Technology behavior of Millennials: An approach through the Uses and Gratifications Theory

Rogelio Pesqueira Sánchez

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Directors: Cristina Calvo Porral
Andrés Faiña Medín

Doctoral Program in Economic Analysis and Business Strategy

UNIVERSIDADE DA CORUÑA

A mi familia

A mis amigos

Muchísimas gracias.

To my family
To my friends
Thank you so much.

Technology behavior of Millennials

La presente tesis no es el resultado de un esfuerzo individual, ningún logro importante lo es, y por ello deseo reconocer el apoyo prestado a todas las personas que, sabiéndolo o incluso no, fueron fundamentales en la consecución de la misma.

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PUBLICATIONS

Chapter 1 has been submitted and accepted for publication in the "*International Journal of Human-Computer Interaction*", that is an academic journal indexed in the Web of Science.

Chapter 2 has been submitted to the academic journal "Behaviour & Information Technology", being currently under review.

Chapter 3 has been submitted to the academic journal "*Computers in Human Behavior*", being currently under review.

Abstract

This thesis aims to shed light on the changes experienced in Millennial´s attitudes towards technology. The thesis is structured in three chapters, all the three chapters have the same structure, first of all an abstract of the chapter is offered, secondly an introduction, then the theoretical frame work and the methodology used are exposed and finally the results and the conclusions are presented.

Resumen

La presente tesis tiene como objetivo arrojar luz sobre los cambios experimentados en las actitudes de los Millennials hacia la tecnología. La tesis está organizada en tres capítulos, los tres capítulos tienen la misma estructura, en primer lugar se ofrece un resumen del capítulo, en segundo lugar una introducción, luego se expone tanto el marco teórico como la metodología usada y finalmente se presentan los resultados y las conclusiones.

Resumo

A presente tese ten por obxectivo esclarecer os cambios experimentados nas actitudes dos Millennials cara á tecnoloxía. A tese está organizada en tres capítulos, os tres capítulos teñen a mesma estrutura, primeiro ofrecese un resumo do capítulo, en segundo lugar unha introdución, a continuación expóñense tanto o cadro teórico como a metodoloxía empregada e finalmente preséntanse os resultados e as conclusións.

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INTRODUCTION

The Millennial Generation is the demographic cohort that follows Generation X. They are the first generation who was born and grown up when well-developed information and communication technologies like computers, Internet, videogames, cell phones, digital music players and digital video cams were available. This fact differentiates this generation form previous generations. There is a consensus about the greater influence received by them is the use of technology, influencing their behavior, culture and beliefs. In turn, they have great technological expertise and a great ability to easily access vast amounts of information (Wolburg & Pokrywczynski, 2001). Media, communication technology, online social networks sites –such as Twitter, Facebook or Myspace- computer games and other communication platforms are massively consumed by Millennials (Lenhart et al., 2010; Cheung, Chiu & Lee, 2011), allowing them to keep in touch with peers and friends and to establish relationships. In fact, they are attracted to a wide variety of media, regularly using blogs and social networks to express their feelings (Hershatter & Epstein, 2010), and depend more on their friends and peers' opinions and word-of-mouth when making purchase decisions (Valentine & Powers, 2013). Likewise, they spend much of their time in virtual spaces, where they do not only enjoy through the social network, but also they share their knowledge, communicate and interact with each other (Prensky, 2001).

Wolburg, J.M. and Pokrywczynski, J. (2001), "A psychographic analysis of Generation Y college students", Journal of Advertising Research, Vol. 41 No. 5, pp. 33–52

Lenhart A, Ling R, Campbell S, Purcell K. Teens and mobile phones. 2010 Retrieved (10/02/2018) from http://pewinternetorg/Reports/2010/Teens-and-Mobile-Phones.aspx

Cheung, C. M., Chiu, P. Y., & Lee, M. K. (2011). Online social networks: Why do students use facebook?. *Computers in Human Behavior*, *27*(4), 1337-1343.

Hershatter, A., & Epstein, M. (2010). Millennials and the world of work: An organization and management perspective. Journal of Business & Psychology, 25, 211-223.

B. Valentine, D., & L. Powers, T. (2013). Generation Y values and lifestyle segments. *Journal of consumer marketing*, *30*(7), 597-606.

Prensky, M. (2001). Digital natives, digital immigrants, part II. Do they really think differently?. *On the Horizon*, *9*(6), 1-6.

Millennials as a generational cohort have common characteristics: they are confident, optimists and team-oriented and gravitate toward group activity (Howe, 2006), are best educated and most culturally diverse than previous generations in history, (Howe & Strauss, 2009), racially and ethnically diverse (Oblinger, 2003), and had very quiet lives when they were teens, listening to music, going to movies or watching TV. This generation consumes differently from others previous generations. For example they "travel less, own fewer cars, have lower driver´s licencese rates" (Garikapati et al., 2016) and for Millennials the act of shopping takes an experiential and entertainment dimension (Lehtonen & Maenpaa, 1997). They are exceedingly tolerant and open-minded toward lifestyles (Morton, 2002) and create the digital lifestyle (Goldenberg, 2005).

This Millennial generation uses technology intensively. This intensive use of technology changes completely their lifestyles, since they "have been acculturated into a materialistic and consumer culture more so than other generations as a result of technological innovations" (Bakewell & Mitchell, 2003), and they prefer services such as Uber and Lyft to car ownership, rent through AirBnB, and stream music through Spotify. Maybe, this intensive use of technology influences both Millennials' way of thinking and processing information, differently from their predecessors (Prensky, 2001).

Howe, N. (2006, April). A generation to define a century. In *Association for Supervision and Curriculum Development Annual Conference, Worldwide Issues, Chicago. Retrieved June* (Vol. 29, p. 2006).
Howe, N., & Strauss, W. (2009). *Millennials rising: The next great generation*. Vintage.
Oblinger, D. (2003). Boomers gen-xers millennials. *EDUCAUSE review*, *500*(4), 37-47
Garikapati, V. M., Pendyala, R. M., Morris, E. A., Mokhtarian, P. L., & McDonald, N. (2016). Activity patterns, time use, and travel of millennials: a generation in transition?. *Transport Reviews*, *36*(5), 558-584.
Lehtonen, T. K., & Mäenpää, P. (1997). Shopping in the east centre mall. *The shopping experience*, *1*.
Morton, L. P. (2002). Targeting generation Y. *Public Relations Quarterly*, *47*(2), 46.
Goldenberg, B. (2005). The consumer of the future. *CRM Magazine*, *9*(5), 22-22.
Bakewell, C., & Mitchell, V. W. (2003). Generation Y female consumer decision-making styles. *International Journal of Retail & Distribution Management*, *31*(2), 95-106.
Prensky, M. (2001). Digital natives, digital immigrants, part II. Do they really think differently?. *On the Horizon*, *9*(6), 1-6.

A generational cohort is a unit of analysis for researchers. Different cohort generations share a common social character, shaped by their common history, common beliefs and common experiences; and in turn, individuals who belong to the same generational cohort share similar values, behaviors, preferences, motivations, interests and attitudes. Millennials is the denomination that we will use to identify the generational cohort under research. The term Millennial was first used by Strauss and Howe (Strauss & Howe, 1991) in 1991. Other studies use other denominations for this generational cohort such as "*Generation Y*" (Weiler, 2004), Go-nowhere generation (McDonald, 2015), Net generation (Tapscott, 1998), Digital Natives, (Prensky, 2001)**,** IPOD generation **(**Akande, 2008), WWW generation (Goldenberg, 2005), Digital Generation **(**Prensky, 2008)**,** Generation Me (Twenge, 2006), Generation We (Greenberg & Weber, 2008) or echo boomers (Alch, 2000).

Strauss and Howe developed the generational theory and distinguished four types of Archetype that each generation matched: Prophet, Nomad, Hero and Artist, Generation X matched to the archetype Nomad so the Millennial Generation should match the archetype Hero. Millennials are those individuals born between 1980 and 2000 being a generational cohort that has common characteristics, motivations, attitudes and behavioral patterns.

Strauss, W. and Howe, N. (1991) Generations: The History of America's Future, 1584–2069, New York, NY, William Morrow.
Weiler, A. (2005). Information-seeking behavior in generation Y students: Motivation, critical thinking, and learning theory. *The journal of academic librarianship*, *31*(1), 46-53.
McDonald, N. C. (2015). Are millennials really the "go-nowhere" generation?. *Journal of the American Planning Association*, *81*(2), 90-103.
Tapscott, D. (1998). The rise of the Net generation: Growing up digital.
Prensky, M. (2001). Digital natives, digital immigrants, part II. Do they really think differently?. *On the Horizon*, *9*(6), 1-6.
Akande, B. O. (2008). The IPOD generation. *Diverse: Issues in Higher Education*, *25*(15), 20.
Goldenberg, B. (2005). The consumer of the future. *CRM Magazine*, *9*(5), 22-22.
Prensky, M. (2008). Young minds, fast times: The twenty-first-century digital learner. *Retrieved November*, *15*, 2011.
Twenge, J. M. (2006). Generation Me: Why today's young Americans are more confident, assertive, entitled--and more miserable than ever before.
Greenberg, E. H., & Weber, K. (2008). Generation we: How millennial youth are taking over America and changing our world forever. Pachatusan.
Alch, M. L. (2000). The echo-boom generation: A growing force in American society. The Futurist, 34(5), 42.

One of the most important common characteristics is their close relation with technology, since they have grown up immersed in technology. They are technologically savvy and literate and technology plays a key role in their daily routines. Being immersed in technology is one of the main differences between this generational cohort and their older counterparts.

Millennials are *digital natives* (Prensky, 2001) because they were born in an age of digital technology. Like digital natives they are "*native speakers*" of the digital language of computers, video games and the Internet. They use technology more than previous generations and technology is a central part of their leisure, work and social interactions. They do not only use technology more intensively than previous generations, but they also use it in a different way. More precisely, Millennials use technology to receive constant updated information in real time; they use technology in multi-task mode and to stay connected every time and everywhere. In addition, Millennials use technology not only for consuming digital content, but for creating, producing and sharing their own-created contents with others.

There is an increasing interest in study this generation and they have been largely examined in the academic literature. They have been object of a lot of research papers about them. Further, we should highlight that while European studies have focused on the relationship between Millennials and work, American researches have focused on the relationship between this generation and education. In fact, Millennials have been largely examined in the academic literature and prior research offers descriptions of Millennials as consumers, or as internet and social media users (Lenhart, Purcell, Smith & Zickuhr, 2010).

Prensky, M. (2001). Digital natives, digital immigrants, part II. Do they really think differently?. *On the Horizon*, *9*(6), 1-6.
Lenhart, A., Purcell, K., & Smith, A. (2011). A., & Zickuhr, K.(2010). *Social media and young adults*.

However, to date there is scarce research identifying the potential segments and technology profiles or typologies within this generation. Further, there is a lack of research about statistical models of millennial behavior with technology; and even there is a lack of studies comparing their technology behavior with the previous generation.

Prior studies indicate that Millennials, who were born into a world full of digital technology, have great technological expertise and ability to access easily to vast amount of information; influencing how they think and process the information available. This sophisticated knowledge and skills related with technology completely influences the millennials' behavior, beliefs and lifestyles, compared with their predecessors. On the other side, numerous studies highlight the strong dependence that Millennials have with technology, and some researchers even studied their technology dependency or addiction. In this line, some studies report a higher level of addiction to smartphones among Millennials, because they need to be constantly in touch with their social networks.

On the other hand, the members of the Generation X are those who born between 1965 and 1980. Generation X is the denomination that we will use to identify the previous generation to Millennials. However, other studies have labelled this generation with other denominations such as for example digital immigrants. These individuals did not grow up surrounded or immersed in digital technology; and in general terms, we can assume that there is a generational gap related to technology between Generation X individuals and Millennials. Despite many members of the Generation X exhibit great digital wisdom and efficacy, the Generation X individuals exhibit less aptitudes, skills, capabilities and competencies related with technology than Millennials.

The theoretical framework for this thesis is The Theory of Uses and Gratifications, developed by Katz et al. (1974). Other related theories reviewed for this thesis are Technology Acceptance Model (TAM) (Davis, 1989) that considers the intention to use and to adopt technology which could be defined as the adoption, use or acceptance of technology; the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) which is a behavioral-based model developed to unify the multiple existing theories about how users accept technology; and the Flow Theory (Csikszentmihalyi, 1977) which conceptualizes the optimal user experience through technologies. All these theories complement each other and provide variables explaining the use of technology, since they contain a number of emotional and cognitive variables influencing the individual's behavior.

The Uses and Gratifications Theory provides a theoretical framework to understand the use of communication media for individuals as a way to obtain gratifications and cover their needs. This theory differs from the technology acceptance theories because it posits that motivational variables directly influence behavioral usage of technology, without the mediation effects of attitude or behavioral intentions.

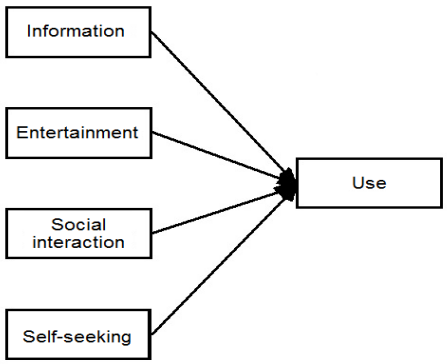
Originally, the Uses and Gratifications Theory was applied to investigate mass communication media adoption behaviors, since individuals' choices about using media are motivated by their desire to gratify their needs. However, this theory has been currently extended to study the motivations and gratifications of diverse technology uses and to examine why individuals

Katz, E., Blumler, J.G., & Gurevitch, M. (1974). *Utilization of mass communication by the individual.* In J.G. Blumler & E. Katz (Eds.). *The uses of mass communications: Current perspectives on gratifications research*. Beverly Hills: Sage Publishing.
Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology"; *MIS Quarterly*, Vol. 13, pp. 319-340.
Venkatesh, V., Morris, M.G., Davis, G.B., and Davis, F.D. (2003), "User Acceptance of Information Technology: Toward and Unified View", *MIS Quarterly*, Vol. 27 No.3, pp. 425-478.
Csikszentmihalyi, M. (1977), *Beyond boredom and anxiety*, Jossey-Bass, San Francisco, CA.

choose and use a particular technology to fulfill their particular gratifications. In fact, this theoretical approach can be applied to a variety of technologies, such as cable TV (Bantz, 1982), the World Wide Web (Ferguson and Perse, 2002), online services (Lin, 1999), the internet in general (Flanagin and Metzger, 2001) or mobile phones (Aoki and Downes, 2003).

According to the Uses and Gratifications Theory (Katz et al., 1974) the communication media compete with each other to satisfy the needs of individuals, through an invisible process, covering the needs of individuals and providing three different gratifications, namely, information, entertainment, social interaction and self-seeking (Figure 1).

Figure 1. *Gratifications derived from the use of technology.*



Source: Katz et al. (1974)

More precisely, the need of information is the need that individuals have to acquiring information, knowledge or understanding. Second, the need of entertainment is the need that individuals have for emotional release, enjoyment, fun or hedonic values. Third, the need of

Bantz, C. R. (1982). Exploring uses and gratifications: A comparison of reported uses of television and reported uses of favorite program type. *Communication Research*, 9(3), 352–379.
Ferguson, D.A., & Perse, E.M. (2002). The World Wide Web as functional alternative to television. *Journal of Broadcasting & Electronic Media*, *44*(2), 155-174.
Lin, C. A. (1999). Online-service adoption likelihood. *Journal of Advertising Research*, *39*(2), 79–89.
Flanagin, A. J., & Metzger, M. J. (2001).Internet use in the contemporary media environment. *Human Communication Research*, *27*(1), 153–181.
Aoki, K., & Downes, E. J. (2003). An analysis of young people's use of and attitudes toward cell phones. *Telematics and Informatics*, *20*(4), 349–364.
Katz, E., Blumler, J.G., & Gurevitch, M. (1974). *Utilization of mass communication by the individual.* In J.G. Blumler & E. Katz (Eds.). *The uses of mass communications: Current perspectives on gratifications research*. Beverly Hills: Sage Publishing.

social interaction is the need that individuals have to keep in contact, converse or strengthen ties with peers, family and friends. Finally, the need of self-seeking is the need that individuals have to explore reality, reinforce one's values and self-understanding. After the literature review and the examination of the previous theories that explain the use and adoption of technologies, we believe that this theory is the most adequate to base this thesis.

For the realization of this thesis some different procedures, techniques, models and instruments were used, based in previous literature. The most relevant methodology used in this thesis is the multivariate analysis; and more precisely, Structural Equation Modelling (SEM) used for Chapter 2 and Chapter 3. The structural equation model (SEM) is a mathematical and statistical model to test and estimate causal relationships from data and qualitative assumptions about causality (Lévy-Mangin and Varela-Mallou, 2006). This instrument aims to fit a proposed model of constructs to observed data and allows confirming its validity or rejecting it. Structural models are expressed by graphs in which the latent variables, also called constructs, are inserted into ellipses, the observable variables that measure them, also called items, in rectangles, and the relations between the variables are expressed by unidirectional lines to express linear regression, or bidirectional to express covariance.

The main goal of this thesis is to examine and analyze the behavior, motivations and usage patterns of Millennials towards technology. This thesis is structured in three chapters as explained below. All the three chapters have been written with a common theoretical framework, the Uses and Gratifications Theory, proposed by Katz et al. (1974) in order to explain the main motivations and gratifications that drive the use of technology.

Mangin, J. P. L., & Mallou, J. V. (2006). *Modelización con estructuras de covarianzas en ciencias sociales: temas esenciales, avanzados y aportaciones especiales*. Netbiblo.
Katz, E., Blumler, J.G., & Gurevitch, M. (1974). *Utilization of mass communication by the individual.* In J.G. Blumler & E. Katz (Eds.). *The uses of mass communications: Current perspectives on gratifications research*. Beverly Hills: Sage Publishing.

Likewise, the three chapters of the thesis have the same structure: Abstract, introduction, literature review, methodology, discussion of results, conclusions and references.

The first chapter categorizes Millennials according their technology behavior. To accomplish this goal, we developed a Cluster analysis on the Millennials based on the technology use and technological behavior. Our findings reported that Millennials are not a homogeneous group, indicating that five different groups of Millennials could be distinguished, based on characteristics that differentiate some them from others.

In this research two main findings are remarkable. In the first place, that Millennials behave quite similarly regardless of their gender, and the fact that there are common characteristics to the five groups that define them as members of a same generational cohort. Secondly, the major contribution of this chapter to the literature is providing a clustered-based characterization of Millennials regarding their technology behavioral usage.

The second chapter shows different theoretical models to study the use and engagement with technologies. The main goal of this chapter is to examine three different models proposed by literature and analyze which fits better to the technological behavior of Millennials. For this purpose we used structural equation modelling. We empirically compared three models validated by the literature, namely "engagement-and-use", "use-to-engagement" and "engagement-to-use".

With the examination of these three models our research aims to analyze the relationship between technology use and technology engagement. The three conceptual proposed models

involve different use and engagement relationships. The first model proposes that technology use and technology engagement are consequences of the main drivers of the Uses and Gratifications Theory. The second model assumes that engagement with technology would be an antecedent or prerequisite of technology use. Finally, the third proposed model assumes that the use of technology is an antecedent of technology engagement. Our results show that one model is the most adequate and that technology engagement and technology use are both consequences.

The third chapter compares the different behavior regarding technology use and engagement between Millennials and Generation X. For this purpose, the authors developed the best conceptual model, as indicated in the Chapter 2.

Differences between Millennials and Generation X have been extensively studied previously, but we base our empirical research on the Uses and Gratifications Theory (Katz et al., 1974) to examine the differences between these generations regarding their technology behavior. Our results support the proposed conceptual model, since our findings provide support for most of the research hypotheses proposed. Our findings indicate that the generational cohort influences substantially on the motivations to use and be engaged with technology. Interestingly, our findings indicate that entertainment is the main motivation driving technology use and engagement for Millennials; thus, showing a hedonic motivation. On the other hand, our results show that search for information is the main motivation influencing Generation X individuals in their technology behavior.

Katz, E., Blumler, J.G., & Gurevitch, M. (1974). *Utilization of mass communication by the individual.* In J.G. Blumler & E. Katz (Eds.). *The uses of mass communications: Current perspectives on gratifications research*. Beverly Hills: Sage Publishing.

CHAPTER 1

A CLUSTERED-BASED CATEGORIZATION OF MILLENNIALS IN THEIR TECHNOLOGY BEHAVIOR

ABSTRACT

Introduction: There is an increasing interest for Millennials; however, to date Millennials' segmentations regarding their technology usage and behavior are scarce.

Purpose: This study addresses the following questions: "*Are there segments within this generation group regarding their digital technology behavior?"*. And if so: "*Are there variances in the way that millennial segments use digital technology?*"; and further: "*What are the main differences among millennial segments regarding their technology behavior?*". So, our purpose is to examine the potential profiles of Millennials regarding their digital technology use and behavior.

Design: Data from a sample of 707 Millennials was analyzed through principal components and Cluster analysis. Then, Millennials' segments were profiled using a MANOVA analysis.

Findings: Findings revealed that not every Millennial has the same technology use and behavior. A five-clustered solution emerged regarding the technological behavior of Millennials: "*technology devotees"*, "*technology spectators"*, "*circumspects"*, "*technology adverse users"* and "*productivity enhancers"*.

Value: This study contributes with a detailed perspective of how different millennial segments use digital technology.

Keywords*: Millennials, Technology, User behavior, Cluster analysis.*

1. INTRODUCTION

Millennials is a unique consumer group, heavily influenced by technology and the Internet, and for this reason this generation has evolved differently from previous generations. Millennials, "Generation Y" or "Gen Y", "Digital Natives" or "Digital Generation", are the demographic cohort following Generation X, which is considered to be the first high-tech generation. The great majority of authors uses these terms interchangeably to conceptualize individuals born from the early 80s to the early 2000s (Strauss and Howe, 1991; Prensky, 2001; Twenge, 2010; Gurau, 2012) who have taken advantage of an environment that facilitated a full immersion degree with digital technology, influencing their personality, beliefs, behaviors and attitudes (Taylor and Keeter, 2010). Millennials were born, have grown up and live with technology, thus becoming *digital natives* who have never experienced any other way of life (Palfrey and Gasser, 2008).

One of the most distinctive characteristics of Millennials is that they are the most technically literate and competent generation, since they were grown up with heavy exposure to technology and the internet (Wolburg and Pokrywczynski, 2001) being early adopters of technology devices, as well as extensive users of the internet (Kumar and Lim, 2008). The major parts of Millennials' daily routines and activities are mediated by digital technologies and technology interaction, such as a computer or mobile devices' use and online activities, social interactions, work, friendships, shopping, entertainment and so on.

Traditionally, demographic and socioeconomic variables have been used in market segmentation studies to divide the market into customer or user segments. However, segmentation analysis based on demographic variables is not the most effective analysis, since individuals in the same segment may have different attitudes, preferences and lifestyles and reveals nothing about users' behavior. On the contrary, psychographic variables have been often been used in market segmentation to gain insights into consumers' behavior. Millennials have been largely examined in the marketing literature which offers descriptions of Millennials as consumers (Strauss and Howe, 2000) or as internet and social media users (Lenhart et al., 2010). However, there is a lack of studies identifying the potential segments and technology typologies within this generation. Additionally, there is scarce research on millennial classification on user groups according to their digital technology use patterns, providing meaningful user categories.

In this context, the purpose of the present paper is to provide a Cluster analysis and a profile of the segments among this generation. So, our major contribution to the literature is providing a segmented characterization of Millennials regarding their digital technology behavior.

2. LITERATURE REVIEW

2.1. Who are the "*Millennials*"?

The term "*Millennial*" was first used by Strauss and Howe (1991), who suggested that generational cohorts develop similar attitudes and beliefs. There is no exact delimitation of this generation cohort, but most researchers use birth years ranging from the early 1980s to the early 2000s (Strauss and Howe, 2000; Prensky, 2001; Lancaster and Stillman, 2002;

Leung, 2003; Wilson and Geber, 2008; Twenge, 2010; Levenson, 2010; Gurau, 2012). Millennials have been exposed to social and economic contexts, that are unique from previous generations (Levenson, 2010), such as the expansion of the digital technology and the media (Lancaster and Stillman, 2002). Prior research characterizes them as being individualistic, mature, sophisticated and well-educated (Syrett and Lammiman, 2003). Millennials have high self-esteem with unrealistic expectations and a general lack of patience, along with higher rates of materialism and narcissism (Twenge, 2010); they are group-oriented, but with a strong sense of identity (Gupta et al., 2010). Similarly, previous studies describe them as being highly responsible, independent and consumption-oriented (Thompson and Gregory, 2012). Regarding their consumption behavior previous studies report that this generation has a strong desire of products/services that match their lifestyle and personality, serving them as a form of self-expression (Gupta et al., 2010).

2.2. The Generational Cohort Theory

The rationale for the present study is the *Generational Cohort Theory*, first proposed by Inglehart (1977). The *Generational Cohort Theory* asserts that populations can be grouped into generations based upon placement in the historical cycle, which includes specific events that shape the attitudes and behaviors of members within each cohort. Later, Strauss and Howe (1991) defined the generational cohorts as those groups of individuals born during the same time period and living through similar life experiences and emotional events, engendering within each group similar values, attitudes and beliefs. This theory is commonly applied to market analysis and to segment markets (Tsui, 2001).

Numerous theoretical approaches have been used to understand technology behavior. However, these studies are of little use to develop a general understanding of various technological behaviors from a typological standpoint, and fail to explain the nature of technology use. That is, focusing on how and why individuals use technology is not examined in theories and models.

In this context, some authors propose the construction of "*market segmentation*" and "*user typologies*", which have their roots in clinical psychology, being similar to the development of personality types (Barnes et al., 2007). The "*market segmentation*" or "*customer segmentation*" is often referred as the examination of consumer or user behavior by grouping individuals according to their similarities (Assael, 2004). Following Morrison (2010), market segmentation could be defined as the division of the overall market for a product or service into groups of people with common characteristics. Further, Bruwer and Li (2002) reported that although classical segmentation methods -such as utilization of demographics- provide personal details about the consumer, they fall short of identifying motivations that drive consumer behavior (Bruwer and Li, 2002).

Other theoretical approach would be the development of a "*typology*" based on the categorization of individuals. Typologies are classification schemes that provide a means for ordering and comparing individuals and clustering them into categorical types (Rich, 1992). Following Barnes et al. (2007) user typologies divide individuals into groups according to their behavior or other patterns, contributing to a deeper knowledge of users. Similarly, user typologies reflect theoretical assumptions about and conceptual organization of, the salient features of complex behavior (Johnson and Kulpa, 2007). As a consequence, in the marketing

area, typologies are often used to organize complex user/consumer behavior into characteristic patterns, trying to determine whether qualitative differences exist among individuals (Johnson and Kulpa, 2007). In the present study, we assume the term of "*user typology*" as a categorization of users into distinct user types that describes the different ways in which individuals use technology, reflecting different preferences, motivations and a variety of uses.

After reviewing the literature on Millennials technology behavior, it is evident that very little research has been conducted on Millennials' segmentation and user typologies regarding their technology behavior. Considering that this generation could be diverse rather than a homogenous group when it comes to use of technology, only few studies have empirically attempted to uncover this heterogeneity.

The study conducted by Kennedy et al. (2010) reported four typologies of technology use among millennial students: "*power users*", "*ordinary users*", "*irregular users"* and "*basic users*"; suggesting a diversity of technology use within this generation. According to Kennedy et al. (2010) the "*power users*" appropriate a wide range of technologies and use them significantly more frequently than other Millennials. Likewise, the "*ordinary users*" could be described as regular users of the internet and mobile technologies; however, these Millennials are not engaged with emerging technologies and games. Another typology, the "*irregular users*" is similar to the ordinary users, but engage in most of the technology-based activities less frequently; being moderate users of the internet and technologies. Finally, the "*basic users*" are extremely infrequent users of new and emerging technologies.

Another related study was developed by Horrigan (2007), who examined the technology assets and attitudes towards technology among US adults, reporting seven user typologies. First, the *"omnivores*" who have the greatest amount of technological gadgets and use them voraciously to participate and express themselves online, being the most active users. Second typology is the "*connectors*", who participate actively and use internet and technologies to connect with people and to access digital content. Likewise, the "*lacklustre veterans*" are frequent users of the internet and technologies, despite not being passionate about technologies; further, they do not feel that technology increases their personal productivity. On the other hand, the "*productivity enhancers*" get a lot of things done with technology and use it mostly for communication. Similarly, the "c*onnected but hassled*" users have invested in a lot of technology, but they find the connectivity intrusive in their lives. Further, the "*inexperienced experimenters*" occasionally take advantage of interactivity, but if they had more experience and technological skills they might use technology more frequently. Finally, the "*light but satisfied*" use technology, despite it does not play a central role in their daily lives.

Likewise, Brandtzaeg et al. (2005), through Cluster analysis segmented children according to their media usage, identifying four differentiated segments. One segment is the "*non-users*" who do not spend time with computers or with the Internet. The second group is the "*advanced users*" who spend the most time using a wide range of technologies for a number of different purposes. The third segment is the "*entertainment users*" who primarily play console games and watch TV; and fourth group is the "*utility users*", who use the internet for information acquisition. Later, Li et al. (2007) developed a Cluster analysis on the internet usage for the US and European population, suggesting six different user typologies: the "*creators*" who create and maintain blogs and webpages or videos; the "*critics*" who use media

content for utility; the "*collectors*" who save interesting internet services; the *"joiners*" who use social networking sites; the *"spectators*" who read and view content on the internet, but do not create content; and the "*inactives*" who do not participate at all in online activities.

2.3. The technology behavior of Millennials

Due to the arrival and fast dissemination of digital technologies in the last decades, the term *digital natives* describe this generation cohort from the previous ones (Prensky, 2001; Palfrey and Gasser, 2008). Millennials were first called *digital natives* (Prensky, 2001) because they are the first generation born and grown up when there are already well-developed information and communication technologies, digital technologies and media available and extensive social networks, online services or television technologies (Valentine and Powers, 2013).

There is a consensus that Millennials were born into a world full of digital technology and that the greater influence they received is the use of technology, influencing their behavior (Close, 2012). In fact, this cohort has been immersed in technology all their lives, developing sophisticated technical skills (Goldenberg, 2005). Technology is part of the daily routines of Millennials, who are internet and technology savvy, digitally conscious, technologically literate and mobile-phone addicted (Akande, 2008). They have great technological expertise and a great ability to easily access vast amounts of information (Wolburg and Pokrywczynski, 2001). Media, communication technology, online social network sites –such as Twitter, Facebook or Myspace- computer games and other communication platforms are massively consumed by Millennials (Lenhart et al., 2010). In fact, Millennials are attracted to a wide variety of media, regularly using blogs and social networks (Hershatter and Epstein, 2010), and depend more on their peers' opinions when making purchase decisions (Valentine and Powers, 2013). Likewise,

Millennials spend much of their time in virtual spaces, where they do not only enjoy relationships in the social network, but also share their knowledge and communicate and interact with each other (Prensky, 2001).

2.4. Technology use, adoption and behavior

In the present study we will develop a clustered-based categorization of Millennials regarding their technology behavior. Prior research has identified a number of variables that significantly influence users' behavior toward technology and technology adoption. First, we will consider the *Technology-Acceptance model* or TAM model (Davis, 1989), which explains the intention to use and adopt technology. Second, we will also consider the *Unified Theory of Acceptance and Technology-Use* model or the UTAUT model (Venkatesh et al., 2003), a behavioral-based model developed to unify the multiple existing theories about technology acceptance. In third place, *Uses and Gratifications theory* (Katz et al., 1974) was considered, since this theory provides an explanation of why individuals use technology. Finally, the *Flow Theory* (Csikszentmihalyi, 1977), which conceptualizes the optimal user experience through technologies, was also considered. All these theories complement each other and provide variables explaining the use of technology.

2.4.1. Drivers of use of digital technology

2.4.1.1. Ease of use

The TAM model includes the variable perceived *ease of use* (Davis, 1989) as influencing the users' intention to accept and adopt technologies. The *perceived ease of use* is defined as the perception that using a specific technology will not require additional effort (Davis, 1989), or

as the degree to which a person believes that using a particular technology will be free of effort (Davis, 1989). Similarly, the UTAUT model incorporated the construct *effort expectancy*, referring to the level of ease related to the utilization of technology; thus, reflecting the user perception of how difficult it is to use technology (Venkatesh et al., 2003).

2.4.1.2. Information-seeking motivation

According to the *Uses and Gratifications* Theory (Katz et al., 1974) one of the main gratifications obtained through the use of technology is information. Therefore the information-seeking motivation would be related with the use of technologies, meaning the procurement of information, finding out about relevant events; or seeking advice and decision choices; satisfying curiosity and general interest. So, we assume that the use of digital technology facilitates the acquisition of direct information, which influences the adoption and use of technology.

2.4.1.3. Utility/usefulness derived from technology

The *perceived usefulness* could be defined as the individual's perception that using the technology will enhance or improve his/her performance; exerting a significant positive influence on technology adoption (Davis, 1989). Later, the UTAUT model –based on the root construct of *perceived usefulness*- included the variable *performance expectancy*, defined as the extent to which individuals believe that utilizing technology will help them to achieve benefits in their jobs (Venkatesh et al., 2003). So, the performance expectancy reflects the user perception of the degree to which using a technology provides benefits in performing certain activities. This construct is tied to utility and has consistently been shown to be the strongest predictor of the behavioral intention to use technology (Venkatesh et al., 2003).

2.4.1.4. Socialization through technology

As stated below, the *Uses and Gratifications* Theory (Katz et al., 1974) highlights the social interaction as one of the gratifications obtained through the use of technology. Following this theory, socialization is one of the key gratifications derived from the use of technology. So, following Katz et al. (1974) we assume socialization or social interaction as identifying with others and gaining a sense of belonging, while enabling to connect with family, friends and society. Further, other studies confirmed that one of the primary purposes for using internet-based technologies is to socialize and expand the social circle (Valenzuela et al., 2009), and some of the main tools that enable this interaction are social networking, blogs, virtual game communities or instant messaging.

2.4.1.5. Technophilia

The positive attitude to technology could be defined as the degree to which a person likes or looks forward to being involved and learn about technology (Edison and Geissler, 2003). Similarly, while some individuals embrace new technology and enjoy the challenges associated with technology, other individuals are uncomfortable or fearful of technological change, thus feeling aversion to technology. In this context, Miotto et al. (2013) named the positive attitude and inclination towards technology as *technophilia*. So, in the present study, we define *technophilia* as the degree of interest and the willingness to adopt and use technologies. Accordingly, high *technophilia* users will tend to search for technology information, explore and try new technology more frequently, developing emotional enduring associations with technologies and a positive motivational state. Consequently, we assume that higher levels of *technophilia* would lead to a greater use and adoption of technologies. The inclusion of this

variable stems from the fact that Millennials are heavily technology-driven; and in turn, we assume that Millennials could experience different levels of *technophilia*.

2.4.2. Barriers to the use of technology

2.4.2.1. Negativity towards technology

Prior research reports that some individuals either have no interest in technology or may think that technology is irrelevant to their daily lives, since it does not offer advantages or benefits to them (Miotto et al., 2013). More precisely, Miotto et al. (2013) named this negative attitude towards technology as technology *negativity*. A related concept is *technology anxiety*, which could be defined as the tendency of an individual to be uneasy, apprehensive or fearful about the use of technology (Igbaria and Parasuraman, 1989); thus, being related to the avoidance or less use of technologies (Park et al., 2012). Therefore, individuals who show technology negativity are more likely to be reluctant to use them.

2.4.2.2. Pay per use technology

The adoption and use of technology may involve some other factors acting as barriers, such as the cost. Following Venkatesh et al. (2012) the price could be defined as the users' cognitive tradeoff between the perceived benefits of the technology use and the monetary cost for using it. Similarly, in the technological context, the price is an important factor influencing the technology use, since users need to consider the costs associated with the purchase of technology services and devices (Venkatesh et al., 2012). Moreover, these authors examine the price-value relationship highlighting that it would be positive when the benefits of using a technology are perceived to be greater than the monetary cost (Venkatesh et al., 2012).

Thus, in the present study, we expect that users will be willing to pay for the use of digital technologies only if the costs are reasonable.

2.4.3. Consequences of the use of digital technology

2.4.3.1. Implication (temporal dissociation)

In the context of technology usage, Agarwal and Karahanna (2000) described a state of deep involvement which could be characterized by *temporal dissociation*; that is, the inability to register the passage of time while engaged in interaction with technology. So, following Agarwal and Karahanna (2000) we can define the concept of temporal dissociation or implication as the experience with technology, which occurs when a user is fully immersed in the interaction with technology and time no longer seems to pass the way it ordinarily does. Therefore, when experiencing implication and temporal dissociation with digital technology, users become so involved that they are oblivious to other stimuli and lose track of time.

2.4.3.2. Peers' interaction

Today, technology-based services -such as social networks- enable individuals to interact simultaneously with other users in network environments, sharing content and services and enabling them to express their opinions (Riegner, 2007). In addition, the internet and digital media provide individuals with a mechanism to connect, share, communicate or interact with each other quite quickly (Valenzuela et al., 2009).

2.4.3.3. Engagement or Flow experience

The concept of *Flow Experience* (Csikszentmihalyi, 1990), and the notion of cognitive engagement (Agarwal and Karahanna, 2000) provide a way of conceptualizing the optimal user experience through technologies. The theory of *Flow Experience* was first proposed by Csikszentmihalyi (1977), who suggested that technology use is characterized by a seamless sequence of responses facilitated by interactivity, accompanied by a loss of self-consciousness. Similarly, the cognitive engagement could be defined as a state of deep involvement and focused immersion, and as a highly enjoyable experience which occurs when a user is fully immersed in the interaction with technology, characterized by total attention and engagement, such that nothing else seems to matter (Agarwal and Karahanna, 2000). Further, *engagement* involves a high level of concentration where irrelevant thoughts and perceptions are screened out, leaving no room for distractions (Agarwal and Karahanna, 2000). This term is conceptually identical to the *Flow Experience* concept (Csikszentmihalyi, 1997). The engagement or flow experience concept has been mainly applied to investigate the behavior and intention to use technology (Agarwal and Karahanna, 2000).

2.4.3.4. Loyalty

According to Oliver (1999) the loyalty could be defined as a deeply commitment to rebuy or repatronize a preferred product or service consistently in the future, despite situational influences or marketing efforts; and following Dick and Basu (1994) the loyalty depends on the psychological disposition of the individual -such as attitudes and preferences-, as well as on the behavioral facets –such as the repeat patronage-. We assume that loyalty towards technology could be a consequence of the digital technology adoption.

2.4.3.5. Satisfaction

Prior research has generally focused on satisfaction as a consequence of a product/service use, and in this context, satisfaction has been conceptualized as the product/service's perceived performance as it matches the expectations of the individual (Oliver, 1999). Similarly, we could define satisfaction with technology as the extent to which the individuals perceive that the available technologies meet their requirements, needs and expectations. In fact, according to the *Uses and Gratifications Theory* (Katz et al., 1974) satisfaction occurs when the gratifications obtained are high when technology is used; but if expectations are not met, then dissatisfaction results (Perse and Ferguson, 2000). Finally, the users' perceived usefulness of technology will affect their satisfaction (Venkatesh et al., 2003).

3. RESEARCH QUESTIONS

Our study aims to answer the following research questions:

RQ1: ""*Are there segments within this generation group regarding their digital technology behavior?"*. So, the first aim of this research is to ascertain whether different segments of Millennials have a different behavior regarding technology.

RQ2: "*Are there variances in the way that millennial segments use digital technology?*. So, we propose that different millennial segments may behave differently when it comes to using and adopting technology.

RQ3: "*What are the main differences among millennial segments regarding their technology behavior?"*. We aim to examine the potential segments of Millennials in their technology behavior.

4. METHODOLOGY

4.1. Sampling and fieldwork

In the first place, variables which may influence the technology use and behavior were identified from previous literature, and then a structured questionnaire was developed.

Participants were contacted at different university campuses in Spain through a personal survey and through the internet, since the survey was available online. The sample was randomly selected among 20 to 30 year old participants, being the age the main criteria in order to participate in the study. In addition, participants were not offered a reward as an incentive for their collaboration.

Participants were asked to give each one of the proposed items a rating on their level of agreement and disagreement based on a 5 -point Likert-type scale, ranging from 1=”*strongly disagree*” to 5=”*strongly agree*”; and in the last part of the questionnaire other socio-demographic characteristics rather than age were captured. We gathered 853 questionnaires, obtaining 707 valid questionnaires, collected among Millennials residing in Spain, representing a sampling error of ± 3.42%, with a confidence level of 95.5%. The fieldwork was carried out from April to June 2015.

4.2. Variables and measurement scale

Derived from previous literature, a list of 50 items measuring motivations and attitudes towards technology use was developed. The items covered three main aspects, namely drivers of technology use, barriers to technology use and consequences of the use of technology.

Regarding the drivers of technology use, we considered the *ease of use*, which was measured adapting a five-item scale from Davis (1989) and from Wu and Wang (2005). We considered the *information-seeking* motivation, measured through a four-item adopted from Calder et al. (2009) and Baldus et al. (2015). Additionally, the *utility* or *usefulness* derived from the technology use was measured using a three-item scale adapted from Lu et al. (2005) and Wu and Wang (2005). Likewise, the *socialization* through technology was evaluated through a scale adapted from Calder et al. (2009) and Baldus et al. (2015). Finally, *technophilia* was examined using the scale proposed by Miotto et al. (2013). Second, in order to measure barriers to technology use, we included two factors: *technology negativity* was measured adapting the scale proposed by Miotto et al. (2013); and the *pay per use*, assessed though the scale proposed by Dodds et al. (1991). Third, we considered some of the consequences of technology use. First, we measured the *implication* or *temporal dissociation* when using technology, using a five-item scale proposed by Agarwal and Karahanna (2002). Second, we evaluated the users' *interaction* through technology using a three-item scale adapted from Holebeek (2011) and Baldus et al. (2014). Third, the *engagement* with technology was evaluated, using a scale adapted from Koufaris (2002) and Sharafi et al. (2016). Fourth, the *loyalty* towards technology was measured adapting a scale proposed by Davis (1989). Finally, *satisfaction* with technology was assessed using a three-item scale adapted from See-To et al. (2012). The variables and measurement scale are shown in Table 1.

4.3. Data analysis

The data analysis was conducted in three stages through SPSS computer software. First, a principal components analysis was developed to the 48 selected items in order to identify the underlying factors related to the use of technology among millennial users. Second, in order to

segment millennial users, a hierarchical Cluster analysis through the Ward's method was performed to identify the millennial segments which shared similar profiles in their technology behavior. Finally, a MANOVA analysis was performed on the obtained millennial clusters to discriminate differences among them (Hair et al., 1989).

5. RESULTS

5.1. Principal components analysis

A factorial analysis was performed through the principal component analysis method on the selected items related to technology behavior to determine whether these factors could be grouped under general characteristics (Hair et al., 1998). For this purpose, the 50 selected items were subjected to principal components analysis, through Varimax rotation in order to extract factors. According to Hair et al. (1989) items that failed to load 0.50 or higher on one factor, or that loaded higher than 0.5 on two or more factors were removed from the scale.

Measures of sampling adequacy indicated that the correlation matrix for a 47-item scale was suitable (Bartlett's Test of Sphericity X^2=1,953, p<0.000; Kaiser-Meyer-Oklin measure value of sampling adequacy =0.876). Then, Cronbach Alpha values were examined to measure the reliability of each factor. The reliability of the factors was acceptable, as our results show adequate values for Cronbach Alpha coefficients for the all factors, exceeding the commonly accepted recommendation of values higher than 0.70 (Hair et al., 1998). Finally, principal component analysis of the selected items identified a thirteen factor solution using the Varimax factor rotation procedure, jointly accounting for 68.85% of the explained variance (Table 1).

Table 1. *Items for each variable and factor loadings.*

VARIABLES	INDICATORS	Factor Loading	Cronbach Alpha
Ease of use Davis (1989) Wu & Wang (2005)	EU1: I find technology easy to use EU2: It is extremely easy to be familiarized with the use of technologies EU3: It is easy for me to become skilled at using technology EU4: Learning to use technologies was easy for me EU5: It is easy to become skillful at using technology	0.682 0.674 0.671 0.667 0.654	0.756
Information-seeking motivation Calder et al. (2009) Baldus et al. (2015)	INFO1: I use technology to find breaking news events INFO2: I use technology to get updated information INFO3: Technology provides me information that helps me make important decisions INFO4: Technology is the best way to stay informed	0.879 0.835 0.734 0.714	0.867
Utility/Usefulness Lu et al. (2005) Wu & Wang (2005)	UT1: The use of technology makes me save time UT2: The use of technology can enhance the productivity of my life/work/ job performance UT3: The use of technology can help me accomplish tasks in my life/work more easily/quickly	0.760 0.687 0.647	0.770
Socialization Calder et al. (2009) Baldus et al. (2015)	SOC1: I often use technology to contribute of provide feedback to other people SOC2: Using technology will give me an opportunity to meet and to know people SOC3: I often use technology to discuss arguments, my opinions and ideas SOC4: I use technology to learn from other persons SOC5: I often use technology to join social networking	0.768 0.695 0.573 0.550 0.520	0.708
Technophilia Miotto et al. (2013)	TEC1: I enjoy exploring all the options that technology offers TEC2: I would enjoy using the interactive technologies available TEC3: I look forward to use technologies for new things and possibilities TEC4: Using technologies could sharpen/open one's mind	0.751 0.676 0.624 0.477	0.761
Technology Negativity Miotto et al. (2013)	NEG1: Using technology is a waste of time NEG2: Using technology does not stimulate me/stimulate my brain NEG3: I do not consider technology to have any educational value NEG4: Technology does not interest me	-0.762 -0.758 -0.754 -0.675	0.795
Pay per use Dodds et al. (1991)	PU1: I would rather pay a subscription fee in order to access the technology I want, if the fee was affordable PU2: I expect that technologies available would be reasonably priced PU3: I would rather pay in order to Access the technology I want	0.845 0.766 0.779	0.745
Implication (temporal dissociation) Agarwal & Karahanna (2000)	IMP1: Time flies when I am using technologies IMP2: Time appears to go by very quickly when I am using technologies IMP3: Sometimes I lose track of time when I am using technologies IMP4: Most times when I get on to the technology, I end up spending more time than I had planned IMP5: I often spend more time on the system than I had intended	0.643 0.772 0.764 0.700 0.603	0.800
Interaction Holebeek (2011) Baldus et al. (2014)	INTER1: I share information and my experiences on the technologies I use INTER2: When using technology I want to share my experience and knowledge with others INTER3: When using technology I want to receive sharing information from others	0.779 0.709 0.703	0.804
Engagement Koufaris (2002) Sharafi et al. (2016)	ENG1: When using technology, I concentrate fully on the activity ENG2: When using technology, I'm absorbed intensely in the activity ENG3: While using technologies, I am immersed in the task I am performing	0.764 0.752 0.652	0.735
Loyalty Davis (1989)	LOY1: I plan to use technology in the future LOY2: I will continue using and adopting technologies LOY3: I expect my use of technology to continue in the future	0.787 0.736 0.704	0.704
Satisfaction See-To et al. (2012)	SAT1: The technology I use meets my needs and expectations SAT2: I am satisfied with the decision to use technology SAT3: The technology improves my quality of life	0.771 0.718 0.619	0.842
Word of mouth Gremler & Gwinner (2000)	WOM1: I often recommend the technologies I like to my friends and relatives WOM2: It is likely that I would recommend to my friends and relatives to use the technology I like	0.782 0.766	0.702

According to our findings, five factors measure potential drivers of technology use –ease of use, information seeking, utility/efficiency, socialization and technology involvement-. Two of the obtained factors measure potential barriers to the use of technology, and six factors could be considered as consequences of technology use.

5.2. Cluster analysis

Cluster analysis uses information inherent in the factor scores, dividing the observations in so that observations with the similar factor score pattern will be grouped together into identifiable groups (Chatfield and Collins, 1980). So, Cluster analysis classifies cases into relatively homogeneous groups and yields typologies. We develop *hierarchical Cluster analysis*, through the Ward's method in order to identify and classify Millennials into different segments or clusters. All factors, along with gender, were considered as variables on which the respondents were clustered.

The hierarchical Cluster analysis using the distance the Ward's method was performed (Hair et al., 1989). Our results showed that a five-cluster solution was deemed to be the best representation of the structure of the data and also made conceptual sense. Then a *discriminant analysis* reported that the 89.6% of the individuals are classified correctly according to the hierarchical-cluster analysis. Our five-cluster solution showed that we obtained five groups or segments of Millennials regarding their technology behavior, comprising 176 individuals in the Cluster 1; 112 individuals in the Cluster 2; 147 individuals in the Cluster 3; 139 Millennials in the Cluster 4 and 131 individuals in the Cluster 5.

5.3. Analysis of differences among clusters

Considering the results obtained in the Cluster analysis, we then conducted a MANOVA analysis to discriminate differences among the millennial segments. The MANOVA analysis was run on the entire set variables, along with gender, to test for between-cluster significant differences, among the different categories of Millennials in their technology behavior. The overall multivariate tests were significant for the five clusters identified (Table 2), revealing different behavior across the five millennial clusters. In addition, *post hoc* analysis was developed using the Tuckey test (Hair et al., 1989), which reported significant differences between the five identified clusters for all items under research, providing validation of the results from the previous Cluster analysis.

Table 2. *Multivariate tests.*

Manova test	Value	F	df	Sig.
Pillai's trace	1.964	9.651	256	0.000
Wilks' λ	0.048	11.343	256	0.000
Hotelling's trace	5.238	13.003	256	0.000
Roy's largest root	2.487	24.868	64	0.000

Our results highlight that there are major differences, both statistically and in content among the five millennial segments (Table 3). That is, our findings show that significant differences were found for all variables among the millennial segments, suggesting different technology behavior.

Table 3. *Results for the five-cluster group solution of Millennials.*

Variables	Indicators	Cluster Means					Tuckey test	
		Cluster 1 (n=176)	Cluster 2 (n=112)	Cluster 3 (n=147)	Cluster 4 (n=139)	Cluster 5 (n=131)	F-Value	Significance (p<0.005)
Ease of use	EU1	4.55	3.92	4.42	4.17	4.60	15.039	0.000
	EU2	3.97	3.68	3.90	3.79	4.15	4.132	0.003
	EU3	4.02	3.69	4.00	3.62	3.90	3.984	0.003
	EU4	4.41	3.99	4.48	3.99	4.54	13.267	0.000
	EU5	3.84	3.61	3.86	3.60	3.95	2.978	0.019
Information-seeking	INFO1	4.27	2.79	4.27	3.89	4.55	89.635	0.000
	INFO2	4.34	2.78	4.32	3.94	4.63	105.642	0.000
	INFO3	4.31	2.64	4.13	3.88	4.63	103.552	0.000
	INFO4	4.48	3.03	4.33	3.88	4.63	80.785	0.000
Utility/Usefulness	UT1	4.20	3.00	3.79	3.25	4.13	39.136	0.000
	UT2	4.06	3.07	3.94	3.40	4.37	37.386	0.000
	UT3	4.47	3.39	4.33	3.60	4.52	60.133	0.000
Socialization	SOC1	4.03	2.60	2.09	2.60	4.00	131.074	0.000
	SOC2	4.40	3.04	3.20	3.17	4.31	59.044	0.000
	SOC3	4.19	2.76	2.16	2.49	4.21	175.447	0.000
	SOC4	4.20	2.75	2.82	2.84	4.14	88.316	0.000
	SOC5	3.64	2.79	1.93	2.20	3.24	53.883	0.000
Technophilia	TEC1	4.14	3.21	3.80	2.94	3.88	35.214	0.000
	TEC2	3.94	3.08	3.60	3.04	3.65	22.153	0.000
	TEC3	4.41	3.42	4.19	3.76	4.40	41.374	0.000
	TEC4	4.08	3.04	4.12	3.28	4.08	39.491	0.000
Negativity	NEG1	1.77	2.42	1.49	2.21	1.39	27,828	0.000
	NEG2	1.92	2.54	1.46	2.45	1.45	34,155	0.000
	NEG3	2.22	2.63	1.84	2.65	1.50	30,963	0.000
	NEG4	2.15	2.61	1.90	2.43	1.65	19,267	0.000
Pay per use	PU1	3.42	2.83	3.09	2.78	3.11	5.836	0.000
	PU2	3.18	2.47	2.80	2.66	2.91	5.901	0.000
	PU3	3.32	2.62	2.82	2.49	3.05	9.551	0.000
Implication	IMP1	3.89	3.47	3.38	2.32	2.63	72.345	0.000
	IMP2	4.44	3.64	4.12	3.06	3.46	55.286	0.000
	IMP3	4.17	3.38	3.54	2.22	2.14	124.418	0.000
	IMP4	4.39	3.64	3.97	2.74	2.79	86.050	0.000
	IMP5	3.74	3.30	3.35	2.18	2.68	62.728	0.000
Interaction	INTER1	3.54	2.97	2.61	2.79	3.61	20.126	0.000
	INTER2	3.39	2.96	2.64	2.60	3.40	15.624	0.000
	INTER3	3.24	2.83	2.46	2.46	3.10	16.144	0.000
Engagement	ENG1	3.90	3.40	3.68	3.26	3.73	11.992	0.000
	ENG2	3.73	3.20	3.46	3.05	3.51	11.917	0.000
	ENG3	3.80	3.23	3.52	2.87	3.16	17.137	0.000
Loyalty	LOY1	4.13	3.21	3.88	3.29	3.93	25.701	0.000
	LOY2	4.56	3.61	4.36	3.75	4.34	33.153	0.000
	LOY3	4.52	3.52	4.44	3.76	4.40	37.047	0.000
Satisfaction	SAT1	3.51	3.30	3.50	3.16	3.52	4.054	0.003
	SAT2	3.70	3.20	3.61	3.18	3.73	11.157	0.000
	SAT3	3.18	2.96	2.90	2.65	3.09	4.919	0.001
Word of mouth	WOM1	4.38	3.33	3.97	3.44	4.39	41.379	0.000
	WOM2	4.36	3.35	4.00	3.42	4.31	35.441	0.000
Gender	M-men W-women	47.2% M 52.8% W	53.6% M 46.4% W	46.3% M 53.7% W	52.2% M 47.8% W	52.3% M 47.7% W		0.603

6. DISCUSSION OF RESULTS

6.1. Profiling Millennials' typologies

The clustered-based segmentation of Millennials becomes crucial to empirically distinguish and measure the different types of technology behavior developed by Millennials. In this context, we provide a common typology of Millennials, offering an overview of the characterization of Millennials' technology use in general terms. So, different segment descriptions or millennial archetypes are presented, classifying these individuals into meaningful categories based on their technology behavior. More precisely, our findings reveal five millennial user types, reflecting substantial differences in the patterns of technology use.

Cluster 1: "*Technology devotees"*

This millennial cluster represents the 24.89% of the sample, being the biggest cluster in number of users (n=176). This group showed the highest levels for ease of use, information-seeking motivation, and socialization purposes, as well as on satisfaction and loyalty. For this reason this cluster is labeled as "*technology devotees*". In fact, this millennial group is the most likely to use technology for different purposes and show a great enthusiasm for technology. In addition, this segment uses technology in order to socialize and to connect with their peers and express their opinions. Similarly, they show a high implication and engagement with technology, reporting the highest levels of *technophilia.* Finally, this group loves exploring and engaging with technology; and in turn, could be characterized as being technology novelty seekers and with higher curiosity about the new technologies. So, we can state that technology plays a dominant role in their lives.

Cluster 2: *"Technology spectators"*

This cluster represents the 15.84% of the sample (n=112) and is characterized by their poor socialization motivation and their poor interaction through technology. That is, this group of Millennials has a poor role in interacting, sharing their opinions, and in the socialization motivation for the technology use. Consequently, this group of Millennials is labeled as "*spectator*s". They do not use technologies to participate in social activities, and show a reserved attitude, observing, reading, but not contributing through technologies. One potential explanation is that this group prefers to engage in activities alone, rather than with peers and friends. They use technologies for communication, more than they use them for self-expression. Moreover, they show low values of utility or information-seeking motivation in their use of technology, as well as slight values for satisfaction and intention to pay per use technology. Finally, they reported average values for engagement and high values for technology negativity; and for this reason we can note that they do not enjoy exploring new technologies and do not consider that technology could help in *broadening their minds*.

Cluster 3: *"Circumspect technology users"*

This cluster represents the 20.79% of the sample (n=147), being characterized as having a balanced or a moderate relationship with technology. So, it seems that technology does not play a central or key role in the daily routines of this group of Millennials. Considering their balanced technology behavior, they are labeled as "*circumspect technology users*". However, the members of this group are technology users and have positive attitudes, motivations and disposition towards technology. In addition, they show high values of engagement and implication when using technology, they are technological active, and show average levels in their interaction with other peers, and in their use for socialization. So, we can state that this

group of Millennials is not highly involved with social activities through technologies, but they show a moderate or use of technology for communication, interaction or socialization with their peers.

Cluster 4: *"Technology adverse users"*

This millennial cluster represents the 19.66% of the sample (n=139), being characterized by their low interest in technology. This group reported the highest scores on technology negativity, as well as the lowest levels of engagement and implication through the technology use. Moreover, their attitude, motivations and relationship with technology could be characterized as being predominantly poor, being doubtful about the benefits they will have from technology use and adoption. Consequently, this group is labeled as "*technology adverse users*". Compared to the other millennial groups, we could highlight their tendency to reject technology engagement, while being particularly averse to the use of technology. Thus, these Millennials are the least interested in adopting new technology and are the least willing to use technologies. Their lowest scores for satisfaction and loyalty may indicate that technology does not satisfy them and that they do not enjoy using it. However, they report average values for ease of use, interaction with their peers and the information seeking motivation, which could be derived from the fact that Millennials are in fact *digital natives* since technology is part of their daily routine.

Cluster 5: *"Productivity enhancers"*

This group of Millennials represents the 18.53% of the sample (n=131), and could be characterized as functional users or utility/efficiency users who mainly use technology to enhance their productivity at work. They feel that using technologies will help them achieve

high benefits in the execution or their jobs, and perceive technology as a useful tool for enhancing work productivity and efficiency. Consequently, we can state that this segment is utility-oriented and work-related; and for this reason we name this group as "*productivity enhancers*". Further, these users are highly aware of its functional benefits and possibilities, and their use of technology is mainly driven by productivity or functional motivation. Thus, they develop a typically instrumental usage and goal orientation towards utility when using technology. Additionally, this segment shows the higher score in the information-seeking motivation in the use of technology and in the technology ease of use; while reporting high scores for *technophilia* and satisfaction. On the contrary, our findings show that this millennial segment has a slight implication or time dissociation when using technology, which could be derived from their functional motivation.

Finally, and consistent with previous research, our study did not find evidence of differences between male and female Millennials. So, our findings report that gender does not influence technology use and adoption among millennial generation.

6.2. Research contribution

The millennial typologies proposed in our study entail some similarities with other technology user types reported in previous research. In this vein, some similarities could be found between our findings and the clusters proposed by Kennedy et al. (2010). Their "*ordinary users*" have some similarities with our proposed "*circumspect technology users*", since they are regular users of technologies, but try not to engage in activities and file sharing. On the other hand, their *"power users"* have a similar behavior to our *"technology devotees",* given that "*power users*" use technology significantly more frequently than other millennial groups.

Moreover, the typologies that emerged from our analysis are different from the typologies developed by Horrigan (2007), and this is to be expected given the differences in the research scopes. Nevertheless, there are some analogies between at least three of our and Horrigan's (2007) technology user types. In the first place, his "*omnivores*" and our "*technology devotees*" share the same characteristics, being strongly engaged and involved with technology. Secondly, the "*productivity enhancers*" and our "*productivity enhancers*" share the same label and similar technology behavior. Finally, we found some similarities between Horrigan's (2007) "*light but satisfied*" users and our "*circumspect technology users"*, since the technology does not play a central role in their daily lives, even though they are satisfied with technologies.

Regarding the classifications developed by Brandtzaeg et al. (2005) and by Li et al. (2007), and considering that their studies focused on new media use among children and internet use respectively, only some analogies were found. Our millennial cluster "*productivity enhancers*" perceive technologies as a way of increasing work productivity, highlighting the utility provided by technologies; being the main attribute of the "*utility users*" proposed by Brandtzaeg et al. (2005). On the other hand, two of the typologies proposed by Li et al. (2007) regarding the use of the internet share some analogies with our millennial cluster. The *"critics*" are related to "*productivity enhancers*", since all these users use technologies mainly for utility; while the *"spectators*" proposed by Li et al. (2007) share some attributes with our "*technology spectators*", given that these users do not contribute through technologies.

7. CONCLUSIONS

The present research provides a clustered-based categorization and a comprehensive millennial typology regarding their digital technology behavior. Accordingly, three research questions have been presented.

The first research question is: "*Are there segments within this generation group regarding their digital technology behavior?"*. Or in other words: "*Could Millennials be seen as an homogenous group regarding their technology behavior?*". The answer would be that "*Millennials are not monolithic, since different typologies have been identified regarding their technology behavior"*. The first aim of this research was to ascertain whether different segments of Millennials have a different behavior regarding technology. The cluster and MANOVA analysis developed indicate that five clearly distinct millennial segments emerged, each one reporting different digital technology use and behavior, giving an idea of the complexity involving the relationship that Millennials have towards technology.

The second research question is: "*Are there variances in the way that millennial segments use digital technology?"*. We aimed to examine the segments of Millennials and their technology behavior. For this purpose, we examined the potential differences among the millennial generation related to their behavior through a MANOVA analysis, and our findings report behavior-based segments with different types of use. So, the answer would be "*Yes, there are significant differences within the millennial generation regarding their use of technology*". Accordingly, the different millennial user types are categorized into technology "*devotees*", technology "*spectators*", "*circumspect"* users, "*adverse*" users and "*productivity enhancers"*.

Finally, the third research question is: "*What are the main differences among the millennial segments regarding their technology behavior?"*. More precisely, our findings provide empirical support for a five-cluster solution, detecting millennial segments with different levels of technology engagement, implication, perceived usefulness, perceived ease of use, information-seeking motivation, socialization use, *technophilia*; as well as different levels of technology negativity, intention to pay per use, satisfaction and loyalty.

In the present study we addressed one key research hypothesis: "*Not every Millennial has the same technology use and behavior"*. Considering our findings this initial hypothesis is supported, since our study highlights differences in technology use within the millennial generation, suggesting that each millennial segment has its own expected benefits and rationale for using technology. In addition, this research reports that it is possible to segment the millennial generation regarding their technology use.

Likewise, the major contribution of the present study is providing a clustered-based millennial categorization which will help to evaluate the millennial heterogeneity in digital technology use, determining the qualitative differences among them. This categorization will help to better understand the fragmentation of Millennials' behavior.

Understanding Millennials' technology use and behavior, and identifying key lifestyle factors should provide a more complete picture to marketers, in order to profile and target these users. In this context, our research suggests that the technology industry should better target Millennials considering their distinct typologies. Considering our findings, managers could develop market segmentation in order to increase Millennials' technology use, since our results

highlight that different millennial segments have different motivations and attitudes towards technology use and behavior. In addition, managers and companies could target each millennial segment with a marketing strategy tailored to their technology patterns, as well as customizing their technology-based services or products.

Some limitations of the present study should be mentioned, when it comes to generalizing the results obtained. First, it should be mentioned that these millennial typologies might not be mutually exclusive, since probably will exist hybrid user types –being combinations of the five categories presented-, given that the same individual could be classified as a different user type regarding the specific technology. The second limitation derives from the fact that this research was conducted in one country and according to previous research, technology use and attitudes are strongly influenced by socio-cultural factors. Therefore, further extension of the research to other countries might provide interesting results.

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CHAPTER 2

MILLENNIALS' TECHNOLOGY BEHAVIOR: AN EXAMINATION OF THREE COMPETING MODELS THROUGH THE U&G APPROACH

ABSTRACT

Purpose: There is abundant research on the motivations and gratifications derived from the use and engagement with technology, but their creation remains unclear: "*is technology use an antecedent of engagement?";* or otherwise "*is engagement and antecedent of use?".* Based on the Uses and Gratifications Theory, this study compares three alternative models that explain the use and engagement with technology.

Methodology: For this purpose we propose and empirically test three alternative competing models through Structural Equation Modeling (SEM) on a sample of 707 individuals.

Findings: A comprehensive comparison of three alternative competing models -"*use-and-engagement*", "*use-to-engagement*" and "*engagement-to-use*"- is presented. Our results show that the "*use-and-engagement*" model is superior in order to predict technology engagement and use in terms of explanatory power, path coefficients and model fit, suggesting that both technology engagement and use could be considered as consequences. In addition, this study indicates the great impact of entertainment motivation on technology engagement and use.

Value: Our major contribution is the empirical examination of three different competing models on the engagement and use of technology.

Keywords*: Technology, Engagement, Use, SEM, Uses & Gratifications Theory.*

1. INTRODUCTION

With the emergence of new technologies, such as augmented reality, wearable technologies, smartphones or 3D printing is it important to understand what factors motivate individuals to use them, and further what factors engage them with technologies.

In fact, there are many theories that explore the use and adoption of technologies. The Technology Acceptance Model (TAM) (Davis, 1989) explains the adoption of technologies and has been widely applied in acceptance behavior of a broad range of information technologies. Similarly, the Unified Theory of Acceptance and Technology-Use model (UTAUT) (Venkatesh et al., 2003), is a behavioral-based model developed to unify the multiple existing theories about technology adoption and acceptance that has been validated and applied to investigate the adoption and use of technology. Further, the usage in a behavioral and psychological context has been reported by the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980). Conversely, the Uses and Gratifications Theory (Katz et al., 1974) provides an explanation of why individuals use technology, based on the main gratifications derived from its use, being a useful theoretical framework to understand the relationships between psychological motivations and technology use and behavior. Considering all these theoretical frameworks numerous studies have attempted to examine the determinants of individual's adoption and use of technologies, comparing different theories and conceptual models (Taylor and Todd, 1995; Hung and Chang, 2005).

In this context, the present study examines and compares three alternative competing models that explain technology behavior, based on the Uses and Gratifications Theory. First model, labeled as "*engagement-and-use*" suggests that both use and engagement with technology are influenced by different motivations; while the second model, named as "*use-to-engagement*", proposed that technology use is an antecedent or prerequisite for technology engagement; and finally the last model "*engagement-to-use*" considers that technology engagement precedes technology use. These competing models will be examined and compared in terms of overall model fit, explanatory power and path coefficients to determine which one is the best to explain and predict the engagement and behavioral use of technology. So, the main goal of this research is to examine the strength of three alternative competing models to explain and predict the technology behavioral usage and engagement.

We selected Millennials as the population under research for this study; that is individuals born approximately between 1980 and 2000 (Gurau, 2012) and that consequently are between 20-31 years old. The reason is that including different age groups or generational cohorts in the study would make the analysis more complex, since different user groups may have different motivations or drivers to use and engage with technology.

The main factor differentiating the generational cohort of Millennials and other generations is the core role of technology in their daily routines, since they have grown up and have been immersed in technology all their lives (Howe and Strauss, 2003); and in turn, they are heavy users of technologies such as online networking sites, internet, smartphones and mobile devices and so on (Howe and Strauss, 2003). Further, technology has influenced Millennials' behavior (Prensky, 2001), being technologically savvy and literate (Howe and Strauss, 2003).

The value of the present research is that to date no previous studies have used Structural Equation Modeling (SEM) to examine different competing models on the creation of technology use and engagement based on the Uses and Gratifications Theory. Therefore, the major contribution of this study is empirically testing and comparing a set of structural models based on the Uses and Gratifications Theory to analyze the creation of technology usage behavior and engagement.

This paper is structured as follows. First, the literature foundations are reviewed, followed by the research hypotheses development. Then, we present the methodology of the research and the data analysis. Finally, the results are discussed, followed by conclusions, managerial implications and study limitations.

2. THEORETICAL FOUNDATIONS

2.1. The Uses & Gratifications Theory

The Uses and Gratifications Theory, proposed by Katz et al. (1974) is a useful theoretical framework to understand the relationship between psychological motives and technology use and behavior. The Uses and Gratifications Theory was first developed in the field of communication, until Rosengren et al. (1985) expanded the application of the theory to new technologies such as satellite, internet or interactive television. Subsequently, this theory was focused on explaining individuals' use and acceptance of diverse technologies using extrinsic and intrinsic motivations (Park, 2010; Luo and Remus, 2014), and assuming that both hedonic and utilitarian motivations influence the individual's adoption of technologies. More precisely, the Uses and Gratifications approach has been applied to a wide range of multiple technologies

such as online services (Lin, 1999); the World Wide Web (Ferguson and Perse, 2002), the Internet (Flanagin and Metzger, 2001; Lou et al., 2011), mobile phone devices (Aoki and Downes, 2003) or computer-based VoIP phone (Park, 2010).

This theory inquires into the reasons why individuals use technologies and states that the main gratifications obtained through the use of technology are the need to search for information, to interact socially and the need for entertainment (Katz et al., 1974). Further, this theory posits that individuals actively select and use technology in a goal-directed manner to achieve desired gratifications. Nowadays, some authors report that new motivations are drawn from new technologies. In this vein, Sundar and Limperos (2013) extended the Uses and Gratifications framework to a perspective of new media technologies and found that individuals using emergent media possibly create such new gratifications as modality, agency, interactivity, and navigability.

2.1.1. Information search motivation

Based on the *Uses and Gratifications Theory* (Katz et al., 1974) one of the main gratifications obtained by the use of technology is information. More precisely, this theory supports that the information search motivation -meaning the procurement of information and finding out about updated events- is strongly related with the use of technologies. So, one of the primary motives and reasons for using technology is the search of information. Further, prior research on the use of Internet highlights that information seeking is one of the major motivations for the use of this specific technology (Song et al., 2004, Lou et al., 2011). Therefore, we assume that one of the motives for using and engaging with technology may be informational.

Similarly, if we assume that one of the main gratifications and motivations for the use of technology is information search (Katz et al., 1974), we can also assume that one of the motives of engaging with technology may be informational. Following Agarwal and Karahanna (2000), the term engagement could be described as an intrinsic motivation which involves high levels of concentration, meaning that the individual acts with complete focus and full consciousness on the activities performed. Consequently, the term *technology engagement* could be conceptualized as a state of focused immersion and deep involvement with a highly enjoyable experience that takes place when the individual is interacting with any technology with total attention and full immersion (Agarwal & Karahanna, 2000). Hence, the following hypotheses are presented:

H_1: The information search motivation has a positive influence on the engagement with technology

H_2: The information search motivation has a positive influence on the use of technology

2.1.2. Social interaction motivation

The term socialization or social interaction could be defined as gaining insight into the circumstances of others, identifying with other individuals and achieving sense of belonging. According to the Uses and Gratifications Theory social interaction is one of the gratifications derived from the use of technology (Katz et al., 1974). Later, Stafford et al. (2004) showed that individuals could gain many gratifications derived from technology use such as connecting with friends, peers and society, meaning as social connection anywhere and anytime. Thus, gratification of the need of social interaction or the need to connect with others is one of the major reasons for using technology (Stafford et al., 2004; Hwang et al., 2014).

Further, Hwang et al. (2014) reported that the willingness to connect with others, as well as the need to express one's opinions, are important motivations for the use of technology. One example could be the use of online networking platforms which allow individuals to connect with others (Lou et al., 2011) and the exchange of contents and information (Hwang et al., 2014); thus meeting of social needs. Accordingly, we assume that one of the motives of engaging with technology may be social; and in turn, the following research hypotheses are presented:

H_3: The social interaction motivation has a positive influence on the engagement with technology

H_4: The social interaction motivation has a positive influence on the use of technology

2.1.3. Entertainment motivation

One of the motivational factors influencing the individual's use or technology is related with the enjoyment, entertainment, pleasure and inherent satisfaction (Lim et al., 2013). According to McQuail (1983) the concept of entertainment is related to the extent to which one activity fulfills the individual's needs for enjoyment, escapism and hedonistic pleasure. So, entertainment derived from technology use means that the use of technology is enjoyable, fun and entertaining. More precisely, individuals have available many different media technologies which could be used for entertainment and enjoyment purposes, such as internet, game consoles, cable TV, computer games and so on (Rauterberg, 2004).

The Uses and Gratifications Theory posits that entertainment is an intrinsic motivation related with the playfulness and fun derived from the technology behavioral usage (Katz et al., 1974).

Similarly, previous studies show that individuals experience hedonic value and gratification when they develop leisure activities through technology (Jung et al., 2009). Further, more recent studies highlight that entertainment, enjoyment and relaxation are major motivations that play a key role in technology usage behavior (Hwang et al., 2014); while other authors reported the hedonic value as one strong variable influencing and determining the technology usage behavior (Li et al., 2015). Therefore, we can state that technology is used to entertainment. In addition, and considering that individuals tend to use technologies for entertainment, we can assume that they may engage with technologies for entertainment purposes. Hence, these hypotheses are posed:

H_5: The entertainment motivation has a positive influence on the engagement with technology

H_6: The entertainment motivation has a positive influence on the use of technology

2.1.4. The type of content

There are some common factors related to the technology use identified in the Uses and Gratifications Theory which include information, social interaction and entertainment; in addition, in the present study we have included the type of content as a relevant factor.

The use of technology and technology engagement may be influenced by the type of content delivered, by the credibility, relevance and trustworthiness of contents provided (De Wulf et al., 2006), as well as by the availability and diversity of contents. In fact, prior studies indicate that the quality and type of content strongly influence the adoption of technology (Jarvenpaa and Todd, 1997). Further, today, and due to emergence of new technologies, it is common that individuals play an active role in the creation of contents; and some studies indicate that

nowadays individuals create and share their own-generated content through social networking (Hill, 2017).

Following Csíkszentmihályi (1993) the type of content is a reason for engagement. According to this author when content is attractive and rewarding the individual will be immersed and concentrated in it; and therefore, we can assume that the type of content may engage the individual with technology and drive technology use. Later, other studies reported that content has shown to be the most influencing factor on cognitive engagement, absorption and level of concentration (Chung and Tan, 2004). Consequently, a repeated and boring content will make individuals to a poor engagement, while an interesting and exciting content may create higher levels of engagement (Kim et al., 2010). Similarly, previous studies report that technology has transformed media experience affecting the cognitive engagement of individuals (Skadberg and Kimmel, 2004) and inviting them to engage with contents (Sundar, 2008). So, considering the influence of the type of content in the use and engagement with technology, we propose these research hypotheses:

H_7: The type of content has a positive influence on the engagement with technology

H_8: The type of content has a positive influence on the use of technology

2.1.5. The relationship between use and engagement with technology

The term engagement could be conceptualized as an intrinsic motivation variable involving high levels of concentration when the individual acts with full consciousness and with a complete focus on the activity being developed (Agarwal & Karahanna, 2000). Accordingly, engagement with technology can be understood as a "state of deep involvement and focused

immersion that occurs when the individual is fully immersed in the interaction with technology" (Agarwal & Karahanna, 2000).

Similarly, according to the Flow Theory (Csikszentmihalyi, 1993) when individuals feel engaged with certain activity or experience, they tend to continue that activity (Kim et al., 2010). So, flow or feeling engaged increases the use or activity being performed. Further, Agarwal and Karahanna (2000) supported that the term of engagement describes the user experience with technologies when this experience is optimal. Therefore, the user engagement with technology is important in order to examine the technology usage. So, we propose the following hypothesis:

H_9: The engagement with technology has a positive influence on the use of technology

In addition, it is coherent to assume that the use of technology is a premise or prerequisite in order to get engaged with technology. Thus, the following hypothesis is posed:

H_{10}: The use of technology has a positive influence on the engagement with technology

3. ALTERNATIVE COMPETING MODELS TO EXPLAIN TECHNOLOGY BEHAVIOR

According to Mathieson (1991) different conceptual models could be compared following three criteria. First criteria examine how well the conceptual models explain and predict the behavioral usage and engagement with technology. More precisely, we should examine whether the factors of each model largely account for the observed variance. So, comparing the model's respective levels of variance provides evidence of the superiority of the models. Second, we should examine the value of the information provided by the alternative models (Matthieson, 1991). That is, under the assumption that the comparison should not be biased to favor one model over the others, we should analyze the empirical evidence on which variables have a stronger influence on behavioral usage and engagement. Accordingly, the path coefficients between variables and their significance could be examined, as well as the model fits. Last criterion for model comparison is the cost of each model, since it is important that models provide valuable information at low cost and with minimum effort.

3.1. Proposal of three alternative competing models

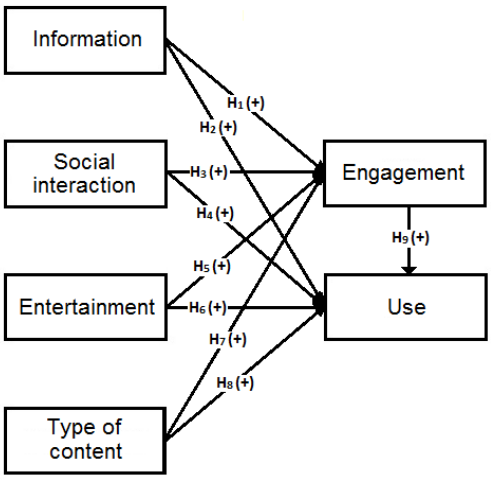
The three alternative competing models empirically tested and examined in this study capture the relationships among information search, social interaction, entertainment, type of content, technology use and engagement with technology. Overall, the primary difference among these three competing models is the role played by use and engagement. More precisely, the three competing models test whether use and engagement are both consequences of the main motivations to use technologies (Model A), or whether these factors are antecedents (Model B and Model C). Therefore, these three alternative competing models provide new insights into

the behavioral usage and engagement with technologies. For the three proposed models, the relationships between variables are well supported by previous research based on the Uses & Gratifications Theory.

3.1.1 Model A: Technology engagement and use as consequences

This model considers both engagement with technology and technology usage as consequences of the different motivations. For this reason, it could be considered as a direct impact model, because it posits that each one of the motivational factors -search for information, social interaction, entertainment and type of content- directly influences both technology use and engagement, showing a direct effect (Figure 1). So, according to this model, technology engagement and use are equally influenced by the different motivations, being considered as dependent variables. In other words, this model holds that cognitive engagement with technology and technology behavioral use are jointly created by different motivations on equal footing; thus being consequences of the motivations and gratifications derived from technology.

Figure 1. Model A "*engagement-and-use*".

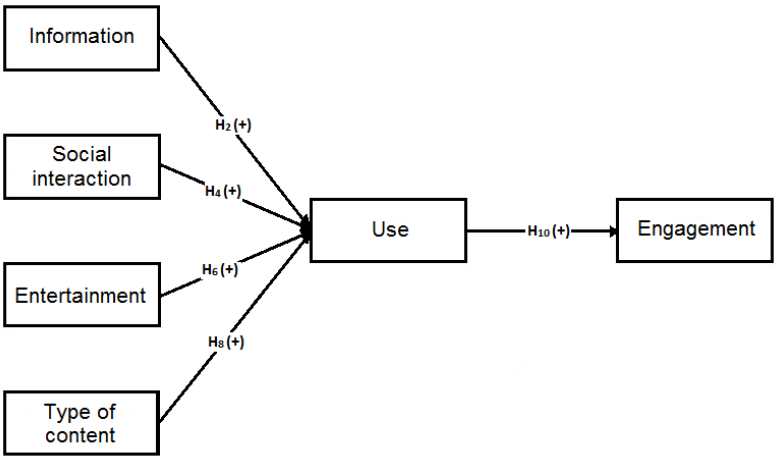


Source: own elaboration

3.1.2. Model B: "Use-to-engagement model" (use as an antecedent)

Model B consists of the original proposed relationships of the U&G Theory (Katz, 1974); but in addition, we have incorporated engagement as a potential consequence of the use of technology, as well as the type of content as a potential variable influencing the use of technology. That is, according to prior studies that indicate that usage is one of the primary determinants of engagement with technology (Sharafi et al., 2006), we assume that in order to be engaged with technologies the individual needs to use them. That is, this model proposes that technology use is an antecedent or prerequisite for technology engagement, suggesting that technology usage does not require a cognitive engagement. So, only technology use is considered as the major predictor directly influencing technology engagement. Consequently, Model B could be labeled as "*use-to-engagement*", since only technology use has a direct impact on technology engagement; while the motivational factors have an indirect impact on engagement with technology (Figure 2).

Figure 2. Model B "*use-to-engagement*".



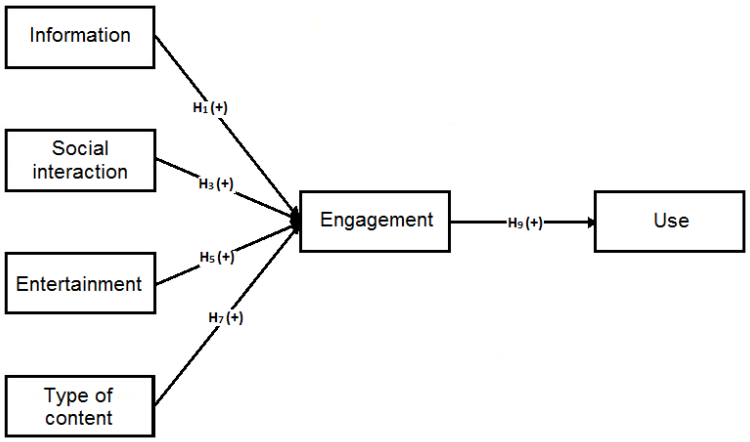
Source: own elaboration

3.1.3 Model C: Engagement-to-use model (engagement as an antecedent)

Model C, labeled as "*engagement-to-use*" proposes that technology engagement precedes or is a prerequisite of technology use, suggesting that technology usage requires certain level of cognitive engagement. This model is based on the Flow Theory proposed by Csikszentmihalyi (1993) who showed that when individuals are cognitively engaged with a certain experience or activity they tend to continue that experience; but when they are not engaged they try to escape from it (Pilke, 2004; Sharafi et al., 2006). Therefore, the cognitive engagement increases the use intensiveness.

For this reason, this model builds on the basis of technology behavior as a cognitive process that may or may not engender subsequent technology usage. In other words, the technology use does not arise until after the individual has cognitive engagement with technology. So, in Model C we propose that the extent to which an individual engages with technology impacts on his/her use of technology. Model C hypothesizes that engagement with technology has a direct positive impact on technology use; and in turn, engagement is hypothesized to influence technology use directly, as depicted in Figure 3.

Figure 3. Model C "*engagement-to-use*".



Source: own elaboration

4. METHODOLOGY

4.1. Variables and scale development

The instrument used in this study contained question items measuring variables influencing the use and engagement with technology based on previous research (Table 1). Respondents were asked to indicate their agreement and disagreement with several statements using a 5-point Likert-type scale ranging from 1="*strongly disagree*" to 5="*strongly agree*". The *information search* motivation was measured adopting a four-item scale from Calder et al. (2009) and Baldus et al. (2015). The *social interaction* through technology was examined adapting four items proposed by Hollebeek (2011) and from Baldus et al. (2015). The *entertainment* motivation was gauged with a four-item scale adopted from Novak et al. (2000) and Koufaris (2002); while the *type of content* was examined using a three-item scale proposed by Doll and Torkzadeh (1988) and by De Wulf et al. (2006). For measuring the user *engagement* with technology we included a three-item scale proposed by Koufaris (2002) and by Sharafi et al. (2006). Finally, the *use* of technology was measured through a three-item scale adopted from Davis (1989).

Table 1. *Variables and measurement scales.*

LATENT VARIABLES	INDICATORS
Information Calder et al. (2009) Baldus et al. (2015)	INFO1: I use media technology to find breaking news events INFO2: I use technology to get updated information INFO3: Media technology provides me information that helps me make important decisions INFO4: I use media technology to check facts and seek for additional information
Social interaction Baldus et al. (2015) Hollebeek (2011)	SOC1: I often use media technology to contribute of provide feedback to other people SOC2: Using media technology will give me an opportunity to meet and to know people SOC3: I often use media technology to discuss arguments, give my opinions and ideas SOC4: I often use media technology to join social networking
Entertainment Novak et al. (2000) Koufaris (2002)	DIS1: I use media technology to have fun DIS2: Using media technologies provides me with a lot of enjoyment DIS3: I feel pleasure when experiencing/exploring new media technologies DIS4: It is pleasant to use media technologies
Type of content Doll and Torkzadeh (1988) De Wulf et al. (2006)	CONT1: Media technology provides me up-to-date contents CONT2: Media technology provides me sufficient/wide variety of contents CONT3: Media technology provides me interesting contents pertaining to my concerns
Engagement Koufaris (2002) Sharafi et al. (2006)	ENG1: When using media technology, I am deeply engrossed in the activity ENG2: When using media technology, I fully concentrate on the activity ENG3: When using media technology, I am usually absorbed intensely in the activity
Use Davis (1989)	USE1: I will use media technology in the next days USE2: I plan to use media technology in the future USE3: I expect my use of media technology to continue in the future

4.2. Sampling and fieldwork

Data for the research were collected through a self-administered questionnaire among individuals residing in Spain on a random basis. Data were obtained from April to June 2015. One pre-screening question regarding the participants' age was included in the questionnaire in order to pool out individuals who are not Millennials. More precisely, participants were asked about their age in order to qualify individuals who are 20 to 30 years old to participate in the study.

Participants were contacted at different university campus and in commercial institutions through a survey and using a self-administered questionnaire that was also available online. Commercial and education institutions were randomly selected, and when the approval to conduct the research was obtained, the participants were invited to voluntarily take part in the research. The self-administered questionnaire allows participants to complete a survey

instrument on their own. Nevertheless, the researcher administrated the questionnaire on a face-to-face basis to ensure high-survey participation, given that participation incentives were not offered.

In addition, a pretest study was developed to survey a small subset of the population to determine whether the research instrument was reliable and valid. Consequently, the questionnaire was pretested among 15 respondents to check question order and the ability of the participants to understand the meaning of the questions. Further, the questionnaire comprised two sections: the first section of the research instrument included variables related with the use and engagement with technology that participants were asked to rate using a five-point Likert-type scale; and the second section gathered socio-economic and demographic characteristics of the participants. Finally, a total amount of 853 questionnaires were collected, obtaining 707 valid questionnaires, thus representing a sampling error of ± 3.42%, with a confidence level of 95.5%.

5. DISCUSSION OF RESULTS

5.1. Measurement model

By means of confirmatory factor analysis (CFA) the measurement model identifies relations between observed and latent variables, through Structural Equation Modeling (SEM) using Amos 18.0 software. So, a confirmatory factor analysis (CFA) was performed with Amos to test the validity of the measurement model of the six factors (Byrne, 2001).

Construct refinement was enabled by the analysis of covariance residuals and modification indices, with the exclusion of items until the goodness of fit indices was achieved

(Baumgartner and Homburg, 1996). This analysis revealed the need to remove two items from the initial scale -INFO2 and DIS4-. When removing these indicators, the results show an appropriate specification of the proposed factorial structure.

The construct reliability, convergent validity and discriminant validity were addressed (Table 2). The construct reliabilities representing internal consistency were analyzed through the Cronbach Alpha estimates, factor loadings and composite reliability (CR) values. Cronbach Alpha estimates ranging from 0.761 to 0.849 (Nunally, 1978) and composite reliability values higher than 0.70 indicate internal consistency (Fornell and Larcker, 1981). In addition, the standardized factor loadings all reached the level of significance and exceeded the commonly accepted value of 0.60 (Hair et al., 2010) indicating an adequate internal consistency of constructs. The average variance extracted (AVE) reached values for all constructs that were higher than the recommended threshold of 0.50 suggesting the convergent validity of the scale (Fornell and Larcker, 1981). Therefore, based on our results, the measurement model is adequate to test the three alternative models.

Table 2. *Factor loadings and indicators of internal consistency and reliability.*

Constructs	Items	Cronbach Alpha	Lambda (λ)	CR	AVE
Information	INFO1 INFO2 INFO3	0.784	0.916 0.829 0.737	0.870	0.693
Social interaction	SOC1 SOC2 SOC3 SOC4	0.768	0.742 0.836 0.658 0.699	0.836	0.566
Entertainment	DIS1 DIS2 DIS3	0.849	0.825 0.831 0.625	0.819	0.612
Type of content	CONT1 CONT2 CONT3 CONT4	0.842	0.743 0.884 0.732 0.684	0.862	0.662
Engagement	ENG1 ENG2 ENG3	0.761	0.806 0.749 0.679	0.799	0.592
Use	USE1 USE2 USE3	0.842	0.684 0.886 0.855	0.879	0.710

5.2. Structural models

Multiple fit criteria were used to analyze the degree of the overall models fit (Hair et al., 2010). According to Hair et al. (2010) the Normal Fit Index (NFI), the Goodness of Fit Index (GFI), Root Mean Square Error or Approximation (RMSEA), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) are valuable to examine the models' overall goodness of fit (Table 3). The final measurement models show a reasonable good fit and most of the fit indices are above the required minimum threshold levels; and in turn, results were deemed satisfactory (Hu and Bentler, 1998; Hair et al., 2010).

Model A named as *"engagement-and-use"* (Figure 1), proposes that the four motivations influence both engagement with technology and technology use. Our results of the goodness of fit indices show a good support for this model (X^2/df=1.968; CFI=0.970; RMSEA=0.037; IFI=0.970; NFI=0.941). Considering Model B *"use-to-engagement"* (Figure 2) the fitness of good indices results indicate a good model fit, despite the Comparative fit index is slightly lower than for Model A (X^2/df=2.148; CFI=0.965; RMSEA=0.040; IFI=0.965; NFI=0.936). Finally, our results for Model C *"engagement-to-use"* (Figure 3) indicate the poorest model fit (X^2/df=2.559; CFI=0.952; RMSEA=0.047; IFI=0.952; NFI=0.924). Therefore, our findings support the validity of the "*engagement-and-use*" model (Model A) over the other two proposed models, since all of the indices show better values.

Table 3. *Goodness of fit indices for the three alternative models.*

	ABSOLUTE FIT MEASURES						INCREMENTAL FIT MEASURES					PARSIMONY MEASURES
MODEL	**Chi-square**	**df**	**p**	**GFI**	**RMR**	**RMSEA**	**AGFI**	**NFI**	**IFI**	**TLI**	**CFI**	**Normed Chi-square**
A	377.920	192	0.000	0.955	0.045	0.037	0.940	0.941	0.970	0.964	0.970	1.968
B	466.182	217	0.000	0.946	0.054	0.040	0.931	0.936	0.965	0.959	0.965	2.148
C	555.374	217	0.000	0.939	0.078	0.047	0.922	0.924	0.952	0.944	0.952	2.559

5.3. Comparison of the three competing models

The present study adopted the model of comparison approach proposed by Joreskog and Sorbom (1993) which requires the specification and test of a priori alternative models using the same set of data. More precisely, in the present study the three models are empirically tested using the same population sample for the three alternative models, using individuals sampled out from the same population. Therefore, the observed differences between the models are likely to be due to the proposed models themselves.

Structural Equation Modeling (SEM) was developed to estimate the standardized coefficients for each path and the variance explained for each dependent variable (Table 4). In order to compare the three alternative models we will analyze both the explanatory power using the observed variance (R^2) for the two dependent variables -use and engagement-, as well as the path coefficients.

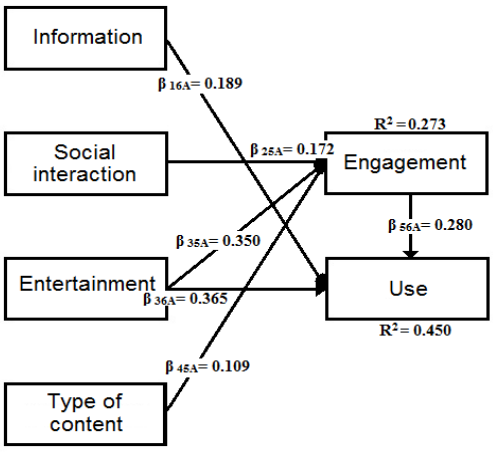
Table 4. *Structural model estimates.*

Path Relationships	**MODEL A "engagement-and-use"**		**MODEL B "use-to-engagement"**		**MODEL C "engagement-to-use"**	
	Standardized Coefficients	**Hypotheses test**	**Standardized Coefficients**	**Hypotheses test**	**Standardized Coefficients**	**Hypotheses test**
Information→ Engagement	β_{15A}= 0.029^{ns}	H_1: Not Supported	-	-	β_{15C}= 0.021^{ns}	H_1: Not Supported
Social interaction → Engagement	β_{25A}= 0.172**	H_2: Supported	-	-	β_{25C}= 0.168**	H_2: Supported
Entertainment→ Engagement	β_{35A}= 0.350**	H_3: Supported	-	-	β_{35C}= 0.406**	H_3: Supported
Type of content → Engagement	β_{45A}= 0.109**	H_4: Supported	-	-	β_{45C}= 0.104**	H_4: Supported
Information→ Use	β_{16A}= 0.189**	H_5: Supported	β_{16B}= 0.145**	H_5: Supported	-	-
Social interaction → Use	β_{26A}= 0.019^{ns}	H_6: Not Supported	β_{26B}= 0.045^{ns}	H_6: Not Supported	-	-
Entertainment→ Use	β_{36A}= 0.365**	H_7: Supported	β_{36B}= 0.490**	H_7: Supported	-	-
Type of content → Use	β_{46A}= 0.026^{ns}	H_8: Not Supported	β_{46B}= 0.016^{ns}	H_8: Not Supported	-	-
Engagement → Use	β_{56A}= 0.280**	H_9: Supported	-	-	β_{56C}= 0.493**	H_9: Supported
Use→ Engagement	-	-	β_{65B}= 0.458**	H_{10}: Supported	-	-
ns=no significant; *** significant (p<0.05)*	R^2 (Use)= 0.450 R^2 (Engagement)= 0.273		R^2 (Use)= 0.474 R^2 (Engagement)= 0.270		R^2 (Use)= 0.336 R^2 (Engagement)= 0.243	

5.3.1. Analysis of path coefficients

In first place, our findings show a significant and positive direct influence of entertainment (β_{35A}=0.350**), social interaction (β_{25A}=0.172**) and type of content (β_{45A}=0.109**) on the engagement with technology in Model A. More precisely, the entertainment motivation showed the strongest influence on technology engagement, followed by the motive of social interaction and the type of content. However, the obtained results do not support a significant influence of information search motivation in technology engagement (β_{15A}=0.029^{ns}). Likewise and regarding Model A, findings indicate that the entertainment motivation (β_{36A}=0.365**), followed by the information search motivation (β_{16A}=0.189**) have the strongest influence on the use of technology. Further, the motivation of social interaction (β_{26A}=0.019^{ns}) and the type of content (β_{46A}=0.026^{ns}) showed not statistical significance on the use of technology. Finally, our findings support a significant influence of engagement with technology on technology usage (β_{56A}=0.280**), as initially hypothesized. Therefore, only three out of the nine research hypotheses could not be supported (Figure 4).

Figure 4. *Relationships for Model A "engagement-and-use".*

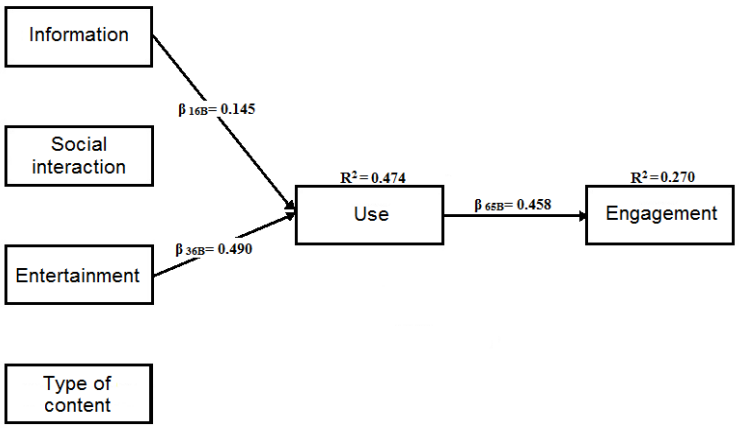


Source: own elaboration

The analysis of Model B "*use-to-engagement*" models reveals some interesting findings (Figure 5). The obtained results indicate that the entertainment motivation has the strongest influence on the use of technology (β_{36B}=0.490**), followed by the information search motivation (β_{16B}=0.145**). So, these findings suggest that the hedonic use of technology may be the most important one for millennial individuals; or in other words, Millennials use technology to experience enjoyment and fun. Similarly, our findings suggest that there does not appear to be a relationship between the social interaction motivation (β_{26B}=0.045^{ns}) and the technology use; as well as between the type of content (β_{46B}=0.016^{ns}) and the technology usage behavior. One possible explanation for this result is that Millennials create and share their own-generated content through the social media and the internet; and in turn, contents provided do not influence in their use of technologies.

Finally, a positive direct relationship between technology use and engagement is supported (β_{56B}=0.458**), as initially hypothesized. So, we can state that the use of technology drives cognitive engagement.

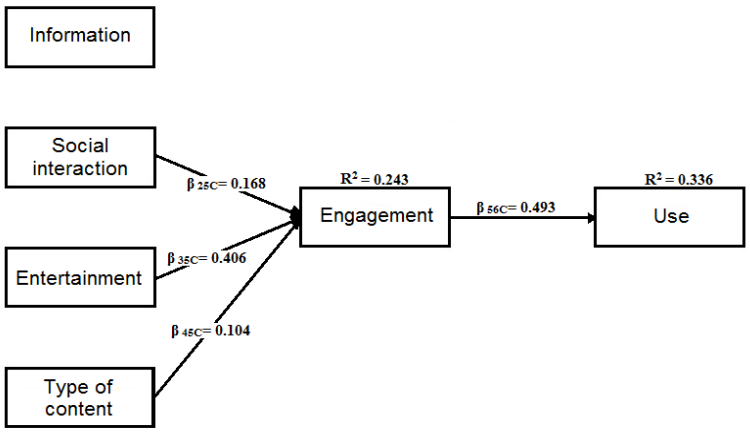
Figure 5. *Relationships for Model B "use-to-engagement".*



Source: own elaboration

On the other hand, the examination of the results of Model C, labeled as "*engagement-to-use*" indicates that in terms of the effect size, the entertainment motivation (β_{35C}=0.406**) seems to contribute the most to technology engagement, followed by social interaction (β_{25C}=0.168**) and the type of content (β_{45C}=0.104**). So, our findings report that the higher entertainment and social interaction motivation the higher engagement with technology; and similarly, the more interesting updated contents the higher technology engagement (Figure 6). However, our findings do not provide empirical support for a significant influence of information motivation on technology engagement (β_{15C}=0.021^{ns}). May be one potential explanation for this result is that Millennials do not consider the information available to be credible and trustworthy; and in turn, the information does not create engagement. Interestingly, our findings report a direct positive effect of technology engagement on technology use (β_{56C}=0.493**) as initially expected, but being slightly higher than the reverse relationship (use on engagement).

Figure 6. *Relationships for Model C "engagement-to-use".*



Source: own elaboration

5.3.2. Analysis of the explained variance

We are interested in the explanatory power of each competing model, which could be examined using the variance explained in the use of technology and engagement with technology. According to Hair et al. (2010) the explained variance (R^2) for the dependent constructs in each one of the competing models could be used to assess the explanatory power of the models, and to determine which model is superior in explaining individuals' technology behavior.

Our findings reveal the existence of a slight difference in the explained variance in the three models, although the three proposed models explain technology use and engagement well. More precisely, we can state that the R^2 values for the three models in technology use are medium, while the variance explained in technology engagement is low (Mathieson, 1991). We found that Model B "*use-to-engagement*" model explains more variance of technology use (R^2_{use}=0.474) than Model A (R^2_{use}=0.450) or Model C (R^2_{use}=0.336). So, in Model B which is the more similar to the U&G proposed model, information seeking, entertainment, socialization and the type of content accounted for substantial variance in technology behavioral usage (R^2=0.474). Therefore, our findings indicate that Model B provides a better prediction of the technology usage behavior; while Models B and C provide less explanatory power. This difference regarding the different explanatory power could be attributed to the use of more variables to explain engagement behavior.

Conversely, the Model A "*engagement-and-use*" explains a slight more variance of engagement with technology ($R^2_{engagement}$=0.273), than Model M ($R^2_{engagement}$=0.270) and Model C ($R^2_{engagement}$=0.243), being low values for the three competing models. So, results show that

Model A provides a better explanatory power of technology engagement, compared with the other alternative models. In addition, Model A "*engagement-and-use*" explains a higher number of relationships in the technology usage and engagement behavior than Model B and Model C. Nevertheless, the results of the structural model analysis indicate a good predictive validity of all the three models.

Finally, and considering the results from the model fits, the path coefficients and the observed variances we propose the following models' comparison (Table 5).

Table 5. *Comparison of the three proposed models.*

MODELS	Label	Model description	Terms of comparison			
			Model Fit	Path coefficients	Tech. Use Explanatory Power (R^2 use)	Tech. Engagement Explanatory Power (R^2 engagement)
MODEL A	"Engagement-and-use"	Technology engagement and use as consequences /dependent variables	**A>B>C**	**A>C>B**	**B>A>C**	**A>B>C**
MODEL B	"Use-to-engagement"	Technology use precedes or is a prerequisite of technology use (use drives technology engagement)				
MODEL C	"Engagement-to-use"	Technology engagement precedes or is a prerequisite of technology use (engagement drives technology usage)				

6. CONCLUSIONS

The goal of the present research was to examine three alternative competing models on the creation of technology engagement and technology behavioral usage. For this purpose, the different motivations that drive technology use proposed by the Uses and Gratifications Theory were considered and the Mathieson's (1991) criteria were adopted.

First conclusion is that our findings indicate that the Uses & Gratifications theory is useful in explaining the main motivations that drive the use of technology, using information search, entertainment and socialization as the major variables influencing technology use.

Regarding the examination and comparison of the three alternative models, the first criterion developed to compare them is the model's ability to explain the technology engagement and behavioral usage, and our findings reveal that the three models explain the technology behavioral usage quite well. Further, the Model B "*use-to-engagement*" explained more variance than Models A and C, and for this reason this model could be considered as providing the better explanatory power. However, the three models provided only a moderate explanation on technology engagement, being Model A "*engagement-and-use*" and Model B "*use-to-engagement*" the models with the greater explanatory power.

The second criterion used for model comparison is the value of the information provided by each model. For this purpose, path coefficients and their significance as well as the model fits of the models were examined. The Model A "*engagement-and-use*" which considers both technology engagement and use as consequences of different motivations –information search,

entertainment, social interaction and type of content- provides more comprehensive information on motivations that drive both technology use and engagement. However, these two variables are not both addressed in the other competing models. Similarly, Model B labeled as "*use-to-engagement*" only provides information on the motivations influencing the use of technologies, assuming that technology engagement is subsequent to the use of technology. On the other hand, Model C "*engagement-to-use*" model provides information on engagement with technology, considering that cognitive engagement with technology serves as an antecedent of technology use -technology use is subsequent to engaging with technology-.

Considering path coefficient values and their significance we can conclude that Model A "*engagement-and-use*" is more specific and provides more complete information on both technology usage and engagement. Moreover, Model C labeled as "*engagement-to-use*" provides more information than Model B, since only one relationship was found to do not have a significant impact on the engagement with technology. So, in general terms, Model A "*engagement-and-use*" model provided the most complete understanding of the causal relationships of variables influencing both technology engagement and behavioral use of technology. Therefore, one major conclusion is that Model A, Model C and Model B would be the stepwise order in the model selection according to the information provided by the models. In addition, our findings report that technology engagement and use could be both considered consequences of motivations such as information search, entertainment, social interaction and the type of content.

The third criterion is the cost of using the models that is determined by the level of effort in using the model in a research context (Mathieson, 1991), which may consider the development

of the instrument and conducting the study. In this vein, we should notice that adopting the Uses and Gratifications Theory is quite laborious, given the need to develop measurements for each context and since applying this theory often require large groups of participants. Therefore, considering this third criterion, the authors believe that the cost of the three competing models is quite similar. Hence, one key finding of the present study is that Model A "*engagement-and-use*", which considers both use and engagement as consequences of the motivational drivers, has been shown to be the superior model to explain and predict technology engagement and behavioral usage.

Other relevant findings are the main motivations in the engagement with and the use of technology. Our results suggest that Millennials are motivated by entertainment, followed by the search for information in the use of technology. On the other hand, regarding technology engagement, individuals are mainly motivated by entertainment, social interaction and the type of content. So, our findings reveal that Millennials are strongly motivated and influenced by hedonic factors when using technologies, such as enjoyment and having fun.

The major contribution of this study is empirically testing and describing three alternative models to explain and predict technology use and engagement. The obtained findings support the use of the three competing models, but also indicate that considering both technology engagement and use as consequences would be the best option.

6.1. Managerial implications and research limitations

The comparison and analysis of different conceptual models is important as they can help scholars to determine which models are more appropriate for the analysis of technology

behavior. In this vein, our results provide some guidelines for choosing between the three alternative models. The authors suggest that the choice of the model could depend on the focus or emphasis of the research to be developed and the type of information needed, that could be focused on the technology usage behavior, or the technology engagement or either in both variables. Similarly, and considering that our findings report that the entertainment motivation has the stronger influence on technology use and engagement, technology-based companies should enhance entertainment and hedonic values in their technology-based products and services.

This study has some limitations that represent avenues for future research. We used Structural Equation Modeling to analyze and compare the alternative models. Even though results derived from SEM analysis cannot serve as the only basis in order to determine causality, this multivariate technique enables a comparison of alternative causal models. So that alternative models could be examined and empirically tested to each other. Secondly, this research did not examine other theoretical models used in technology use and adoption; and in turn, other theoretical models could be conducted to explain the use and engagement with technology. In addition, future research may ascertain the applicability of the obtained results to other generational cohort rather than Millennials. Finally, future research could address how usage and engagement are integrated within a specific type of technology such as for example online social networking, mobile texting or new age technologies such as augmented reality, 3D printing or wearable technologies.

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CHAPTER 3

GENERATIONAL COHORT ROLE IN MEDIA TECHNOLOGY BEHAVIOR: AN APPROACH TO MILLENNIALS AND GENERATION X

ABSTRACT

Purpose: The present study addresses the following issues: "*Does generation cohort influence media technology behavior?"*. And if so: "*What are the main motivations underlying Millennials and Generation X technology use and engagement?"*.

Methodology: For this purpose, based on the Uses and Gratifications approach this study empirically tests technology behavior through Structural Equation Modeling (SEM), drawing on sample of 707 Millennials and 276 Generation X individuals.

Findings: Our findings indicate that Millennials have a higher use and engagement with media technologies for entertainment purposes, while Generation X users are mainly driven by information search. Further, our findings indicate the moderating role of generation cohort in the use of media technologies.

Value: A clear understanding of the technology behavior of different generations is critical. This study improves the understanding of the generational differences in using and being engaged to media technology.

Keywords*: Cohort, Millennials, Generation X, Media technology, Behavior.*

1. INTRODUCTION

Technology usage has increased dramatically in the past decade, providing people with easier means of obtaining information, entertainment, social activities and interaction. Accordingly, the main drivers of the rise of media technologies in the last years are the digitalization and the interconnected networks.

Today, media technology range from a plethora of devices -smartphones- to channels -the Internet- to venues on those channels -social networking sites- allowing users to interact through them to communicate with other users (Sundar & Limperos, 2013). Similarly, media technology and the high connectivity of mobile devices such as tablets, laptops or smartphones, enables users to enjoy numerous gratifications related to media technology such as social connection anytime and anywhere, immediate communication, ease-of-use, information seeking, work management or entertainment (Chen & Leung, 2015; Leung & Zhang, 2016). Therefore, certain gratifications can be obtained by using different media technologies.

Different variables may be affecting the use and engagement with technology, and one of these factors is age. Age has been proven to be a determining factor influencing technology behavior. In fact individuals could be divided according to their age or generational cohort. Generational cohorts are groups of individuals born during the same time, resulting in great similarity in their beliefs, motivations, values, behaviors and preferences that create a generational identity that may be influencing technology usage patterns, engagement and behavior (Mitchell, 2003).

There are important variances in the way each generational groups use technology (Magsamen-Conrad et al., 2015); thus, the generational cohort could be affecting the individual use and engagement with technology.

In this context, a well-known cohort-based categorization is based on whether individuals belong to the millennial generation, from those of the older individuals, such as Generation X people (Gurau, 2012). Authors agree that Millennials have been shown to differ from other generations, since they are digital natives and technology savvy; and the majority of research studies have focused on the perception of technologies by Millennials. However, there is a gap on research regarding their motivations to use and engage with technologies compared to earlier cohorts. Millennials and Generation X have different experiences, values, motivations and preferences that might be influencing their technology behavior.

Scarce research has been devoted to the differences in technology behavior between generational cohorts. Further, no comparative research has been conducted comparing Millennials and Generation X regarding the main motivations and drivers of their technology usage and engagement. And more precisely, *are there different motivations underlying the Millennials and Generation X media technology behavior? Do they have different motivations and drivers in their technology use and engagement?*. In this context, our main purpose is to examine whether generational differences might be related to the technology use behavior, focusing on Millennials (Generation Y) and Generation X. Likewise, the major contribution of the present study is the analysis of the motivations influencing media technology behavior based upon users' generational cohort and focusing on Millennials and Generation X from a Uses & Gratifications perspective.

This paper is structured as follows. First, we review the theoretical background, and subsequently, we propose the research hypotheses and the conceptual model. Then, we present the methodology and the data analysis. Finally, some conclusions are presented.

2. LITERATURE REVIEW

2.1. The use and adoption of technology by Millennials

The concept of millennial generation was first proposed by Tapscott (1997) and Prensky (2001). Millennials -also known as Generation Y- are defined as individuals born between approximately 1980 and 2000 (Gurau, 2012) characterized by their different values and behavior compared with previous generations (Eastman and Liu, 2012). More precisely, the core role of technology in their lives is the main factor differentiating Millennials and earlier generations, influencing their expectations and perceptions (Pew Research Center, 2010).

Millennials are technologically literate and savvy, since they have grown up and have been immersed in technology all their lives, being in constant contact with digital media, technologies and the Internet (Howe & Strauss, 2003). In addition, they are the first high-tech generation (Norum, 2003) and consequently, they could be named as "*digital natives*" (Prensky, 2001; Palfrey & Gasser, 2013). Accordingly, technology has influenced Millennials' behavior, way of thinking and learning process, being different from previous generations (Prensky, 2001); since they perceive information and communication technologies in a more positive way compared to older individuals (Howe & Strauss, 2003).

Millennials integrate technology into their daily routines and are heavy users of mobile technology, internet, connectivity, interactive media and social networks (Pew Research Center, 2010). Other authors described Millennials as individuals who use technology to stay always connected to multiple social networks (Goldenberg, 2007; Noble, Haytko & Phillips, 2009), creating and sharing contents through blogs and social media (Tapscott, 2009).

Researchers assume that Millennials aggressively integrate technology into their daily routines; however, the way in which they use the numerous technologies and their motivations remains underexplored.

2.2. Generation X and their technology behavior

Generation X refers to those individuals born from 1965 to 1980, being one of the most highly educated generations characterized by their skepticism, pragmatism and an attitude of risk avoidance (Gurau, 2012).

This generation was not brought up with the Internet and digital technologies and learned to use it as adults (Prensky, 2001). The Generation X easily assimilated technology into their daily life, using PCs at school and growing up as the Internet developed (Hill, 2017).

So, in contrast to Millennials; the Generation X individuals are those who were not born into the digital world but have, at some later point in their lives, adopted many or most aspects of new technologies (Prensky, 2001). For this reason, Generation X individuals could be named as "*digital immigrants",* since they were not born and grew up with technology, but instead they have adapted to technology. The term "*digital immigrant"* implies the possibility that

even if you were not born in the era of digital technology you can migrate to it, keeping a certain analog behavior (Prensky, 2001). One example of their adaptation to new technologies is that Generation X individuals generally prefer email and text over telephone or face-to-face communications and are characterized by high rates of internet adoption (Hill, 2017).

2.3. The Uses and Gratifications Theory

The Uses and Gratifications Theory (Katz, Blumler & Gurevitch, 1974) is a useful theoretical framework to understand why individuals use technology through the relationship between psychological motives and technology use and behavior. More precisely, according to this theory the individuals' motives predict uses, gratifications and effects; thus understanding the motives for technology use. Further, this theory assumes that individuals select and use technology in a goal-directed manner to achieve a level of gratifications and to fulfill their needs. Likewise, the Uses and Gratifications Theory states that the main gratifications obtained through the use of technology are information, entertainment and social interaction (Katz, Blumler & Gurevitch, 1974). Finally, this theory differs from the technology acceptance theories because it posits that motivational variables directly influence behavioral usage of technology, without the mediation effects of attitude or behavioral intentions.

The Uses and Gratifications Theory (Katz et al., 1974) is deemed appropriate for investigation into the adoption behaviors of technologies, because individuals choose and use a particular technology to fulfill their particular gratifications. So, this theoretical approach can be applied to a variety of technologies (Park, 2010). In fact, the Uses and Gratifications approach has been applied to a wide range of technologies, such as cable TV (Bantz, 1982), the World Wide

Web (Ferguson & Perse, 2002), online services (Lin, 1999), the internet in general (Flanagin & Metzger, 2001) or mobile phones (Aoki & Downes, 2003).

Originally, this theoretical framework was applied to investigate mass communication media adoption behaviors, is the belief that people's choices about using media are motivated by their desire to gratify their needs. However, this theory has been currently extended to study the motivations and gratifications of diverse technology uses (Luo & Remus, 2014). Further, the Uses and Gratifications of media technology were not considered in traditional Uses and Gratifications Theory until Rosengren et al. (1985) expanded the application of the theory to new communications technology such as satellite, Internet or interactive television. Later, Sundar and Limperos (2013) extended the Uses and Gratifications framework to a perspective of media technology and found that individuals using emergent media technologies –such as for example the internet- could possibly create new gratifications as interactivity, navigability and agency. In this vein, Volkom et al. (2013) noted that media technology is being used for multiple purposes such as information, entertainment, social activity and relationship maintenance.

Other authors like Leung and Zhang (2016) reported that owing to the high connectivity and the mobility of tablets, laptops and mobile devices, users can gain gratifications such as social connection anytime and anywhere, information seeking, and work management. Similarly, prior research shows as motives for the Internet use social information, entertainment, relaxation and pass time (Ferguson & Perse, 2002); information seeking, and interpersonal utility (Lou, Chea & Chen, 2011); diversion, virtual community and relationship maintenance (Song et al., 2004).

2.4. Hypotheses development

2.4.1. Information search/ Information seeking

One of the primary motives for technology use is information. In fact, technology is an interface that facilitates the search for information using various techniques -such as query-by-example or hypertext-; so one of the reasons for using technology is to facilitate the search of information. According to the *Uses and Gratifications Theory* (Katz, Blumler & Gurevitch, 1974) one of the main gratifications obtained through the use of technology is information.

Therefore, the information-seeking motivation would be related with the use of technologies, meaning the procurement of information, finding out about relevant events and conditions, society and the world; or seeking advice or opinion and decision choices; satisfying curiosity and general interest. Additionally, prior research on internet usage has identified information seeking and social interaction as important motives for using internet (Song et al., 2004; Loy, Chea & Chen, 2011).

Engagement is considered an intrinsic motivation variable that involves a high level of concentration when the individual acts with full consciousness and with a complete focus on activities (Agarwal & Karahanna, 2000). Similarly, the term engagement with technology could be defined as a state of deep involvement and focused immersion, a positive highly enjoyable experience which occurs when an individual is fully immersed in the interaction with technology, characterized by total attention (Agarwal & Karahanna, 2000). So, considering that one of the main gratifications obtained through the use of technology is information

(Katz, Blumler & Gurevitch, 1974), we can assume that one of the motives of engaging with technology may be informational. Thus, the following hypotheses are posed:

H_1: The information search has a positive influence on the engagement with technology

H_2: The information search has a positive influence on the use of technology

2.4.2. Social interaction

The *Uses and Gratifications Theory* highlights social interaction as one of the gratifications derived from the use of technology (Katz, Blumler & Gurevitch, 1974). More precisely, we assume socialization or social interaction as gaining insight into the circumstances of others, identifying with others and gaining a sense of belonging, while enabling to connect with family, friends and society. Similarly, Stafford, Stafford and Schkade (2004) reported that individuals could gain gratifications related with technology such as social connection anytime and anywhere. And later Hwang, Kim and Jeong (2014) highlighted that the willingness to engage in social interaction and expressing one's opinions could be an important motive for technology use.

Therefore, gratification of the need of social interaction and the need to connect with others is further supported by technology and one of the reasons for using technology. For example, further research on technology usage reports that social online networking has made it possible for many individuals to meet their social needs (Lou, Chean & Chen, 2011). Likewise, prior studies on internet have identified social interaction as an important motive for using the internet (Song et al., 2004; Lou, Chean & Chen, 2011); since the use of the internet allows

users to exchange information with distant others (Hwang, Kim & Jeong, 2014). Thus, we present the following hypotheses:

H_3: The social interaction motivation has a positive influence on the engagement with technology

H_4: The social interaction motivation has a positive influence on the use of technology

2.4.3. Entertainment

The entertainment construct refers to the extent to which the media technology is fun and entertaining to users (McQuail, 1983), fulfilling the users' needs for hedonistic pleasure, enjoyment, escapism or emotional release. In addition, entertainment is an intrinsic motivation in the Uses and Gratifications Theory (Katz, Blumler & Gurevitch, 1974) associated with fun and playfulness inherent to the adoption process that affects the behavioral usage of technology (Luo & Remus, 2014). In fact, prior research reports that individuals feel gratification and hedonic value when developing leisure activities through technology (Jung, Perez-Mira & Wiley-Patton, 2009); and that motives such as entertainment, enjoyment and relaxation play an important role in the use of technology (Hwang, Kim & Jeong, 2014).

So, we can state that technology is used to entertainment. Digital media technology used for entertainment covers a broad range of products and services such as cable TV, VCR, VOD, computer game, game console, gambling machines, Internet or the upcoming service robots (Rauterberg, 2004). Accordingly, Grant and O'Donahoe (2007) noted that young users use interactive technologies -such as smartphones and tablets- for entertainment; and several

studies have reported that this motive has a significant impact on behavior intention to use personal computers and the internet. In this vein, some authors have highlighted entertainment and the hedonic factors as strong predictors in determining internet user behavior (Tsao & Steffes-Hansen, 2008; Li et al., 2015). So, considering that individuals tend to use technologies for entertainment, we pose the following hypotheses:

H_5: The entertainment motivation has a positive influence on the engagement with technology

H_6: The entertainment motivation has a positive influence on the use of technology

2.4.4. The type of content

There are some common motivations related to the use and engagement with technology identified which include information search, social interaction and entertainment; and in addition, in the present study we included the variable of the type of content.

Previous research reports that the type and quality of content has a key role of on user adoption of technology (Jarvenpaa & Todd, 1997). The use of technology and how the types of content engage technology users may be influenced by the type of content –such as information, entertainment or advertising-, as well as by the availability and diversity of different contents.

Content has been previously defined as a construct which has dimensions of exactness, sufficiency, credibility, timeliness and relevance (De Wulf et al., 2006). However, today individuals want a personalized and targeted content and do not want to search through huge

amounts of content to find what they are looking for; while visual displays of information and data are becoming increasingly important, as reflected in applications such as Instagram, Periscope or Facebook Live (Hill, 2017). Further, individuals create and share their own-generated content through social sharing (Hill, 2017).

In addition, authors report that technology affordances have transformed our media experience by inviting us to engage with content (Sundar, 2008), significantly affecting the cognitive engagement of users (Skadberg & Kimmel, 2004). Similarly, when content is rewarding for an individual, this individual will be concentrated and will feel immersed in it; so the type of content is a reason for engagement with and the use of technologies (Csíkszentmihályi, 1990). Later, Chung and Tan (2004) reported that the most influential antecedent of engagement is content, being the individual's level of concentration and absorption also affected by the type of content (Chung & Tan, 2004). For example, a boring and repeated content may make individuals to have a low level of engagement; while an exciting and interesting content may create greater engagement (Jung, Perez-Mira & Wiley-Patton, 2009; Kim, Oh & Shin, 2010). So, if content providers can induce pleasantness, playfulness, entertainment and excitement through their contents, then individuals are likely to engage with technologies.

So, considering the importance of content in the use and engagement with technology, we present the following hypotheses:

H_7: The type of content has a positive influence on the engagement with technology

H_8: The type of content has a positive influence on the use of technology

2.4.5. Engagement

Finally, we have considered that the concept of engagement provides a way of conceptualizing the optimal user experience through technologies (Agarwal & Karahanna, 2000). The user engagement is important in studying technology use behavior; and has been extensively applied to investigate the behavior and use of technology (Agarwal & Karahanna, 2000). So, we propose the following hypothesis:

H_9: The engagement with technology has a positive influence on the use of technology

2.5. The moderating role of generation/cohort

Because of the difference in the aging process, psychological and social circumstances are factors of different generational cohorts that might influence beliefs and motivations affecting the use of technology. Similarly, some authors reported that age is a key variable to understand the relation between the individual and technology and that there are generational differences in the use of technology (Magsamen-Conrad et al., 2015). So, it can be stated that each generational group has its own expected benefits from and rationale for using technology.

Previous research assumes the existence of differences –or a generational gap- in technology use with respect to a generational cohort group, particularly regarding Millennials compared to their mature counterparts (Prensky, 2001). In fact, Millennials are a technology-native group, being more technologically savvy than Generation X individuals interacting with technology like no other generation before (Prensky, 2001).

Additionally, prior research reveals generational differences when using technology. First, regarding information search, previous studies report that technology natives -such as Millennials- have significant advantages over novices in information seeking. So it can be assumed that when digital natives have the need to search information they will use technology because they know how to use it and feel comfortable using it (Marchionini, 1997). Second, regarding social interaction, prior research notes that Millennials regularly use social networks, blogs or texting as a regular mode of socialization and communication and to openly express their feelings and interests (Hershatter & Epstein, 2010), since Millennials have fused their social lives with their use of technology to bring them closer to their family and friends (Pew Research Center, 2010). Third, Millennials have passion for entertainment and strongly value entertainment and leisure elements (Lévy, Weitz & Grewal, 2002); being more likely to use technology for entertainment (Thayer & Ray, 2006); while mature individuals are more concerned with the practical aspects of technology than to the entertainment value (Hur, Lee & Choo, 2017). Finally, previous studies suggest that Millennials use technology not only for consuming content, rather they use technology to create, produce and share their own content (Hill, 2017). Therefore, we propose that the generational cohort may influence the use of technology:

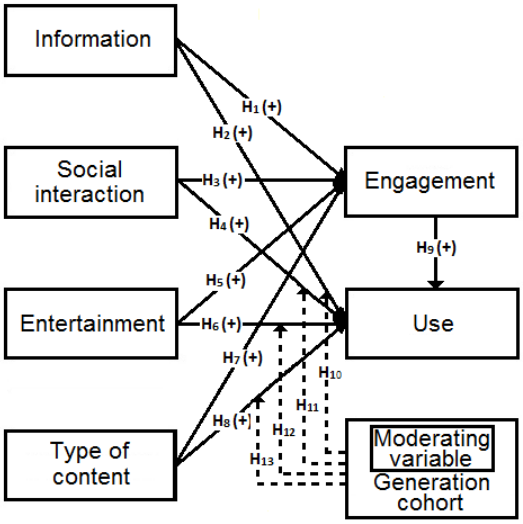
H_{10}: The generation/cohort moderates the influence of information motivation on the use of technology

H_{11}: The generation/cohort moderates the influence of social interaction motivation on the use of technology

H_{12}: The generation/cohort moderates the influence of entertainment motivation on the use of technology

H_{13}: The generation/cohort moderates the influence of the type of content on the use of technology

Figure 1. *Conceptual proposed model.*



Source: own elaboration

3. METHODOLOGY

3.1. Variables and scale development

The measurement instrument was developed based on an extensive literature review (Table 1). Participants were asked to indicate their level of agreement with statements on a 5-point Likert-type scale (1="*strongly disagree*"; 5="*strongly agree*"). The *information search* motivation was measured adopting a three-item scale from Calder, Malthouse and Schaedel (2009) and Baldus, Voorhees and Calantone (2015). The *social interaction* through technology was examined with four measures adopted from Hollebeek (2011) and from Baldus, Voorhees and Calantone (2015). The *entertainment* motivation was gauged with a three-item scale adopted from Novak, Hoffman and Yung (2000) and Koufaris (2002); while

the *type of content* was examined using a three-item scale proposed by Doll and Torkzadeh (1988) and by De Wulf et al. (2006). For measuring the user engagement with technology we included three items proposed by Koufaris (2002) and by Sharafi, Hedman and Montgomery (2016). Finally, the *use* of technology was measured through a three-item scale adopted from Davis (1989).

Table 1. *Variables and measurement scales.*

LATENT VARIABLES	INDICATORS
Information Calder et al. (2009) Baldus et al. (2015)	INFO1: I use media technology to find breaking news events INFO2: I use technology to get updated information INFO3: Media technology provides me information that helps me make important decisions
Social interaction Baldus et al. (2015) Hollebeek (2011)	SOC1: I often use media technology to contribute of provide feedback to other people SOC2: Using media technology will give me an opportunity to meet and to know people SOC3: I often use media technology to discuss arguments, give my opinions and ideas SOC4: I often use media technology to join social networking
Entertainment Novak et al. (2000) Koufaris (2002)	DIS1: I use media technology to have fun DIS2: Using media technologies provides me with a lot of enjoyment DIS3: I feel pleasure when experiencing/exploring new media technologies
Type of content Doll and Torkzadeh (1988) De Wulf et al. (2006)	CONT1: Media technology provides me up-to-date contents CONT2: Media technology provides me sufficient/wide variety of contents CONT3: Media technology provides me interesting contents pertaining to my concerns
Engagement (Flow experience) Koufaris (2002) Sharafi et al. (2016)	ENG1: When using media technology, I am deeply engrossed in the activity ENG2: When using media technology, I fully concentrate on the activity ENG3: When using media technology, I am usually absorbed intensely in the activity
Use Davis (1989)	USE1: I will use media technology in the next days USE2: I plan to use media technology in the future USE3: I expect my use of media technology to continue in the future

3.2. Sampling and fieldwork

Data were collected from April to June 2015 through a self-administered questionnaire among individuals residing in Spain on a random basis. Participants were contacted at different university campus, as well as in commercial institutions through a personal survey and through

the internet, since the survey was available online. Commercial and education institutions were randomly selected, and then we obtained approval to develop the research study; and participants were invited to voluntarily take part in the research. The self-administered questionnaire allows participants to complete a survey instrument on their own; however, to counteract a potential low-response rate, the researcher administrated the questionnaire on a face-to-face basis; thus ensuring a high-survey participation in spite of not incentive being offered.

One pre-screening question was included in order to check the participants' age. Participants were first asked about their age; so that only respondents who are between 20 and 30 years old and individuals between 35 and 50 years old were qualified to participate in the study. Therefore, the age of the participants was the main criteria to participate in the study.

A pretest study was conducted to survey a small subset of the population in order to determine whether the research instrument was valid and reliable. More precisely, the questionnaire was pretested among 15 respondents to check wording and question order and the ability of the participants to understand the meaning of the questions. The first section of the research instrument included different variables related with the use and engagement with media technology, and participants were asked to rate them using a five-point Likert scale. The second section of the questionnaire gathered socio-economic and demographic characteristics of the participants.

A total amount of 707 valid questionnaires were collected among Millennials, yielding a sampling error of 3.42% at a confidence level of 95%; while 276 valid questionnaires were gathered among Generation X individuals, with a sampling error of 5.91.%.

4. DISCUSSION OF RESULTS

4.1. Measurement model

A confirmatory factor analysis was performed using software Amos 18.0, to test the validity of the measurement model. The first analysis revealed the need to remove two items from the proposed initial scale, namely INFO2 y SOC3**,** due to the low value of their squared multiple correlations. Having removed these items, the results obtained showed an appropriate specification of the proposed factorial structure.

The reliability, the convergent validity and the discriminant validity of the constructs was examined (Table 2). The internal consistency of the items developed to measure the research constructs show a high level of reliability. In order to examine the reliability the Cronbach Alpha (α) estimates were used. Our results indicate that all constructs were acceptable, since reliability estimates of 0.7 or above are deemed to be acceptable (Hair et al., 2010).

The standardized factor loadings (λ) all reached the level of significance and exceeded or were close to the commonly accepted value of 0.60 (Hair et al., 2010), with the exception of ENG3, indicating an adequate internal consistency of the multiple items. Additionally, all the constructs had a composite reliability (CR) above 0.60 and the average variance extracted

(AVE) reached values for all constructs that were higher than the recommended threshold of 0.50; thus suggesting the convergent validity of the scale (Fornell & Larcker, 1981).

Table 2. *Factor loadings and indicators of internal consistency and reliability.*

CONSTRUCT	Items	MILLENNIALS				GENERATION X			
		Cronbach Alpha	Lambda (λ)	CR	AVE	Cronbach Alpha	Lambda (λ)	CR	AVE
Information	INFO1 INFO3	0.714	0.761 0.730	0.824	0.700	0.809	0.781 0.871	0.812	0.684
Social interaction	SOC1 SOC2	0.780	0.645 0.978	0.877	0.789	0.913	0.863 0.974	0.916	0.873
Entertainment	DIS1 DIS2 DIS3	0.708	0.827 0.829 0.625	0.879	0.710	0.798	0.923 0.894 0.681	0.889	0.731
Type of content	CONT1 CONT2 CONT3	0.826	0.740 0.889 0.731	0.937	0.835	0.861	0.811 0.846 0.808	0.862	0.675
Engagement	ENG1 ENG2 ENG3	0.745	0.799 0.754 0.593	0.843	0.646	0.748	0.673 0.925 0.594	0.830	0.628
Use	USE1 USE2 USE3	0.723	0.723 0.758 0.676	0.832	0.622	0.812	0.655 0.902 0.800	0.845	0.649

Finally, the discriminant validity of the measurement model was examined. The correlations between constructs were compared to the square roots of AVE extracted from the individual constructs (Fornell & Larcker, 1981), and results show that the square roots of AVE are higher than the correlation values, indicating an adequate discriminant validity of the constructs (Table 3). Therefore, reliability, convergent validity and discriminant validity indicate that the measurement model was appropriate.

Table 3. *Discriminant validity and matrix of correlations.*

	MILLENNIALS						GENERATION X					
	Inf.	**Soc.**	**Ent.**	**Cont.**	**Eng.**	**Use**	**Inf.**	**Soc.**	**Ent.**	**Cont.**	**Eng.**	**Use**
Information	**0.837**						**0.827**					
Social interaction	0.145	**0.888**					0.138	**0.934**				
Entertainment	0.456	0.093	**0.843**				0.609	0.156	**0.855**			
Type of content	0.183	0.014	0.249	**0.913**			0.365	-0.116	0.132	**0.821**		
Engagement	0.230	0.219	0.386	0.191	**0.804**		0.548	0.228	0.521	-0.028	**0.792**	
Use	0.411	0.145	0.583	0.159	0.505	**0.789**	0.583	0.316	0.515	0.078	0.565	**0.806**

Note: Values in bold diagonal cells represent the square root of the AVE.

4.2. Structural model

A set of fit indices were used to analyze the degree of the model fit (Table 4). The Normed Chi-square (CMIN/DF), the Goodness of Fit Index (GFI), Root Mean Square Error or Approximation (RMSEA), Normal Fit Index (NFI), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) are valuable to examine the models' overall goodness of fit (Hair et al., 2010). Following Hair et al. (2010), absolute measures of the modeling adjustment such as the Normed Chi-square (CMIN/DF=2.570), Goodness of Fit Index (GFI=0.947) and the Root Mean Square Error of Approximation (RMSEA=0.041) indicate adequate values. The measure of incremental fit and parsimony also show a good model fit, provided that the Incremental Fit Index (IFI=0.951), Tucker-Lewis Index (TLI=0.933) and the Comparative Fit Index (CFI=0.955) values are higher than the recommended threshold of 0.90 (Hair et al., 2010). Therefore, the model fit indices was deemed satisfactory.

Table 4. *Goodness of fit indices of the structural model.*

ABSOLUTE FIT MEASURES						INCREMENTAL FIT MEASURES					PARSIMONY MEASURES
Chi-square	**df**	**p**	**GFI**	**RMR**	**RMSEA**	**AGFI**	**NFI**	**IFI**	**TLI**	**CFI**	**Normed Chi-square**
457.489	178	0.000	0.947	0.059	0.041	0.918	0.922	0.951	0.933	0.955	2.570

4.3. Analysis of relationships among variables

The results of empirical test provide support for the conceptual proposed model and for the research hypotheses regarding the motivations/gratifications that drive the technology behavior among Millennials and Generation X (Table 5).

Table 5. *Structural model estimates.*

Path Relationships	MILLENNIALS (n=707)			GENERATION "X" (n=276)		
	Standardized Coefficients	t value	Hypotheses test	Standardized Coefficients	t value	Hypotheses test
Information→ Engagement	β_{15M}= 0.029^{ns}	0.530	H_1: Not Supported	β_{15X}= 0.477**	3.616	H_1: Supported
Social interaction → Engagement	β_{25M}= 0.181**	4.004	H_2: Supported	β_{25X}= 0.104^{ns}	1.633	H_2: Not Supported
Entertainment→ Engagement	β_{35M}= 0.326**	5.875	H_3: Supported	β_{35X}= 0.193*	1.766	H_3: Supported
Type of content → Engagement	β_{45M}= 0.101**	2.237	H_4: Supported	β_{45X}= -0.217**	-2.726	H_4: Supported
Information→ Use	β_{16M}= 0.182**	3.381	H_5: Supported	β_{16X}= 0.490**	3.896	H_5: Supported
Social interaction → Use	β_{26M}= 0.012^{ns}	-0.289	H_6: Not Supported	β_{26X}= 0.142**	2.563	H_6: Supported
Entertainment→ Use	β_{36M}= 0.433**	7.289	H_7: Supported	β_{36X}= 0.195**	2.085	H_7: Supported
Type of content → Use	β_{46M}= 0.024^{ns}	-0.576	H_8: Not Supported	β_{46X}= -0.128*	-1.821	H_8: Supported
Engagement → Use	β_{56M}= 0.301**	5.808	H_9: Supported	β_{56X}= 0.192**	2.432	H_9: Supported
ns=no significant; *** significant (p<0.05)* * *significant (p<0.10)*	R^2 (Engagement)= 0.373 R^2 (Use)= 0.498			R^2 (Engagement)= 0.398 R^2 (Use)= 0.628		

Our findings indicate that entertainment has the strongest influence on the use of technology (β_{36M}=0.433**) and on the engagement with technology (β_{35M}=0.326**) for Millennials. So, our findings report that the higher entertainment motivation, the higher usage and engagement with media technologies. Likewise, our findings indicate the slight positive influence of the social interaction as an engagement driver (β_{25M}=0.181**), followed by the type of content (β_{25M}=0.101**), for the millennial cohort. However, the information search as a motivation showed not statistical significance (β_{15M}=0.029^{ns}) on the engagement with technology for this group. Regarding the use of technology, our findings indicate that the entertainment motivation (β_{36M}=0.433**) exerts the highest influence on the use of technology, followed by

the information search (β_{16M}=0.182**) for the Millennials. Further, our results do not support a significant influence of social interaction motive (β_{26M}=0.012^{ns}) and type of content (β_{56M}=0.024^{ns}) in the use of media technologies for Millennials.

Therefore, our findings indicate that the main motive of Millennials for using and being engaged with media technology is entertainment. So, we can state that the desire to be entertained is highly dominant for Millennials' technology behavior. Likewise, Millennials show a slight motivation of information search and a lack of significant influence of social interaction in the use of technologies. One potential explanation could be the different media technologies that could be used. For example, maybe the need for information is the major motive for reading news in the internet, while other technologies are mostly used for entertainment, such as a smartphones, texting or online networking.

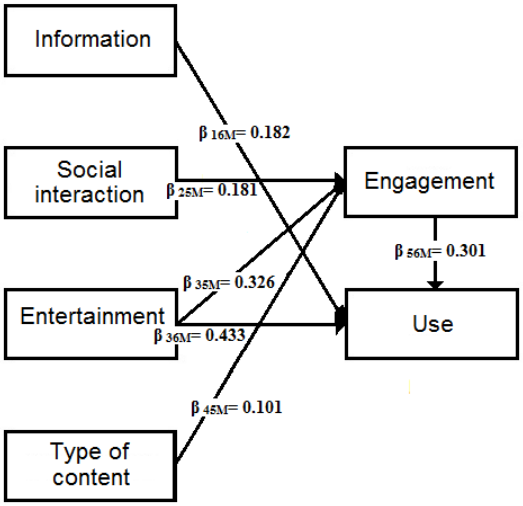
Interesting differences were found between Millennials and Generation X in their technology behavior, as depicted in Figures 2 and 3. Our findings report that the information search motivation has the strongest influence in the use (β_{16X}=0.490**) and engagement (β_{15X}=0.477**) with technology for Generation X individuals. Therefore, one relevant finding is the information seeking motivation as the main driver for Generation X technology behavior. On one hand, our findings show that information search (β_{15X}=0.477**), followed by entertainment motivation (β_{35X}=0.193**) have the strongest influence of technology engagement for Generation X. Consequently, information search followed by is the stepwise order of influence on engagement with technology. Similarly, our findings report that Generation X individuals show an inverse relationship between the type of content and the engagement with technology

(β_{45X}=-0.217**); as well as lack of statistical influence of the social interaction motive (β_{25X}=0.104^{ns}) in technology engagement.

One potential explanation for this result might be that Generation X individuals do not engage with technology for social interaction, since their integrative and socialization needs with family and friends are not developed through technologies such as online networking or texting, and rather they meet these needs in the real life. Similarly, one possible explanation of the negative influence of the type of content on the engagement with technology could be that Generation X individuals do not evaluate positively the credibility, trustworthiness and sufficiency of the contents provided, as reported by De Wulf et al. (2006). So, Generation X individuals could be considered as distrusting contents.

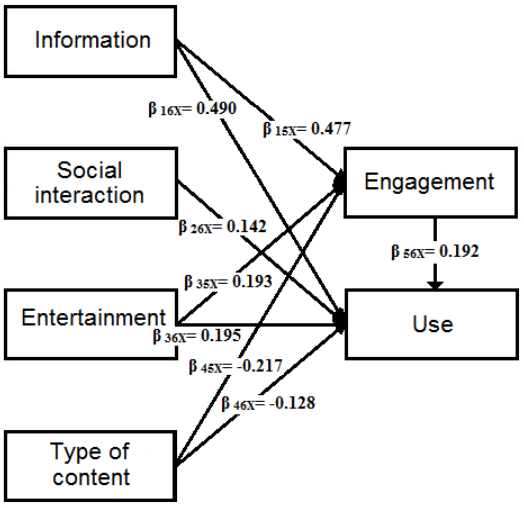
On the other hand, and regarding the use of technology by Generation X, our findings show the strongest influence of the information search motivation (β_{16X}=0.490**), followed by entertainment (β_{36X}=0.195**) and social interaction (β_{26X}=-0.142**) as influencing the use of technologies. So, our findings highlight the slight influence of the entertainment and social interaction motives in the technology usage. In other words, the information search motive is the more relevant driver in the use of media technologies for Generation X individuals. In addition, our findings support the negative influence of the type of content in the technology use (β_{46X}=-0.128*) for this generational cohort, which could be also explained by the Generation X individuals' distrust regarding the contents provided through media technologies.

Figure 2. *Motivations/gratifications driving technology behavior for Millennials.*



Source: own elaboration

Figure 3. *Motivations/gratifications driving technology behavior for Generation X.*



Source: own elaboration

Finally, most of the proposed research hypotheses are supported, except for H_1, H_6 and H_8 for Millennials and H_2 for Generation X individuals; supporting the conceptual proposed model.

4.4. The moderating role of the generational cohort

A common way of testing the moderating effects in Structural Equation Modeling is to divide the data set into two or more groups and then compare the model fit across groups (Hair et al., 2010). The obtained data allowed us to classify individuals according to their generational cohort considering their age as either Millennials (n=707) or Generation X individuals (n=276), thus examining two sub-samples.

One model is calculated without any constraints and the other models have the coefficients set. If the model without any constraints is significantly better (with a smaller X^2) than the constrained model, we can assume that one groups' coefficients differ from the other group. Additionally, if the changes in X^2 are significant, given the change in the degree of freedom (ΔX^2/ Δdf) then a moderating effect exists (Hair et al., 2010). So, the Chi-Square difference test is performed for the moderating variable under research, a significant Chi-Square difference between the constrained and the unconstrained models implies that the compared models are dissimilar, thus indicating a moderation effect.

Accordingly, the proposed model was run with all parameters allowed to be estimated freely within each subsample (X^2=523.468; $p<0.001$; CFI=0.956). In a series of constrained models, the path coefficients corresponding to the relationships between information search (H_{10}), social interaction (H_{11}), entertainment (H_{12}), type of content (H_{13}) and technology use were

constrained to remain invariant across the two subsamples. The significantly Chi-Square higher values for the constrained models did not improve model fit in any of relationships -with the exception of type of content and technology use-. So, our findings support the hypothesized moderating role of the generational cohort on the relationships between information search motivation (ΔX^2=7.867; df=1; p<0.000); social interaction motive (ΔX^2=5.017; df=1; p<0.000) and entertainment motivation (ΔX^2=4.098; df=1; p<0.000) on technology use (Table 5). However, the effect of the type of content on technology use was not statistically significant and hypothesis H_{13} was rejected.

Table 6. *The moderating role of generational cohort.*

Moderating effect	***Chi-square***	**df**	**CFI**		
Unconstrained baseline model	523.468	208	0.956		
Constrained paths	***Chi-square***	**ΔX^2**	**df**	**p**	**Hypotheses**
Information→ Tech use	531.335	7.867	209	0.000	$H_{10:}$ Supported
Social interaction→ Tech use	528.485	5.017	209	0.000	$H_{11:}$ Supported
Entertainment→ Tech use	527.566	4.098	209	0.000	$H_{12:}$ Supported
Type of content→ Tech use	525.335	1.867	209	0.000	$H_{13:}$ Not Supported

5. CONCLUSIONS

This study attempts to explore the motives that drive Millennials and Generation X individuals' use and engagement with media technologies, examining the role of the generational cohort. So, our main goal was to examine whether the generational cohort had an impact on the technology use and engagement. Based on the uses and gratifications approach, our findings show that the generational cohort of the individual influences the motivations driving technology use and engagement. More precisely, results suggest different patterns of

technology behavior, revealing the distinct motivations for the different generational cohorts to use technology and to be engaged with technology in their daily lives.

Our findings depict interesting differences in the motives that drive technology behavior between Millennials and Generation X users. Regarding the first proposed research question: "*Does generation cohort influence media technology behavior?",* the obtained results suggest that Millennials and Generation X individuals exhibit a differentiated media technology behavior. In addition, other major finding is the moderating role of the cohort in the use of technologies. That is, we hypothesized that the generational cohort would play a moderating role on the technology use, and our results confirm the moderating role for all the proposed relationships, instead for the type of content-technology use link. So, considering the moderating role of the generational cohort in the use of technology, it can be assumed that the generational cohort does influence the media technology behavior.

Regarding the second research proposed question: "*What are the main motivations underlying Millennials and Generation X technology use and engagement?",* our findings highlight interesting differences in the motives underlying technology behavior. More precisely, the obtained results indicate that Millennials' major motivation for technology behavior is based on entertainment. So, Millennials will use and be cognitively engaged and fully immersed in the interaction with technology when feeling heightened enjoyment and entertainment. On the other hand, the Generation X exhibits a strong information search motivation in the use and engagement with technology. One potential explanation is that Millennials are strongly oriented to the hedonic value of technology use, while Generation X individuals are more focused on its utilitarian value.

Little research focused on the motives or antecedents that guide the use and engagement with technology, comparing to different generational cohorts. In this context, the major contribution of the present research consists on the analysis of the drivers of technology use and engagement in two different generation cohorts, suggesting that different motivations -information search and entertainment- drive the use and engagement with technology according to the generational cohort.

5.1. Managerial implications and research limitations

Understanding the values, beliefs, attitudes and motivations of a generation becomes essential to target individuals. In this vein, the present study provides insights into the behavioral differences between Millennials and Generation X that could be considered in order to develop marketing strategies to target the different motivations. More precisely, technology-based products and services should consider the user behavior according to their generational cohort to adapt their products and services to the motivations and usage patterns of their customers. Considering the research findings, one major managerial implication is that technology-based companies could use the user cohort as a variable for segmenting their customers, in order to develop specific marketing strategies.

This research nonetheless has limitations that represent avenues for future research. In first place, the data for the study come from one single country; so, research replications across other countries will establish further generalizations. Second, another limitation of this study was the selection of motivations influencing the use and engagement with media technology, out of many possible motives and drivers, such as work-efficiency or ease-of-use. Addressing

these limitations in further research would provide a deeper view of individuals' technology behavior.

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ANEXO

RESUMEN DE LA TESIS EN CASTELLANO

La presente tesis lleva por título "El comportamiento tecnológico de los Millennials: Un enfoque a través de la teoría de los usos y las gratificaciones" y ha sido realizada en la Universidad de la Coruña (UDC) por el estudiante de doctorado Don Rogelio Pesqueira Sánchez actuando como codirectores de la tesis la doctora Doña Cristina Calvo Porral y el doctor Don Andrés Faiña Medín. La tesis está estructurada en un prefacio a modo de introducción y tres capítulos que se corresponden respectivamente con los tres artículos de investigación que fueron realizados para la misma.

Los tres capítulos tienen una estructura similar. En primer lugar se realiza un resumen del artículo en el cual se introduce el mismo, se explica su propósito, se informa de los hallazgos obtenidos, se valora su importancia y se ofrecen unas palabras clave relacionadas con el artículo para facilitar búsquedas. En segundo lugar se realiza una breve introducción en la cual se explica el problema planteado y se formulan las preguntas que se esperan responder. En tercer lugar se expone el marco teórico del artículo y la metodología investigadora empleada. Por último se ofrecen los resultados obtenidos y se proponen una serie de conclusiones extraídas de los mismos así como potenciales líneas de investigación.

Para la realización de los artículos de la investigación se llevo a cabo de forma previa a los mismos un cuestionario de carácter aleatorio. Los participantes en dicho cuestionario fueron contactados en diferentes campus universitarios así como en centros comerciales, así mismo se realizo la misma encuesta a través de Internet distribuyéndose mediante correo electrónico.

Los lugares en los que se recogieron los datos fueron seleccionados al azar y se obtuvieron los diferentes permisos para llevar a cabo la investigación en dichos lugares. Los participantes rellenaron la encuesta voluntariamente sin que se ofreciesen incentivos por la participación. En el cuestionario se incluyó una pregunta previa a la evaluación para verificar la edad de los participantes de modo que solo los cuestionarios de individuos con edades comprendidas entre 20 y 30 años y de individuos con edades comprendidas entre 35 y 50 años de edad fueron tenidos en cuenta para realizar el estudio.

Con carácter previo a la realización de la encuesta la misma se probó con un pequeño subconjunto de la población a fin de determinar si el instrumento de investigación era válido y confiable. Se verifico de este modo la redacción del cuestionario, el orden de las preguntas y la capacidad de los participantes para comprender el significado de las mismas. El cuestionario se estructuro en dos secciones para facilitar su respuesta.

La primera sección del cuestionario incluyó sentencias que tenían por objeto medir diferentes variables relacionadas con el uso que los individuos dan a la tecnología y el enganche que los mismos tienen con esta. Para la valoración de esta sección se utilizó una escala de Likert de cinco puntos mediante la cual los individuos mostraban su conformidad o disconformidad con diferentes sentencias siendo 1= "totalmente en desacuerdo" y 5= "totalmente de acuerdo". Las sentencias se sacaron de estudios e investigaciones previamente publicados. La segunda sección del cuestionario reunió las características socioeconómicas y demográficas de los participantes.

Se recogieron un total de 707 cuestionarios válidos entre los Millennials, arrojando un error de muestreo de 3.42% a un nivel de confianza del 95%. Así mismo se recolectaron 276 cuestionarios válidos entre individuos de la Generación X, con un error de muestreo de 5.91% a un nivel de confianza del 95%.

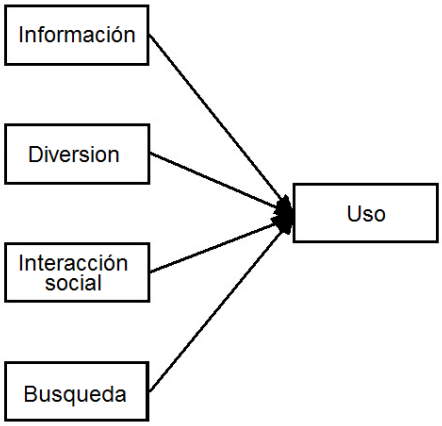
Recogidas las encuestas se reviso la literatura existente relacionada con el objeto de la investigación. Para la realización de dicha revisión se utilizaron bases de datos científicas, principalmente Scopus, así como Google Scholar y Web of Science.

Después de la revisión de la literatura existente, se eligió como marco teórico la Teoría de los Usos y las Gratificaciones. Otras teorías relacionadas con la Teoría de los Usos y las Gratificaciones revisadas y utilizadas en la investigación fueron el Modelo de Aceptación de Tecnología (TAM), la Teoría Unificada de Aceptación y Uso de la Tecnología (UTAUT), la teoría de las cohortes generacionales y la Teoría del Flujo.

La Teoría de Usos y Gratificaciones proporciona un marco teórico para comprender el uso de los medios de comunicación como una forma que el individuo tiene para obtener gratificaciones y cubrir sus necesidades. Esta teoría difiere de las teorías de aceptación de tecnología porque postula que las variables de motivación influyen directamente en el uso conductual de la tecnología, sin los efectos de mediación de la actitud o las intenciones de comportamiento. Originalmente, la Teoría de Usos y Gratificaciones se aplicó para investigar los comportamientos de adopción de los medios de comunicación masiva, ya que las elecciones de los individuos sobre el uso de los medios están motivadas por su deseo de satisfacer sus necesidades. Sin embargo, esta teoría se ha extendido actualmente para estudiar las

motivaciones y la obtención de gratificaciones relacionadas con diversos usos de la tecnología y para examinar por qué los individuos eligen y usan una tecnología particular para satisfacer sus necesidades y obtener gratificaciones.

Figura 1: *Teoría de los Usos y las Gratificaciones.*



Fuente: Katz et al. (1974)

El Modelo de Aceptación de Tecnología teoriza en relación a que factores son tenidos en cuenta por los usuarios para que estos acepten y utilicen una tecnología determinada. El Modelo de Aceptación de Tecnología establece que cuando los usuarios se enfrentan a la decisión de usar una tecnología nueva, existen una serie de factores que influyen en su decisión de adoptar o no dicha tecnología. De entre los diversos factores que influyen en la decisión de adoptar o no una determinada tecnología destacan dos, la utilidad que percibe el individuo que le reportará el uso de dicha tecnología y la facilidad o dificultad con la que el individuo considera que podrá adoptar dicha tecnología.

La Teoría Unificada de Aceptación y Uso de la Tecnología tiene por objeto conocer las causas por las que los usuarios utilizan un sistema de información determinado y como lo usan.

Conforme a la Teoría Unificada de Aceptación y Uso de la Tecnología el uso de un sistema de información vendría dado por los siguientes cuatro factores, la utilidad que el sistema de información proporcionará al individuo, el esfuerzo que costará al individuo adoptar el sistema de información, la influencia social que obtendrá el individuo por utilizar el sistema de información y la facilidad que tiene el individuo para utilizar el sistema de información. Además de estos cuatro factores principales el modelo tiene en cuenta género, edad, experiencia en el uso de sistemas de información y la voluntariedad u obligatoriedad en la adopción del uso del sistema de información para moderar dichos factores.

La teoría de las cohortes generacionales establece que diferentes generaciones tienen vivencia, visiones y experiencias compartidas que marcaran su comportamiento. Conforme a dicha teoría cada 20 y 25 años nace una nueva generación con rasgos y características totalmente diferentes los cuales la distinguen tanto de las generaciones que la precedieron como de las generaciones que la siguen. Conforme a esta teoría la Generación X es la generación integrada por los individuos nacidos entre 1960 y 1980 mientras que los Millennial son los individuos de la generación nacida entre 1980 y 1990.

La Teoría del Flujo establece el marco teórico para conocer qué requisitos son necesarios para que un individuo entre en un estado mental de inmersión completa en la actividad que está llevando a cabo. Conforme a dicha teoría dos son los factores que deben ser estudiados para conocer si una actividad determinada puede hacer que un individuo entre en estado de flujo.
Los factores que son fundamentales para conocer si una actividad puede introducir a un individuo en un estado de flujo son la facilidad o dificultad de la actividad y la mayor o menor habilidad del individuo para realizar la actividad.

Para la realización de los tres artículos se utilizaron diferentes procedimientos, técnicas, modelos e instrumentos, utilizados en la literatura con anterioridad. La metodología más relevante es el análisis multivariante y más precisamente el Modelo de Ecuación Estructural (SEM) que es usado tanto en el capítulo 2 como capítulo 3. Además del análisis multivariante utilizado en el capítulo 2 y en el capítulo 3 se utiliza en el capítulo 1 de la tesis el MANOVA y el análisis Cluster.

El modelo de Ecuación Estructural (SEM) es un modelo matemático y estadístico que permite evaluar y estimar relaciones causales a partir de datos y supuestos cualitativos sobre causalidad. Este instrumento pretende ajustar un modelo propuesto de constructos a los datos observados y permite confirmar su validez o rechazarlo. Los modelos estructurales se expresan mediante gráficos en los que las variables latentes, también llamadas constructos, se insertan en elipses, las variables observables, también llamadas ítems, que las miden en rectángulos y las relaciones entre las variables se expresan con líneas unidireccionales para expresar regresión lineal y con lineas bidireccionales para expresar covarianza.

El MANOVA es una herramienta estadística utilizada cuando hay dos o más variables dependientes que permiten identificar en un modelo si los cambios en las variables independientes tienen efectos significativos sobre las variables dependientes y las interacciones entre las variables independientes y su grado de asociación con los dependientes.

El análisis Cluster es un instrumento matemático que hace posible distinguir los diferentes grupos entre los que se distribuye un gran grupo que los engloba según su relación con una variable determinada.

El primer capítulo lleva por título **"Categorización de los Millennials basada en su comportamiento tecnológico"** y estudia si existen segmentos dentro del grupo generacional de los Millennials en relación a su comportamiento con la tecnología digital. La mayor contribución de este capítulo a la literatura es proporcionar una caracterización basada en clusters de los Millennials con respecto a su comportamiento en el uso de la tecnología.

La generación Millennial es la primera generación que ha crecido en un entorno en el que la tecnología digital es utilizada en múltiples facetas de la vida hasta convertirse en algo omnipresente en la rutina diaria. La experiencia de haber crecido rodeados por la tecnología digital ha hecho que como generación compartan unas características, motivaciones, aptitudes, actitudes y comportamientos comunes. En especial estas características, motivaciones, aptitudes, actitudes y comportamientos son diferentes a las mostradas por generaciones anteriores. Pero esto último hace que sea legitima la pregunta sobre si el comportamiento de los Millennials como grupo es homogéneo o existen segmentos dentro de este grupo generacional con respecto a su comportamiento de tecnología digital que tienen la suficiente entidad propia como para poder atribuírseles características diferenciadoras con respecto al resto de segmentos que componen el grupo de Millennials.

Para realizar dicho estudio se llevo a cabo un análisis de componentes principales y un análisis Cluster de los Millennials basado en el comportamiento que los mismos tienen con respecto a la tecnología. Una vez realizada la segmentación del grupo de Millennials los mismos fueron categorizados utilizando un análisis MANOVA.

Los constructos que se utilizaron en los anteriores análisis para llevar a cabo la categorización (todos ellos referidos a la tecnología digital) fueron: Facilidad de uso, utilidad, motivación de búsqueda de información, socialización, technophilia, negatividad, intención de pagar por usar, posibilidad de interactuar, implicación (disociación temporal), experiencia de flujo (compromiso), lealtad y satisfacción. Las preguntas utilizadas para medir los constructos ya han sido utilizadas y testeadas con anterioridad. Los resultados de los análisis arrojaron que los Millennials no son un grupo homogéneo en relación a la tecnología a pesar de que comparten características, visiones y experiencias comunes.

Mediante el análisis se distinguieron cinco grupos con características diferenciadoras, 176 individuos se integraron en el grupo 1, 112 individuos se integraron en el grupo 2, 147 individuos se integraron en el grupo 3, 139 se integraron en el grupo 4 y 131 individuos se integraron en el grupo 5. Cada uno de los grupos muestra un comportamiento diferente hacia la tecnología y una forma diferente de relacionarse con la misma. La denominación que se dio a los diferentes grupos fueron: "*devotos de la tecnología*", "*espectadores de la tecnología*", "*circunspectos*", "*usuarios adversos de la tecnología*" y "*potenciadores de la productividad*". Cada uno de los cinco grupos anteriores utilizaba la tecnología de forma diferente y se relacionaba con la misma de forma desigual. En el análisis destacó el hecho de que la relación de los Millennials con la tecnología es totalmente independientemente de su género. La conclusión que se extrae del primer capítulo es que no todos los Millennials tienen el mismo comportamiento hacia la tecnología ni la usan en igual manera.

Como limitación al presente estudio debe mencionarse que las cinco tipologías halladas pueden no ser mutuamente excluyentes, ya que probablemente existan individuos híbridos que

muestren combinaciones diferentes de las cinco categorías y por ello un mismo individuo podría clasificarse en un grupo o en otro con respecto a una tecnología concreta.

Por último, en relación al primer capítulo, se debe destacar que las conclusiones obtenidas en la investigación son coherentes con otras investigaciones previas realizadas.

El segundo capítulo lleva por título **"Modelización del comportamiento tecnológico de los Millennials: un examen de tres modelos en competencia a través del enfoque de la teoría de Usos y Gratificaciones"** y estudia cual de los tres modelos teóricos que se proponen se ajustan mejor al comportamiento tecnológico de los Millennials. El objetivo de este capítulo es examinar los diferentes modelos propuestos por los investigadores y descubrir cuál se ajusta mejor a los datos obtenidos. La metodología utilizada para llevar a cabo esto fue la modelización mediante Ecuaciones Estructurales. La comparación entre modelos se realizó en primer lugar comparando la varianza de los distintos modelos para el uso y el enganche a la tecnología, en segundo lugar comparando los índices de bondad de los distintos modelos y en tercer y último lugar comparando el numero de hipótesis que explica cada modelo prefiriendo el modelo que explique mayor numero de hipótesis.

Los modelos contrastados son el *modelo de participación y enganche*, el *modelo de uso-enganche* y el *modelo de enganche-uso*. Dichos modelos corresponden a las siguientes tres posibilidades que se estudian y que son: El *uso de la tecnología y el enganche con la tecnología son independientes*, el *uso de la tecnología es un antecedente o requisito del enganche a la tecnología* y, por último, el *enganche a la tecnología es un antecedente o requisito del uso de la tecnología*. Los modelos están basados en la Teoría de Usos y

Gratificaciones y los constructos con los que se construyeron los mismos fueron la búsqueda de información, la interacción social, el entretenimiento, el tipo de contenido, el enganche y el uso.

Estos tres modelos tienen como objetivo investigar la relación de los Millennials con los constructos *uso de tecnología* y *enganche con la tecnología*. El Análisis Factorial Confirmatorio fue el instrumento matemático y estadístico utilizado para medir las relaciones entre las variables observadas y las variables latentes.

No todas las hipótesis de los distintos modelos son soportadas y algunas hipótesis son soportadas con más fuerza que otras.

El tercer capítulo, que lleva por título **"Comportamiento las cohortes generacionales hacia la tecnología: un enfoque para los Millennials y la Generación X"**, estudia las diferencias existentes en los comportamientos relacionados con el uso de la tecnología y el enganche a la tecnología entre los Millennials y los individuos pertenecientes a la Generación X. Esto se fundamenta en que los Millennials y los miembros de la Generación X poseen distintos valores, creencias, actitudes y motivaciones que hacen que sea válida la pregunta de si su comportamiento frente a la tecnología también es distinto. Concretamente se estudia en el presente capitulo cuales son los principales motivos que subyacen en el uso de la tecnología y en el enganche a la misma en los Millennials y en individuos de la Generación X. Para este propósito, se ha escogido el modelo, de los analizados en el capítulo 2, que mejor se adaptaba a explicar el comportamiento de los Millennials en relación al uso de la tecnología y el enganche a la misma.

La generación Millennial ha crecido rodeada de tecnología digital como los ordenadores, Internet, los videojuegos, los teléfonos móviles, los reproductores de música digital o las videocámaras, por este motivo a los Millennials se los conoce como nativos digitales. Los integrantes de la Generación X han tenido que adaptarse a la tecnología digital ya que no han crecido rodeados de ella pero la misma ha jugado un papel fundamental en sus vidas con posterioridad, por este motivo a los individuos pertenecientes a la Generación X se los conoce como inmigrantes digitales.

Al igual que el capitulo 2 la investigación está basada en la Teoría de Usos y Gratificaciones. El *Modelo de uso y enganche* ha sido el modelo con el que ambas generaciones han sido comparadas. Los resultados obtenidos respaldan el modelo conceptual propuesto y brindan respaldo a la mayoría de las hipótesis de investigación propuestas. Conforme a dichos resultados la pertenencia a una determinada cohorte generacional influye sustancialmente en las motivaciones para usar y engancharse a la tecnología. Los resultados indican que el entretenimiento es la motivación principal que impulsa el uso de la tecnología y el enganche a la tecnología para los Millennials. Por otro lado, los mismos resultados muestran que la búsqueda de información es la principal motivación que influye en los individuos de la Generación X para usar y engancharse a la tecnología.

Los resultados anteriores sugieren diferentes patrones de comportamiento tecnológico entre los Millennials y los miembros de la Generación X revelando las distintas motivaciones para que los integrantes de dichas cohortes generacionales usen la tecnología y se enganchen a la misma.