a good tailor that understood his vision, the time wasted during repeated visits for fittings; also, once he had achieved the perfect fit, he would have to spend more money than initially planned, as he was motivated to order additional clothing to save time in the future. His online co-design experience was related to product knowledge in terms of material quality, colour and the instructions on body measurements. He described his experience as follows:

First issue online I faced is the material quality... the problem is most of the material online the colour is either lighter or darker it is not like how you see it on the screen, and the material quality it tends to be different [than expected]. When it comes to design and customization ... measurement is a big big issue online ... instructions need to be very clear on how to do them, and why. I did measurements to online custom made ... but they do only shirts for men (33 yrs. I/H male).

Similar to the male participants' experience described above, females liked making co-design decisions. One of the consumer participants who co-designed and made her own clothing, described how she liked the creative process finding it to be rewarding, but disliked the effort and cost involved:

Yeah... I do... I do like it. You get to choose everything. You get to choose the fabric, you get to choose the pattern, and you can even modify the pattern a little bit... and just the creative decisions are pretty rewarding. (Dislike) It takes a lot of effort and ...it's actually not cheaper, these days it's actually more expensive, fabric is pretty expensive (41 yrs. G/H female).

Another female consumer participant, who co-designed and made her own clothing, described her experience as fun. Similar to the I/U male above, she was proud to tell her friends that she made it; and similar to the G/H female above, she disliked the cost, time, and feared making mistakes due to her lack of experience. She described her likes and dislikes as follows:

[Like] the idea of creating something, and it was fun to make, something practical that I can actually use, and kind of show other people that I've made it.... And it was fun to pick up the fabrics... it was fun to being part of the creating process. [Because] I was creating something... I was in charge, I got to show it off a bit to... friends, and ...they would say where did you got that?? Oh... I made it ...[Dislike] ultimately it's not always cheaper... it is time consuming... and...you have to buy a lot of extras (41 yrs. G/U female).

Lastly a female participant, who co-designed her clothing through a traditional tailor, expressed pride in her creation, and credited her tailor for making a quality product that matched her vision. Similar to others above she disliked the time it took to produce a tailored piece of clothing:

What I like about it, my tailor is very good, I am rest assured that she will get the style, she is not going to mess it for me, and it is going to fit appropriately. I know that when I wear something from her people always ask me where I got it. But what I do not like about that is it takes a lot of time (2-4 weeks). That is major disadvantage (25 yrs. I/H female).

In summary, the above results shed light on consumers' feelings, likes and dislikes of clothes co-design. They tended to value being involved in the co-design and personalization of their clothing, and felt proud to share their success stories. They disliked the cost and time required for the traditional custom clothing process at retail. However, those who co-designed a shirt online had a different experience. The participant who was a novice in custom clothing

rated his online co-design experience as highly positive; by contrast, the participant who had prior experience in custom clothing did not express positive feelings. The reason was that the clothing material and colour were misrepresented on screen, and the online body measurement instructions were unclear.

Consumer participants were asked during the interview (Q #16, Appendix B.1) to describe how they felt, or expected to feel, when wearing custom clothing co-designed by them. Based on their experience, experts were asked during the interview (Q #8, Appendix B.2) if they were aware of any personal impacts this experience had on consumers. Table 15 in Appendix G shows the results of the analysis of consumer and expert participants' data. The following identifies and interprets the results of consumer and expert participants' responses, and highlights those added by experts.

The primary results show that 12 out of 13 (92%) consumer participants, across ML segments, expressed positive feelings (good / happy, special, excited, achiever, proud and comfortable) towards wearing clothing they co-designed in the past, or expected to co-design in the future. Caution was expressed by 1 out of 13 (8%) participants, regarding the fact that the outcome depended on the quality of the "tailor". Details are illustrated in figure 16 below.

Figure 16: Custom Clothing: Primary Personal Impact Chart

The overall results of consumer participants showed further increase in positive personal impacts (knowledgeable, empowered, satisfied, and unique). Comparing these results with the experts' feedback showed that, overall the experts (4/11 responded to this question) validated several positive personal impacts (great, special, comfortable, confident and incredibly satisfied); and contributed two additional impacts (personal brand and feeling loved) as illustrated in Figure 17 below.

Figure 17: Custom Clothing Co-design: Personal Impact, Expert Perspective Chart

Consumer participants revealed deep emotions when they described the personal impacts they experienced wearing a piece of clothing they co-designed. As an example, one of the male participants, who co-designed his shirt online, described how excited and happy he felt to wear a shirt that was made just for him. Other reasons for his excitement included him taking part of an innovative concept, that of apparel MC and co-design, where its online design tool kit technology gave him control of the future product, and a unique experience he could share with his peers.

I was excited, definitely excited I was... happy for sure. ...Because one thing I like about this experience is I like innovation ... wearing it felt really good, and it was exciting again because you can tell people and share your experience (21 yrs. H/U male.)

An additional insight came from a male participant who, although did not have past experience in co-designing his clothing, knew friends who did. His response differed as he felt that he was given the freedom to express himself; he felt empowered by the knowledge he acquired while engaged in the co-design and customization process; he described it as follows:

Freedom...I think being able to have ... customized clothes that ... suit my personality would be great ... I think proud and knowledgeable ... I feel a little bit more ... Intelligent in terms of what I am wearing. You are going through the process right? So you're almost feeling like its part of you.... You kind of become more involve, and I think that can feel empowered (21 yrs. G/U male).

A female participant, who did not have previous experience in clothing co-design and did not *trust* her own ability to make design decisions, described her feelings as happy and proud to wear co-designed clothing, however added that she would be equally happy had someone else who knew her well, designed it for her. This information provides insight into the importance of knowing the consumer preferences well, and in making a product that embodied them. Below is a quotation from her response:

I would feel good... But I do not know if I am more happy that I am part of it, than if someone who knew me really well and made it, and then this is really nice, and I probably would be equally happy enjoying the process (29 yrs. G/U female).

Another one came from a female participant, who had a previous experience in co-designing clothing with a tailor. She trusted her ability to make design decisions and prided herself on being unique. She stated that wearing unique clothing co-designed by her made her feel confident, as per her response:

I feel good, feel different umm, because I know it is unique, it is my style, I feel better because I know people are going to ask me oh this style is so nice, how did you have come up with it? So it is usually... a nice feeling. Feel confident (24 yrs. I/H female).

The results described above reveal a strong personal impact that clothing co-designed by its consumers had, or could have, on their wellbeing (feeling well and or good / happy). According to the consumer participants' information validated by the experts, the personal impacts of wearing clothing co-designed by its wearer could trigger strong positive emotions, or a state of being. These included feeling "great, special, confident and incredibly satisfied". Perhaps these results, once verified further in a quantitative study, could prove the strongest indicators to promote and advocate for engaging consumers in co-designing their clothing.

An important insight that addresses designers' attitude towards co-design came from one of the industry experts interviewed for this study. This expert commented on apparel designers "fear" of leaving design decisions to consumers, and observed that apparel designers tend to have a strong desire to 'control' the outcome of their creation. This insight will be discussed in the conclusion section below.

The following describes results of the data analysis of clothing customization priorities as identified by consumer participants, and validated by experts. This data includes clothing details or the level of customization most important to them, followed by clothing type or item, and clothing category, or the occasion it would be worn at. Knowledge of consumer priorities contributes to understanding consumer attitudes towards apparel MC and co-design. Consumer and expert participants knowledgeable in tailoring were asked in the questionnaire to prioritize clothing elements labeled under three classifications: Clothing Details, Clothing Type and Clothing Category. Consumer participants answered section (c), Appendix C.1; and expert participants with expertise in tailoring (2) completed section (a), Appendix C.2. Following are the results of their responses. They were asked to classify according to priority (1- first priority; 2 – second, and so on).

The priorities of ‘Clothing Details’ included size, silhouette, material, colour, and graphics. The mean results showed clothing size were selected as the first priority to customize by consumer participants across gender, and was validated by expert participants. This finding confirms earlier results by consumer participants when they identified ‘size’ or “fit” as their most disliked aspect of RTW clothing, and their highest liked aspect of custom clothing. Other priorities differed by gender and by expert. For example, the mean results showed that males selected clothing material and silhouette as second and third priority, compared to clothing colour and material selected by experts. Females selected clothing silhouette and material as second and third priority, compared to expert participants who selected the same except in reverse order. The numerical data of these results is shown in Table 6 below.

Table 06 _ Clothing Detail Prioritization

Male n=5, Female n=8; Expert n=2; 1= first priority

Clothing Detail	Size	Silhouette	Material	Colour	Graphics
Overall Priority	1	2	3	4	5
Overall Priority - Expert	1	3.5	2.5	3	5
Male Priority	1	3	2	4	5
Male Priority - Expert	1	4	3	2	NA
Female priority	1	2	3	5	4
Female priority - Expert	1	3	2	4	5

The priorities of ‘Clothing Type’ included items worn by males and females such as suit, pants, jacket, shirt, top, vest, skirt and dress. The mean results showed that male participants rated customizing of a shirt as first priority, followed by pants, and a top. In comparison, expert participants validated the first two priorities and selected a suit as the third priority. Female participants rated customizing a dress as first priority, followed by a suit, and a skirt. In comparison, expert participants selected a skirt as first priority, followed by shirt, and pants. The numerical data of these results is shown in Table 7, and is summarized below.

Table 07 _ Clothing Type Prioritization

Male n=5, Female n=8; Expert n=2; 1= first priority

Clothing Type	Suit	Pants	Jacket	Shirt	Top	Vest	Skirt	Dress
Male Priority	4	2	6	1	3	5	NA	NA
Male Priority - Expert	3	2	4	1	NA	5	NA	NA
Female Priority	2	5	4	3	5	5	6	1
Female Priority - Expert	6	3	5	2	7	0	1	4

During the interview some of the participants indicated why they preferred to customize one item to another. A male participant explained his reason for choosing to customize “shirt” and “pants” as top priorities because they were “part of you” more so than other items:

Jackets and sweatshirts you do not really need them just to fit you, so I would not necessarily be willing to pay extra. But the stuff (shirt and pants) that you wear, that is more part of you, like you do not take off like a jacket, that is definitely (21 yrs. H/U male).

Similarly, female participants’ reason(s) for identifying a “dress” as first priority was revealed during the interview and indicated that a “dress” is the one-piece of clothing that can compliment her body type:

I think dresses are big hit and miss for me in terms of buying them in stores, so that's definitely I want to do [customize] a dress, that fits my upper body and my lower body (24 yrs. G/H female).

Another believed that a custom “dress” had the potential to differentiate her from others:

Particularly with a dress you want to look very distinct from another person, it doesn't have to be colourful or anything, it could be a black dress but the cut is very fitting to you and fitting to your body, something about it a little bit unique so there is no duplicate of it (29 yrs. G/U female).

The priorities of ‘Clothing Category’ included “formal, business casual, casual/leisure, special event, arts, uniform, and sports wear”. The mean results showed “business casual” as the first priority for consumer participants across gender; in comparison “formal” wear was the

expert participants choice. This was followed by “formal” and “casual/leisure” as second and third priority for male consumer participants, while “special events” and “business casual” were the expert participants’ choices. Female participants showed “special events” and “formal “ wear as second and third priority; in comparison expert participants validated the second priority of “special events”, and identified “business casual” as the third priority. The numerical data of these results is shown in Table 8 below.

Table 08: Clothing Category Prioritization by Gender

Male n=5, Female n=8; Expert n=2; 1= first priority

times	Business Casual	Formal	Special Event	Casual / Leisure	Sports	Arts	Uniform
Overall Priority	1	2	3	4	5	6	7
Overall Priority - Expert	3	1	2	5	NA	4	6
Male Priority	1	2	4	3	5	7	6
Male Priority - Expert	3	1	2	4	NA	NA	NA
Female Priority	1	3	2	4	5	6	7
Female Priority - Expert	3	1	2	5	NA	4	6

These results show across gender consumer participants were in agreement on the first priority to customize “business casual” clothing, however the expert participants selected “formal wear”. There was no clear reason behind these results during the interview. One possibility is that “business casual” is the clothing category worn and used the most by most of the participants in this study. More research is needed with larger sample to confirm these results and to provide reasons behind them.

In summary, the questionnaire results on the prioritization of customization revealed that consumer participants identified what is important for them to customize. Across gender, they selected clothing “size” as the first customization priority under clothing detail; males selected “shirt” and “pants” and females selected “dress” and “suit” as the top items to customize under clothing type. The motivation behind the male’s selection was that “shirt” and “pants” were viewed as an extension of the body; the motivation behind the female’s selection of a “dress”

was twofold, to complement their body type, and its potential to differentiate them from others. Finally, across gender, they selected “business casual” wear as their first priority under clothing category. Only two expert participants knowledgeable in tailoring answered the questionnaire. Although they validated few of the consumer participants’ priorities, their sample was too small to consider in this case.

4.4 Consumer Adoption

To further explore consumer attitudes towards apparel MC, it was important to examine their willingness to adopt this concept. To this end consumer participants were asked several questions that focused on their adoption needs and willingness to pay and wait for clothing they co-designed; and expert participants were asked to share their perspective on adoption needs.

Adoption Needs

During the interview consumer participants (Q # 17, Appendix B.1), and expert participants (Q # 13, Appendix B.2) were asked what needs to happen for consumers to feel comfortable customizing/co-designing clothing online. The results (Table 16, 17, Appendix H) show three leading adoption comfort needs: design ‘coaching’, design “options”, and ‘trust’ in the brand were highest for consumers, and “price” was rated highest by experts. A comfort need expressed by few consumer participants was for business ‘transparency’ (Figure 20, Appendix H). Four comfort needs were identified solely by expert participants, with the top being the need for a consumer “community” presence both on and offline (Figure 21, Appendix H).

Coaching: The need for online design ‘coaching’ was identified by 5/13 (38%) of consumer participants, and validated by 2/10 (20%) of experts. Consumer participants interpreted this need as an interaction with a design expert to validate their design decision, learn their personal style, and offer advice and suggestions to improve it, one describing it as follows:

One of the things about online shopping it is very independent, and ... interaction there with someone else would be a big thing for me, if I were to customize clothes online (21 yrs. old G/U male).

Expert participants, on the other hand, seemed to understand coaching as less personal, such as offering a “*fashion guide, shape that enhances the body type*”, and providing advice on the website.

Options: Similar to ‘coaching’, the need for design ‘options’ was identified by 5/13 (38%) of the consumer participants; and was validated by only 1/10 expert (10%). This need was interpreted in various ways by consumer participants such as having “*lots of options*”, and “*access to fabric catalogue*”, or as “*option, choosing your size...colour*”, or as “*limited number of options*”; and experts interpreted “*options*” as “*simple choices*” to avoid confusion, and *paradox of choice*.

Trust: The need for online ‘trust’ in the brand was identified by 4/13 (31%) of consumer participants, and validated only by 1/10 (10%) expert. Consumers interpreted ‘trust’ as “solid reviews /testimonials” from people they trusted and the brand’s reputation, both of which contributed to build confidence in product. One of the consumer participants described it as:

Trust, reputation in customization. Review from someone that used them. Personally I cannot take my clothes to any tailor that I do not know or know anyone that sews with them to be very honest. Because, there has to be a word of mouth, you as a tailor you are telling me you are good but I do not know anyone that used you so that is very risky (24 yrs. I/H female).

Expert participant interpreted this need by using the marketing term “*trusting the brand*”.

Price: Expert participants identified “*price*” or “*cost*” of customized clothing as the highest adoption comfort need. It was identified by 5/10, (50%) of experts, and 1/13 (8%) consumer participants. Although “*price*” was not considered very important for consumer

participants in their response to this question, they did identify it as the aspect they disliked the most about custom clothing.

Community: The highest adoption comfort need solely identified by expert participants was that of “community”. They interpreted the need for “community” as psychological, and functional support system for online consumers. They highlighted its role in helping consumers feel part of a special “community” that shared the same interest. Experts perceived online “community” as a meeting place in cyber space that united like-minded consumers, and facilitated their exchange, fostering collaborative learning and creativity. One expert described it as follows:

There needs to be a connection with a sense of community... clothing is very much about our sense of self within a larger sphere. So if there is going to be that engagement of people then it has to be something that is inclusive, or it actually acknowledge that it is not a act that happens in isolation... Our preferences of clothing are actually leaning heavily on the way we socialize. So if there is a way online for individuals to connect, and share...If there is some means of linking people up so they are connected with the broader community... pick for customization will come with that.

Business Transparency: The need for business transparency was identified by one consumer participant, as an adoption comfort need; however, none of the expert participants included this need in their response. The need for business transparency was described as clothing that are “ethically made. Know who made it, and where.” As consumer awareness of the social, economic and environmental impacts of the apparel industry rise, so does the need for ‘business transparency’.

Consumer participants (Q #18, Appendix B.1) and expert participants (Q. #14, Appendix B.2); were asked during the interview what elements need to be present for consumers to consider co-designing/customizing clothing online. The results (Figure 19; Table 16 and 17 Appendix H), and data analysis by ML segment show that online ‘tools’ were rated as highest

element needed by consumer participants to consider adopting apparel MC. This need was identified by 9/13 (69%) of consumer participants, and validated by 5/9 experts (56%). The term ‘tools’ in this study encompasses three categories: ‘*easy to use*’ tools, ‘*web design*’ tools, and product ‘*visualization*’ tools. The findings showed that the language, and in some cases content, used by the consumers to describe them differed from that used by the experts. Experts tended to use professional, technical and system related language, and consumers used terms familiar to online users. The following presents highlights of these findings and includes direct quotations from consumer and expert participants.

Easy To Use Tools: Consumers described ‘easy to use tools’ as “*convenient to use ... not complex*”, and as “*very easy to use tool ... really interactive tool ... quick to make changes.*” Another specifically identified body measurement tools describing the need for “*proper and easy to use measurement tools.*” While, experts used professional terms stressing the need for quality, and describing it as “*the way how choice has to be presented to get this kind of flow feeling.*” and “*it has to be forgiving*”. These descriptions by consumer and expert participants provide a mental image of what they expect from an ‘easy to use tool’.

Web Design Tool: Consumer participants identified several needs under this category. The need for simplicity was described as “*several drop down menus segmented into different aspects*”. The need for clarity as “*the instructions need to be clear when it comes to the measurements*”. Another participant expressed his need for a clear process, asked the website design to “*explain the process... lets you know what is happening*”. The need for realism was described as “*show fabric pattern as true scale*”. Another expressed the need to trust design “*options*” as, “*the right fabric... both textures... as well as colors, and ... lots of different patterns to choose from*”. A female consumer participant expressed her need for guidance and asked for “*pre-set questions... that help you determine certain things [type, cut, material,*

colour etc.]". Another expressed a need for recommendation system to provide "*the predictability of what would fit and what would look nice... captured in a module would be cool*". Another participant, who loved learning, expressed need for "*a tutorial on how to do things and ... a section for questions*". One unexpected response came from a 65 years old I/H female participant, as she expressed a desire for customizing her personal style from RTW clothing options. She expressed a need for a website that can show "*a variety of different pieces that I could put together. So lots of different styles, lot of options, and easy to do because... to me it would be like a fun game*". Her response indicates that some consumers are more inclined to create their own style with RTW clothing, than to co-design it.

Experts described "web design" tools in different ways using technical terms. One of the experts expressed the need for "*smart coding*". Another expressed the need to educate consumers providing them with, "*knowledge about body type, colour, fabric, type of design*". Another suggested a new way of approaching apparel co-design by collecting consumer preferences, he gave an example of co-designing a car online, "*If I buy a car now, I can go to the internet and I can build my car and change it a little bit, but it is only from my point of view, there is no expert that is telling me, I have to tell a little bit about myself, what I like and what photos I do not like, what my family likes and do not like, and based on this information they get my preference together with the designer, then you can make something. That is real co-design*". This last insight suggests engaging the consumer early in the customization process, learning their preferences before presenting them with a variety of co-design options. This approach promises a co-design toolkit with a personalized solution space for the end user.

Visualization Tools: Consumer participants described 'visualization' tool as having access to large volume of quality pictures. This was well described as "*lots of pictures from all angles, either on a model or on a mannequin ...[to] see how it actually is draped over*". While an

expert participant expressed that for end users “*the UX and UI, and being able to visualize their product would be the most important part*”. Another expert expressed the need for “*process transparency, visualization that you realize where you are in the process*”. Based on industry knowledge another expert added that, “*if consumer saw the products of other consumers through the same medium, they will feel more comfortable with what they are purchasing... [experience showed that] having a real image of the product [on screen] sells more than rendered images*”. Another made a reference to gaming websites such as the *Second Life*, where user can build and dress their own avatars online.

The above findings provide a good idea of what online ‘tools’ consumers need to consider adopting apparel MC; they also provide the experts’ perspective that expanded on the consumers’ data, and suggested future improvements. This area suggests that there is an opportunity for product and UX designers to develop a desirable website design and visualization tools that are easy to use. This also is an indication that co-designing with potential end users can bring added value to the designer, the project and the end product.

Willingness

To gauge future intentions to adopt apparel MC and co-design, it was important to learn how willing will consumers be to pay extra (Q. #20), and wait (Q #21, Appendix B.1) for clothing they co-designed? The following discusses the results and data analysis of their responses:

Willingness to Pay Extra: Results have shown that although all consumer participants like to co-design custom clothing; only 11/13 (85%) were willing to pay extra for it (Table 17, 18, Appendix K.1). The results showed a wide range of paying levels. It was as low as 50% less and as high as 250% more than the retail price. Due to this wide range the results were grouped in three paying levels: Level 1 from 50% less to 0%, level 2 from 10% to 60%, and level 3 from

100% to 250% more than the retail price. Detailed analysis of the maximum amount the consumer participants were willing to pay by ML segment show high relation between level 3 and ‘Group’ segment. These results are illustrated in Figure 22 Appendix K.1.

Participants’ questionnaire data of RTW clothing fit issues (section (a), Appendix C.1), and interview data of willingness to pay extra were examined. The following is data analysis results that shed light on possible reasons for willingness to pay extra identified per paying level.

Level 1 consisted of 2/13 (15%) consumer participants (0 M/ 2 F) identified as I/H segment. They were interested in apparel customization, however one was unwilling to pay more, and the other was expecting to pay less than retail price. The first participant was retired, was unwilling to pay more, and explained this saying: *“because fast fashion is so tempting and so inexpensive. ... I don't spend a lot of money today. Years ago I did but now that I am retired, I have all the suits I need in the world”*. The second participant was an under-graduate student, and her reason for willingness to pay 50% less than retail was to customize a copy of an expensive designer garment. In addition to these reasons the median results of their body area/participant with RTW clothing fit issues was as low as 2, coupled with low BMI (underweight, and low end of normal-weight). These results indicate that low BMI, the stage in life (retired, and student), which may have affected their budget are possible reasons for their unwillingness to pay more for custom clothing.

Level 2 & 3 were interested in and willing to pay extra. Level 2 formed the majority of the sample or 8/13 (62%) consumer participants (4 M/ 4 F), who were willing to pay 10% - 60% extra. Level 3 consisted of 3/13 (23%) consumer participants (1 M/2 F) who were willing to pay substantially more, that of 100% - 250%. Participants’ reasons for willingness to pay extra seemed to relate to various factors. This included, but not limited, to their stage in life (mostly

graduate students and working professionals), which also affected their available budget. Their median of body area/participant was 2.75 for level 2, and 3.33 for level 3. These results indicate that the higher this median is, the more willing pay extra the participant are. However, for some participants, getting well-fitted clothing was not the only reason; other reasons included getting higher quality material, and having more control over personalizing their clothing. In addition, the willingness to pay extra may be influenced by the social occasion, and the level of customization level required. The following quotations from interview responses support these findings.

[Willing to pay extra] because the quality would be better, the personalization will be there... 10% to 20% max for customizing the size, and rest for better quality and personalization (33 yrs. old I/H male, overweight).

And

Depends on what I am customizing.... I would say the online customization would have different prices... major event it is going to be... more expensive than customizing for something (not major)...Depends on the material and on the style (25 yrs. old I/H female, normal weight).

And

If it would be customizing... the details like either the colour or the cut or the sleeves or the collar, or anything like that, I think I would be willing to pay 50% to 80% more ... If it is customized completely to me I would be willing to pay 100% to 150% more I think (24 yrs. old G/U female, normal weight).

These results provide insights on some of the motivations behind consumers' willingness to pay extra for clothing they helped co-design. These findings emphasize that consumers expect to pay more for deeper level of customization; the importance and high profile of the social occasion where the clothing would be worn also affected their willingness to pay a higher price. Interestingly, a portion of the 'Group' segment was willing to pay substantially more than the rest, a topic for further validation in a quantitative study with a larger sample.

Willingness to Wait: Results (Table19, Appendix K.2) show that all consumer participants were willing to wait. They also showed a wide range of waiting periods, from 1 to 4 weeks. Due to this wide range these results were grouped into three levels using maximum waiting time. The maximum waiting period for level 1 was 2 weeks, level 2 was 3 weeks, and level 3 was 4 weeks. Detailed analysis of these results by ML segment showed high relation between level 3 and ‘Group’ female segment as illustrated in figure 18 below.

Fig 18: Maximum Willingness to Wait by Segment

These findings showed that most consumer participants, across ML segments, were willing to wait a maximum of 2 weeks. Followed by consumer participants, identified as I/H, I/U, and G/U, were willing to wait for 3 weeks. An interesting observation was that ‘Group’ segment (G/H and G/U) was willing to wait the longest of 4 weeks. These insights would need to be validated in a quantitative study with larger sample.

4.5 Summary

This chapter identified results and findings per key theme. Collectively the results answered the main objective that of exploring Canadian consumers attitudes towards apparel MC and their willingness to adopt it. This chapter presented the ML segments of the consumer participants; examined a contextual baseline; presented consumer participants' attitudes based on past experience in RTW and custom clothing, and online shopping; identified consumer participants' attitudes towards clothes co-design, and the personal impact it had on them; determined their priorities across three classifications of custom clothing: detail, type, and category; identified consumer participants' needs to consider adopting clothes co-design online, and finally, their willingness to pay extra and wait longer for it. Where applicable, expert participants' results were compared to that of consumer participants', validating and in some cases adding new data, and suggesting improvements.

The results of consumer participants' sample segmentation showed most were identified as G/U across gender. Most had positive feelings towards RTW clothing, however they disliked the "fit", and reported problems with the way RTW clothing fit certain part(s) of their body. Although all shopped online, not all did so for clothing.

Most consumer participants expressed positive attitudes towards custom clothing and co-design. They also expressed concern with its "price" and the "time" required for the customization process. They expressed the highly positive personal impact of wearing custom clothing has on them. Expert participants validated most consumer responses and added a few of their own.

Results of customization prioritization showed consumer participants' first priority was to customize the clothing "size" and "business casual" wear across gender. The males prioritized a "shirt" followed by a pair of "pants", and the females prioritized a "dress" followed by a "suit".

Expert participants validated some, but not all priorities. Lesser priorities by gender were also identified.

Results of clothing co-design adoption needs identified four important factors: “trust” in the brand, design “coaching” online and live communication with the designer, variety of “options”, and intuitive and interactive online “tools” for co-designing clothing. The industry expert participants validated all, however cautioned to keep the “options” simple, as the contrary could cause consumers to be overwhelmed and abandon the co-design operation. The expert participants added the need for an online consumer “community” of like-minded co-designers as a supportive network. While consumer participants expressed need for ‘business transparency’ that was absent from the expert results.

Results of willingness to pay extra and wait for co-designed custom clothing showed most consumer participants were willing to pay extra, and all were willing to wait. Their responses were categorized by their degree of willingness and analyzed by ML segment.

5

CONCLUSION

This chapter discusses and concludes major findings and insights on consumer attitudes, and potential adoption of apparel MC and co-design. It is organized in two sections: Discussion and Conclusion.

5.1 Discussion

This section highlights the significance of the study's preliminary findings and insights, and examines the extent to which they are supported by academic literature. The discussion is undertaken along key themes: Consumer Segmentation, Contextual Baseline, Consumer Attitudes, and Consumer Adoption.

Consumer Segmentation

The results of consumer sample segmentation in this study could not be compared to the literature, as it is the first ML segmentation to use social tendency in conjunction with shopping behaviour by gender. More than half of the consumer participants were identified as Group/Utilitarian (G/U). The 'Group' segment (G/U & G/H) across shopping behaviour and gender, correlated with the highest levels of consumer willingness to pay and wait for co-designed clothing. These findings signaled that the social tendency segmentation has the potential to provide consumer data that would be of interest to the apparel industry in general, and apparel co-design in particular. This preliminary finding needs a quantitative study with much larger sample to validate its relevancy to consumer research.

Contextual Baseline

The data analysis results of consumer participants' attitudes towards RTW clothing revealed that most disliked not finding their "size", and all experienced difficulties fitting

clothing to at least one area of their body. These findings are supported by several studies (LaBat & DeLong, 1990; Goldsberry et al., 1996; Sindicich, 2008; Sindicich & Black, 2011; Chattaraman et al 2013). Consumer dissatisfaction with the fit of RTW clothing could act as one of the motivators for them to consider custom clothing. Although custom tailored clothing offered at retail has been done for years, offering it online seems to have similar challenges to that of purchasing RTW clothing online. Most of these challenges revolved around misrepresentation of clothing “size”, fabric “colour” and “quality”. The uncertainty of clothing “fit” or “size” was also a barrier for those who did not shop for clothing online. An insight came from one male participant who did not shop online for clothes, but did so for shoes. He did when he was certain of the shoe’s “*brand*” and “*size*”, and shopped for accessories (ties) where uncertainty was low and “*fit*” was not critical. This suggests that well-known clothing brands with a reputation for consistency in “*size*” and “*quality*” could persuade consumers to buy their products online. However, unknown clothing brands would need to consider removing or lowering consumer uncertainties of clothing fit/size, and colour and quality representation on screen.

The results of examining the attitudes of the consumer sample towards custom clothing showed that some “need help” with the customization process. This finding is supported by a study in the US (Ulrich et al., 2003) that focused on female college students. This finding showed that the “need help” in the co-design and customization process was present across genders. Other preliminary findings further contributed to the limited literature on custom clothing, showing that most consumer sampled expressed positive feelings towards custom clothing; they most liked its right “*fit*”, and feeling in “*control*” of its design decisions; and most disliked its “*price*”.

Consumer Attitude

This section provides synthesis of the results of consumer attitudes towards three key themes: Co-designing Clothing, Personal Impacts, and Priority by gender of clothing co-designed by the consumer.

Co-designing Clothing: Most consumer participants, across gender, expressed positive feelings towards co-designing clothing. Several studies supported the user's feeling of "joy" (Ulrich et al., 2003) after co-designing a formal suit, and a t-shirt online (Kamali & Loker, 2002). This study's findings contribute new data to user's positive feeling in this context. This includes users feeling "*great*", and in 'control' of 'design decisions' about co-designing clothing. Additional contributions include that most of consumer sample disliked the aspect of the "*time*" required to co-design clothing. This study also noted a positive relation between certain findings and consumer segments. For example, there was a positive relation between feeling in 'control', and 'Individual' male segments; between feeling "*great*" and 'Utilitarian' male and 'Hedonic' female segments; and between the dislike of "*time*" required in the co-design process and G/U and I/H segments, across gender (Appendix F.4). These findings need validation to identify niche consumer segments and their corresponding attitudes in the context of apparel MC and co-design.

In addition, expert participants' data relevant to consumers' interest in clothing co-design was partially supported by literature (Ulrich et al., 2003; Al-Mousa, 2005; Kamali, & Loker, 2002). Consumers' "*high interest*" was supported, while their "*low interest*" was not; thus it is considered as new contribution to literature. The expert sample contributed data that explained possible reasons for the consumer's interest level in clothing co-design. This included consumers' lack of "*time*" to perform the co-designing activity and the "*skills*" required for

them to do a good job at it. These findings need further validation to identify consumer interest levels in apparel co-design examined by ML segment.

Personal Impact: Limited studies (Franke et al.2010; Kusnezov, 2012) identified a relation between one's feelings and co-designing clothing, however they did not provide an in-depth discussion on the impact that co-designing of clothing has on the wellbeing of its wearer. The findings of this study provided insights to these personal impacts, such as that of feeling “great /happy”, “special” and “confident” when wearing clothing one has co-designed, all of which contribute to one's wellbeing. The experts interviewed have validated these findings, however a larger sample is needed.

Prioritization: Literature on consumer priorities within apparel co-design has been limited and conducted using discrete consumer segments, mainly focused on females. The findings in this study contribute to literature by provide consumer prioritization of custom/co-designed clothing by gender across three levels: (a) clothing detail, (b) type, and (c) category. Compared to literature these findings showed more differences than similarities. The reasons for these differences are unclear, and may be related to sample characteristics such as its size, age group, culture, and personal preferences. These findings contribute new data on Canadian consumers to the literature , in the context of apparel MC and co-design. The following discusses the findings of consumer priorities per clothing details, type and category, by gender.

- a) *Clothing Details:* Consumer participants selected the “fit” or “size” of clothing as their highest priority. The expert sample and literature (Anderson-Connell et al., 2002, Kamali, & Loker, 2002) supported them. But unlike the literature that focused on female consumers, these findings were across gender. In addition, unlike other studies (Park, 2004), that focused on mostly female college students, these findings contribute new

consumer segmentation data that considers social tendency and wider range of age groups (21-65) across gender.

It is noted that while the above findings show clothing “*size*” as the top priority for customizing clothing, and ‘*graphics*’ the least, the literature showed that more of the latter is available in apparel MC consumer market (Walcher & Piller, 2012). This observation signals a gap in the market’s responsiveness to consumers’ first priority (size), across gender and particularly for females.

- b) *Clothing Type*: Limited literature was conducted in the US, and focused on female university students. Its findings showed that the females’ priority was to customize a t-shirt first, bottom second, and top third (Kamali, & Loker, 2002). Although these findings provided data on female priorities, it lacked specificity of *clothing type*. To this the findings of this study contribute specific data of clothing type and across genders.
- c) *Clothing Category*: The limited literature conducted in this area focused on female college students, and provided data on cultural differences between Saudi Arabia and the US. Its findings showed that Saudi female students’ priority was to customize eveningwear, compared to casual/leisure wear (jeans) chosen by a similar group in the US (Al-Mousa, 2005). In contrast, the findings in this study contribute new data to literature by identifying customization priorities to 7 specific clothing categories, across gender, and for a Canadian context.

Consumer Adoption

This section provides synthesis of the results of consumer attitudes towards two key themes: *Consumer Adoption* of clothing co-designed by them online, and their *Willingness* to pay and to wait for it.

Adoption Needs: Data analysis results showed that some adoption needs were obvious to experts but not to consumer participants, and visa versa. This finding reinforces the value of the multi source approach undertaken in this study, which is important for the examination of a new concept such as apparel MC. The highest need identified exclusively by expert participants was the provision of consumer online “*community*” in the context of apparel MC. This need is supported by the literature (Franke et al., 2008; Wu, 2010). Further studies are required to confirm this need in the context of apparel MC.

Although the need for business “*transparency*” was expressed by few consumer participants, it is worth commenting on in this conclusion. As consumers become more aware of the impact of business practices on society, economy and the environment, they become more knowledgeable and more likely to care about business ethical practices in general, and the apparel industry in particular. In the near future, business “*transparency*” could become an important element that consumers would look for, and expect from brands they do business with. To that end, businesses would benefit from providing “*transparency*” as an integral part of their brand image; this is particularly important to new online businesses that need to build trust with potential consumers.

The findings also showed that consumer participants considered online “*tools*” as primary element for adopting apparel co-design. Although literature (Anderson, et al., 1997 cited by Ou, 2011; Hermans, 2014; Loker et al., 2008) identified consumers’ need for online “*tools*” in the context of apparel MC, the findings were not specific. Future qualitative and quantitative studies could focus on identifying the online tools considered most valuable to consumers to adopt, as they are realistic for businesses to implement.

As presented in chapter 4,,consumer participants identified design ‘*coaching*’, a variety of design “*options*”, and “*trust*” in the brand, as top attributes they needed to feel comfortable

adopting apparel co-design online. These needs were validated by expert participants, and supported by the literature. These findings contribute to the literature in many ways. The literature on design ‘*coaching*’ (Anderson-Connell et al., 2002; Ulrich et al., 2003) focused only on female consumers; this study contributes (to the literature) the voice of male consumer who was as interested in design ‘*coaching*’ as the female.

Equally important to ‘*coaching*’ was the participants’ need for a variety of co-design “*options*”. Although expert participants validated this need, they cautioned that the “*options*” should be limited to “*simple choices*”. This was meant to avoid users’ confusion when faced with too many online design “*options*” to choose from. Both need varieties of “*options*” and “*simple choices*” are supported by the literature. Some support the consumers’ perspective (Kamali & Loker, 2002; OU 2011; Cho & Fiorito, 2009; Park, 2004), while others support the experts’ perspective (Ender, 2010; Lee et al., 2011). To achieve limited or simple “*options*” without losing the consumer’s interest, the approach of “micro communities”, as in the case of *Spreadshirt* brand that offers t-shirts co-designed online (Ender, 2010), is a practical one; as this approach provides consumers with only the choices that matter to them. In support of this approach, one of the expert participants raised the need to increase communication between the brand and online consumers. He suggested that the brand first establish the consumers’ life style preferences then present them with design “*options*” that fit with their preferences (expert interview). This approach would provide online consumers with personalized co-design choices that make sense only to them, while avoiding the “paradox of choice” phenomenon. This topic is worthy of further research in the context of co-designing apparel online.

The second highest adoption comfort need was that of consumers’ “*trust*” in the brand. The need for “*trust*” seems universal especially for online brands, perhaps because they do not have a physical presence that consumers can associate them with. This finding is supported by

limited studies in the context of apparel MC: one study focused on female consumers in the US (Cho & Fiorito, 2009), another focused on cultural difference between college students in the US and Taiwan (Cho, 2010). This study contributes to literature by identifying the importance of “*trust*” in relation to other adoption comfort needs and data across genders.

In addition, this study identifies an unexpected new apparel co-design concept that may help consumers create their own personal style, in the form of an easy-to-use online application. This came about in a response by, the eldest (65 yrs.) I/H female, consumer participant who loved to shop for pleasure and has a creative bent. In her response to adoption needs, she stressed her interest in co-designing her own personal style by choosing from a variety of RTW clothing “*options*”. Similar to this consumer participant, there might be a consumer market segment interested in creating their own personal style, rather than co-designing clothing items. This concept is worth pursuing in future studies for its practicality to the average consumer, and its relevance to apparel designers and marketers.

Willingness: The findings in this study showed that most consumer participants were willing to pay extra, and all were willing to wait for custom clothing they co-designed. In general, these findings are supported by the literature from the USA (Kamali & Loker, 2002) and Korea (Park et al., 2009). However, other literature on apparel MC that focused on Chinese university students showed that utilitarian shoppers were neither interested in co-designing clothing online, nor willing to pay extra for it (Ou, 2011). In contrast, this study showed that utilitarian consumer participants were interested and willing to pay for co-designed clothing. Only few consumer participants (2/13) were unwilling to pay extra, and were identified as hedonic shoppers. Possible reasons could be attributed to cultural differences between Chinese and Canadian consumer participants, and to the small sample size. This finding warrants a larger study to examine the nature of the underlying contributing elements behind utilitarian and

hedonic shoppers' willingness to pay for apparel co-design by culture. Other contributions included the positive relations between willingness to pay significantly more (100%-250%), and the 'Group' consumer segment identified with high BMI; and between most of the 'Group' female segment and willingness to wait significantly longer (4 weeks). These positive relations were unexpected, once they are validated in a larger study, they would have implications on designers and marketers in terms of defining target market for apparel co-design.

In general, the *willingness* to pay more and wait for apparel co-designed online by Canadian consumers signal their positive readiness to engage in it. The contributions discussed above expand data on male consumer's willingness; provide insights on positive relations between ML segment(s) and their level of willingness to pay and wait. This topic warrants a large quantitative study to examine and validate the factors behind consumers' willingness to pay extra, and wait longer for apparel they co-designed.

Before summarizing this study's contributions, it is important to remind readers that this qualitative study's findings cannot be generalized, due to its small sample (13 consumers, 11 experts). However, it contributes a number of qualitative findings to consumer-focused literature in the context of apparel MC and co-design. This includes qualitative data on attitudes and adoption of this concept from a Canadian consumer perspective, and across gender (male and female). Although limited in sample, this study is the first in this area to test for personal impact, social tendency, and the three-level prioritization of co-designing clothing on-line. In addition, it uncovers an unexpected new consumer need for creating personal style online using RTW clothing; and provides a practical suggestion to reduce "paradox of choice" phenomenon, for online consumer co-designers.

Overall, the findings in this study indicate that most Canadian consumer participants, across gender, expressed a positive attitude towards apparel MC and co-design online.

However, for them to adopt it various key areas needed to be present (*coaching, options, trust and on-line tools*). Findings have shown that co-designing clothing by online consumers requires them to have certain product and co-design process knowledge, along with confidence in their ability to make decisions. As demand for this concept rises, apparel and UX designers and marketers would benefit from the qualitative findings of this study; and may use them as a baseline for larger quantitative consumer research.

5.2 Conclusion

This qualitative study focused on the Canadian consumers and their attitudes and willingness to adopt apparel co-design online. The study focused on 13 consumers residing in the Ottawa area, 21 to 65 years of age, and sought to validate their responses by cross-referencing their responses with those of 11 industry experts residing in Canada and abroad. Guided by the “reasoned action” theory (Ajzen & Fishbein, 1980) and the definition of attitude in the realm of psychology (Edwards’ (1957), results indicated that most consumer participants had a positive attitude towards apparel co-design online, and showed potential willingness to adopt it. However, this is dependent on the presence of certain key adoption factors. The most noted was the presence of online “*tools*” that are easy to use, have good website design, and realistic product visualization. Most consumer participants felt comfortable adopting apparel MC when they trusted the brand, and had access to a variety of design “*options*” and “*coaching*” (live and online tutorial). Most were willing to pay extra for customized clothing, and all were willing to wait for it. Results analyzed by ML consumer segments indicated that those who were willing to pay and wait were present across social tendency, shopping behaviour and gender. However, those who were willing to pay significantly more, and wait longer, were present in the ‘Group’ segment. Due to the small sample (13), these findings need to be verified in a quantitative study with a larger sample.

This study contributes to apparel MC consumer literature in several ways. It expands on the literature by providing a male perspective on apparel co-design. It is the first study to examine the areas of: social tendency as a part of consumer ML segmentation; prioritization of co-design by gender across three levels (detail, type and category); identification of top consumer needs to adopt clothing co-design online, and their willingness to pay and wait by ML segment.

There are numerous implications to this study's findings. To begin with, designers may benefit from the inclusion of social tendency as part of consumer ML segmentation, as it could provide them with additional key information to create personality traits and preferences for target client, an important criterion for product development and testing. It also provides designers and marketers with consumer behaviour data that may help improve user requirements and communication design. In addition to segmentation, the problem areas identified in RTW clothing, such as difficulties experienced in fitting clothing to the waist area for most males, and the hips, and chest area for most females, provide apparel designers, marketers and researchers with opportunities to improve clothing design and production. Other opportunities include improving online "*colour*" misrepresentation and "*quality*" of material and craftsmanship of apparel sold online.

The findings in this study include consumers' likes and dislikes of custom and co-designed clothing online. For example they like the "fit" of custom clothing the most, followed by being in "control" of the design decisions, and dislike its "price" and the "time" required to complete a customization process. This type of knowledge prioritized by consumers helps designers and marketers focus their efforts on what is important, and work towards offering a product / service that closely fits to its target consumer.

The personal impact of wearing custom clothing co-designed by the wearer was

overwhelmingly positive. These included them feeling “*empowered, happy and confident*”. These highly positive feelings are new findings that reinforce the link between clothing and one’s wellbeing; and provide a baseline for future research on the topic. Perhaps new clothing designed for hospitals can help improve the wellbeing of its patients. As for designers, Kusnezov (2012) provides an example of how a designer can learn to shed her “fear” of losing control over the creative process, by becoming aware of the positive difference she is able to make in the lives of her customers. Experts interviewed confirmed that designers share such “fears”. This designer’s change in attitude towards apparel co-design provides a glimpse of what may lie ahead for designers in this area. As more designers gain deeper knowledge of the positive impact apparel co-design has on its consumers, the more they may consider letting go of their “fear” of losing ‘control’ over the creative process, and consider sharing the creative process with the end user. Apparel designers, marketers and researchers have an opportunity to explore this aspect of clothing in other domains to further validate this finding.

Consumer prioritization results of clothing detail, type and category by gender could provide valuable input into apparel MC user requirements. For example male participants prioritized “*shirt*” first then ‘*pants*’, and female prioritized a ‘*dress*’ before a ‘*suit*’; and both prioritized ‘*business casual*’, and clothing “*fit*”. Such specific knowledge could help guide and prioritize the efforts of apparel designers and marketers. In addition, the positive relations of participants’ *willingness* to pay extra and wait, with the ‘Group’ segment and other BMI, could contribute to identifying the personas of the target consumer, for apparel co-design. Again, the specific conclusions above would benefit from further verification in future studies.

Limitations

Although experts validated most of the consumer responses in this study, and most of the findings were supported by literature, caution should be exercised in generalizing its findings to

the Canadian population. One of this study's main limitations is its small sample pool (13 consumer participants) from a single geographic region (Ottawa). Another limitation is the fact that consumer participants' personal data was self-reported, and although this data was transcribed and approved by the participants, a second method to confirm it would have further increased its accuracy. In addition the recruitment method of consumer participants was based on convenience. This method may have excluded participants who were not interested in apparel MC and co-design. To avoid such limitations it is recommended that a larger scale quantitative study to be undertaken across Canada.

Topics for Future Research

Throughout this study, several topics were identified as worthy of future research, most compelling of which is to conduct a quantitative study with the same goal, with a much larger sample from across Canada's urban and rural areas, while using the outcome of this study as its baseline. The sample needs to represent the Canadian population in terms of age group, body type, body weight and gender. There is also an opportunity to develop on-line "*tools*" by engaging ML consumer segments identified in the study, to develop requirements for an ideal apparel co-designing website. This could be followed up by a study that tests prototypes of co-designed websites to evaluate usability, creativity, attitudes and potential adoption by online consumers. Another topic is to explore requirements for an easy to use online *tool kit* for average consumers to create their personalized style with RTW clothing. Also worthy of research is that of developing service/product requirements for '*coaching*' potential consumers to co-design clothing; this would include identifying the type and level of help (novice, expert) consumer co-designers need, and analyze data by ML segments identified in this study. Its outcome could provide apparel designers, marketers and researchers with valuable user requirement for apparel MC.

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GLOSSARY

Term	Definition
Attitude	Attitude is defined as the degree of positive or negative affect associated with some psychological object (Edwards, A. L. 1957)
Body Cathexis	The degree of satisfaction with our own bodies as a whole or as specific parts (Kaiser, 1985, p. 65).
Clothing	Any tangible or material object obtained by buying, receiving, or construction, attached to or worn on the body (Kaiser, 1990, 5)
Co-design	Co-design is another option for mass-customization. With the help of computer technology online or in-store professional assistance, the consumer “creates an individualized product design from a company’s style, fabric, color, surface design, and size alternatives (Fiore et al., 2004, 838). “Co-design” conveys consumers' descriptions of a collaborative relationship in person or online) between a consumer and an individual who is trained to manipulate computer-aided design CAD) images and serve as a consultant during the design of a garment. “Design options” lets consumers make design variation choices from a menu. (Ulrich et al, 2003, 400).
Fashion	A dynamic social process by which new styles are created, introduced to a consuming public, and popularly accepted by that public (Kaiser, 1990, p. 4).
Fashion Leadership	The first few consumers who try the product or service are known as early adopters and innovators (Solomon, 2006, p. 586). In the fashion industry, those who are willing to try innovations are referred to as fashion leaders (Ou, 2011).
Fashion Followers	Fashion followers trail behind other consumers and wait until a new style is at its highest point of acceptance before purchase (Cho & Workman, 2011).
Mass Customization	A combination of the mass production of individually customized goods and services (Pine, 1993, 48). A hybrid of mass production and customization (Fiore, Lee & Kunz, 2003). There are two variations in mass customization: co-design and measurement data gathering (Fiore, 2008).
Virtual Model	A digital tool exhibiting customized clothes to the consumer according to his/her body measurements when he/she shops online (Loker, et al., 2008).
Solution Space	...pre-existing capability and degrees of freedom built into a given manufacturer’s production system (von Hippel, 2001).
Toolkits	A collection of web-based design tools that enable consumers to alter the function and style of mass customized products. In essence, mass customization toolkits are user interfaces that open a dyadic exchange between consumers and firms (von Hippel, 2001; Dellaert & Stremersch 2005) (Hunt et al., 2013).

APPENDICES

Appendix A.1 Participant Invitation Letter

To Participant
Email [Email address of representative](#)

Subject: Request to participate in an academic research on apparel online mass customization
(Project #102471)

Dear Representative,

Please allow me to introduce myself; my name is Hala Hawa, a Master's student in the school of Industrial Design, at Carleton University, Ottawa, Ontario, Canada. My thesis research covers apparel online mass customization. The research started in the fall of 2014 and will conclude in the spring 2015.

Your experience in selecting and purchasing your own clothing, at retail and / or online, is valuable for this research. Currently I am in the process of organizing interviews with potential participants on this topic. If you are interested in participating in this exciting research please take a moment to read and sign the consent form.

If you require more information I would be happy to answer any questions you have on this research. Also, if you know others who might be interested in contributing to this research, I would greatly appreciate if you could pass on their name and contact information.

This study is under the supervision of Prof. Bjarki Hallgrímsson, School of Industrial Design, Carleton University (613-520-2600, ext. 5677 or Bjarki.hallgrimsson@carleton.ca) and the ethics protocol for the study has been cleared on the 20th of January by the Carleton University Research Ethics Board and any questions or concerns may be sent to the CUREB chair Prof. Andy Adler at 613-520-2517 or ethics@carleton.ca).

I wish to thank you in advance for your assistance and look forward to hearing from you soon.

Sincerely,

Hala Hawa BID PMP
MDes Graduate Student,
Carleton University, School of Industrial Design Ottawa
Canada

HalaHawa@cmail.carleton.ca

Appendix A.2 Industry Invitation Letter

To   Company representative
Email   [Email address of representative](#)

Subject: Request to participate in an academic research on apparel online mass customization
(Project #102471)

Dear Representative,

I is ecstatic to learn about the work of your company in virtual apparel customization as illustrated on your company's website..

Please allow me to introduce myself; my name is Hala Hawa, a Master's student in the school of Industrial Design, at Carleton University, Ottawa, Ontario, Canada. My thesis research covers apparel online mass customization with a focus on technology adoption and impacts on key stakeholders.

With your experience and that of your team in this field you would be a valuable person for me to interview for my research, which includes three phases: Literature review, interviews and a co-design

session. The research started this fall and will conclude in spring 2015. Currently I am in the process of organizing interviews with technology experts. I am hoping you would agree to participate in an interview with me on this topic.

As an industry expert participant and with your permission I would like to add your and or your company's name in the acknowledgment portion of my thesis. I anticipate no risk to you by taking part in this study.

If you require more information I would be happy to answer any questions you have on this research. Also, if you know other professionals such as educators, designers and producers, who might be interested in contributing to this research, I would greatly appreciate if you could pass on their name and contact information.

This study is under the supervision of Prof. Bjarki Hallgrimsson, School of Industrial Design, Carleton University (613-520-2600, ext. 5677 or Bjarki.hallgrimsson@carleton.ca) and the ethics protocol for the study has been cleared on the 20th of January by the Carleton University Research Ethics Board and any questions or concerns may be sent to the CUREB chair Prof. Andy Adler at 613-520-2517 or ethics@carleton.ca).

I wish to thank you in advance for your assistance and look forward to hearing from you.

Sincerely,

Hala Hawa BID PMP
MDes Graduate Student,
Carleton University, School of Industrial Design Ottawa
Canada
[Redacted]
HalaHawa@cmail.carleton.ca

Appendix A.3 Expert Invitation Letter

To Participant
Email [Email address of representative](#)

Subject: Request to participate in an academic research on apparel online mass customization
(Project #102471)

Dear Representative,

Please allow me to introduce myself; my name is Hala Hawa, a Master's student in the school of Industrial Design, at Carleton University, Ottawa, Ontario, Canada. My thesis research covers apparel online mass customization. The research started in the fall of 2014 and will conclude in the spring 2015.

Your experience in selecting and purchasing your own clothing, at retail and / or online, is valuable for this research. Currently I am in the process of organizing interviews with potential participants on this topic. If you are interested in participating in this exciting research please take a moment to read and sign the consent form.

If you require more information I would be happy to answer any questions you have on this research. Also, if you know others who might be interested in contributing to this research, I would greatly appreciate if you could pass on their name and contact information.

This study is under the supervision of Prof. Bjarki Hallgrímsson, School of Industrial Design, Carleton University (613-520-2600, ext. 5677 or Bjarki.hallgrimsson@carleton.ca) and the ethics protocol for the study has been cleared on the 20th of January by the Carleton University Research Ethics Board and any questions or concerns may be sent to the CUREB chair Prof. Andy Adler at 613-520-2517 or ethics@carleton.ca).

I wish to thank you in advance for your assistance and look forward to hearing from you soon.

Sincerely,

Hala Hawa BID PMP
MDes Graduate Student,
Carleton University, School of Industrial Design Ottawa
Canada

HalaHawa@cmail.carleton.ca

Appendix B.1 Participant Interview Guide

Title: Participant Interview Script
Project Title: Apparel Mass Customization (MC): Impact and Adoption (Project #102471_ cleared by EBC on the 20th of Jan. 2015)

Following is the script for interview with participants.

Me: Hello (Mr. / Mrs. name of participant), Thank you very much for agreeing to take this interview on the topic of apparel online mass customization. How are you doing today?

Participant:-----

Me: Thank you, this interview includes 25 questions and is expected to last approximately 45 minutes of your time. Do you have any questions before we get started?

Participant:-----

Me: (answer any questions the participant has and start the interview). Thank you lets get started with the interview.

Lets begin with the topic of shopping

1. What motivates you to shop for your clothing?
2. Describe your most favourite apparel shopping experience? Why is it your favourite?
3. How often do you shop for your clothing? Why?
4. Do you typically shop for clothing solo or with others? Why?
5. Did you ever shop on line? Do you shop for clothing online? Do you know someone that does?
How do you feel about shopping for clothing online? Why?

Next set of questions address clothing style preferences

6. Who and what influence your personal dressing style? Why?
7. How would you describe your dressing style? Would you say your dressing style tends to blend in with your peers or stand out from it? Why?
8. How do you feel about people who pioneer their own individual look and feel in clothing? Why?

Next set of questions addresses ready-made clothing

9. How do you feel about the ready-made clothing?
10. Starting with the most and end with least important aspect please describe:
  - What you like about it? Why?
  - What you dislike about? Why?

Next set of questions addresses custom clothing

11. How do you feel about custom clothing?
12. Starting with the most and end with least important aspect please describe:
  - What you like about it? Why?
  - What you dislike about? Why?

Next set of questions address co-designing of clothing

13. Have you ever co-designed your clothing where you made design decision on the overall look and feel, material, shape, size, colour, pattern or any other design element before ordering it?
14. Describe your co-designing experience.
  - What you liked and disliked about it and why?
15. If you have a magic wand to change anything about this experience what would you do? Why?
16. Describe the emotions you felt (or expect to feel if no previous experience):
  - During the clothing customization experience? Reasons for this feeling?
  - When wearing the customized item? Reasons for this feeling

Next set of questions address online MC of clothing

17. What needs to happen for you to feel comfortable co-designing /customizing your clothing online? Why?
18. What elements would need to be present for you to consider co-designing / customizing clothing online? Please prioritize them.

Next set of questions address expectations

About online experience

19. Describe your desired online experience of co-designing / customizing clothing?

About affordability

20. How much more than standard retail price did you pay or willing to pay for a clothing item you've co-designed/customized? Why?

About delivery

21. How long did you wait or are willing to wait before receiving clothing item you co-designed/customized?

About customization levels

22. Please complete and return "Apparel Customization Prioritization Matrix" survey.

23. Describe a clothing item you wish you can co-design/customize online. Why?

Thank you very much this brings us to the end of the interview

24. Is there anything that you would like to add on this topic?

Participant: -----

Me: Thank you very much for your participation in this interview it is greatly appreciated. I will follow up with a transcription of this interview for your review and approval before including its aggregate data in the research. Thanks again. Good-bye.

Appendix B.2

Expert Interview Guide

Title: Expert Interview Guide

Project Title: Apparel Mass Customization (MC): Impact and Adoption (Project #102471_ cleared by EBC on the 20th of Jan. 2015)

Following is the script for interview with experts. Selected questions from this list will be asked to particular experts based on their expertise and industry background.

Me: Hello (Mr. / Mrs. name of expert),

Thank you very much for agreeing to take this interview on the topic of apparel online mass customization. How are you doing today

Expert: -----

Me: Thank you, this interview requires approximately 45 minutes of your time. Do you have any questions before we get started?

Expert:-----

Me: (answer any questions the expert has and start the interview). Thank you lets get started with the interview.

About your experience in mass customization (MC) of clothing can you please

1. Describe your involvement in custom clothing design and or production.

About technology and based on your experience

2. What is the most significant current and /or future technology for affordable MC clothing? Why?
3. Describe this technology?
4. Using this technology what is the average time and cost required for:
  - a. Design,
  - b. Production
  - c. Delivery

About consumers and based on your experience can you please

5. Describe the consumer type interested in made to measure clothing.
6. Describe the consumer type interested in co-designing clothing.
7. In general how would consumers feel about the process of customizing their clothing?
8. Are you aware of any personal impact this experience have on them? Please describe.
9. Is there a difference between a male and female consumers? What are the primary differences?
10. Please complete and send "Apparel Customization Prioritization Matrix" sent to you.

About online MC of clothing barriers & opportunities

11. How do you feel about clothing being co-designed by end users online?
12. Are you aware of how consumers feel about online customization of clothing?
13. What needs to happen for consumers to feel comfortable co-designing /customizing clothing online? Why?
14. What elements would need to be present for consumers to consider co-designing / customizing clothing online? Please prioritize them.

15. What opportunities do you foresee in the near future for online MC of clothing?

About online MC clothing business and based on your experience

16. How can an online MC of clothing business survive and thrive?

17. What companies do you consider have a successful online MC of clothing business? What is behind their success?

Thank you very much this brings us to the end of the interview

18. Is there anything that you would like to add on this topic

Expert:-----

Me: Thank you very much for your participation in this interview it is greatly appreciated. I will follow up with a transcription of this interview for your review and approval before including its aggregate data in the research. Thanks again. Good-bye.

Appendix C.1 Participant Questionnaire

a

Mark X next to your Clothing Size, Fit Issues								
Typical Clothing Size(s)	XXS	XS	S	M	L	XL	XXL	Other (specify)
Typical Fit Issues (mark as many as apply)	Neck	Shoulders	Chest	Waist	Hips	Arms	Legs	Other (specify)

b

Add your own data								
Other Data	Body Height (cm)	Body Weight (KG)	Age (Yr.)	Male	Female			

c

Prioritize the following custom clothing elements based on your preference <i>1= highest priority, 2= second highest etc..& NA = Not Applicable</i>									
Clothing Detail	Size	Silhouette	Material	Colour	Graphics	Other (specify)			
Clothing Type	Suit	Pants	Jacket	Shirt	Top	Vest	Skirt	Dress	Other (specify)
Clothing category	Formal	Business Casual	Casual / Leisure	Special Event	Arts	Uniform	Sports	Other (specify)	

Appendix C.2

Expert Questionnaire

a

Please prioritize the following based on customer's demand <i>1= highest priority, 2= second highest etc..</i>								
Clothing Detail	Size	Silhouette	Material	Colour	Graphics	Other (specify)		
Man								
Women								
Clothing Type	Suit	Dress	Jacket	Skirt	Pants	Shirt	Top	Vest
Man								
Women								
Clothing category	Formal	Business Casual	Casual / Leisure	Special Event	Arts	Uniform	Other (specify)	
Man								
Women								

Appendix D.1

Participant Consent Form

Title: Interview Consent Form
Project Title: Apparel Mass Customization: Impact and Adoption (Project #102471)

I _____ choose to participate in an interview for the research study entitled *Apparel Mass Customization: Personal Impact and Adoption*. I understand this interview is part of a master's thesis course #IDES 5909 and the researcher for this project is Hala Hawa, a graduate student in the School of Industrial Design, and the research supervisor is Professor Bjarki Hallgrímsson, at Carleton University.

I understand that the researcher is investigating apparel online mass customization in general and its adoption and impact on key stakeholders in particular. The input of this interview will further guide the understanding of this concept and its impacts. This interview includes a series of related questions and is expected to last approximately 1 hour. I understand the researcher will audiotape and transcribe this interview and review and approve its content with me prior its use in this project.

I understand there is no anticipated risk to me as a participant in this study. I will not be identified in the study and my comments cannot be attributed to me. I have the right to decline to answer questions and to end my participation in this interview at any time and for any reason. I can withdraw verbally or by sending an email to the researcher or the research supervisor listed below. I can withdraw my participation within one week from conducting this interview. If I withdraw from the interview, all information I provided will be immediately destroyed.

All research data will be password-protected. Any hard copies of data (including any handwritten notes or USB keys) will be kept in a locked cabinet to which only the research has access. Research data will only be accessible by the lead researcher and the research supervisor. Once the project is completed, all research data will be destroyed (electronic data will be erased and hard copies will be shredded.)

The ethics protocol for this research project was reviewed and cleared on the 20th of January 2015 by the Carleton University Research Ethics Board (CUREB). Should I have questions or concerns related to my involvement in this research, I will contact:

REB contact information:
 Professor Andy Adler, Chair or Professor Louise Heslop, Vice-Chair
 Research Ethics Board, Carleton University
 1325 Dunton Tower
 1125 Colonel By Drive
 Ottawa, ON K1S 5B6
 Tel: 613-520-2517
ethics@carleton.ca

Researcher information:
 Hala Hawa,
 School of Industrial Design
 Carleton University
 Tel: [REDACTED]
 Email: hala.hawa@carleton.ca

Supervisor contact information:
 Professor Bjarki Hallgrímsson
 School of Industrial Design
 Carleton University
 Tel: 613 520-5672
 Email: bjarki.hallgrimsson@carleton.ca

_____
 Signature of participant

_____
 Signature of researcher

_____
 Date

_____
 Date

Appendix D.2 Expert Consent Form

Interview Title: Interview Consent Form
Project Title: Apparel Mass Customization: Impact and Adoption (Project #102471)

I _____ choose to participate in an interview for the research study entitled *Apparel Mass Customization: Personal Impact and Adoption*. I understand this interview is part of a master's thesis course #IDES 5909 and the researcher for this project is Hala Hawa, a graduate student in the School of Industrial Design, and the research supervisor is Professor Bjarki Hallgrímsson, at Carleton University.

I understand that the researcher is investigating apparel online mass customization in general and its adoption and impact on key stakeholders in particular. The input of this interview will further guide the understanding of this concept and its impacts. This interview includes a series of related questions and is expected to last approximately 1 hour. I understand the researcher will audiotape and transcribe this interview and review and approve its content with me prior its use in this project.

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REB contact information:
 Professor Andy Adler, Chair or Professor Louise Heslop, Vice-Chair
 Research Ethics Board, Carleton University
 1325 Dunton Tower
 1125 Colonel By Drive
 Ottawa, ON K1S 5B6
 Tel: 613-520-2517
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Researcher information:
 Hala Hawa,
 School of Industrial Design
 Carleton University
 Tel: [REDACTED]
 Email: hala.hawa@carleton.ca

Supervisor contact information:
 Professor Bjarki Hallgrímsson
 School of Industrial Design
 Carleton University
 Tel: 613 520-5672
 Email: bjarki.hallgrimsson@carleton.ca

_____
 Signature of participant

_____
 Signature of researcher

_____
 Date

_____
 Date

Appendix E

Industry Expert Profile

Table 9: Profile of Industry Expert Sample

No.	Expert	Gender	Industry	Expertise	Position	Country
1	M1	Female	Retail	Apparel Tailoring	Sales + operations	Canada
2	J	Male	Retail	Apparel Tailoring	Sales + operations	US
3	C1	Female	Research	Apparel Tailoring	Researcher	Canada
5	S	Female	Academia	Apparel Academic Research	Educator	US
4	H1	Female	Academia	Apparel Design + Operatons	Educator	Canada
6	H2	Male	Academia	Body scanning	Educator	Europe
7	F	Male	Academia	Mass Customization Business Management	Educator	Europe
8	M1	Female	Computers	Fashion software	Design Lead	US
9	D	Male	Computers	Fashion software	Product Mangement	US
10	X	Male	Architecture / product Design	Innovations + 3D Printing	Design Leader	Australia
11	F2	Male	Architecture / product Design	Innovations + 3D Printing	Design Leader	US
12	C2	Male	Computers	Scalable Avatars	Researcher	Canada

Appendix F.1 RTW Clothing

Table 10 RTW Clothing Attitude Results by ML Segment

Category	Subject Category	Subject	Female (8/13) G/U (3/3), G/H (2/2) & I/H (3/3)	Male (5/13) G/U (3/3), I/H (1/1) I/H (1/1)	Rate	Result
RTW Clothing Attitude	Feeling	Positive feelings	G/U & I/H	G/U & I/H & I/U	61% (5/5 M, 3/8 F)	"Like it; Great"
		Less positive feelings	I/H & G/H	NA	31% (0/5 M, 4/8 F)	"Affordable; Ok; Convenient"
		Negative feelings	G/U	NA	8% (0/5 M, 1/8 F)	"Poor Quality"
	Cognition	Like	I/H	I/U	31% (1/5 M, 3/8 F)	Convenience
		Dislike	All	All	54% (4/5 M, 3/8 F)	Wrong Fit
	Clothing fit Issues	Waist	All	All	62% (4/5 M, 4/8 F)	Waist clothing fit Issue
		Chest	G/U & G/H	G/U & I/H	54% (2/5 M, 5/8 F)	Chest clothing fit Issues
		Arms	G/H & I/H	G/U & I/U	46% (3/5 M, 3/8 F)	Arms clothing fit Issues
		Hips,	G/U & G/H	NA	38% (0/5 M, 5/8 F)	Hips clothing fit Issues
		Shoulders	I/H & G/H	i/U	38% (1/5 M, 4/8 F)	Shoulders clothing fit Issues
		Summary	G/U & G/H		Majority of fit issues	The 'Group' segment have the highest need in fitting clothing to their body.

Table 11 RTW Clothing Fit Issues by ML Segment

NO	Age (Yr.)	Male	Female	Social Tendency	BMI	BMI	Neck	Shoulders	Chest	Waist	Hips	Arms	Legs	Total
1	28	X		G/U	22.1	Normal	0	0	1	1	0	1	0	3
2	25	X		G/U	23.1	Normal	0	0	0	1	0	0	0	1
3	21	X		G/U	26.6	Overweight	0	1	0	1	0	1	1	4
4	22	X		I/U	21.6	Normal	1	0	0	0	0	1	0	2
5	33	X		I/H	29.3	Overweight	0	0	1	1	0	0	0	2
6	41		X	G/H	19.7	Normal	1	0	1	0	0	1	0	3
7	29		X	G/U	21.5	Normal	0	0	1	1	1	0	0	3
8	24		X	G/U	21.3	Normal	0	0	1	0	1	0	0	2
9	24		X	G/H	23.9	Normal	0	1	1	0	1	1	0	4
10	41		X	G/H	25.3	Overweight	0	1	1	1	1	0	1	5
11	24		X	I/H	15.7	Underweight	0	0	0	1	1	0	1	3
12	25		X	I/H	19.0	Normal	0	1	0	1	0	1	0	3
13	65		X	I/H	21.7	Normal	0	1	0	0	0	0	0	1
Total		5	8				2	5	7	8	5	6	3	36
Avg. / Participant							15%	38%	54%	62%	38%	46%	23%	277%
Avg. / Male							20%	20%	40%	80%	0%	60%	20%	240%
Avg. / Female							13%	50%	63%	50%	63%	38%	25%	300%

Appendix F.2

RTW Clothes Online Shopping

Table 12 RTW Clothing Shopping Online Attitude Results by ML Segment

Category	Subject Category	Subject	Female (8/13) G/U (3/3), G/H (2/2) & I/H (3/3)	Male (5/13) G/U (3/3), I/H (1/1) I/H (1/1)	Rate	Result
RTW Clothes Shopping Online Attitude	Shop for Clothing online n=9	Participation level by segment n=9	All	All	69% (9/13) (6/8 F, 3/5 M)	Majority predominantly female shop for clothing online
			G/H (2/2)	I/U (1/1) & I/H (1/1)	44% (4/9)	High segment Participation
			G/U (2/3) & I/H (2/3)	NA	44% (4/9)	Medium segment participation
			NA	G/U (1/3)	11% (1/9)	Low segment participation
		Positive feelings n=9	G/U (1/3) & G/H (1/2) & I/H (1/3)	I/U (1/1)	44% (4/9)	"Like it"
			G/U (2/3) & G/H (1/2)	NA	33% (3/9)	"Time saver"
			G/U (1/3) & I/H (2/3)	NA	33% (3/9)	"Convenience"
		Negative feelings n=9	G/U (2/3)	G/U (1/3) & I/H (1/1)	44% (4/9)	"Wrong fit"
			G/U (1/3) & G/H (2/2)	NA	33% (3/9)	Preference to shop at "Retail"
			G/U (1/3)	I/H (1/1)	22% (2/9)	"Wrong colour"
	Do not Shop for Clothing online n=4	None Participation level by segment n=4	G/U (1/3) & I/H (1/3)	G/U (2/3)	31% (4/13) (2/8 F, 2/5 M)	Majority G/U segment age (21-25) Minority I/H female age 65
		Negative feelings	G/U (1/3) & I/H (1/3)	G/U (1/3)	75% (3/4)	Clothing "Size" uncertainly
		Positive feelings	NA	G/U (1/3)	25% (1/4)	"Like it" and like "Price" and "Options" for shoes & accessories

Appendix F.3 Custom Clothing Attitude

Table 13 Custom Clothing Attitude Results by ML Segment

Category	Subject Category	Subject	Female (8/13) G/U (3/3), G/H (2/2) & I/H (3/3)	Male (5/13) G/U (3/3), I/H (1/1) I/H (1/1)	Rate	Result
Custom Clothing Attitude	Feeling	Positive feelings Primary	G/U (1/3) & G/H (2/2) & I/H (1/3)	G/U (2/3) & I/U (1/1)	54% (7/13) (4/8 F, 3/5 M)	Feels positive "Great, Neat idea, Fun" validated by 40% (2/5) of experts.
		Positive feelings Overall	G/U (1/3) & G/H (2/2) & I/H (2/3)	G/U (2/3) & I/U (1/1)	62% (8/13) (5/8 F, 3/5 M)	
		Less positive feelings Primary	G/U (1/3)	G/U (1/3)	15% (2/13)	Feels less positive "Expensive", is validated by experts under adoption needs.
		Less positive feelings Overall	G/U (1/3) & G/H (1/2) & I/H (1/3)	G/U (1/3) & I/H (1/1)	38% (5/13)	
		Conditional feelings Primary & Overall	NA	I/H (1/1)	8% (1/13)	Feeling is conditional 'Tailor dependent', is validated by experts (20%, 1/5).
		Added by experts	Experts		60% E (3/5)	Feeling of "Need help"
	Cognition	Like	G/U (3/3) & G/H (2/2) & I/H (1/3)	I/U (1/1) & I/H (1/1)	62% (8/13) primary response	Clothing 'Size/Fit'
			G/U (3/3) & G/H (2/2) & I/H (2/3)	G/U (2/3) & I/U (1/1) & I/H (1/1)	85% (11/13) overall response	
			NA	G/U (1/3)	8% (1/13) primary results	'Control' of design decisions
			G/U (2/3) & G/H (1/2) & I/H (1/3)	G/U (1/3) & I/H (1/1)	46% (6/13) overall	
		Dislike	I/H (3/3) & G/H (1/2) & G/U (1/3)	G/U (1/3)	46% (6/13) Primary	Dislike the "price" of custom clothing
			I/H (3/3) & G/H (2/2) & G/U (1/3)	G/U (1/3) & I/U (1/1)	62% (8/13) Overall	

Appendix F.4

Co-designing Clothing Attitude

Table 14 Co-design Clothing Attitude Results by ML Segment

Category	Subject Category	Subject	Female (8/13) G/U (3/3), G/H (2/2) & I/H (3/3)	Male (5/13) G/U (3/3), I/H (1/1) I/H (1/1)	Rate	Result
Co-design Clothing Attitude	Co-design Experience	Yes	G/U (1/3) & G/H (2/2) & I/H (2/3)	G/U (1/3) & I/H (1/1) & I/U (1/1)	62% (8/13) (3 M, 5 F)	Male co-design with professional tailor (40%, 2/5), and online (40%, 2/5). Female co-designed their clothing with a professional tailor (13%, 1/8), with mom (13%, 1/8), and with a design tool (38%, 3/8).
		No	G/U (2/3), I/H (1/1)	G/U (2/3)	38% (5/13) (2 M, 3 F)	This cluster does not have an experience in co-designing clothing.
	Feeling n=8	Positive feelings Primary	I/H (1/3) & G/H (1/2)	G/U (1/3) & I/U (1/1)	50% (4/8) Primary & Overall	feeling “great”
		Positive feelings Overall				
		Positive feelings Primary			25% (2/8) Primary	feeling ‘in-control’
		Positive feelings Overall	G/U (1/3) & G/H (1/2) & I/H (1/3)	I/U (1/1), I/H (1/1)	63% (5/8) Overall	
		Positive feelings Primary	G/U (1/3) & G/H (1/2) & I/H (1/3)	I/I I/H	50% (4/8) (3 F, 1 M)	Feeling “rewarding”
		Positive feelings Overall				
		Conditional feelings Primary & Overall	I/H (1/3)	G/U (1/3) & I/H (1/1)	38% (3/8) (1 F, 2 M)	feeling it is “tailor dependent”
		Added by experts	Experts		43% E (3/7)	High Interest
					43% E (3/7)	Limited Involvement
	Cognition n=8	Like (Primary and Overall)	G/H (2/2) & G/U (1/3) & I/H (1/3)	G/U (1/3) & I/H (1/1) & I/U (1/1)	88% (7/8) (3 M, 4 F)	like making ‘design decisions’
		Like (Overall)	G/H (2/2) & G/U (1/3)	NA	38% (3/8) (3 F, 0 M)	like producing their ‘design’
		Dislike (Primary and Overall)	G/U (1/3) & I/H (1/3)	G/U (1/3) & I/H (1/1)	50% (4/8) (2 F, 2 M)	dislike the ‘time consuming’ aspect of co-designing
		Improvement (Primary)	G/U (1/3) & I/H (1/3)	G/U (1/3) & I/H (1/1)	50% (4/8) (2 F, 2 M)	Reduce co-design and customization Time
		Improvement (Overall)	G/U (1/3) & I/H (1/3) & G/H (1/2)		63% (5/8) (3 F, 2 M)	

Appendix G

Personal Impact

Table 15 Co-design Personal Impact Results by ML Segment

Category	Subject Category	Subject	Female (8/13) G/U (3/3), G/H (2/2) & I/H (3/3)	Male (5/13) G/U (3/3), I/H (1/1) I/H (1/1)	Rate	Result
Co-design: Personal Impact	Personal Impact	Positive feelings (primary and Overall)	All	All	92% (12/13) (5 M, 7 F)	feeling "happy, great, special, confident, satisfied"
		Positive feelings Primary	G/U (2/3) & I/H (1/3) & G/H (1/2)	I/U (1/1) & I/H (1/1)	46% (6/13) (2 M, 4 F)	Feeling "Great / Happy" is validated by experts (50%, 2/4)
		Positive feelings Overall		G/U (1/3) & I/U (1/1) & I/H (1/1)	54% (8/13) (3 M, 4 F)	
		Positive feelings Overall	I/H (1/3)	G/U (1/3) & I/U (1/1)	23% (3/13) (2 M, 1 F)	Feeling "Special" is validated by experts (50%, 2/4)
		Positive feelings Overall	G/U (1/3) & I/H (1/3)	G/U (1/3)	23% (3/13) (1 M, 2 F)	Feeling "Confident" is validated by experts (25%, 1/4)
		Added by experts	Experts		50% E (2/4)	Personal Brand
					25% E (1/4)	Feeling "Loved"

Appendix H Adoption Needs

Figure 19 Clothing Co-design online: Adoption Elements Needed Chart

Figure 20 Clothing Co-design online: Adoption Comfort Needs Chart

Figure 21 Clothing Co-design online: Adoption Comfort Needs Exclusive to Experts Chart

Appendix H (cont.)

Table 16 Adoption Needs Results by ML Segment

Category	Subject Category	Subject	Female (8/13) G/U (3/3), G/H (2/2) & I/H (3/3)	Male (5/13) G/U (3/3), I/H (1/1) I/H (1/1)	Rate	Result
Adoption Needs	Desired Experience	Primary	G/U (1/3) & I/H (1/3)	G/U (1/3) & I/H (1/1)	31% (4/13) (2 M, 2 F)	Desire for online “Intuitive interactive tools”
		Overall		G/U (2/3) & I/H (1/1)	38% (5/13) (3 M, 3 F)	
	Comfort Needs	Primary	G/U (1/3) & I/H (1/3)	G/U (1/3)	23% (3/13) (2 F, 1 M),	Need for “Trust” is validated by experts (10%, 1/10).
		Overall	G/U (2/3) & I/H (1/3)		31%, (4/13) (3 F, 1 M)	
		Primary	G/U (1/2) & G/H (1/2)	NA	15% (2/13) (2 F, 0 M),	Need for design “Coaching” is validated by experts (20%, 2/10).
		Overall	G/U (1/2) & G/H (1/2) & I/H (1/3)	G/U (2/3)	38% (5/13) (3 F, 2 M)	
		Primary	NA	I/U (1/1) & I/H (1/1)	15% (2/13) (0 F, 2 M),	Need for variety of “Options” is validated by experts (10%, 1/10).
		Overall	G/H (2/2)	G/U (1/3) & I/U (1/1) & I/H (1/1)	38% (5/13) (2 F, 3 M)	
		Added by experts	Experts		30% (3/10)	Create a sense of “community” online
					20% (2/10)	Provide easily “accessible” website and services.
					20% (2/10)	Provide “reliable technology”
					10% (1/10)	Provide “fast” pace in offering new styles,
					10% (1/10)	strong “market demand” for co-designing clothing online.
	Co-design Elements	Primary	G/H (1/2) & I/H (2/3)	G/U (2/3) & I/H (1/1)	46% (3 F, 3 M)	Easy to Use Tools is validated by experts (56%, 5/9)
		Overall	G/H (1/2) & I/H (3/3) & G/U (2/3)		69% (6 F, 3 M)	
		Primary	G/U (2/3) & I/H (1/3)	I/U (1/1)	31% (4/13) (1 M, 3 F)	"Options" is validated by experts as 'Simple Options'
		Overall		I/U (1/1) & I/H (1/1)	38% (5/13) (2 M, 3 F)	
		Primary	G/U (1/3) & G/H (1/3)	NA	15% (2/13) (2 F, 0 M),	Live Coach' is validated by experts as 'Communication'
		Overall		G/U (1/3)	23% (3/13) (1 M, 2 F)	
		Added by experts	Experts		22% (2/9)	Create a sense of “community” online

Appendix H (cont.)

Table 17 Expert Validation of Adoption Comfort Needs

Expert Validation of Consumer Responses						
Expert Responses			Consumer Responses			
Theme : Sub Theme	Aspect	Expert (n=10)	Corresponding Theme	Corresponding Sub Theme	Aspect	Consumer (n=13)
Adoption: Custom Clothing Online: Adoption Comfort Needs	Simple Options	10%	Adoption	Custom Clothing Online: Adoption Comfort Needs	Variety Options	38%
	Coach	20%			Creative Options	15%
	Trust	10%			Design Coaching	38%
	Tools	60%			Trust	31%
	Transparent Process	10%			Easy to use (tools)	23%
	Cost	50%			Design Tools	23%
					Clear Process	15%
					Price	8%

Table 18 Expert Validation of Adoption Elements Needed

Expert Validation of Consumer Responses						
Expert Responses			Consumer Responses			
Theme : Sub Theme	Aspect	Expert (n=9)	Corresponding Theme	Corresponding Sub Theme	Aspect/ Sub Theme	Consumer (n=13)
Adoption: Custom Clothing Online: Co-design Elements Needed	Tools	56%	Adoption	Custom Clothing Online: Co-design Elements Needed	Tools	69%
	Options	11%			Variety of Options	38%
	Communication	11%			Live Coach	23%

Appendix K.1

Willingness to Pay Extra

Table 19 Custom Clothing: Willingness to Pay Extra (3 Levels)

	Gender	Minimum pay Extra	Maximum pay Extra	Average Pay Extra	Rational	ML Segment	Age (Yr.)	BMI	BMI	Quantity of Body Areas with fit issues
Level 1	Female	-50%	-50%	-50%	Copy designer clothing for less	I/H	24	15.7	Underweight	3
	Female	0%	0%	0%	Budget	I/H	65	21.7	Normal	1
Level 2	Male	20%	25%	23%	Fit	I/U	22	21.6	Normal	2
	Male	20%	30%	25%	Control	G/U	28	22.1	Normal	3
	Male	10%	30%	20%	Fit	I/H	33	29.3	Overweight	2
	Female	20%	30%	25%	Fit	G/U	29	21.5	Normal	3
	Female	20%	30%	25%	Fit	G/U	41	25.3	Overweight	5
	Male	20%	40%	30%	Control	G/U	25	23.1	Normal	1
	Female	30%	40%	35%	Control	G/H	41	19.7	Normal	3
	Female	40%	60%	50%	Quality	I/H	25	19.0	Normal	3
Level 3	Female	100%	100%	100%	Fit	G/H	24	23.9	Normal	4
	Female	50%	150%	100%	Control	G/U	24	21.3	Normal	2
	Male	200%	250%	225%	Quality	G/U	21	26.6	Overweight	4
	Total	480%	735%	608%						
	Average / participant	37%	57%	47%						
	Average / Male	54%	75%	65%						
	Average / Female	26%	45%	36%						

Table 20 Custom Clothing: Level 2 Willingness to Pay Extra

	Gender	Minimum pay Extra	Maximum pay Extra	Average Pay Extra	Rational	ML Segment	Age (Yr.)	BMI	BMI	Quantity of Body Areas with fit issues
Level 2	Female	20%	30%	25%	Fit	G/U	29	21.5	Normal	3
	Female	20%	30%	25%	Fit	G/U	41	25.3	Overweight	5
	Female	30%	40%	35%	Control	G/H	41	19.7	Normal	3
	Female	40%	60%	50%	Quality	I/H	25	19.0	Normal	3
	Male	20%	25%	23%	Fit	I/U	22	21.6	Normal	2
	Male	20%	30%	25%	Control	G/U	28	22.1	Normal	3
	Male	10%	30%	20%	Fit	I/H	33	29.3	Overweight	2
	Male	20%	40%	30%	Control	G/U	25	23.1	Normal	1
	Total	180%	285%	233%						
	Average	23%	36%	29%						
	Average / Female	28%	40%	34%						
	Average / Male	18%	31%	24%						

Appendix K.1 Cont. Willingness to Pay Extra by Segment

Figure 22: Maximum Willingness to Pay Extra by Segment

This diagram shows relation between the participants by gender and their willingness to pay extra for clothing they co-designed. The vertical axis of this diagram represents the participants shopping behaviour (Hedonic & Utilitarian), the horizontal axis represents their social tendency (Group & Individual). The coloured markers represent the participants' gender: round for female, and square for male. The grid between the vertical and horizontal axis represents willingness to pay measuring unit at 50%. The grid starts at 50% less (-50%) followed by 0 % followed by +50% to a maximum of +300%.

The responses of willingness to pay are mapped onto this grid. The participants' responses show a minimum of 50% less (-50%) to maximum of 250% extra than the retail price of an apparel item they wish to customize. Due to the wide span of these responses they are grouped into three paying levels:

Level 1 Unwilling to pay (0%) and those who expected to pay less (-50%)

Level 2 Willing to pay min 10% to maximum 60% more

Level 3 Willing to pay significantly more 100%-25%

This diagram shows relations between consumer segmentation (gender, shopping behaviour and social tendency) and their willingness to pay extra for apparel they co-designed.

Appendix K.2

Willingness to Wait

Table 21 Custom Clothing: Willingness to Wait

No.	Gender	Minimum Willing to wait (weeks)	Maximum Willing to wait (weeks)
1	Male	2	3
2	Male	2	2
3	Male	1	2
4	Male	3	3
5	Male	1	2
6	Female	2	4
7	Female	2	2
8	Female	2	3
9	Female	4	4
10	Female	2	4
11	Female	1	2
12	Female	2	3
13	Female	2	2
Total		26	36
Average/ Participant		2	3
Average / Male		1.8	2.4
Average / Female		2.1	3