THE CO-CREATION OF GAMIFIED FITNESS EXPERIENCES

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Tess E. Hawkins

Department of Management, Marketing and Entrepreneurship

University of Canterbury

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Abstract

This thesis aims to investigate the different motivations of fitness technology users. Specifically, this thesis examines technology-based fitness experiences and the motivations and value that users derive from these experiences. Three literature streams are used to explain user engagement in technology-based fitness experiences: experience marketing, co-creation and gamification. In order to understand user motivations and the value derived from using this type of technology, an online survey was created using Qualtrics and a sample was recruited through Mechanical Turk. The scales used in the survey were sourced and adapted from the co-creation and gamification literature streams. A total of 360 responses were collected, and statistically analysed using multivariate procedures, including factor analysis and cluster analysis. On the basis of this analysis, users were put into distinct groups and profiled.

The results revealed that functional, social and emotional value are significant sources of motivation for engaging in technology-based fitness experiences. It was also found that gamification is a significant area of value for users and, therefore, is as an important consideration for fitness app designers. The most relevant and influential constructs, in relation to technology-based fitness experiences and product usage co-creation, were also identified. These include the risk and accessibility components of the DART framework and the four factors of the mobile Internet experience. In contrast, personalisation and flow were identified as unimportant to users. It was found that users predominantly utilise fitness apps to help meet their need to achieve fitness and health related goals. However, it was also identified that the gamification aspects of fitness apps are highly valued by users. This study demonstrates that fitness app designers must endeavour to make their apps functional and entertaining as it will likely elicit user adoption.

1. Thesis Overview

1.1 Introduction

In recent years there has been a wide adoption of fitness technology. For example, Fitbit has over 10.9 million active users (Kim, 2015b). Fitbit is a wearable fitness technology that enables users to track aspects of fitness such as their steps and sleeping patterns (Kim, 2015b). Another example is Nike+ Run Club, which has over 800,000 users (Nielsen, 2014). Nike+ Run Club is an app which has a number of features including tracking abilities, personalised fitness plans and a leaderboard (Nike, 2016). In general, fitness apps and wearable technology allow users to track their physical activity accurately and in real-time (Kim, 2015a). The use of fitness technology can be described as technology-based fitness experiences. More specifically, fitness apps and wearable technology are examples of gamified co-created experiences; during which users employ technology provided by brands to meet their needs and create an experience. The adoption of fitness technology is extensive. In 2015, the fitness technology industry in the United States presented a revenue of U.S. $904 million (Statista, 2016a). Health and fitness apps had a revenue of U.S. $345.2 million and wearable technology had a revenue of U.S. $558.4 million (Statista, 2016a). By 2020, health and fitness technology revenue in the United States is projected to reach U.S. $2,217 million (Statista, 2016a).

Considering the size of the fitness technology industry and the increasing number of users engaging in these experiences, there is a surprising lack of literature attempting to understand these experiences and users motivations for engaging in them. The aim of this thesis is to investigate the different motivations that users may have to use this fitness technology. Primarily, the research attempts to identify and group different users according to the value they derive from fitness apps and their subsequent motivations for use.

1.2 Research Background

Since 2007, smartphones have become widely adopted: over 56% of Americans now own a smartphone (Arthur, 2012). Wang, Park and Fesenmaier (2012) highlight one of the most useful features of smartphones: that they support the use of mobile apps. The growth of apps can be seen in Apple's iTunes App Store; when it first launched in 2008 it had 60,000 apps, by 2013 the store had over 827,000 (Delano & Reynolds, 2013). In 2014, Apple's App Store had over 20,000 apps in the Health and Fitness category (Martínez-Pérez et al., 2014).

In a report published by Nielsen (2014) almost one-third of U.S. smartphone owners, approximately 46 million people, used apps from the fitness and health category. These apps were used, on average, 16 times per month and for close to an hour (Nielsen, 2014). The most popular apps were Nike+ Run Club (0.8 million users) and Fitbit (3.3 million users) which connects users with their wearable technology (Nielsen, 2014). Wearable technology generally refers to dedicated electronic monitoring devices that are used for long-term data tracking, which can be synced to a smartphone app (Kaewkannate & Kim, 2016). These devices are small, state-of-the-art computers that users wear (Kaewkannate & Kim, 2016). One of the main reasons wearable fitness technology and fitness apps have become popular is that they allow users to gain access to real-time information and tracking (Kaewkannate & Kim, 2016). Over 25 million health and fitness trackers were sold in 2015, worldwide (Statista, 2016b). The fitness technology industry in the United States, including fitness apps and wearable fitness technology, had a revenue of U.S. $904 million in 2015 (Statista, 2016a).

Three literature streams help to explain the surge in technology-based fitness experiences: experience marketing, co-creation and gamification. Within experience marketing several academics describe the shift in perspective from meeting consumer's functional needs with tangible products, to meeting their experiential needs (Holbrook & Hirschman, 1982; Pine & Gilmore, 1998; Vargo & Lusch, 2004a). In 2004(b), Prahalad and Ramaswamy published an article recognising that consumers had become "informed, networked, empowered and active" (p. 6); subsequently consumers had become inclined to interact with brands and "co-create value". This resulted in several companies attempting to "co-create" with consumers during different points of the value chain, including product usage (Kohler, Fueller, Matzler & Stieger, 2011a). The majority of the co-creation literature focuses on product innovation with far less analysing product usage experiences (Kristensson, Matthing, & Johansson, 2008; Humphreys & Grayson, 2008; Lee, Olson & Trimi, 2012). Gamification is often used to motivate consumers and encourage their engagement and participation in experiences (Zichermann & Linder, 2010; Zichermann & Cunnigham, 2011). Morford, Witts, Killingsworth and Alavosius (2014) identified fitness as the most common area of application for gamification. There are many gamified fitness apps as well as gamified apps that connect to wearable technology (Gilmore, 2016). With most of the literature analysing product innovation and little examining product usage experiences, this presents a significant literature gap, which this thesis attempts to fill.

This thesis will primarily use the Fitbit app as an example of a co-created, gamified product usage experience. Fitbit is a wristband style, fitness tracking, wireless enabled, wearable device that measures a variety of data, including steps taken and quality of sleep (Kaewkannate & Kim, 2016). The wristband connects to the Fitbit app which allows users to set goals and track how well they are doing, encouraging greater physical activity during the day (Fitbit, 2016b). In 2014, the Fitbit app had over 10.9 million active users (Kim, 2015b).

1.3 Research Questions

The aim of this research is to understand the value users derive by engaging in the co-creation of gamified fitness experiences and group users accordingly. This thesis will attempt to answer the following questions:

- What types of personal value do users derive from engaging in the co-creation of technology-based fitness experiences?
- What aspects of co-creation do users value in the context of technology-based fitness experiences?
- What aspects of gamification do users value in the context of technology-based fitness experiences?

1.4 Research Methodology

It was identified through the literature review that there was a large number of fitness technology users and a significant demographic diversity among these users, therefore a larger sample size is preferable as it is more representative. The literature review revealed three significant literature streams that underpin the research topic, providing a strong basis for quantitative research. Consequently, a quantitative approach was adopted entailing the creation of an online survey using Qualtrics, using a sample recruited through Mechanical Turk. Scales were adapted from the co-creation and gamification literature streams. Although co-creation and gamification have not been combined before, each area presents multiple studies that provide comprehensive frameworks and concepts can be used in conjunction (Prahalad & Ramaswamy, 2004a; Deng, Lu, Wei & Zhang, 2010; Hailin, 2010; Hamari & Koivisto, 2014). After the data was collected, multivariate analyses were used to determine the most important areas of value according to user responses, and to identify distinct groups of users based upon the variables included in this thesis.

1.5 Theoretical Contributions

The literature review revealed that the most of the co-creation literature is in reference to product innovation, with little examining product usage co-creation (Kristensson et al., 2008; Humphreys & Grayson, 2008; Lee et al, 2012). This study specifically seeks to fill this research gap. It also attempts to identify the product innovation co-creation constructs that are relevant to product usage co-creation. This research combines three substantial literature streams which previously have not been examined in conjunction: experience marketing, co-creation and gamification. Constructs and scales within the co-creation and gamification literature streams are identified, analysed and synthesised. This study contributes three specific motivations to use fitness apps and highlights gamification as an important consideration.

1.6 Practical Implications

This research endeavours to provide an understanding of distinct groups of users who use fitness apps and their motivations for doing so. With this information, it is also the hoped that designers of fitness apps will be able to use their resources more effectively, focusing on the features and functions that help generate positive experiences for users. This study investigates aspects of fitness apps that are important to users, which designers could utilise to enhance user satisfaction and generate greater demand. The research also highlights the importance of a creating a balance between making the apps useful for users attempting to achieve fitness goals and also ensuring the apps are entertaining. Finally, this research investigates behavioural intentions as a result of positive product usage experiences, attempting to demonstrate the benefits of co-creating these experiences.

1.7 Thesis Outline

This thesis consists of five chapters, followed by a reference list and appendices. This section outlines the content of each chapter.

This chapter has introduced the research by providing a justification for the chosen subject, outlining the research gap and the significance of the chosen field. Context to the research was explained, followed by the research questions. The research method was then described and finally the theoretical and practical implications of this research were provided.

Chapter Two, Literature Review, describes the three main literature streams underpinning this topic. These include experience marketing, co-creation and gamification. Within each stream, definitions and interpretations are outlined and theoretical development is

described. Fitness literature, app literature and wearable technology literature are also examined.

Chapter Three, Methodology, outlines the method adopted for the research. The development of the online survey, the sample design and the use of an expert panel are described. The distribution method and the analyses used are then discussed.

Chapter Four, Results, presents the findings of the survey, including a sample overview. The results of the multiple multivariate analyses used in this study are outlined.

The Fifth and final chapter, Discussion, presents a discussion of research findings and research implications and contributions. The limitations of the study are outlined and suggestions for future research are provided.

2. Literature Review

This chapter provides the theoretical background of the research conducted. It attempts to describe the three main literature streams underpinning the thesis topic: experience marketing, co-creation and gamification. Each stream is examined in terms of definitions and interpretations, followed by a theoretical development and the relevant research findings. An examination of physical activity and its prominence in today's society is then provided. Apps and wearable technology, the facilitators of co-creation experiences, are then described.

2.1 Experience Marketing

Experience marketing has become a significant area of marketing literature (Carù & Cova, 2003; Basoc, 2015; Chang, Yuan & Hsu, 2010). The term "experience" is interpreted in several different ways and can be used in many contexts. Therefore, there is significant confusion regarding the term "experience" as well as discrepancies amongst the subsequent literature. The Oxford dictionary lists "experience" as both a noun and a verb and provides several definitions (Oxford University Press, 2016). By being both a noun and a verb the word represents both an occurrence and a process. Tynan and McKechnie (2009) explain the myriad of situations the term experience covers stating that "it (experience) is used variously to convey the process itself, participating in the activity, the affect or way in which an object, thought or emotion is felt through the senses or the mind, and even the outcome of an experience by way of a skill or learning for example" (p.503).

Several studies have used the term "experience" differently, heightening the confusion (Carù & Cova, 2003). In terms of marketing, experience is mainly viewed as an extra offering that meets the needs of the postmodern consumer (Carù & Cova, 2003). In 2004, Poulsson and Kale established that there had been no systematic attempts to define experience in marketing terms. In an article published by Pine and Gilmore (1998), experience is defined as "when a company intentionally uses services as the stage, and goods as props, to engage individual customers in a way that creates a memorable event" (p.98). It has also been postulated that experience marketing involves brand experiences which are engaging, interactive, and entertaining (Poulsson & Kale, 2004). Brand experiences have been defined as "subjective, internal consumer responses (sensations, feelings, and cognitions) and behavioural responses evoked by brand-related stimuli" (Brakus, Schmitt & Zarantonello, 2009, p.53). Brand stimuli is considered as any aspects of a brand's design and identity, communications, or environments

in which the brand is marketed or sold (Brakus et al., 2009). For the purposes of this thesis, brand experiences will be used to define "experience".

Experience marketing has a history over a thirty years, which began in the seminal article written by Holbrook and Hirschman (1982). The authors introduced the idea that consumer behaviour has an experiential aspect which is hedonic in nature and related to the multi-sensory, fantasy and emotive aspects of product usage (Holbrook and Hirschman, 1982). This perspective encouraged researchers to view consumers as possessing both experiential as well as functional needs. Since this seminal article, there has been increased consensus amongst academics and practitioners regarding the significance of experience and its influence on consumer behaviour (Tynan & McKechnie, 2009).

Pine and Gilmore (1998) explained the progression the world has made from a commodity-based economy, to a goods-based economy, to a service-based economy and finally to an experience-based economy. The authors explained that consumers desired experiences and that businesses were responding by explicitly designing and promoting them (Pine & Gilmore, 1998). Pine and Gilmore (1998) describe experiences as distinct economic offerings, recognising them as completely separate from services and goods. The idea of transformative economy was later criticised by Holbrook (2000), who detested the conflation of goods, services and experiences. Holbrook (2000) explained that every consumption event is different and each provides some form of experience.

The idea of moving away from the traditional view of consumers as rational beings concerned with functional features to beings that are concerned with achieving pleasurable experiences, was also supported by Schmitt (1999). He created a conceptual model of experience marketing based on the definition of two key elements: the strategic experience modules and the experience producers. He postulated that there are five different types of experiences involving sensing, feeling, thinking, acting and relating (Schmitt, 1999). These different experiences include sensory experiences, affective experiences, creative cognitive experiences, physical experiences, behaviours and lifestyles, and social identity experiences (Schmitt, 1999). Several scholars reference focusing on enhancing the consumption experience rather than focusing solely on product attributes, encompassing a more holistic view of consumption (Holbrook & Hirschman, 1982; Pine & Gilmore, 1998; Schmitt, 1999; Tynan & McKechnie, 2009). These concepts of experience consumption were encompassed in and developed further through the theory of Service-Dominant logic (Tynan & McKechnie, 2009).

Service-Dominant logic emphasises experiences and the co-creation of value between brands and their consumer's context (Tynan & McKechnie, 2009).

The concept of Service-Dominant logic (SDL) has also been analysed in relation to experience marketing (Vargo & Lusch, 2004a; 2004b, 2008). Sheth, Sisodia and Sharma (2000) proposed that just as the marketing function shifted from a mass-market focus, to a segmentation focus, the function would shift again to a customer-centric focus. The SDL concept encompassed the idea that marketers would begin seeking to fulfil the needs and wants of consumers on an individual basis (Sheth et al., 2000). Vargo and Lusch (2004a) stated that the models used to understand marketing were mostly developed during the nineteenth century and that the majority of them were goods and output orientated. The authors explained that times had changed and a focus on the intangibles, such as interactivity, connectivity and ongoing relationships, was needed (Vargo & Lusch, 2004a). SDL was suggested as an appropriate model to understand marketing in the new era.

Tynan and McKechnie (2009) explain that applying SDL requires changing from the traditional perspective of managing resources and capabilities to managing the customer experience. The authors assert that there is, "a fundamental change in perspective … to one where producers and consumers both produce and consume, thus requiring a long-term strategy which includes a shared vision, mutually negotiated experiences and constant collaboration" (p.508). SDL also highlights value-in-use rather than value-in-exchange (Vargo and Lusch 2004b). In the SDL context "service" is viewed as the common denominator in exchange and not as the intangible alternative of a good (Vargo and Lusch 2004b). SDL emphasises viewing consumers as co-creators of value who are equal to that of the brand and as such SDL is one of the dominant theories underpinning co-creation (Lusch & Vargo, 2006).

There are a number of perspectives and theories regarding what constitutes an experience in a consumption context, including the "customer experience" perspective and the "experiential consumption" perspective (Addis & Holbrook, 2001: Frow & Payne 2007). The term "customer experience" is often used within experience marketing (Bagozzi, Gopinath & Nyer, 1999; Lemke, Clark & Wilson, 2011; Gentile, Spiller & Noci, 2007; Frow & Payne 2007). Meyer and Schwager (2007) define customer experience as "the internal and subjective response that customers have to any direct or indirect contact with a company" (p.118). Gentile at al. (2007) found six components of the customer experience: sensorial, emotional, cognitive, pragmatic, lifestyle, and relational. Throughout the literature cognition and affect have been

identified as significant components of customer experience (Bagozzi et al, 1999; Frow & Payne 2007; Tynan & McKechnie 2009). Meyer and Schwager (2007) explain that consumers are no longer only concerned about what is provided but also how something is provided and therefore experiential needs must be considered. There are a range of customer experiences that are explored in the literature. Originally, the scope was limited to real-world experiences but with the emergence of technology the online consumer experience is now a significant point of interest (Chang et al., 2010).

Another term often used in experience marketing is "experiential consumption" (Addis & Holbrook, 2001; Bigné, Mattila & Andreu, 2008; Jantzen, Fitchett, Østergaard & Vetner, 2012). Sheu, Su and Chu (2009) explain that experiential marketing is a methodology as well as a concept that has evolved beyond the traditional "features-and-benefits" marketing. The authors state that "experiential marketing connects consumers with brands in personally relevant and memorable ways" (Sheu et al., 2009, p.8487). Experiential consumption focuses on the emotional and hedonic qualities of consumption and the need to create engaging and positive consumption experiences (Jantzen et al., 2012). Jantzen et al. (2012) explain that emotions are complex and have been heavily researched in both psychology and anthropology, referencing strong biological and cultural influences.

Reddy (2001) proposed the emotional regime theory which explains that some aspects of emotions are culturally constructed in order to solidify relationships between individuals and their community. The premise of this theory was that enjoyment and pleasure are important in life and are necessary for personal development, social development and overall happiness (Reddy, 2001). The experiential consumption perspective highlights the ideology that attaining pleasurable experiences is an existential goal in life and can lead to self-actualisation (Jantzen et al., 2012). It has been argued that modern life has become significantly "joyless" and that experiential consumption is an avenue to restoring some of that joy and pleasure (Jantzen et al., 2012). In many contexts consumption has been seen to elicit emotional responses in consumers. Jantzen et al. (2012) explains that emotions are systematic bodily responses to stimuli.

Before considering the role of emotions in experiences, a distinction must be made between emotions, mood states and attitudes. Bigné et al. (2008) describe emotions as having a greater intensity than moods, and that they tend to be linked to a specific stimulus. Although previous research indicates that mood states may cause bias during evaluation (Knowles, Grove

& Pickett, 1993), mood states are not the focus of this study. However, this study does examine the emotional value consumers derive from a product usage experience. Menon and Dube´ (2000) defined emotions as a complex set of interactions among subjective and objective factors giving rise to affective experiences. Attitudes are evaluative judgments regarding a stimulus object that differ in valence and strength (Maio & Haddock, 2015). Attitudes towards attitude objects, such as a brand, are based on cognitive, affective and behavioural information (Maio & Haddock, 2015). It was found that consumers generally incorporate negative experiences into their attitudes more quickly than positive ones, highlighting the importance of providing continuously positive experiences for consumers (Maio & Haddock, 2015).

The interplay between affect and cognition remains a widely debated topic in psychology (Chebat & Michon, 2003; Dubé, Cervellon & Jingyuan, 2003). There are two major arguments: the emotions-lead-to-cognition approach and the cognition–leads-to-emotions approach (Bigné et al., 2008). Within the marketing field scholars incorporate the cognitive theory of emotions to explain consumer behaviour in regards to services (Bigné et al., 2008) (Bagozzi & Moore, 1994; Bagozzi et al., 1999). Schachter and Singer (1962) state that the cognitive theory of emotions suggests that affect is a function of the cognition of arousal. Mandler (1975) postulates that arousal occurs as a result of interruptions or unexpected events. For example, an exciting and interactive fitness app may cause consumers to exercise more often as a result of the high level of stimulation.

Oliver, Rust and Varki (1997) provided a framework for understanding the relationship between cognitive and affective evaluations in which these are conceptualised as disconfirmation and emotions. Disconfirmation is a psychological interpretation of an expectation-performance inconsistency (Oliver et al., 1997, p. 28). Positive disconfirmation, exceeding expectations, elicits feelings of satisfaction; in contrast falling short of consumer expectations is likely to lead to negative evaluations (Oliver et al., 1997; Wirtz & Bateson, 1999; Menon & Dubé, 2000). Although this model has been previously used only in relation to services, it is believed that this model of emotions also applies to product usage; as such, the disconfirmation construct will be incorporated into this study. Positive disconfirmation and subsequent satisfaction can lead to positive behavioural intentions that benefit the brand (Baker & Crompton, 2000; Szymanski & Henard, 2001; Wakefield & Inman, 2003).

It has been found that satisfaction is highly correlated with positive attitudes and subsequently with behavioural intentions, for example repurchase intentions (Szymanski &

Henard, 2001; Bigné et al., 2008). Satisfaction is also believed to result in customer loyalty and willingness to pay more in some consumption contexts (Wakefield & Blodgett, 1999; Baker & Crompton, 2000). Bloemer and De Ruyter (1999) found that both positive emotions and satisfaction were positively linked to loyalty. Wakefield and his colleagues (Wakefield & Barnes, 1996; Wakefield & Bush, 1998; Wakefield & Inman, 2003) demonstrate that consumption context (utilitarian and hedonic) can effect the impact of satisfaction on loyalty intentions and willingness to pay. Bigné et al. (2008) explain that when comparing utilitarian-type services and hedonic services, hedonic services tend to be more emotional in nature and as a result intensify the effects of satisfaction on behavioural responses. Poulsson and Kale (2004) explain that another important component of experience marketing is experience co-creation.

2.3 Co-creation

Before describing the experience co-creation literature stream, co-creation will be examined. In recent years there has been a myriad of academic literature published referencing the term "co-creation" (Storbacka, Payne, & Frow, 2008; Zwick, Bonsu, & Darmody, 2008; Cova, Dalli, & Zwick, 2011). Galvagno and Dalli (2014) explain that the co-creation literature has become extremely complex due to an increasing variety of approaches and a number of theoretical perspectives being adopted in the field. The authors attribute the inconsistencies to differing academic perspectives, including service science perspective, innovation and technology management perspective, and marketing and consumer research perspective (Galvagno & Dalli, 2014). Not only do these perspectives provide differing definitions of co-creation but there are also differing definitions within each literature stream.

Within the marketing co-creation body of literature there are many discrepancies regarding the term's definition and subsequently how to understand the concept. Zwass (2010) provides a broad definition, stating that it is the creation of value by consumers. Frow and Payne (2007) define co-creation as the opportunity brands and customers have to create value through customised, co-produced offerings. Co-creation is also explained as when consumers are able to personalise their experience using a company's products or services (Piligrimiene, Dovaliene & Virvilaite, 2015). According to Galvagno and Dalli (2014) co-creation is the joint, collaborative, concurrent, peer-like process of producing new value, both materially and symbolically. Galvagno and Dalli's (2014) definition is based on a comprehensive, systematic literature review and as such will be used in this study.

In 2004(b), Prahalad and Ramaswamy published an article in which they recognised that consumers had become "informed, networked, empowered and active" (p. 6). In the article the authors state that armed with new tools and dissatisfied with available choices, consumers had become inclined to interact with brands and "co-create value" (Prahalad & Ramaswamy, 2004b). The authors define co-creation as the process of consumers taking an active role and creating value together with a company or brand (Prahalad & Ramaswamy, 2004b). This shifted away from Pine and Gilmores' (1998) idea of consumers as "guests" in the experience economy, to viewing consumers as valuable sources of information.

Within the literature there is an ongoing debate regarding the differences between co-creation and co-production and the need for a distinction (Grönroos & Voima, 2013). Lusch and Vargo (2006) explain that the two are separate constructs; however, the authors acknowledge that they are nested concepts. The authors stipulate that co-production is a subordinate concept of co-creation (Lusch & Vargo, 2006). While co-creation of value takes place during the usage/consumption stage, co-production takes place during the production stage of consumption (Lusch & Vargo, 2006). Co-creation during the usage stage of consumption is an opportunity to create meaningful experiences for consumers.

Galvagno and Dalli (2014) outlined several areas of marketing that co-creation could possibly improve, such as improving consumption and usage experiences (Gentile et al., 2007; Storbacka et al., 2008) and stimulating product and service innovation (Sawhney, Verona & Prandelli, 2005; Bitner, Ostrom & Morgan, 2008). Most of the co-creation literature focuses on product innovation with far less studies analysing product usage experiences (Kristensson et al., 2008; Humphreys & Grayson, 2008; Lee et al., 2012). Many authors have acknowledged that, alongside value in exchange, value-in-use is an important aspect of the consumption process emphasising the importance of product usage encounters (Ballantyne & Varey, 2006; Gronroos, 2008; Storbacka et al., 2008) This thesis specifically examines the co-creation of product usage experiences, attempting to fill the literature gap.

As previously outlined, co-creation is a complex concept; subsequently, Prahalad and Ramaswamy (2004a) provided the DART framework to help researchers and practitioners to understand aspects of co-creation strategies. The DART framework includes dialogue, access, risk assessment and transparency (Prahalad & Ramaswamy, 2004a). Within the DART framework, dialogue refers to interactivity, engagement and inclination to act from both consumers and brands (Prahalad & Ramaswamy, 2004a). It goes beyond listening to

consumers: dialogue in this context involves shared learning and communication (Prahalad & Ramaswamy, 2004a). Access regards providing consumers with the necessary information and tools to co-create with brands (Prahalad & Ramaswamy, 2004a). Risk assessment encompasses the probability of harm to the consumer and whether consumers have been fully informed of all the risks (Prahalad & Ramaswamy, 2004a). Finally, transparency refers to brands providing full information pertaining to prices, costs, profitability, products and business systems to consumers participating in co-creation (Prahalad & Ramaswamy, 2004a). While all four of these dimensions are applicable in product innovation co-creation, only access and risk assessment apply in a product usage co-creation setting. As such, dialogue and transparency will be omitted from this study and access and risk assessment will be included.

The relationship between organisations and consumers has fundamentally changed as consumers have taken a more active role in the consumption process. Prahalad and Ramaswamy (2004c) reference the Internet as enabling consumers to connect globally, gain increased access to information and make informed decisions. Eugena (2015) explains that consumers have changed from merely receivers of the value propositions, to educated consumers that can partake in the creation of value. There are a number of perspectives regarding the role of the consumer in the consumption process, please see Figure 2:1.

Table 2:1 Changing Consumer Role

Scholars	Year	Service Dominant Logic Changing Consumer Role
Mills & Morris	1986	Partial Employee
Baudrillar	1988	Educated Consumer
Normann & Ramirez	1993	Co-Producer
Firat, Dholakia & Venkatesh	1993	Customizing Consumer
Wikstrom	1996	Co-Producer
Prahalad & Ramaswamy	2000	Active Consumer
Bendapudi & Leone	2003	Co-Producer
Vargo & Lusch	2004	Co-Producer
Prahalad Ramaswamy	2004	Personalized Co-creation
Vargo & Lusch	2006	Co-creator of Value
Gronroos	2008	Value Co-creators
Cova & Dalli	2009	Working Consumer

(Source: Eugena, 2015)

Baudrillard (1988) suggested that consumers need to be educated due to consumption becoming a productive process. Firat, Dholakia and Venkatesh (1995) explain that when organisations open their proprietary processes, educated consumers are able to move from the role of consumer to producer. By taking an active role in value creation many academics have begun viewing these consumers as "co-producers" (Normann, & Ramirez, 1993; Wikstrom, 1996; Bendapudi & Leone, 2003; Prahalad & Ramaswamy, 2004b; Vargo & Lusch, 2004a). Mills and Morris (1986) even go as far as to call these consumers partial employees. The authors found that consumers become partial employees when there is a match between product relation and their degree of involvement (Mills & Morris, 1986). It must be stipulated that most of this literature is in relation to product innovation co-creation.

Cova and Dalli (2009) explain that consumers have been increasingly viewed as a primary source of value and theorised as producers. The authors propose the concept of the working consumer, where they are active in the value creation process through immaterial labour and primary social relationships (Cova & Dalli, 2009). It is acknowledged that consumers are not partners and therefore do not "co-produce" but instead perform immaterial work (Cova & Dalli, 2009). This brings into question the "co" in "co-creation" as consumers and brands are not in a partnership or on equal terms. The authors describe these working consumers as being exploited by market forces and that there is a need for development of protection rules and systems (Cova & Dalli, 2009). The working consumer concept challenges other concepts such as SDL, which Cova and Dalli (2009) believe tries to create a vision of an idyllic marketplace where consumers and brands live in harmony.

Gronroos (2008) explains that value is not always found in exchange but also can be found in use, as seen when consumers use services. As a result, consumers are considered value co-creators and use the services as they desire (Gronroos, 2008). This view of consumers is related to the view that value co-creation is uniquely derived by each consumer (Vargo & Lusch, 2004a; 2006). Some authors believe that an organisation's most basic role is to facilitate value by providing consumers with the necessary platforms to utilise their own resources, e.g. knowledge and skills (Gronroos, 2008; Vargo & Lusch, 2004a). Consequently, consumers derive value-in-use by co-creating with brands (Gronroos, 2008). This can also be seen in the context of experience as consumers use a platform provided by the brand to co-create an experience unique to them.

It is the belief of the author that brands have more power than consumers and therefore, they are not equals. This belief is held because the brand governs the platforms and dictates to the consumer the parameters of the experience. As such, the brand and the consumer are not equal. However, for the purposes of this thesis, consumers will be viewed as "co-creators" as no other word aptly describes the brand/consumer relationship in terms of product usage co-creation.

Consumer value has been established as an important factor in many marketing decisions (Piligrimiene et al., 2015). Study within this area is extensive and while many of the dimensions are similar there are noticeable differences amongst the studies. Sheth, Newman and Gross (1991) identified functional, social, emotional, epistemic and rational dimensions as the factors comprising consumer value. Sweeney and Soutar (2001) provided similar dimensions, referencing emotional, social, functional (price/value for money) and functional (performance/quality) scales of personal value. The majority of studies reference the functional, social, emotional and economic aspects of personal value (Deng et al., 2010; Wang, Liao & Yang, 2013; Ruiz-Molina & Gil-Saura, 2008). Consequently, when analysing consumer value in a co-creation context five of these dimensions were be incorporated into this study, due to their high level of empirical significance.

Within the co-creation context, economic value relates to reduced costs of product/service acquisition, special offers and rewards as a result of engaging in co-creation (Piligrimiene et al., 2015). It has been postulated within the literature that the economic aspect of value for consumers is the most important (Yang & Jolly, 2009; Deng et al., 2010). However, Piligrimiene et al. (2015) explain that many consumers participate in co-creation when there is no financial incentive. In a product innovation co-creation setting, economic value can be applicable as consumers may be compensated for their ideas or participation. However, in a product usage setting economic value is not relevant as consumers do not receive any form of economic reward, therefore, the economic value scale will not be included in this study.

Social value, in relation to co-creation, regards enhancing social self-concept by increasing status and self-esteem which is derived from acknowledgement among members of the community (Piligrimiene et al., 2015). The functional dimension includes product knowledge and information acquired during co-creation that could be shared with other consumers (Smith & Colgate, 2007; Piligrimiene et al., 2015). While this interpretation of function is relevant in a product innovation setting it does not apply to product usage. As such,

within this thesis, the functional value will refer to whether the product meets consumer needs, and functions correctly (Smith & Colgate, 2007; Yuan & Wu, 2008). Finally, emotional value is associated with feelings and positive emotions evoked by using the product or by engaging in value co-creation (Miladian & Sarvestani, 2012; Piligrimiene et al., 2015).

Van Doorn et al. (2010) suggest that as a result of value co-creation, consumers derive benefits, such as satisfaction, brand trust, brand commitment, decrease of consumption costs and value of new relationships. As such, satisfaction and brand loyalty related concepts will also be incorporated into this study. Within the co-creation literature it has been found that the benefits derived by consumers vary depending on the context (Piligrimiene et al., 2015). It has also been found that the benefits derived by consumers differ to those derived from the brand (Piligrimiene et al., 2015).

In the past, value for the brand was always measured in economic terms; however, in light of modern marketing theories it has been found that intangible value such as long-term relationships should also be considered (Kumar et al., 2010; Mencarelli & Riviere, 2015). Kumar et al., (2010) proposed "customer engagement value" to describe the benefits companies derive as a result of the co-creation process. According to these authors, this concept has four dimensions including: customer lifetime value (reflecting customer buying behaviour), customer referral value (new customer attraction), customer influencer value (a customer's ability to influence existing and potential consumers by spreading word of mouth communication), and customer knowledge value (from customer feedback such as ideas for innovation and improvements), (Kumar et al., 2010). This concept was supported by Larivière et al. (2013) who found that additional revenue could be found through co-creation due to deeper relationships and resulting repeat purchases. They also found that co-creation could provide market insight, customer knowledge and real-time tracking and control (Lariviere et al., 2013). While these aspects of co-creation are important, this study is consumer focused, therefore brand value was not examined.

While experience marketing and co-creation have their own broad literature streams, there is a literature stream that incorporates concepts and theories from both: experience co-creation. Along with experience marketing and co-creation, experience co-creation holds important concepts which underpin the thesis topic.

2.5 Experience Co-creation

Ramaswamy (2008) combined the experience marketing literature stream and the co-creation literature stream to form experience co-creation. The experience co-creation process is described as enabling co-creative interactions so that individuals can have meaningful and compelling engagement experiences (Ramaswamy, 2008). The author explained that by continuously interacting with its consumers through engagement platforms, especially those centred on consumer experiences, brands could build strategic capital and subsequently find a new source of competitive advantage. The author identified co-creative interactions as an emerging strategy for value creation (Ramaswamy, 2008). Within this article it is stated that there had been a fundamental shift in the basis and process of value creation, from products and services towards experience co-creation platforms (Ramaswamy, 2008).

Prahalad and Ramaswamy (2003) reference technological advances as one of the key drivers shifting marketing thought from product to experience. Ramaswamy (2008) specifically identifies search engines, engagement platforms, the growth of Internet-based interest groups, and widespread communication technologies as facilitators for the integration of consumers into certain parts of the value chain. Kohler et al. (2011a) reference the Internet as having particular features that allow companies to interact with consumers in a unique way to cultivate consumer knowledge and creative ideas. The Internet has become an important medium used by brands as it is flexible, interactive and in certain situations cost-effective (Lacka, Chan & Yip, 2014). This has resulted in several companies attempting to collaborate with consumers during different points in the value chain, including product usage (Kohler et al., 2011a). Prahalad and Ramaswamy (2003) stipulate that the ability to envision and combine technological capabilities to facilitate experiences will be the key success factor in experience innovation.

While there are studies analysing how to successfully design co-creation experiences online, the majority are in reference to product innovation (Nambisan & Baron, 2009; Kohler at al., 2011a; Kohler, Fueller, Stieger & Matzler, 2011b). However, it has been found that the experiences consumers had as a result of engaging in product innovation co-creation can be a source of value (Kohler et al., 2011a). The authors identified several benefits that influenced these experiences including cognitive, social, personal and hedonic factors (Kohler et al., 2011a). These could also be seen as benefits that could motivate consumers to engage in product usage experiences. Another framework within this literature stream which could be

seen as applicable is that proposed by Nambisan and Nambisan (2008). The authors suggested that the creators of virtual co-creation systems must consider four experience dimensions including: pragmatic, sociability, usability, and hedonic (Nambisan & Nambisan, 2008).

Prahalad and Ramaswamy (2004b) indicated that high-quality, unique co-creation experiences between brands and consumers could be a possible source of competitive advantage. It is explained that the basis for unique value lies in consumer experiences and that the quality of these experiences is dependent on the level of their involvement (Prahalad & Ramaswamy, 2004b). Individual characteristics of each consumer cause variation in their level of involvement in a particular experience, therefore, personalisation becomes extremely important. Prahalad and Ramaswamy (2004b) note that brands need to create an experience environment that facilitates the personalisation of unique experiences. The authors further illuminate the idea of creating individual co-creation experiences by explaining the influence of "experience space". Within the experience space the consumer is central and an event, such as product purchase, triggers a co-creation experience (Prahalad & Ramaswamy, 2003). Prahalad and Ramaswamy (2003) explain that the context (time and space) of the event and the level of involvement had by the individual influences the experience. Finally, the author's state that the personal meaning assigned to the co-creation experience and the level of involvement is what determines the level of value created (Prahalad & Ramaswamy, 2003). Co-creation requires active consumer participation, as a result consumer engagement concepts such as gamification are extremely important (Piligrimiene et al., 2015).

2.6 Gamification

The link between gamification and consumer engagement during co-creation has been postulated by several authors (Huotari & Hamari, 2012; Ind & Coates, 2013; Piligrimiene et al., 2015). The majority of the literature referencing this link is in relation to product innovation co-creation, with few studies investigating the link between gamification and product usage co-creation. The term "gamification" was first used by Brett Terill in 2008 who stated that it was the process of applying game mechanics to other web properties to increase engagement (Pace & Dipace, 2015). While some authors propose that gamification is the process of making activities more game-like (Werbach, 2014), others highlight the use of game mechanics and elements to motivate consumers and encourage their engagement and participation (Zichermann & Linder, 2010; Zichermann & Cunnigham, 2011). Huotari and Hamari (2012)

state that gamification refers to "a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation" (p.19).

Hamari et al. (2014) identified ten different motivational affordance categories within the gamification literature: points, leaderboards, achievements/badges, levels, story/theme, clear goals, feedback, rewards, progress and challenge. It was found that engagement elicited by gamification depends on several factors, such as the motivations of use and the nature of the gamified system (Hamari et al., 2014). Zichermann and Cunningham (2011) refer to recency, frequency, duration, virality and ratings as unrelated metrics that, as a whole, comprise engagement. The authors note that the relative importance of these metrics varies depending on the type of brand using gamification (Zichermann & Cunningham, 2011).

There have been multiple studies exploring gamification and how the concept elicits high levels of engagement (Hailin, 2010; Hamari & Koivisto, 2014; Harwood & Garry, 2015; Kuo & Chuang, 2016). In 1991, Csikszentmihalyi introduced the concept of "flow" which describes an optimal experience characterised as a state of being fully focused and engaged in an activity. This optimal experience occurs when an individual performs at the height of their skills and the task is optimally challenging (Nakamura & Csíkszentmihályi, 2002). Hoffman and Novark (1996) then introduced the flow theory into the hypermedia computer-mediated environment. Flow is widely accepted to be one of the fundamental reasons that people play games online (Hailin, 2010). Initially, the flow concept includes five conditions: autotelic experience, balance of skill and challenge, control, clear goals, and feedback (Hamari & Koivisto, 2014). It has been found there are four possible outcomes from achieving flow: merging action-awareness, concentration, loss of sense of time, and loss of self-consciousness (Hamari & Koivisto, 2014).

Hailin (2010) created and tested a mobile experience model, based on the technology acceptance model (TAM) and the flow experience. The TAM was created to better understand why people accept or reject computers (Davis, Bagozzi & Warshaw, 1989). The two key variables in the model are the perceived ease of use and perceived usefulness which Hailin (2010) later used in his mobile experience model. Hailin's (2010) study proposed four factors of the mobile Internet experience including level of challenge, the user skill level, perceived ease of use and perceived usefulness. Challenge refers to how difficult it is to achieve a task and the level of skill required (Hailin, 2010). User skill level describes the extent to which a user believes they have the necessary abilities or skills to use mobile technology (Hailin, 2010).

Perceived ease of use refers to how simple the user believes it is to navigate the technology and achieve the desired value (Hailin, 2010). Finally, perceived usefulness alludes to the degree to which a user believes that the mobile technology will provide value (Hailin, 2010). Hailin (2010) posits that if a mobile experience has optimal challenge and the user has the necessary skills, finds the technology easy to use and believes the mobile experience is useful, that the user will achieve flow and have a positive experience.

Gamification has been used to increase engagement in several areas including business energy conservation, education, and health and fitness (Morford et al., 2014). Morford et al. (2014) identified fitness as the most common area of application for gamification. There are many gamification fitness apps and wearable fitness technologies that help users reach their health and fitness goals (Gilmore, 2016). A common approach to reaching health related goals, is eating healthy food and engaging in physical activity (Caspersen, Powell & Christenson, 1985).

2.7 Physical Activity

The physical fitness literature is extensive and spans multiple decades (Collingwood & Willett, 1971; Jasnoski, Holmes, Solomon & Aguiar, 1981; Altchiler & Motta, 1994; Gerber & Pühse, 2009). The terms “physical activity," "exercise," and "physical fitness” are often used interchangeably; however, each term describes different concepts. Caspersen et al. (1985) define physical activity as any bodily movement produced by skeletal muscles that results in energy expenditure. The authors explain that exercise is a subset of physical activity that is planned, structured, and repetitive and has the objective of improvement or maintenance of physical fitness (Caspersen et al., 1985). Finally, physical fitness is described as a set of attributes that are either health or skill related, and the degree to which people have these attributes can be measured with specific tests (Caspersen et al., 1985). For the purposes of this thesis, the terms “physical activity” and “fitness” will be used interchangeably to refer to regular, moderate physical activity requiring an energy expenditure of 1,000 calories per week (Hoeger & Hoeger, 2013).

The majority of the physical activity related studies investigate the concept in relation to obesity, diseases, anxiety and self-concept (Doan & Scherman, 1987; Aşçi, 2003; Fogelholm, 2010; Asmundson et al., 2013). The physical and psychological benefits of physical activity are well documented within the literature (Asmundson et al., 2013; Hoeger &

Hoeger, 2013). Physical activity and subsequent fitness has been found to decrease the risks for developing heart diseases, stroke, metabolic syndrome, Type 2 diabetes, obesity, osteoporosis and high blood pressure (Hoeger & Hoeger, 2013). Over two decades ago the U.S. National Institute of Mental Health recognised the link between physical activity and emotional well-being (Asmundson et al., 2013). It has been found that physical activity has therapeutic effects for those suffering from anxiety and depression disorders (Asmundson et al., 2013). Anxiety disorders are the most commonly diagnosed mental disorders and have an adverse financial impact on society (Asmundson et al., 2013). Clinical studies have also shown that regular physical activity can improve mood, cognitive function, creativity and short-term memory as well as enhancing a person's ability to perform daily tasks (Hoeger & Hoeger, 2013). Research has found that increased physical activity can lead to a healthier lifestyle and subsequently can improve a person's quality of life (Hoeger & Hoeger, 2013; Porter, 2016). Physical activity is an important area of investigation considering the multitude of physical and psychological benefits.

There are several factors driving an increased interest in physical activity including social marketing initiatives and active wear brand marketing campaigns. Inactivity and a significant number of overweight adults worldwide remains a significant issue. In 2014, it was found that more than 1.9 billion adults were overweight worldwide, with over 600 million of these people being classified as obese (World Health Organisation, 2016). Consequently, it is not surprising there have been a number of social marketing initiatives put in place to encourage healthy lifestyles and physical activity. For example, the VERB campaign which promoted physical activity in young Americans, and the Change4Life campaign which promoted physical activity in the United Kingdom (Centers for Disease Control and Prevention, 2007; United Kingdom Department of Health, 2011). More recently there has been a specific focus on encouraging young women to become more active; for example, the This Girl Can campaign in England and the Girls Make Your Move campaign in Australia (Rumsby, 2015; Australian Government Department of Health, 2016). It has been found that social marketing campaigns encouraging physical activity have led to behavioural change (Gordon, McDermott, Stead & Angus, 2006; Thornley & Marsh, 2010). For example, the This Girl Can campaign was credited with inspiring 148,700 women aged 16 and over to take part in sport for at least half an hour each week between April and September 2015 (Rumsby, 2015). Alongside the social marketing campaigns are active wear brand campaigns encouraging women to become more active and use of the brands products. For example, Under Armour released the "I Will What

I Am" campaign featuring fit celebrities such as Misty Copeland and Gisele Bundchen (Under Armour, N.D.).

Other drivers of the increased interest in physical activity include the recent fitness trend and the availability of gamified, inexpensive fitness technology. The recent socio-cultural fitness trend has been referenced as "fitspiration" and is said to have replaced the "thinspiration" trend which had encouraged people to lose excessive weight (Tiggemann & Zaccardo, 2015). In contrast, the fitness trend consists of images that are designed to motivate people to exercise and strive for a healthier lifestyle (Tiggemann & Zaccardo, 2015). Social media platforms such as Facebook, Instagram and Pinterest enabled the rapid dissemination of this trend, encouraging many to engage in physical activity (Goldstraw & Keegan, 2016; Simpson & Mazzeo, 2016). The overwhelming ability to engage in social comparison on social media has also mediated the increase in numbers engaging in fitness (Nesi & Prinstein, 2015; Vogel, Rose, Okdie, Eckles, & Franz, 2015). These consumers see an overwhelming number of images of physically fit people which inadvertently incorporates into their image of their ideal self (Belk & Pollay, 1985). When they compare this with their actual self it is not congruent, eliciting feelings of inadequacies and encouraging corrective action (Choi & Rifon, 2012). The widespread adoption of fitness apps and wearable fitness technology has also been referenced as a driver of increased physical activity (McGrath & Scanaill, 2014).

2.8 Health and Fitness Technology

2.8.1 Apps

Fitness gamification would not be nearly as prominent as it is now without the rise in smartphone ownership (Gilmore, 2016). Since 2007, smartphones have become widely adopted: over 56% of Americans now own a smartphone (Arthur, 2014). Wang et al. (2012) highlight the fact that one of the most useful features of smartphones is that they support the use of mobile apps. These apps offer a wide range of information services, such as specialised information search, consumer-to-consumer communication and entertainment value (Wang et al., 2012). The growth of apps can be seen in Apple's iTunes App Store, when it first launched in 2008 it had 60,000 apps, by 2013 the store had over 827,000 (Delano & Reynolds, 2013). In 2014, Apple's App Store had over 20,000 apps in the Health and Fitness category (Martínez-Pérez et al., 2014).

It was revealed in a report published by Nielsen (2014) that almost one-third of U.S. smartphone owners, around 46 million people, used apps from the fitness and health category. It was found that on average the 46 million users accessed the fitness and health apps 16 times per month and used them for almost an hour (Nielsen, 2014). The most popular apps were Nike+ Run Club (0.8 million users) and Fitbit (3.3 million users) (Nielsen, 2014). Lee and Cho (2016) identified the ability to set goals and track health activities, the ability to interact with other users and the ability to acquire relevant, accurate information as the common motivations to use fitness apps. The authors explained that entertainment and trendiness were also motivations for use (Lee & Cho, 2016). The gamification aspects of fitness apps add an element of entertainment to fitness activities which are normally perceived as dull and unappealing (Zichermann & Cunnigham, 2011). Other factors include feedback provision, social comparison, prompts, cues and rewards (Lyons, Lewis, Mayrsohn, & Rowland, 2014). While there are stand-alone fitness apps such as Nike+ Run Club there are other apps such as the Fitbit app which connects to wearable fitness technology (Kaewkannate & Kim, 2016).

2.8.2 Wearable Technology

The first device that was considered a wearable computer was invented in 1961; however, wearable technologies have only become widely adopted in recent years (Starner, 2002). Barfield and Caudell (2001) define a wearable computer as a "fully functional, self-powered, self-contained computer that allows the user to access information anywhere and at any time" (p. 471). The term wearable technology includes several different forms of body mounted technology such as watches, glasses, contact lenses, e-textiles, smart fabrics, headbands, beanies and caps, rings and bracelets (Wright & Keith, 2014). Wearables can gather data from either the wearer's body or from the environment (Baumann, 2016). According to Kaewkannate and Kim (2016) wearable technology allows users to gain access to real-time information and tracking. Wearable devices provide a platform for greater social interaction, provide entertainment value and also have several functional features (Kaewkannate & Kim, 2016). While smartwatches are the most valuable segment of the wearables market, fitness trackers remain the most popular, accounting for over half of all global wearable shipments in 2015 (CCS Insight, 2016).

Kaewkannate and Kim (2016) define wearable fitness technology as "… a type of technology in the form of small hardware that includes an application with tracking and monitoring fitness metrics such as distance walked or run, calories consumed, and in some

devices heart rate and sleep tracking" (p.1). The term generally refers to dedicated electronic monitoring devices that are used for long-term data tracking, which can be synced to a computer or smartphone app (Kaewkannate & Kim, 2016). Wearable fitness technology provides functional benefits such as counting steps, heart rate monitoring, tracking workout progress, and calories burned (Baumann, 2016). McGrath and Scanaill (2014) reference several key drivers for the adoption of fitness related wearable technology including: fitness awareness, public health awareness initiatives, smartphones and availability of wireless fitness accessories. It was also acknowledged that factors such as high-performance sports, brand profiling, social networking, and the gamification of fitness data are possible drivers (McGrath & Scanaill, 2014). However, the authors also identify barriers to adoption including: app selection, smartphone design, proprietary wireless connectivity protocols and device cost (McGrath & Scanaill, 2014). One of the most popular wearable fitness technologies is Fitbit. Since 2010, Fitbit has sold over 38 million devices worldwide and has over 16 million active users (Statista, 2015c).

2.9 Chapter Summary

This chapter outlined and described the relevant literature to this study, including the three main areas: experience marketing, co-creation and gamification. A definition for "experience" was provided as well as the differing interpretations and the development of the literature stream. Within the co-creation section a distinction was made between product innovation co-creation and product usage co-creation. The differing interpretations of the role of the consumer were identified and the different values for both the consumer and the brand were outlined. The experience co-creation literature stream was then detailed and how technological advances developed the field was described. How gamification is used to enhance engagement and interactivity was then outlined. The benefits of physical activity were then analysed as well as the drivers for increased interest in the area. Finally, health and fitness technology, including fitness apps and wearable fitness technology, were examined.

3. Method

This chapter outlines the methodology used to collect and analyse the data. First, this chapter outlines the research design and provide the context to the survey. It then describes the research instrument in greater detail including the constructs and items used, as well as their ordering. The sample size is then described explaining the constraints of the sample and justification for the respondent criteria. The following sections explain the data collection procedure and how validity and reliability of the research instrument was ensured. Finally, the data analysis procedure is outlined and ethical considerations are identified and examined.

3.1 Research Design

It was identified through the literature review that the three main areas underpinning this research topic have been well-researched and provide a number of validated constructs and scales to inform this study. On the basis of this information, it was determined a quantitative approach entailing a large sample survey was appropriate. Despite being a quantitative study, an exploratory approach was implemented attempting to understand the different reasons users have for utilising fitness technology. A range of measures were used to determine the most relevant and influential constructs to understand user motivations .

The survey was created and formatted using Qualtrics. The demographic and app usage questions were answered using a selection of predefined responses, while the construct items used seven-point Likert scale. An expert panel was then utilised to ensure the flow and cohesion of the survey as well as a non-expert panel. The survey was then distributed through Mechanical Turk to 440 individuals. Once the completed surveys were obtained, factor analysis and Cronbach's Alpha were used to determine dimensionality and reliability of the scales. Cluster analysis was then used to identify distinct groups of users that engage in gamified, co-created experiences based on the different types of value they derived from participating. Finally, chi-square analysis was used to decipher if there was a dependent relationship between the user groups and their demographic variables. The chi-square analysis was also applied to determine if there was a relationship between the user groups and behavioural intentions. Finally tests for independence were used identify significant differences between the average means of the user groups.

3.2 Research Context

In this study, the Fitbit app was used as an example of a gamified, co-created technology based fitness experience. Fitbit was founded in 2007 by James Park and Eric Friedman who saw the potential of using sensors in small, wearable devices to create positive fitness and health experiences (Fitbit, 2016c). The company's aim is, "to empower and inspire you to live a healthier, more active life" (Fitbit, 2016c). The Fitbit range includes pocketable devices as well as wristband style devices (Fitbit, 2016b). These wearable devices track a variety of data including: steps taken, distances, floors climbed, calories burned, and quality of sleep (Fitbit, 2016b). Since 2010, Fitbit has sold over 38 million devices worldwide (Statista, 2016c). All of these wearable devices wirelessly connect to the company's free smartphone app, allowing seamless integration and easy access to data (Fitbit, 2016a).

The app allows users to easily track the data the wearable technology gathers, and clearly shows trends in the data (Fitbit, 2016a). It is also possible for users to set goals and targets as well as creating reminders for exercise (Fitbit, 2016a). Users can also share their exercise achievements through the app on any social media platform (Fitbit, 2016a). The gamified aspects of the app include: regular notifications to encourage physical activity, the ability to challenge friends on the app (for instance the most number of steps a day) and badges which are earnt when the user reaches certain milestones; for example, 20,000 steps (Fitbit, 2016a). The app also allows users to stay connected through messaging and statistics sharing directly on the app (Fitbit, 2016a). Personalised workout plans and food plans are also available on the app and are based on the user's age, height and weight (Fitbit, 2016a). Fitbit has over 9.5 million active users worldwide (Goode, 2015). With the large number of users, multiple gamified features and personalisation features, the Fitbit app provides the ideal context for this study.

3.3 Research Instrument: Survey Questionnaire

A structured survey was administered that used a multiple-item scale measurement format, specifically a seven point Likert rating scale (1 = strongly disagree, 7 = strongly agree). As there were no specific scales associated with the co-creation of a product usage experience in the context of physical activity, relevant scales were identified through the literature and adapted. By using validated scales it helped ensure the comparability and generalisability of the study. The main areas of investigation included co-creation and gamification. Co-creation

was divided into two sections: the value the user derived from the experience, and the co-creation specific aspects such as personalisation. These sections were followed by a section relating to the gamification aspects of the app. Finally, a section pertaining to behavioural intentions was included. The entire survey is included in Appendix 7.2.

3.3.1 Participant Instructions and Consent

At the beginning of the survey an introduction section was provided which identified the purpose of the survey, instructions on how to answer the questions and the approximate length of survey (ten minutes). It also included the compensation rate and how the information would be used and stored. Contact details of the researcher and the supervisor were also included. Consent was obtained through respondents answering yes or no to the following question: "Having read this information sheet I agree to participate in this survey". A copy of the participant instructions and consent is available in Appendix 7.2.1.

Screening questions were then asked in order to decipher if respondents met the sample criteria requirements and therefore qualify to participate. These questions referred to age, recency of use and how often the respondent used the Fitbit app. The screening questions are available in Appendix 7.2.2.

3.3.2 App Usage Questions

App usage questions followed the screening section to obtain data regarding the different ways participants use the Fitbit app. How long the respondent had been using the app was included as well as how often they used it and the average time spent on the app. All of the product usage questions are included in Appendix 7.2.3. After the introduction section, screening questions and app usage section, questions pertaining to the value users derived from using the Fitbit app were asked.

3.3.3 Value Derived Scales

The five types of personal value users receive through using the Fitbit app were then measured. The emotional value scale was measured using items adapted from Deng et al. (2010) as well as from Yuan, Ma, Kanthawala and Peng (2015). Utilitarian value items were derived from studies conducted by Steenkamp and Geyskens (2006). The social value items and the functional value items were adapted from Deng et al. (2010). Epistemic value was measured with items adapted from Wang et al. (2013). All the items within each personal value scale can be found in Table 3:1.

Table 3:1 Scale Items for Value Derived

Value Derived Constructs	**Source**
Emotional Value (EV)	
EV1 Using the Fitbit app regularly makes me feel good.	Adapted from Deng, Lu, Wei & Zhang (2010)
EV2 I find using the Fitbit app enjoyable.	Adapted from Deng, Lu, Wei & Zhang (2010)
EV3 Using the Fitbit app gives me pleasure.	Adapted from Deng, Lu, Wei & Zhang (2010)
EV4 I find using the Fitbit app interesting.	Adapted from Deng, Lu, Wei & Zhang (2010)
EV5 I find using the Fitbit app fun.	Adapted from Yuan, Ma, Kanthawala & Peng (2015)
EV6 I find using the Fitbit app entertaining	Adapted from Yuan, Ma, Kanthawala & Peng (2015)
Utilitarian Value (UV)	
UV1 I believe the Fitbit app provides clear and truthful information about health and fitness.	Adapted from Steenkamp & Geyskens (2006)
UV2 The Fitbit app makes it easier for me to decide how often to exercise.	Adapted from Steenkamp & Geyskens (2006)
UV3 The Fitbit app allows me to track useful information	Adapted from Steenkamp & Geyskens (2006)
UV4 The Fitbit app lowers my confidence to make the right health and fitness choices.	Adapted from Steenkamp & Geyskens (2006)
UV5 The Fitbit app makes it easier for me to reach my health and fitness goals.	Adapted from Steenkamp & Geyskens (2006)
UV6 I believe the Fitbit app provides information that is up-to-date.	Adapted from Steenkamp & Geyskens (2006)
Social Value (SV)	
SV1 When people see or hear I am using the Fitbit app it gives them a good impression of me.	Adapted from Deng, Lu, Wei & Zhang (2010)
SV2 Using the Fitbit app gives me a sense of belonging to the other users.	Adapted from Deng, Lu, Wei & Zhang (2010)
SV3 Using the Fitbit app improves the way I am perceived by others.	Adapted from Deng, Lu, Wei & Zhang (2010)
SV4 Using the Fitbit app helps me feel accepted by others.	Adapted from Deng, Lu, Wei & Zhang (2010)
SV5 Using the Fitbit app gives me social approval.	Adapted from Deng, Lu, Wei & Zhang (2010)
Epistemic Value (EV)	
EV1 I began using the Fitbit app because I like trying new technologies.	Adapted from Wang, Liao & Yang (2013)
EV2 Using the Fitbit app allowed me to experiment with new ways of tracking my health and fitness activities.	Adapted from Wang, Liao & Yang (2013)

EV_3 The Fitbit app aroused my curiosity.	Adapted from Wang, Liao & Yang (2013)
EV_4 I use the Fitbit app because I like to follow technology trends.	Adapted from Wang, Liao & Yang (2013)
Functional Value (FV)	
FV_1 I have found the Fitbit app to be reliable.	Adapted from Deng, Lu, Wei & Zhang (2010)
FV_2 I think the Fitbit app has good functions and features.	Adapted from Deng, Lu, Wei & Zhang (2010)
FV_3 The Fitbit app fulfils my needs well.	Adapted from Deng, Lu, Wei & Zhang (2010)
FV_4 I believe the Fitbit app has an acceptable standard of quality.	Adapted from Deng, Lu, Wei & Zhang (2010)
FV_5 I have found that the Fitbit app offers consistent quality	Adapted from Deng, Lu, Wei & Zhang (2010)

3.3.4 Co-creation Scales

The personalisation aspect of co-creation was measured using items adapted from Bacile, Ye and Swilley (2014) and Steenkamp and Geyskens (2006). Two items were also created by the researcher to understand the value users derive from specific features available on the Fitbit app: "I believe the Fitbit app has an acceptable standard of quality" and "I have found that the Fitbit app offers consistent quality". Accessibility and perceived risk, from the co-creation DART framework, were measured using items adapted from Steenkamp and Geyskens (2006), Bacile et al. (2014), and Albinsson, Perera and Sautter (2016). All the items can be found in Table 3:2.

Table 3:2 Scale Items for Co-creation

Co-creation Constructs	Source
Personalisation (CP)	
CP_1 The Fitbit app has interactive features that fit my needs.	Adapted from Steenkamp & Geyskens (2006)
CP_2 I can adapt the features on the Fitbit app to better serve my needs.	Adapted from Bacile, Ye & Swilley (2014)
CP_3 The Fitbit app creates the feeling of receiving personalized attention.	Adapted from Steenkamp & Geyskens (2006)
CP_4 I value the personalized exercise plans the Fitbit app creates for me.	Created by the researcher based on the above personalisation items
CP_5 I value the personalized food plans the Fitbit app creates for me	Created by the researcher based on the above personalisation items
Accessibility (CA)	
CA_1 Downloading information from the Fitbit app is slow.	Adapted from Steenkamp & Geyskens (2006)
CA_2 It is difficult to find the information I need on the Fitbit app.	Adapted from Steenkamp & Geyskens (2006)
CA_3 It is easy to access the Fitbit app wherever I want to.	Adapted from Albinsson, Perera & Sautter (2016)
CA_4 I can easily access the Fitbit app whenever I want to.	Adapted from Albinsson, Perera & Sautter (2016)
Perceived Risk (CR)	
CR_1 I believe using the Fitbit app is risky.	Adapted from Bacile, Ye & Swilley (2014)
CR_2 I believe using the Fitbit app can lead to bad results.	Adapted from Bacile, Ye & Swilley (2014)
CR_3 I received comprehensive information pertaining to the risks and benefits of using the Fitbit app.	Adapted from Albinsson, Perera & Sautter (2016)
CR_4 I was provided with the necessary tools and support to make fully informed decisions as to whether I should participate in certain health and fitness activities.	Adapted from Albinsson, Perera & Sautter (2016)

3.3.5 Gamification Scales

The four aspects of the mobile experience model, level of challenge, user skill level, perceived ease of use and perceived usefulness, were tested using items adapted from Novak, Hoffman and Yung (2000), Yuan et al. (2015), and Hsiao, Chang and Tang (2016). The final item included in the perceived usefulness scale was created by the researcher: "Overall, I have found the Fitbit app to be very useful." This item was created on the basis of other items within

this section adapted from Hsiao et al. (2016). The flow concept was measured using items derived from Pauwels, Leeflang, Teerling and Huizingh (2011). The gamification aspects were measured using items created by the researcher. These items were guided by and based on multiple gamification studies including: Nelson, Verhagen and Noordzij (2016), Hamari and Koivisto (2015), Witt, Scheiner and Robra-Bissantz (2011) and Hsu, Chang and Lee (2013). The items regarding gamification features of the app, such as badges and challenges, were also informed by details found on the company website (Fitbit, 2016a). The formatting and layout of the items were guided by the other items used in this survey which were sourced from validated studies. All the gamification items can be found in Table 3:3.

Table 3:3 Scale Items for Gamification

Gamification Constructs	**Source**
Level of Challenge (GLC)	
GLC_1 Using the Fitbit app challenges me.	Adapted from Novak, Hoffman & Yung (2000)
GLC_2 Using the Fitbit app challenges me to perform to the best of my ability.	Adapted from Novak, Hoffman & Yung (2000)
GLC_3 Using the Fitbit app provides a good test of my skills.	Adapted from Novak, Hoffman & Yung (2000)
GLC_4 I find using the Fitbit app stretches my capabilities to the limits.	Adapted from Novak, Hoffman & Yung (2000)
User Skill Level / Perceived Ease of Use (GEU)	
GEU_1 I have the resources and skills necessary to use the Fitbit app.	Adapted from Yuan, Ma, Kanthawala & Peng (2015)
GEU_2 I have the knowledge necessary to use the Fitbit app.	Adapted from Yuan, Ma, Kanthawala & Peng (2015)
GEU_3 Learning to use the Fitbit app was easy for me.	Adapted from Yuan, Ma, Kanthawala & Peng (2015)
GEU_4 It was easy for me to become skilful at using the Fitbit app	Adapted from Yuan, Ma, Kanthawala & Peng (2015)
GEU_5 My interaction with the Fitbit app is clear and understandable.	Adapted from Yuan, Ma, Kanthawala & Peng (2015)
GEU_6 I find the Fitbit app easy to use.	Adapted from Yuan, Ma, Kanthawala & Peng (2015)
Perceived Usefulness (GU)	
GU_1 Using the Fitbit app has increased my productivity in managing my health and fitness.	Adapted from Hsiao, Chang & Tang (2016)
GU_2 Using the Fitbit app has enhanced my effectiveness in managing my health and fitness.	Adapted from Hsiao, Chang & Tang (2016)

GU_3 Overall, using the Fitbit app has significantly improved my ability to manage my health and fitness activities.	Adapted from Hsiao, Chang & Tang (2016)
GU_4 Overall, I have found the Fitbit app to be very useful.	Created by the researcher based on the above perceived usefulness items
Flow (GF)	
GF_1 While using the Fitbit app I often forget my immediate surroundings.	Adapted from Pauwels, Leeflang, Teerling & Huizingh (2011)
GF_2 I often lose track of time while using the Fitbit app.	Adapted from Pauwels, Leeflang, Teerling & Huizingh (2011)
GF_3 While using the Fitbit app I often have a diminished sense of self.	Adapted from Pauwels, Leeflang, Teerling & Huizingh (2011)
GF_4 Time seems to fly by when I use the Fitbit app.	Adapted from Pauwels, Leeflang, Teerling & Huizingh (2011)
Game Mechanics (GM)	
GM_1 I find that the tracking features on the Fitbit app allow me to improve my health and fitness.	Created by the researcher based on the literature review
GM_2 Setting goals on the Fitbit app increased my motivation to improve my physical wellbeing.	Created by the researcher based on the literature review
GM_3 Achieving my goals on the Fitbit app increased my motivation to improve my physical wellbeing.	Created by the researcher based on the literature review
GM_4 The badge feature on the Fitbit app increased my motivation to exercise.	Created by the researcher based on the literature review
GM_5 I feel good when I earn a new badge on the Fitbit app.	Created by the researcher based on the literature review
GM_6 I often challenge my friends on the Fitbit app.	Created by the researcher based on the literature review
GM_7 Challenging my friends on the Fitbit app increased my motivation to exercise more.	Created by the researcher based on the literature review
GM_8 Overall, the game aspects of this app (e.g. goals and badges) increase my motivation to exercise.	Created by the researcher based on the literature review

3.3.6 Behavioural Intention Scales

Behavioural intentions as a result of positive product usage experiences were then examined. Disconfirmation was measured using items adapted from Bigné et al. (2008), and Oliver et al. (1997). Satisfaction was measured using items adapted from Bigné et al (2008). Attitudes, continuous intentions for system use, continuous intentions for exercise, and word of mouth intentions were measured using items adapted from Hamari and Koivisto (2014). Willingness to pay was measured using items adapted from Bigné et al. (2008). Finally, loyalty

was measured using items adapted from Anderson and Srinivasan (2003). All the behavioural intention items can be found in Table 3:4.

Table 3:4 Scale Items for Behavioural Intentions

Behavioural Intention Constructs	**Source**
Disconfirmation (BID)	
BID₁ Overall, my experience using the Fitbit app has been worse than expected.	Adapted from Bigné, Mattila & Andreu (2008)
BID₂ Overall, I expected something better from the Fitbit app.	Adapted from Bigné, Mattila & Andreu (2008)
BID₃ Overall, when compared to my expectations, I find using the Fitbit app to be a positive experience.	Adapted from Oliver, Rust & Varki (1997)
BID₄ Overall, when compared to my expectations, I find using the Fitbit app to be a negative experience.	Adapted from Oliver, Rust & Varki (1997)
Satisfaction (BIS)	
BIS₁ This is one of the best health and fitness apps I could have used.	Adapted from Bigné, Mattila & Andreu (2008)
BIS₂ I am satisfied with my decision to use the Fitbit app.	Adapted from Bigné, Mattila & Andreu (2008)
BIS₃ My choice to use the Fitbit app was a wise one.	Adapted from Bigné, Mattila & Andreu (2008)
BIS₄ I am sure I did the right thing using the Fitbit app.	Adapted from Bigné, Mattila & Andreu (2008)
Attitude (BIA)	
BIA₁ All things considered, I find using the Fitbit app to be a wise thing to do.	Adapted from Hamari & Koivisto (2014)
BIA₂ All things considered, I find using the Fitbit app to be a good idea.	Adapted from Hamari & Koivisto (2014)
BIA₃ All things considered, I find using the Fitbit app to be a positive experience.	Adapted from Hamari & Koivisto (2014)
BIA₄ All things considered, I find using the Fitbit app to be favorable.	Adapted from Hamari & Koivisto (2014)
Continuous Intentions for System Use Items (BISU)	
BISU₁ I intend to continue using the Fitbit app as often as I have in the past.	Adapted from Hamari & Koivisto (2014)
BISU₂ I predict that I will use the Fitbit app more frequently in the future.	Adapted from Hamari & Koivisto (2014)
BISU₃ It is likely that I will use the Fitbit app more often during the next couple of months.	Adapted from Hamari & Koivisto (2014)

Continuous Intentions for Exercise Items (BIE)	
BIE$_1$ I plan to increase the amount of exercise I am doing, rather than decrease it.	Adapted from Hamari & Koivisto (2014)
BIE$_2$ I predict that I will exercise more frequently within the next three months.	Adapted from Hamari & Koivisto (2014)
BIE$_3$ I think I will keep exercising in the near future, at least as much as I have during the last few months.	Adapted from Hamari & Koivisto (2014)
BIE$_4$ The Fitbit app has encouraged me to exercise regularly and I intend to keep exercising regularly.	Adapted from Hamari & Koivisto (2014)
Word-of-Mouth (BIWM)	
BIWM$_1$ I would recommend the Fitbit app to my friends.	Adapted from Hamari & Koivisto (2014)
BIWM$_2$ I will recommend the Fitbit app to anyone who seeks my advice regarding health and fitness.	Adapted from Hamari & Koivisto (2014)
BIWM$_3$ I will refer my acquaintances to the Fitbit app.	Adapted from Hamari & Koivisto (2014)
BIWM$_4$ I will say positive things about the Fitbit app to other people.	Adapted from Hamari & Koivisto (2014)
Willingness-to-Pay (BIWP)	
BIWP$_1$ I would use the Fitbit app even if I had to pay for it.	Adapted from Bigné, Mattila & Andreu (2008)
BIWP$_2$ I would pay a higher price for other fitness apps.	Adapted from Bigné, Mattila & Andreu (2008)
BIWP$_3$ I wouldn't mind if I had to pay to use the Fitbit app.	Adapted from Bigné, Mattila & Andreu (2008)
Loyalty (BIL)	
BIL$_1$ I seldom consider switching to another health and fitness app.	Adapted from Anderson & Srinivasan (2003)
BIL$_2$ As long as the present service continues, I doubt that I would switch health and fitness apps.	Adapted from Anderson & Srinivasan (2003)
BIL$_3$ When I use a health and fitness app, Fitbit is my first choice.	Adapted from Anderson & Srinivasan (2003)
BIL$_4$ I believe that the Fitbit app is my favorite health and fitness app.	Adapted from Anderson & Srinivasan (2003)

3.3.7 Demographic Questions

Finally, demographic questions relating to gender, education, relationship status, employment and income were included. Mechanical Turk worker I.D. numbers were also requested at the end of the survey. Within the four distinct sections of this survey, there were a total of 21 constructs and 98 items.

3.4 Survey Review

Before the survey was finalised and administered, preliminary versions of the survey were created for review and pre-testing. The survey was reviewed by the researcher and the supervisor multiple times to identify unnecessary questions, spelling mistakes and assess the cohesion of the survey as a whole. This included rewording some items and reordering, ensuring a concise, clear survey. A pre-test was then conducted on an expert panel of half a dozen knowledgeable respondents, allowing an opportunity for outsider feedback. The expert panel consisted of postgraduate marketing students who have extensive knowledge of marketing concepts. The postgraduate students assessed the survey for missing marketing concepts as well as providing insight into the flow of the content. While it was found that no key concepts were missing, the input of the expert panel proved invaluable as they identified consistency problems which were thereafter rectified. The expert panel also evaluated how long it took to complete the survey, enabling a correct timeframe estimate to be included in the introduction section. Finally, a pre-test was conducted on four non-experts in the marketing field to determine if the items made sense to those who had no background in the area. As majority of respondents in the sample were unlikely to have a marketing background, this was an important part of the survey review. On the basis of the feedback of the non-expert panel, certain marketing words were replaced with more common terms.

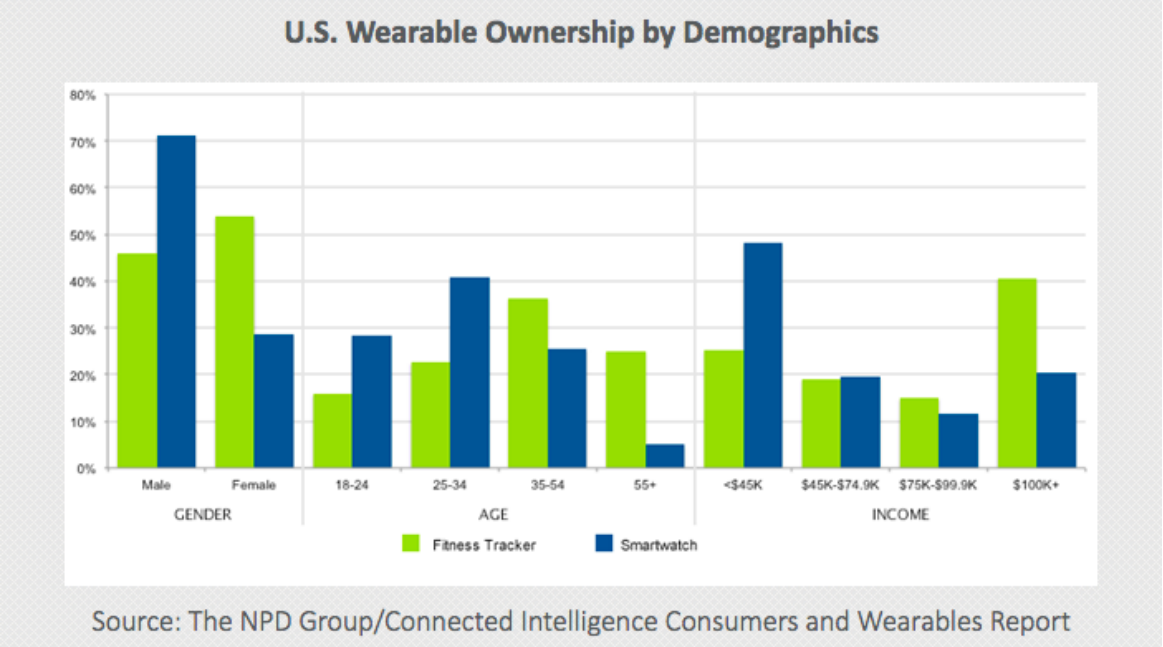
3.5 Sample

Bartlett, Kotrlik and Higgins (2001) explain that a usual goal of survey research is to collect data representative of a population. In order to ensure quality and accuracy of research inappropriate, inadequate, or excessive sample sizes must be avoided (Bartlett et al., 2001). As such, it becomes important to use appropriate samples and sample sizes. Criteria enables other researchers using the same procedure to arrive at similar results and therefore the study can withstand rational criticism (Bartlett et al., 2001). A specific sample criteria and sample parameters were used in this study to ensure a sample that was representative of the population.

Recent research about wearable technology ownership, conducted by the NPD group, was used to form respondent criteria. The NPD group conducts market research on the rapidly evolving U.S. wearable technology market twice a year (NPD, 2015). The graph presented in Figure 3:1 was published in 2015 and depicts demographic information regarding fitness tracker users and smartwatch users in the United States (NPD, 2015). The demographic

information below was used as a basis for the research sample as no specific fitness app demographic information could be obtained. The graph illustrates the diversity of users and that fitness technology has gained a large mainstream following. The sample, therefore, includes both men and women aged eighteen to fifty-five. As previously stipulated, for the purposes of this thesis "physical activity" and “fitness” refers to regular moderate physical activity which requires an energy expenditure of 1,000 calories per week (Hoeger & Hoeger, 2013). As such, the sample required participants to have used the Fitbit app on a weekly basis. This also ensured recency and regularity of use and increased the reliability of the data gathered.

Figure 3:1 U.S. Wearable Ownership by Demographics



(Source: NPD, 2015)

3.6 Sample Recruitment

An online panel was used due to the limited time and resources allocated to this study. The survey was distributed through Mechanical Turk, a crowdsourcing Internet marketplace. Mechanical Turk was considered a viable method due to the broad scope of the respondent criteria and the need for a large sample. It has been found that participants on Mechanical Turk are more demographically diverse than standard Internet samples and that the data obtained is at least as reliable as traditional methods (Buhrmester, Kwang & Gosling, 2011). It was assumed an online panel was suitable given that users co-create these fitness experiences on a technological platform also. The survey was sent to potential respondents with a small

description of who could partake. Mechanical Turk only uses American participants; therefore, using this platform resulted in an American sample. This seemed appropriate as the sample parameters were based on research conducted in America (NPD, 2015).

The use of Mechanical Turk entailed paying respondents U.S. $1.60 for appropriate completion of the survey. Mechanical Turk also allows the administrator to withhold payment, permitting substandard participants to be removed and not compensated. To ensure high quality responses, several filtering techniques were implemented. For example, participants who did not qualify after answering the initial demographic questions were thanked for their interest and exited from the survey. Gender and age demographic questions were also placed in the latter section of the survey to mitigate initial dishonesty. Two internal consistency checks were included to identify respondents who were not reading the questions properly and subsequently not answering appropriately. For example, one internal consistency question appeared as: "If you are reading this question please select strongly agree." The use of Mechanical Turk allowed for maximum efficiency: all responses were collected within 48 hours.

3.7 Data Preparation and Coding Procedure

Once the data had been collected it was exported to SPSS (version 24) for analysis. Neuman (2006) explains that there are three steps when processing data: coding data, cleaning data and entering the data. Reverse coded variables were recoded into different variables so the data was correctly scaled. The survey responses were thoroughly studied in order to identify any ambiguities, errors or omissions. The data was examined in order to identify and remove test data, responses with multiple I.Ds, responses with duplicate I.P addresses and responses with incorrect answers to the internal consistency questions. The minimum completion time was deemed to be four minutes (240 seconds) and the maximum time was determined to be thirty minutes (1800 seconds). The times were based on how long it took participants to complete the survey, with these times being used to ensure high quality responses. In order for the data to be "clean" for accurate analysis, the responses were further assessed attempting to identify any inconsistencies. Straight lined responses were deleted as well as responses in which participants had answered an app usage, which was included twice, differently. In the following section, the methods of analysis used are outlined and explained.

3.8 Validity and Reliability of the Research Instrument

There are several different measurement tools and techniques that can be used in research design. Validity and reliability are highly cited as important measures for assessing the instruments used in research designs (Hair, Babin, Money & Samouel, 2003). Hair et al. (2003) define validity as "the extent to which a construct measures what is supposed to measure" and "involves consulting a small sample of typical respondents and/or experts to pass judgement on the suitability of the items (indicators) chosen to represent the construct" (Hair et al., 2003, p.174) In this study validity was ensured by an in-depth literature review and through the use and adaption of validated scales used in previous studies. The reliability of the survey was ensured by enlisting the supervisor to review the survey as well as conducting two pre-tests on both an expert and non-expert panel. All suggestions were examined and, if appropriate, implemented.

Saunders, Lewis and Thornhill (2015) explain that reliability is conceptualised as the consistency or stability of a measurement. Reliable measurement is necessary to ensure that the instrument works properly at different times under different conditions (Cooper & Schindler, 2011). Factor analysis and Cronbach's Alpha have been widely employed to assess the internal consistency and reliability of multi-item scales (Pallant, 2013).

3.9 Data Analysis Procedures

Factor analysis is referred to as a data reduction technique which is used to analyse the dimensionality of scales. It takes a large set of variables and attempts to reduce them or summarise them using a smaller set of factors or components (Pallant, 2013). This is achieved by detecting the intercorrelations of a set of variables (Pallant, 2013). There are a number of factor analytic techniques but for the purposes of this study the principle component analysis (PCA) was implemented (Pallant, 2013). This technique is exploratory in nature and seeks to determine if items within each scale also load onto other scales. Before PCA was conducted each of the constructs were assessed for the suitability of factor analysis by identifying if the Kaiser Meyer-Olkin value was .6 or above and ascertaining if Barlett's Test of Sphericity reached statistical significance. PCA was then used to decipher if there were any components with eigenvalues exceeding 1 within each section of the survey. The communalities were then analysed to determine if any items had an extraction value lower than .5; if so, the item was deleted and the analysis was run again. Once the data set had communalities extraction values

of .5 or above, the rotated component matrix was examined. Items that loaded onto more than one factor were removed to produce a clean data set. Once the data was cleaned, the factors were examined and renamed if necessary. Following this, Cronbach's Alpha was used to determine the reliability of the scales and whether they were all measuring the same variable within each construct.

It is generally accepted by academics that .70 is an appropriate cut-off value for Cronbach's Alpha (Hair et al., 2003; Cooper & Schindler, 2011; Saunders et al., 2015); however, Hair et al. (2003) explain that lower coefficients can be acceptable depending on the research objectives. In this study .7 was used as the cut-off value. Each scale and its items were tested using Cronbach's Alpha. The total statistics table was also used to determine if the Cronbach's Alpha value could be increased if certain items were deleted. After this analysis the average value of the items within each scale were calculated.

Hierarchical cluster analysis was then conducted on the remaining scales after the process outlined above was applied. Silver and Wrenn (2013) explain that "cluster analysis allows for the classification or segmentation of a large group of variables into homogeneous subgroups based on similarities on a profile of information" (p.219). In the context of this study, cluster analysis grouped the sample participants based on their similar answers to the different sections of the survey. It identifies the composition of the groups and provides the number of possible cluster solutions. Cluster analysis was applied to the three distinct sections of the survey: the value derived scales, the co-creation scales and the gamification scales. Finally, cluster analysis was applied to all three sections cumulatively. The cluster analysis outputs were carefully analysed to identify groups that reflected significant segments within the market. The difference between the coefficient values was examined to determine a significant change in the variables. The possible cluster solutions were then inspected to find the percentage of the sample they represented. Groups that represented less than 10% of the sample were discarded as they did not represent a significant proportion of the sample.

The final analysis used in this study was the chi-square test. Kinnear and Taylor (1996) state that the chi-square test is one of the most common bivariate analysis which uses cross tabulation to identify a relationship between two variables. Within this study the chi-square test was used to identify if there was a relationship between the identified groups and the demographic characteristics. Any significance value below .05 was used to indicate a relationship between the user groups and the demographic variable.

3.10 Ethical Considerations

This research project abided by the guidelines stipulated by the University of Canterbury Human Ethics Committee and a low risk application was submitted to them for approval. No data was collected before approval was granted on the 23rd of September 2016 (see Appendix 7.1).

A preface to the survey was provided, followed by a screening section which deemed if a respondent was appropriate. Within this preface, each participant was provided with information regarding the objective of the research, the nature of the research and the parties involved. This was to ensure that no respondent was misled in any way. It was stipulated that participation in this study was completely voluntary and that respondents were able to withdraw from the research at any time without any penalty. However, it was also stated that should they choose to exit the survey without completion that they would not be compensated for their partial survey response (see Appendix 7.2.1).

While the research topic was not controversial, all subjects were assured of their safety, anonymity and subsequent privacy. Participants were not asked to divulge their names at any time, in order to create a feeling of safety. Instead the Mechanical Turk worker I.Ds were used to identify survey responses. Finally, consent was established by continuing from the preface to the following questions.

3.11 Chapter Summary

This chapter outlined the quantitative research methodology which was employed in attempts to answer the research questions stipulated in Chapter One. First, this chapter explained and justified the survey research design. After this, details regarding the context of the survey were supplied. The constructs, scales and items included in the research instrument were then outlined as well as their sources. Following this, the sample was described and justifications for its parameters were explained. The data collection procedure and how validity and reliability of the research instrument was ensured was then detailed. Finally, the data analysis process and procedure were described and the ethical considerations in relation to this study were presented. The next chapter provides an overview of the multivariate analyses used in this study and their results.

4. Results

The aim of this chapter is to present the results of the statistical analyses conducted to answer the research questions presented in Chapter One. The results are organised in three distinct sections. The first section includes an overview of the research sample, including size and composition. This section also provides justification for the exclusion of certain participants. The second section examines the dimensionality and reliability of the scales used for each construct. In the final section, the results of the multivariate analyses conducted are outlined and explained.

4.1 Sample Size and Composition

4.1.1 Sample Size

As outlined in the previous chapter, data collection took place on the 15th and 16th of November 2016 over a period of 48 hours. A total of 430 responses were gathered through Mechanical Turk. As outlined in the method the initial data set was cleaned for ambiguities, errors and omissions.

Of the initial 430 cases, one response was a test conducted by Mechanical Turk personnel and subsequently was removed from the data set. The data was then cleaned by removing the surveys that were incomplete (ten), leaving 419 responses. A search for duplicate worker I.D.s was then conducted, one was found so the two responses were omitted. Duplicate I.P. addresses were also identified and discarded, there were seven instances of this and therefore fourteen responses were deleted. One respondent did not provide consent despite completing the survey and this response was removed. A total of sixteen responses were deleted as they incorrectly answered either one or both of the internal consistency questions. Completion duration was then examined and a minimum time of four minutes (240 seconds) was stipulated: as a result eleven responses were deleted. A maximum completion time of thirty minutes (1800) seconds was also implemented which lead to removing ten responses, leaving 386 responses remaining.

The question outlining how often the respondent used the Fitbit app was asked once in the screening question and again in the product usage section. Two participants responded to the same question with different answers and, therefore, were not included in the analysis. Finally, reverse coded questions (UV_4, CA_1, CA_2, BID_1, BID_2, BID_4, BIWP_2) were

checked for straight lined responses and subsequently three responses were discarded. This resulted in a total of 360 responses, appropriate for data analysis.

4.1.2 Sample Composition

Table 4:1 depicts the distribution of the socio-demographic characteristics in the sample. There were more women than men with 58.6% of respondents being female and 41.4% being male. The age distributions showed that the majority of the sample were in the middle age ranges: 47.8% were aged 25-34 and 38.1% were aged 35-54. Over half the sample had at least graduated college, with only 7.5% having only completed high school and 27.5% having completed some college. No one in the sample indicated that they has completed less than high school. At 46.1%, the majority of the sample indicated they were married, with the next highest percentage being 24.7%: identifying as single. Furthermore, a large proportion of the sample were employed either full-time or part-time. Only 5.6% identified as students, 10.8% identified as unemployed and 2.2% stated they were retired. Finally, 54.7% of the sample responded that they believed they were in the middle third income bracket relative to others in the population.

Table 4:1 Demographic Sample Composition

Demographic Variable	Category	Percentage
Gender	Male	41.4%
	Female	58.6%
Age	18-24	8.6%
	25-34	47.8%
	35-54	38.1%
	55+	5.6%
Education	High school or equivalent	7.5%
	Some college	27.5%
	College graduate	49.4%
	Master's degree	12.8%
	Professional degree (MD, JD, etc.)	1.9%
	Doctorate	0.8%
Relationship Status	Single	24.7%
	In a long-term relationship	22.2%
	Married	46.1%
	Separated	1.1%
	Divorced	5.0%
	Widowed	0.8%
Current Employment	Student	5.6%
	Employed full-time	69.4%
	Employed part-time	11.9%
	Unemployed	10.8%
	Retired	2.2%
Income	Rather not say	3.6%
	Lower third	31.4%
	Middle third	54.7%
	Upper third	9.2%
	Unsure	1.1%

4.2 Scale Structure and Reliability

The dimensionality and reliability (internal consistency) of the scales were tested using PCA, followed by Cronbach's Alpha (Cronbach, 1951). PCA with Varimax rotation was used to assess the dimensionality of the scales used in this survey. Coefficients less than .3 were suppressed and items identified as loading onto two or more factors were considered cross-loading. Cross-loading items were deleted as well as items with communalities less than .5. Once PCA was completed, the scales were tested for internal consistency (reliability) using Cronbach's Alpha procedure. Cronbach's Alpha was used to indicate potential items to be deleted, to increase the reliability of the scales.

4.2.1 Value Derived

The PCA analysis revealed a three-factor solution within the value derived items. These factors explained 74.2% of the variance. On the basis on this analysis Utilitarian Value and Epistemic Value were omitted, leaving Social Value, Functional Value and Emotional Value. The items were evenly spread over the three factors, with each scale retaining all its original items. The Cronbach's Alpha analysis revealed all three factors had Cronbach Alpha values of over .8, subsequently, no items were deleted.

Table 4:2 Factor Analysis for Value Derived

	Factor		
Item	**Social Value**	**Functional Value**	**Emotional Value**
Using the Fitbit app helps me feel accepted by others.	.91		
Using the Fitbit app improves the way I am perceived by others.	.91		
Using the Fitbit app gives me social approval.	.90		
Using the Fitbit app gives me a sense of belonging to the other users.	.82		
When people see or hear I am using the Fitbit app it gives them a good impression of me.	.77		
I believe the Fitbit app has an acceptable standard of quality.		.87	
I have found that the Fitbit app offers consistent quality.		.87	
The Fitbit app fulfils my needs well.		.81	
I think the Fitbit app has good functions and features.		.80	
I have found the Fitbit app to be reliable.		.76	
I find using the Fitbit app fun.			.86
I find using the Fitbit app entertaining.			.84
I find using the Fitbit app interesting.			.74
Using the Fitbit app gives me pleasure.			.74
Variance explained (percentage)	42.98	20.88	10.33
Mean	4.20	5.92	5.45
SD	1.20	.65	.86
Cronbach's Alpha	.93	.90	.87

4.2.2 Co-creation

Within the co-creation PCA analysis, all three factors remained. These factors accounted cumulatively for 77.6% of the variance. However, based on the analysis CP_1,

CA_1, CA_2, CR_3 and CR_4 were deleted. Personalisation remained with four items, accessibility with two items and perceived risk with two items. Cronbach's Alpha analysis revealed values of .8 or above; therefore, no items were deleted.

Table 4:3 Factor Analysis for Co-creation

	Factor		
Item	**Personalisation**	**Perceived Risk**	**Accessibility**
I value the personalized exercise plans the Fitbit app creates for me.	.87		
I value the personalized food plans the Fitbit app creates for me.	.83		
The Fitbit app creates the feeling of receiving personalized attention.	.81		
I can adapt the features on the Fitbit app to better serve my needs.	.69		
I believe using the Fitbit app is risky.		.93	
I believe using the Fitbit app can lead to bad results.		.92	
I can easily access the Fitbit app whenever I want to.			.92
It is easy to access the Fitbit app wherever I want to.			.90
Variance explained (percentage)	36.35	27.23	13.97
Mean	4.99	6.17	5.85
SD	1.07	.94	.84
Cronbach's Alpha	.82	. .88	85

4.2.3 Gamification

The PCA analysis of the gamification scales identified a five-factor solution that explained 77.7% of the variance. All six items from the user skill level / perceived ease of use scale remained as factor one. The second factor combined the four items found in the level of challenge scale and two items that belong to the perceived usefulness scale. This factor will hereby be referred to as performance enhancement. The four items from flow were included as factor three. Game mechanics was split into two separate factors with two items remaining within each. The factor with GM_4 and GM_5 will hereby be referred to as game mechanics badges (GB). The factor with GM_7 and GM_8 will hereby be referred to as game mechanics challenges (GC). The Cronbach's Alpha analysis revealed that all values were .8 or above.

Table 4:4 Factor Analysis for Gamification

	Factor				
Item	**User Skill Level / Ease of Use**	**Performance Enhancement**	**Flow**	**Game Mechanics Challenges**	**Game Mechanics Badges**
It was easy for me to become skillful at using the Fitbit app.	.90				
My interaction with the Fitbit app is clear and understandable.	.90				
Learning to use the Fitbit app was easy for me.	.89				
I find the Fitbit app easy to use.	.88				
I have the knowledge necessary to use the Fitbit app.	.84				
I have the resources and skills necessary to use the Fitbit app.	.80				
Using the Fitbit app challenges me to perform to the best of my ability.		.86			
Using the Fitbit app challenges me.		.81			
Using the Fitbit app provides a good test of my skills.		.80			
I find using the Fitbit app stretches my capabilities to the limits.		.79			
Overall, using the Fitbit app has significantly improved my ability to manage my health and fitness activities.		.75			
Using the Fitbit app has increased my productivity in managing my health and fitness.		.74			

I often lose track of time while using the Fitbit app.			.89		
While using the Fitbit app I often forget my immediate surroundings.			.88		
Time seems to fly by when I use the Fitbit app.			.82		
Challenging my friends on the Fitbit app increased my motivation to exercise more.				.94	
I often challenge my friends on the Fitbit app.				.93	
The badge feature on the Fitbit app increased my motivation to exercise.					.91
I feel good when I earn a new badge on the Fitbit app.					.90
Variance explained (percentage)	30.14	22.78	9.50	8.93	6.31
Mean	6.22	5.19	2.76	3.95	5.34
SD	.70	1.04	1.29	1.92	1.23
Cronbach's Alpha	.94	.90	.90	.93	.89

4.2.4 Behavioural Intentions

PCA showed a three-factor solution within the behavioural intention items. These factors explain 75.3% of the variance. On the basis of this analysis the disconfirmation scale, the continuous intentions for system use scale and the loyalty scale were omitted. The first factor includes all the items from satisfaction, attitudes and word of mouth. This factor will hereby be referred to as satisfaction as it pertains to all the positive perceptions and attitudes towards the Fitbit app. The second factor contains all three items from the willingness to pay scale and the third factor consists of two items from the continuous intentions for exercise scale. Based on the Cronbach's Alpha analysis BIS_1 and BIWP_2 were deleted. Subsequently, all the behavioural intention scales had Cronbach's Alpha values of .8 or above.

Table 4:5 Factor Analysis for Behavioural Intentions

Item	Factor		
	Satisfaction	**Willingness to Pay**	**Continuous Intentions for Exercise**
All things considered, I find using the Fitbit app to be a positive experience.	.90		
My choice to use the Fitbit app was a wise one.	.90		
All things considered, I find using the Fitbit app to be favorable.	.88		
I will say positive things about the Fitbit app to other people.	.87		
I am sure I did the right thing using the Fitbit app.	.86		
I am satisfied with my decision to use the Fitbit app.	.85		
All things considered, I find using the Fitbit app to be a wise thing to do.	.84		
All things considered, I find using the Fitbit app to be a good idea.	.83		
I would recommend the Fitbit app to my friends.	.83		
I will recommend the Fitbit app to anyone who seeks my advice regarding health and fitness.	.82		
I will refer my acquaintances to the Fitbit app.	.78		
This is one of the best health and fitness apps I could have used.	.73		
I wouldn't mind if I had to pay to use the Fitbit app.		.89	
I would use the Fitbit app even if I had to pay for it.		.87	
I would pay a higher price for other fitness apps.		.73	
I predict that I will exercise more frequently within the next three months.			.94
I plan to increase the amount of exercise I am doing, rather than decrease it.			.93
Variance explained (percentage)	53.77	12.05	9.14
Mean	5.93	3.24	5.29
SD	0.78	1.56	1.28
Cronbach’s Alpha	.96	.88	.91

4.2.5 Co-creation and Gamification

Finally, the three main areas and their remaining nine factors were analysed simultaneously. The analysis revealed a five factor solution which explained 77.9% of the variance. The remaining factors were social value, level of challenge, user skill level/ease of use, game mechanics badges and game mechanics challenges. The Cronbach's Alpha analysis revealed all the scales had values .8 or above, thus no items were deleted.

Table 4:6 Factor Analysis for Co-creation and Gamification

	Factor				
Item	**User Skill Level / Ease of Use**	**Performance Enhancement**	**Social Value**	**Game Mechanics Badges**	**Game Mechanics Challenges**
It was easy for me to become skillful at using the Fitbit app.	.90				
Learning to use the Fitbit app was easy for me.	.89				
My interaction with the Fitbit app is clear and understandable.	.89				
I find the Fitbit app easy to use.	.88				
I have the knowledge necessary to use the Fitbit app.	.85				
I have the resources and skills necessary to use the Fitbit app.	.82				
Using the Fitbit app challenges me to perform to the best of my ability.		.83			
Using the Fitbit app provides a good test of my skills.		.78			
Using the Fitbit app challenges me.		.78			

I find using the Fitbit app stretches my capabilities to the limits.	.77			
Overall, using the Fitbit app has significantly improved my ability to manage my health and fitness activities.	.77			
Using the Fitbit app has enhanced my effectiveness in managing my health and fitness.	.77			
Using the Fitbit app has increased my productivity in managing my health and fitness.	.76			
Using the Fitbit app improves the way I am perceived by others.		.91		
Using the Fitbit app helps me feel accepted by others.		.89		
Using the Fitbit app gives me social approval.		.88		
Using the Fitbit app gives me a sense of belonging to the other users.		.79		
When people see or hear I am using the Fitbit app it gives them a good impression of me.		.76		
The badge feature on the Fitbit app increased my motivation to exercise.			.89	
I feel good when I earn a new badge on the Fitbit app.			.87	

Challenging my friends on the Fitbit app increased my motivation to exercise more.					.90
I often challenge my friends on the Fitbit app.					.90
Variance explained (percentage)	34.47	19.42	10.89	7.47	5.64
Mean	6.22	4.96	4.20	5.34	3.95
SD	.70	1.18	1.20	1.23	1.92
Cronbach's Alpha	.94	.88	.93	.89	.93

4.3 Multivariate Analyses

Cluster analysis, chi-square analysis and tests for independence were run on the data set in order to group and profile users according to the aspects of the Fitbit app they value. Hierarchical cluster analysis using Ward's method was applied to identify groups of users that were similar to each other but distinctly different from others. The "stopping rule" was employed which entailed analysing the changes in the cluster sum of squares, to suggest a number of clusters as the initial solution (Hair et al., 2003). Groups were found within each section of the survey including value derived, co-creation and gamification. All of the co-creation and gamification scales were then analysed simultaneously to identify distinct groups based upon these constructs. After the cluster analysis, the chi-square procedure was implemented to determine if there was a significant relationship ($p<.05$) between the groups and the demographic variables. The final analyses conducted were the tests for independence, which included one-way ANOVA and independent sample t-test. These results showed the significant differences between the mean averages of the distinct user groups.

4.3.1 Value Derived

Within the value derived scale, cluster analysis suggested a two to four cluster solution. After a comparison of the means of each possible cluster solution, it was determined a three-cluster solution was appropriate. The mean factor scores for each of the three groups are provided in Table 4:7. Group one (Indifferent Users) represents 27.5% of the sample while group two (Positive Users) represents 59.4% and group three (Anti-Social Users) represent 13.1%. Using the means as a basis, it can be determined that Indifferent Users perceived

functional value to be the most important personal value they derived from the Fitbit app. This was followed by emotional value and finally, social value. Social value was determined as the least important value for users. Positive Users had a similar format; however, this group valued all three metrics more than the other two groups. Anti-Social Users also had the same hierarchy but derived especially little social value with a mean rating of 2.55 out of 7.

Table 4:7 Cluster Analysis for Value Derived

	Segment		
Factor	**Indifferent Users**	**Positive Users**	**Anti-Social Users**
Social Value	3.44	4.90	2.55
Functional Value	5.32	6.17	6.10
Emotional Value	4.51	5.82	5.70

Based on the chi-square analysis of the three groups found in the value derived section, age (χ^2= 14.61, p= .02) and gender (χ^2=6.34, p=.04) were revealed as significant. Although age was found to be significant and have an effect, this effect cannot be articulated. In terms of gender it was found that group one (Indifferent Users) had more males and less females than expected, whereas group two (Positive Users) had more females and less males than expected. On the basis of this analysis it appears women derive more overall value from the Fitbit app than males.

The one-way ANOVA analysis revealed that all three behavioural intention scales were significant: willingness to pay (F=13.99, p=.00), continuous intentions to exercise (F=12.16, p=.00), satisfaction (F=72.07, p=.00). It was found that there was a significant difference in the means between group two and one within willingness to pay. The mean difference was calculated to be .96, demonstrating that Positive Users were only slightly against paying for the app, whereas Indifferent Users were strongly against paying for the app. In terms of the continuous intentions to exercise scale, it was determined that there was a significant difference between group two and one (.56) as well as between two and three (.80). While the Positive Users stated their definite intentions to continue exercising, the Indifferent Users and the Anti-Social Users expressed only some intention to continue exercising. It was found that, within satisfaction, there was a significant difference between group two and one of .96. It was also established that there was a significant difference between group three and one (.75) within satisfaction. The Positive Users and the Anti-Social Users both strongly expressed their

satisfaction with the Fitbit app, whereas the Indifferent Users stated that they were only mostly satisfied with the app.

4.3.2 Co-creation

The cluster analysis of the co-creation scales revealed a possible two or three cluster solution. Upon comparison of the means it was determined a two-cluster solution was suitable. The mean factor scores for each of the two groups are provided in Table 4:8. There was a near even split of the sample amongst the two groups with Positive Co-creators accounting for 50.8% of the sample and Neutral Co-creators accounting for 49.2%. Positive Co-creators had higher mean averages on all three of the co-creation scales than the Neutral Co-creators. They appeared to find the Fitbit app extremely accessible and that the app presented very little risk. The Neutral Co-creators appeared to have similar views but felt less strongly. Personalisation emerged as the weakest scale within both groups.

Table 4:8 Cluster Analysis for Co-creation

	Segment	
Factor	**Positive Co-creators**	**Neutral Co-creators**
Personalisation	5.53	4.43
Perceived Risk	6.59	5.73
Accessibility	6.31	5.38

The chi-square analysis revealed that education (χ^2=15.16, p=.01) and income (χ^2=13.61, p=.01) were significant variables and that they had a relationship with the co-creation groups. Through the chi-square results it can be seen that a greater majority of participants in group one had less education than those participants in group two. Only 9.3% of Positive Co-creators held a degree at Master's or above; in contrast 22% of Neutral Co-creators had achieved higher education. Despite income being statistically significant, the effect cannot be explained.

The independent sample t-test showed that all three behavioural intention scales were significant: continuous intentions to exercise (F=2.61, p=.00), willingness to pay (F=6.66, p=.02), satisfaction (F=9.16, p=.00). Within the continuous intentions to exercise scale, group one and two had a difference of .48. It was found that there was a difference of .39 within the willingness to pay scale between the two groups. It was also determined there was a difference

of .75 between the two groups in terms of satisfaction. The Positive Users found the Fitbit app extremely satisfying while the Neutral Co-creators found the app only mostly satisfying.

4.3.3 Gamification

The gamification cluster analysis revealed a possible two to five cluster solution. However, after comparing the means, a three-cluster solution was adopted. The mean factor scores for each of the three groups are provided in Table 4:9. Group one (Skilled Users) represents 43.1% of the sample, group two (Playful Users) represents 41.1% and group three (Anti-Game Users) represents 15.8%. Skilled Users had the highest average mean for user skill level and performance enhancement demonstrating a high aptitude for the Fitbit app. Playful Users had the highest average mean scores for both of the game mechanic scales indicating they appreciated and engaged in the gamified aspects of the app. In contrast, Anti-Game Users had the lowest scores for both game mechanic scales showing they did not enjoy the gamified aspects. Flow was found to have low mean averages across all three groups indicating that the flow concept is not applicable within the Fitbit app context and perhaps not applicable to fitness apps in general.

Table 4:9 Cluster Analysis for Gamification

	Segment		
Factor	**Skilled Users**	**Playful Users**	**Anti-Game Users**
User Skill Level / Ease of Use	6.30	6.19	6.10
Performance Enhancement	5.59	5.28	3.45
Flow	2.87	2.93	1.63
Game Mechanics Challenges	2.42	5.48	1.68
Game Mechanics Badges	5.31	5.63	4.03

Income (χ^2=37.29, p=.00) was revealed as significantly related to the gamification groups on the basis of the chi-square analysis. The Skilled Users group had a larger number of participants in the lower income bracket than expected and the Playful Users group had more participants in the middle income bracket.

The one-way ANOVA analysis revealed that the willingness to pay scale (F=12.00, p=.02) and the satisfaction scale (F=35.94, p=.02) scale were significant. Within the willingness to pay scale there was a significant difference in the means between group one and three (1.13) as well as within two and three (1.29). While the Skilled Users and the Playful

Users did not want to pay for the app, the Anti-Game Users were extremely against paying for the app. In terms of the satisfaction scale, there was a significant difference between group one and three of 1.07. There was also a significant difference in the means between two and three of .96. The Skilled Users and Playful Users were extremely satisfied with the app while the Anti-Game Users were only mostly satisfied with the app.

4.3.4 Co-creation and Gamification

This analysis integrated the scales from both the co-creation area and the gamification area. These results identify the most important sources of value for users across all areas. The cluster analysis suggested a two to four cluster solution. After comparing the means of the possible solutions, a three-cluster solution was deemed appropriate. The mean factor scores for each of the three groups are provided in Table 4:10. Group one (Active Users) accounts for 43.1% of the sample, group two (Highly Engaged Users) accounts for 41.1% and group three (Function Focused Users) accounts for 15.8%. On the basis of the means it can be seen that the Highly Engaged Users derive the most social value from the Fitbit app: they also use the two gamified aspects the most. This group also perceives themselves to be highly skilled at using the app. The Active Users group has similar results; however, with slightly lower means. While they do engage in the badge gamified aspect they tend not to derive value from the challenge aspect. The Function Focused Users derive little value in the gamified aspects of the app as well as deriving little social value from the app. On the basis of this information it can be inferred that this group is more function focused.

Table 4:10 Cluster Analysis for Co-creation and Gamification

	Segment		
Factor	**Active Users**	**Highly Engaged Users**	**Function Focused Users**
User Skill Level / Ease of Use	6.11	6.35	6.16
Performance Enhancement	5.27	5.22	3.44
Social Value	4.15	4.73	2.93
Game Mechanics Challenges	2.91	5.91	1.72
Game Mechanics Badges	5.29	5.69	4.54

The chi-square analysis of the co-creation and gamification scales showed that age (χ^2=14.43, p=0.3) and income (χ^2=23.02, p=.00) were significantly related to the groups.

Active Users was found to have less participants in the 25-34 age bracket than expected as well as more participants in the 35-54 age than expected. In contrast, Highly Engaged Users had more participants in the 25-34 age bracket than expected and less participants in the 35-54 age than expected. These results suggest that it is easier to engage the 25-34 age bracket in the gamified aspects of the app and that they derive more social value than the older age brackets (35-54). In regards to income, it was found that Highly Engaged Users had more participants in the middle income third than expected and that Function Focused Users had more participants in the upper income third.

The willingness to pay scale ($F=9.77$, $p=.02$) and the satisfaction scale ($F=25.30$, $p=.00$) were found to be significant through the one-way ANOVA analysis. Within the willingness to pay scale, significant differences in the means were found between group one and three (.95) as well as group two and three (.99). The Active Users and the Highly Engaged Users were unwilling to pay for the app while the Function Focused Users were strongly against paying for it. It was found that there were significant differences in between the means of group one and three (.62) in terms of satisfaction. Finally, it was determined there was a significant difference between groups two and three (.81) within the satisfaction scale. The Active Users and the Highly Engaged Users were extremely satisfied with the app, whereas the Function Focused Users were only mostly satisfied with the app.

4.4 Chapter Summary

The aim of this chapter was to present the results of the analyses run to answer the research questions. First, the sample size and composition were described and explained. The results of the dimensionality and reliability tests were then provided. After this, the results of the cluster analysis were outlined. The number of significant groups and their average mean scores were outlined in tables and explained. The results of the chi-square analysis and independences tests were detailed, providing insight into whether there were significant relationship between certain variables and the groups. The results presented in Chapter Four are further discussed in Chapter Five.

5. Discussion

This chapter concludes the thesis by discussing the main findings in relation to the relevant literature. The theoretical contributions and practical implications of the research are explained. Limitations of the study and suggestions for future research are also outlined.

5.1 Discussion of Main Findings

The results of this thesis confirm the findings of other co-creation literature, showing that functional, social and emotional value are important types of personal value for users in a co-creation context (Ruiz-Molina & Gil-Saura, 2008; Deng et al., 2010; Wang et al., 2013). It was found there is a diversity of Fitbit app users who value different aspects of the app. The results revealed that functional value was found to be the most important type of personal value derived from the Fitbit app for all user groups, followed by emotional value. This is understandable as the app serves a specific function: helping users achieve their health and fitness goals. It is also understandable that emotional value would rank highly for users: if the Fitbit app was successfully serving its function and meeting user needs, users would feel positive about the app and subsequently derive emotional value. The third and final personal value, derived by some users of the Fitbit app, was social value. It was found that while the Positive Users did derive some social value from the app, the Anti-Social Users derived very little. This study posits that the main motivations for using fitness apps include functional value, emotional value and, for some, social value. From the results of the research it was seen that women derive more overall value from the Fitbit app than men. Another unexpected result was that despite deriving very little social value, the Anti-Social User group was extremely satisfied with the app alongside the Positive Users.

Within the co-creation aspects it was found that there were no negative Co-creators with all user group mean averages being 4 or above. In the literature review it was postulated that the risk and accessibility components of the DART framework would apply to product usage co-creation contexts (Prahalad & Ramaswamy, 2004a). The results of this research confirmed this idea. Both groups, Positive Co-creators and Neutral Co-creators, found the Fitbit app to pose little risk and considered the app extremely accessible. Surprisingly, the results demonstrated that Neutral Co-creators were indifferent to the personalisation aspects of the app and that Positive Co-creators were only slightly positive towards personalisation. This contradicted the literature which outlined personalisation as an important aspect of co-creation

(Prahalad & Ramaswamy, 2004b). However, this result could of occurred because Fitbit does not perform this function well. Both the Positive Co-creators and the Neutral Co-creators stated they had intentions to continue exercising and that they were against paying for the app. However, the groups differed slightly in terms of satisfaction. The Positive Users found the Fitbit app extremely satisfying, while the Neutral Co-creators found the app only mostly satisfying.

Gamification proved a strong area of the survey, retaining the most scales and items after dimensionality and reliability analyses. This study confirmed Hailin's (2010) proposed four factors of the mobile Internet experience: level of challenge, user skill level, perceived ease of use and perceived usefulness. The performance enhancement scale was comprised of items from level of challenge and perceived usefulness. The user skill level and perceived ease of use were also combined to create a scale. All three groups, Skilled Users, Playful Users and Anti-Game Users, considered themselves skilled at using the Fitbit app. While the Skilled Users and Playful Users believed the app enhanced their ability to achieve their goals and challenged them, the Anti-Game Users did not.

Despite the fact that the concept of flow has been widely accepted as relevant in a computer mediated environment, this study found that flow was not applicable within the Fitbit app context (Hoffman & Novark, 1996; Hailin, 2010; Hamari & Koivisto, 2014). All three groups did not believe they reached a flow-like state while using the app. It is understandable flow would not be applicable to fitness apps as they are not games despite having gamified aspects. Users do not become engrossed in the use of fitness apps the way they do during online games.

Of the ten motivational affordance categories Hamari et al. (2014) identified, this study examined two: challenges and badges. It was found that all the user groups enjoyed the badge feature more than the challenge feature. All three groups found the badge feature somewhat enjoyable. In contrast, only the Playful Users somewhat enjoyed the challenges and the Skilled Users and Anti-Game Users strongly disliked the challenge feature. In terms of behavioural intentions it was not surprising none of the users were willing to pay for the app and that the Anti-Game Users were extremely against paying. It was found that, despite not enjoying the gamified features, the Anti-game users were mostly satisfied with the app alongside the extremely satisfied Skilled Users and Playful Users.

When the co-creation scales and the gamification scales were simultaneously analysed, it was found that the social value was the strongest of all the personal values. It was also found that amongst all the scales, four of the gamification scales were the strongest; again, demonstrating that gamification is important in terms of fitness apps. While the cluster analysis of the combined scales revealed similar results in terms of the gamification scales, the groups differed slightly in terms of social value. While the Active Users and the Highly Engaged Users derive some social value from the Fitbit app, the Function Focused Users derive very little. It was also revealed that there were more users in the younger age bracket (25-34) within Highly Engaged Users and more users in the older age bracket (35-54) within the Active Users, demonstrating that younger users tend to be more engaged than older users. In terms of behavioural intentions, the results were similar to those found in the gamification section, which is understandable as the majority of scales included were gamification scales.

5.2 Research Implications and Contributions

The findings of this research provide several theoretical and practical implications and contributions, which are identified and discussed in the sections which follow.

5.2.1 Theoretical Implications

Several studies reference functional, social, emotional and economic value as the relevant types of personal value within co-creation contexts (Deng et al., 2010; Wang et al., 2013; Ruiz-Molina & Gil-Saura, 2008). This study contributed three specific motivations to use fitness apps: functional value, emotional value and social value. It was found that functional value was the most important type of personal value derived from the Fitbit app for all user groups in the sample. Users utilise fitness apps to help them achieve their health and fitness goals making the functional aspect of fitness apps critical. Emotional value was found to be secondary to functional value. Whether the app is enjoyable to use and entertaining is a decisive factor when deciding whether or not to use a fitness app. Finally, social value was found to be important to some users and not important to others. While some users are concerned with how others view them, others are not. For those users that are concerned with how they are perceived, what using a fitness app says about them becomes a motivation for use. These users are attempting to portray their ideal-self to others (Belk & Pollay, 1985).

It was found through the literature review that gamification has been used to elicit engagement in many contexts (Hailin, 2010; Hamari & Koivisto, 2014; Harwood & Garry,

2015; Kuo & Chuang, 2016). This study found that gamification was an important area of value for users and highlights gamification as an significant consideration in terms of fitness apps. Of all the co-creation and gamification scales included in this study, gamification had the strongest section and the most items after scalability and reliability testing. In the factor analysis of all the co-creation and gamification scales, only one co-creation scale remained while four gamification scales were included; once again, demonstrating the strength and importance of gamification. Gamification provides entertainment and creates engagement. Engagement is achieved by challenging the user, stretching their capabilities and encouraging them to develop skills. While gamification is important it must act concurrently with the functional aspect of the app. Users need to find the app entertaining while still maintaining the belief the app enhances their ability to achieve their health and fitness goals. Fitness apps need to be considered both entertaining and useful in order to elicit user adoption.

Theoretically, this thesis made a contribution by examining a facet of co-creation that previously had received little attention. It was identified through the literature review that the majority of the co-creation literature is in reference to product innovation with few studies analysing product usage co-creation (Kristensson et al., 2008; Humphreys & Grayson, 2008; Lee et al., 2012). By investigating the Fitbit app this study specifically looked at a product usage experience during which users co-create an experience with a brand. This study found that while some product innovation co-creation constructs were applicable to a product usage co-creation context, others were not. For example, this thesis stipulates that economic value is not relevant in the setting of product usage co-creation (Piligrimiene et al., 2015). It was also determined that dialogue and transparency, from the DART framework, are irrelevant in terms of product usage co-creation (Prahalad & Ramaswamy, 2004a).

This thesis also contributed by analysing and synthesising constructs within two separate literature streams. The research indicated that co-creation and gamification constructs can be combined and used in conjunction in the context of technology-based fitness experiences. More specifically, this study found that functional, social and emotional value are important types of personal value for users in the context of fitness apps (Deng et al., 2010; Wang at al., 2013; Ruiz-Molina & Gil-Saura, 2008). This research confirmed that the risk and accessibility components of the DART framework were relevant within a product usage co-creation context (Prahalad & Ramaswamy, 2004a). Surprisingly, personalisation was found to be only slightly positively perceived by users (Prahalad & Ramaswamy, 2004b). This study

confirmed the four factors of the mobile Internet experience: level of challenge, the user skill level, perceived ease of use and perceived usefulness (Hailin, 2010). It was also found that the concept of flow was not applicable in the context that this research examined (Hoffman & Novark, 1996; Hailin, 2010; Hamari & Koivisto, 2014).

5.2.2 Practical Implications

It was the endeavour of this research to provide fitness app designers with an understanding of distinct user groups, the aspects of fitness apps they value and subsequently their motivations for use. It was found there is a diversity of users in terms of demographics and that different user groups value different aspects of fitness apps. However, it was found that all three groups within value derived, Indifferent Users, Positive Users and Anti-Social Users, rank the three personal values in the same order. It was found that users predominantly use fitness apps to help meet their need to achieve fitness and health related goals. Therefore, function value was revealed as the most important type of value. This was followed by emotional value, which motivated consumers to use fitness apps by entertaining them and providing enjoyable experiences. Finally, some users (Positive Users) derived social value from the app, drawing meaning from what people perceived about them by using a fitness app. In contrast, Indifferent Users and Anti-Social Users derived little social value from the Fitbit app. Therefore, for these users, social value was not a motivation for use. On the basis of this information it is hoped that brands creating fitness apps will be able to use their resources effectively, focusing on the features and functions of their apps that pertain to these three areas. It is postulated that by enhancing the functional, emotional and social value of a fitness app it will lead to increased user adoption. It was also found that women derive more overall value from the Fitbit app than men. Perhaps more attention should be focused on targeting women by fitness app designers. It was also found that there were more participants aged 25-34 in the Highly Engaged Users suggesting that this age range may deserve more attention than others.

This study investigated the aspects of fitness apps that are important to users which designers could use to enhance consumer experiences. It was found that it is important to make fitness apps easily accessible, as well as ensuring users believe they present little risk. Within this study users were either indifferent or only slightly positive towards personalisation. However, it is postulated that perhaps the personalisation aspect of the Fitbit app is not performing well; rather than demonstrating that personalisation is not an important concept in the context of fitness apps. Gamification was found to be the strongest section of this study

showing that gamification aspects are an important consideration when creating a fitness app. Fitness apps need to challenge the user but also need ensure users believe they possess the necessary skills to use the app. The app must be easy for consumers to use, and perceived as useful. The success of a fitness app lies in creating a balance between making the app useful to achieve fitness goals and making the app entertaining. Fitness apps need to present high levels of both functional and emotional value.

As a subset this research aimed to provide insight into behavioural intentions that result from positive product usage experiences demonstrating the value of co-creating these experiences to designers. While multiple behavioural intention scales were initially included in this study, after scalability and reliability testing few scales remained. The items from the satisfaction scale, attitudes scale and word of mouth scale were combined into one scale which was referred to as satisfaction. The only other two behavioural intention scales that were included were continuous intentions for exercise and willingness to pay. It was found that all user groups were unwilling to pay for the Fitbit app, demonstrating that fitness app designers should not consider charging users.

5.3 Limitations and Future Research

There are multiple limitations that need to be considered when interpreting the findings of this research. The results of this study also present several avenues for future research.

The use of Mechanical Turk meant that the sample included only American users. Users from different countries have different social norms and priorities: as such, it is likely that users from other countries would value different aspects of fitness apps and have different motivations for use. By having an American-only sample it may limit the generalisability of the results presented in this study. Fitness apps are often not country specific and most are used worldwide, therefore, a more diverse sample would allow for results that could be used by all fitness app designers. Future research could include a study that examines the same context with the same survey but includes a sample that has users from different countries.

This study examined the Fitbit app in isolation; no other fitness apps were analysed due to time constraints. Therefore, the results reflect the most important areas of value for users on the basis of the Fitbit app only: the examination of another fitness app, or multiple fitness apps in conjunction, could lead to differing results. For example, the examination of another fitness app might find that users perceive personalisation as an important feature. An avenue for future

research includes a study which investigates users that use multiple fitness apps regularly or a study that includes multiple users that utilise different fitness apps. The results of these studies could be used to confirm or expand, the three motivations for use found in this study.

Another limitation of this research is that only one example of a co-created product usage experience was analysed. The Fitbit app was an extremely specific example of this phenomena and, therefore, limits the generalisability of the results. A study examining other co-created product usage experiences would allow for comparison of results. It would also allow for a more generalised understanding of what users value in co-created experiences and what motivates them to engage in them. This future research could examine other apps created by brands; for instance, a ski field app which provides snow condition information and tracks the number of runs a user completes a day.

Moving beyond the technology focus of this thesis, the research focused solely on the value users derive from co-creating an experience with a brand. The literature review found that brands also receive value from co-creating experiences with users. Brands are an important consideration as they are the facilitators and without them no experience would take place. It is therefore suggested that another avenue for research could include a study that examines the value brands derive from co-creating product usage experiences. This will provide insight into the reasons brands create these experiences. A clear understanding of the benefits brands receive from co-creating product usage experiences could lead to more brands adopting this strategy to engage with their consumers.

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Appendices

7.1 Ethics Application Approval

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 364 2987, Extn 45588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2016/57/LR

23 September 2016

Tess Hawkins
Management, Marketing & Entrepreneurship
UNIVERSITY OF CANTERBURY

Dear Tess

Thank you for submitting your low risk application to the Human Ethics Committee for the research proposal titled "The Co-Creation of Unique Product Usage Experiences".

I am pleased to advise that the application has been reviewed and approved.

With best wishes for your project.

Yours sincerely

pp. R. Robinson

Kelly Dombroski
Deputy Chair, Human Ethics Committee

7.2 Survey Structure

7.2.1 Participant Instructions and Consent

Technology-based fitness experiences.

You have been invited to participate in a research project that investigates fitness experiences through technologies such as apps and wearable technology. The aim of this research is to to understand these experiences and their outcomes.

Your involvement in this research will be to participate in a short online survey which should only take approximately 10 minutes. This will entail questions regarding your recent use of the Fitbit app. Although it is acknowledged that the Fitbit app is generally connected to a Fitbit wearable technology, this study specifically investigates the use of the Fitbit **app**.

At no time will you be required to reveal your name or any other identifying information, you will remain completely anonymous. You have the right to withdraw from the project at any time, including withdrawal of information provided. Any uncompleted surveys will be discarded. However, should you not complete the survey you will not be remunerated. You must answer all of the questions to the best of your ability. The results will be stored on University of Canterbury servers for 5 years.

This project is being carried out as a requirement for my Master's in Marketing at the University of Canterbury, New Zealand. A thesis is a public document and as such will be available through the University of Canterbury Library, however you may be assured of the complete confidentiality of all data collected and that the identity of all participants will remain anonymous. If you have any concerns about this project please discuss them with my supervisor, Paul Ballantine, who can be contacted at paul.ballantine@canterbury.ac.nz

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee low risk process.

Thank you for your time.

Warm regards,
Researcher: Tess Hawkins (tess.hawkins@pg.canterbury.ac.nz)
Supervisor: Paul Ballantine (paul.ballantine@canterbury.ac.nz

Having read this information sheet I agree to participate in this study.

- ○ Yes
- ○ No

7.2.2 Screening Questions

Before we begin we need to make sure you qualify for our study. Please indicate your age:

- ◯ Under 18
- ◯ 18 - 24
- ◯ 25 - 34
- ◯ 35 -54
- ◯ 55+

Have you used the Fitbit app in the last three months?

- ◯ Yes
- ◯ No

Please indicate how often you use the Fitbit app.

- ◯ Less than once a month
- ◯ Once or twice a month
- ◯ 1-2 times a week
- ◯ 3-4 times a week
- ◯ 5-6 times a week
- ◯ Daily

7.2.3 Product Usage Questions

How long have you been using the Fitbit app?

- ◯ Less than a year
- ◯ Between 1-2 years
- ◯ Between 2-3 years
- ◯ More than 3+ years

On average, how often do you use the Fitbit app?

- ◯ Once or twice a month
- ◯ 1-2 times a week
- ◯ 3-4 times a week
- ◯ 5-6 times a week
- ◯ Daily

On average, how much time do you spend on the Fitbit app during each usage?

- ◯ Between 0-30 minutes
- ◯ Between 30-60 minutes
- ◯ Between 1-2 hours
- ◯ More than 2+ hours

7.2.4 Value Derived Items

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Using the Fitbit app regularly makes me feel good.	○	○	○	○	○	○	○
I find using the Fitbit app enjoyable.	○	○	○	○	○	○	○
Using the Fitbit app gives me pleasure.	○	○	○	○	○	○	○
I find using the Fitbit app interesting.	○	○	○	○	○	○	○
I find using the Fitbit app fun.	○	○	○	○	○	○	○
I find using the Fitbit app entertaining.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I believe the Fitbit app provides clear and truthful information about health and fitness.	○	○	○	○	○	○	○
The Fitbit app makes it easier for me to decide how often to exercise.	○	○	○	○	○	○	○
The Fitbit app allows me to track useful information.	○	○	○	○	○	○	○
The Fitbit app lowers my confidence to make the right health and fitness choices.	○	○	○	○	○	○	○
The Fitbit app makes it easier for me to reach my health and fitness goals.	○	○	○	○	○	○	○
I believe the Fitbit app provides information that is up-to-date.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
When people see or hear I am using the Fitbit app it gives them a good impression of me.	○	○	○	○	○	○	○
Using the Fitbit app gives me a sense of belonging to the other users.	○	○	○	○	○	○	○
Using the Fitbit app improves the way I am perceived by others.	○	○	○	○	○	○	○
Using the Fitbit app helps me feel accepted by others.	○	○	○	○	○	○	○
Using the Fitbit app gives me social approval.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I began using the Fitbit app because I like trying new technologies.	○	○	○	○	○	○	○
Using the Fitbit app allowed me to experiment with new ways of tracking my health and fitness activities.	○	○	○	○	○	○	○
The Fitbit app aroused my curiosity.	○	○	○	○	○	○	○
I use the Fitbit app because I like to follow technology trends.	○	○	○	○	○	○	○
If you are reading this question please select strongly agree.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I have found the Fitbit app to be reliable.	○	○	○	○	○	○	○
I think the Fitbit app has good functions and features.	○	○	○	○	○	○	○
The Fitbit app fulfils my needs well.	○	○	○	○	○	○	○
I believe the Fitbit app has an acceptable standard of quality.	○	○	○	○	○	○	○
I have found that the Fitbit app offers consistent quality.	○	○	○	○	○	○	○

7.2.5 Co-creation Items

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
The Fitbit app has interactive features that fit my needs.	○	○	○	○	○	○	○
I can adapt the features on the Fitbit app to better serve my needs.	○	○	○	○	○	○	○
The Fitbit app creates the feeling of receiving personalized attention.	○	○	○	○	○	○	○
I value the personalized exercise plans the Fitbit app creates for me.	○	○	○	○	○	○	○
I value the personalized food plans the Fitbit app creates for me.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Downloading information from the Fitbit app is slow.	○	○	○	○	○	○	○
It is difficult to find the information I need on the Fitbit app.	○	○	○	○	○	○	○
It is easy to access the Fitbit app wherever I want to.	○	○	○	○	○	○	○
I can easily access the Fitbit app whenever I want to.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I believe using the Fitbit app is risky.	○	○	○	○	○	○	○
I believe using the Fitbit app can lead to bad results.	○	○	○	○	○	○	○
I received comprehensive information pertaining to the risks and benefits of using the Fitbit app.	○	○	○	○	○	○	○
I was provided with the necessary tools and support to make fully informed decisions as to whether I should participate in certain health and fitness activities.	○	○	○	○	○	○	○

7.2.6 Gamification Items

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Using the Fitbit app challenges me.	○	○	○	○	○	○	○
Using the Fitbit app challenges me to perform to the best of my ability.	○	○	○	○	○	○	○
Using the Fitbit app provides a good test of my skills.	○	○	○	○	○	○	○
I find using the Fitbit app stretches my capabilities to the limits.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I have the resources and skills necessary to use the Fitbit app.	○	○	○	○	○	○	○
I have the knowledge necessary to use the Fitbit app.	○	○	○	○	○	○	○
Learning to use the Fitbit app was easy for me.	○	○	○	○	○	○	○
It was easy for me to become skillful at using the Fitbit app.	○	○	○	○	○	○	○
My interaction with the Fitbit app is clear and understandable.	○	○	○	○	○	○	○
I find the Fitbit app easy to use.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Using the Fitbit app has increased my productivity in managing my health and fitness.	○	○	○	○	○	○	○
Using the Fitbit app has enhanced my effectiveness in managing my health and fitness.	○	○	○	○	○	○	○
Overall, using the Fitbit app has significantly improved my ability to manage my health and fitness activities.	○	○	○	○	○	○	○
Overall, I have found the Fitbit app to be very useful.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
While using the Fitbit app I often forget my immediate surroundings.	○	○	○	○	○	○	○
I often lose track of time while using the Fitbit app.	○	○	○	○	○	○	○
While using the Fitbit app I often have a diminished sense of self.	○	○	○	○	○	○	○
Time seems to fly by when I use the Fitbit app.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I find that the tracking features on the Fitbit app allow me to improve my health and fitness.	○	○	○	○	○	○	○
Setting goals on the Fitbit app increased my motivation to improve my physical wellbeing.	○	○	○	○	○	○	○
Achieving my goals on the Fitbit app increased my motivation to improve my physical well-being.	○	○	○	○	○	○	○
The badge feature on the Fitbit app increased my motivation to exercise.	○	○	○	○	○	○	○
I feel good when I earn a new badge on the Fitbit app.	○	○	○	○	○	○	○
I often challenge my friends on the Fitbit app.	○	○	○	○	○	○	○
Challenging my friends on the Fitbit app increased my motivation to exercise more.	○	○	○	○	○	○	○
Overall, the game aspects of this app (eg goals and badges) increase my motivation to exercise.	○	○	○	○	○	○	○

7.2.7 Behavioural Intention Items

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Overall, my experience using the Fitbit app has been worse than expected.	○	○	○	○	○	○	○
Overall, I expected something better from the Fitbit app.	○	○	○	○	○	○	○
Overall, when compared to my expectations, I find using the Fitbit app to be a positive experience.	○	○	○	○	○	○	○
Overall, when compared to my expectations, I find using the Fitbit app to be a negative experience.	○	○	○	○	○	○	○
If you are reading this question please select strongly disagree.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
All things considered, I find using the Fitbit app to be a wise thing to do.	○	○	○	○	○	○	○
All things considered, I find using the Fitbit app to be a good idea.	○	○	○	○	○	○	○
All things considered, I find using the Fitbit app to be a positive experience.	○	○	○	○	○	○	○
All things considered, I find using the Fitbit app to be favorable.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
This is one of the best health and fitness apps I could have used.	○	○	○	○	○	○	○
I am satisfied with my decision to use the Fitbit app.	○	○	○	○	○	○	○
My choice to use the Fitbit app was a wise one.	○	○	○	○	○	○	○
I am sure I did the right thing using the Fitbit app.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I intend to continue using the Fitbit app as often as I have in the past.	○	○	○	○	○	○	○
I predict that I will use the Fitbit app more frequently in the future.	○	○	○	○	○	○	○
It is likely that I will use the Fitbit app more often during the next couple of months.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I plan to increase the amount of exercise I am doing, rather than decrease it.	○	○	○	○	○	○	○
I predict that I will exercise more frequently within the next three months.	○	○	○	○	○	○	○
I think I will keep exercising in the near future, at least as much as I have during the last few months.	○	○	○	○	○	○	○
The Fitbit app has encouraged me to exercise regularly and I intend to keep exercising regularly.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I would recommend the Fitbit app to my friends.	○	○	○	○	○	○	○
I will recommend the Fitbit app to anyone who seeks my advice regarding health and fitness.	○	○	○	○	○	○	○
I will refer my acquaintances to the Fitbit app.	○	○	○	○	○	○	○
I will say positive things about the Fitbit app to other people.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I would use the Fitbit app even if I had to pay for it.	○	○	○	○	○	○	○
I would pay a higher price for other fitness apps.	○	○	○	○	○	○	○
I wouldn't mind if I had to pay to use the Fitbit app.	○	○	○	○	○	○	○

Please indicate the extent to which you agree/disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I seldom consider switching to another health and fitness app.	○	○	○	○	○	○	○
As long as the present service continues, I doubt that I would switch health and fitness apps.	○	○	○	○	○	○	○
When I use a health and fitness app, Fitbit is my first choice.	○	○	○	○	○	○	○
I believe that the Fitbit app is my favorite health and fitness app.	○	○	○	○	○	○	○

7.2.9 Demographic Questions

What is your gender?

- ◯ Male
- ◯ Female

Please indicate the highest level of education completed.

- ◯ Grammar School
- ◯ High school or equivalent
- ◯ Some college
- ◯ College Graduate
- ◯ Master's degree
- ◯ Professional degree (MD, JD, etc.)
- ◯ Doctorate
- ◯ Other

What is your current relationship status?

- ◯ Single
- ◯ In a long-term relationship
- ◯ Married
- ◯ Separated
- ◯ Divorced
- ◯ Widowed

Please select the option which best describes your current employment.

- ◯ Student
- ◯ Employed full-time
- ◯ Employed part-time
- ◯ Unemployed
- ◯ Retired

Please indicate the option which best describes your income in relation to others in the population.

- ◯ Rather not say
- ◯ Lower third
- ◯ Middle third
- ◯ Upper third
- ◯ Unsure

Please enter your Mechanical Turk worker I.D. in the field below.