# A TYPOLOGY CATEGORIZATION OF MILLENNIALS IN THEIR TECHNOLOGY BEHAVIOR

Calvo Porral, Cristina; Pesqueira Sanchez, Rogelio; Faíña Medín, Andrés.

Universidad de A Coruña (Spain).

**RESUMEN**

*Hay un interés creciente por los millennials; y sin embargo, hasta la fecha hay escasas segmentaciones de los millennials en cuanto a su comportamiento en relación a la tecnología. En este contexto, este estudio trata las siguientes cuestiones:"¿Son los millennials monolíticos o hay diferentes segmentos en esta generación en cuanto a su comportamiento tecnológico?". Y si este fuera el caso: "¿Existen diferencias importantes en cuanto a la forma en que los millennials usan la tecnología?". Nuestro objetivo consiste en examinar los potenciales perfiles de los millennials en relación a su comportamiento y uso de la tecnología. Los datos obtenidos de una muestra de 707 millennials se analizaron mediante un análisis de componentes principales y análisis clúster. A continuación, los segmentos se caracterizaron mediante un análisis MANOVA. Nuestros resultados revelan la existencia de cinco segmentos o tipologías de millennials en cuanto a su comportamiento tecnológico: los "devotos de la tecnología", los "espectadores", los "prudentes", los "adversos" y los "productivos". Este estudio contribuye de forma detallada al conocimiento sobre cómo las diferentes categorías de millennials usan la tecnología.*

**Palabras Clave:**

Millennials, Tecnología, Comportamiento, Segmentación.

**ABSTRACT**

*There is an increasing interest for millennials; however, to date millennials' segmentations regarding their technology behavior are scarce. In this context, this study addresses the following questions: "Are millennials monolithic, or are there segments within this generation group regarding the technology behavior?". And if so: "Are there important variances in the way that millennial segments use technology?". Our purpose is to examine the potential profiles of millennials regarding their technology use and behavior. Data from a sample of 707 millennials was gathered and analyzed through principal component analysis and cluster analysis. Then, millennials' segments were profiled using a MANOVA analysis. Our findings revealed five different segments or typologies of millennials regarding their technology behavior: technology devotees, technology spectators, circumspects, technology adverse users and productivity enhancers. This study contributes with a detailed perspective of how different millennial segments use technology.*

**Keywords:**

Millennials, Technology, Behavior, Segmentation.

## 1. Introduction

Millennials is a unique consumer group, heavily influenced by technology and the internet, making them a challenging target. Millennials, "Generation Y" or "Gen Y", "Echo Boomers", "Net Generation", "Digital Natives", "Digital Generation" or the "Connected Generation" are the demographic cohort following Generation X, which is considered to be the first high-tech generation. The great majority of authors use these terms interchangeably to conceptualize individuals born from the early 80s to the early 2000s (Strauss & Howe, 1991; Prensky, 2001; Twenge, 2010; Gurau, 2012) who were grown up in an environment with a full immersion in digital technology, influencing their personality, beliefs, behaviors and attitudes. Millennials were born, have grown up and live with technology, thus becoming *digital natives* who have never experienced any other way of life (Palfrey & Gasser, 2008). So, one of the most distinctive characteristics of millennials is that they are the most technically literate, competent and technology savvy generation, since they were grown up with heavy exposure to technology and the internet (Wolburg & Pokrywczynski, 2001), being early adopters of technology devices, as well as extensive users of the internet (Kumar & Lim, 2008). Millennials' lives and daily routines and activities are mediated by digital technologies and technology interaction.

Traditionally, demographic and socio-economic variables have been used in market segmentation studies to identify the key characteristics of a market segment and to divide the market into customer or user segments. However, segmentation analysis based on demographic variables alone is not the most effective analysis, since individuals in the same segment may have different attitudes, preferences and lifestyles (Kotler & Armstrong, 1999). Additionally, demographic segmentation reveals nothing about consumers/users' behavior; and in turn, has less explanatory power when analyzing segments among millennials. On the other side, psychographic variables have been often been used in market segmentation to gain insights into consumers' behavior.

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). However, to date there have not been any studies identifying the potential segments and technology profiles or typologies within this generation. Further, there is a lack of research on millennial classification on user groups according to their technology use patterns, providing meaningful categories of millennial typologies. In this context, the purpose of the present paper is to provide segmentation and a profile of each one of the clusters among this generation. We aim to provide typologies of millennials in their technology use and behavior which could be useful to organize their behavior into characteristic patterns. So, our major contribution is providing a segmented characterization of millennials regarding their technology behavior and patterns. That is, we will provide a classification of diverse millennial technology behavior into meaningful categories according to their technology behavior.

## 2. Literature review

### *2.1. Who are the "millennials"?*

The term "*millennial*" was first used by Strauss and Howe (1991), who developed a generational theory suggesting that generational cohorts develop similar attitudes and beliefs.

There is no exact delimitation of this generation group, but most researchers use birth years ranging from the early 1980s to the early 2000s (Prensky, 2001; Lancaster & Stillman, 2002; Wilson & Geber, 2008; Twenge, 2010; Levenson, 2010; Gurau, 2012). This generation has 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 & Stillman, 2002). Prior research characterizes them as being individualistic, technology savvy, and as having high self-esteem with unrealistic expectations and a general lack of patience, along with higher rates of materialism and narcissism (Twenge, 2010); or as being group-oriented and with a strong sense of identity (Gupta, Brantley & Jackson, 2010). Similarly, previous studies describe them as highly responsible, independent, consumption-oriented and skeptical (Thompson & 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, and that will serve as a form of self-expression (Gupta et al., 2010).

### *2.2. Millennials as digital natives*

Due to the fast dissemination of digital technologies in the last decades, the term *digital natives* distinguishes this generation from the previous generations -who were called *digital immigrants*- (Prensky, 2001; Palfrey & Gasser, 2008). Prensky (2001) was the first who call millennials *digital natives*, since they are the first generation born and grown up when there are already well-developed information and communication technologies, digital technology and media available, instant global communication and extensive social networks mobile technologies (Valentine & Powers, 2013).There is a consensus that millennials were born into a world *full of digital technology* and that the greater influence received them is the use of technology, influencing their behavior, culture and beliefs (Close, 2012). 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 massive consumed by millennials (Lenhart et al., 2010; Cheung, Chiu & Lee, 2011), allowing them to keep in touch with people and to establish relationships. In fact, millennials 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, millennials 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).

### *2.3. Technology adoption, use and behavior*

Prior research has identified a number of variables that significantly influence users' behavior toward technology and technology adoption. In the present study we will develop a millennial-user typology based on four theoretical approaches. First, we will consider the *Technology-Acceptance model* or TAM model (Davis, 1989), given its high explanatory power in technological behavior. This model considers the intention to use and to adopt technology, which could be defined as the adoption, use or acceptance of technology (Davis, 1989). However, this theoretical approach has failed to include all the relevant factors about the individuals' adoption and use of technology and for this reason we will also consider the *Unified Theory of Acceptance and Technology-Use* model or the UTAUT model (Venkatesh, Morris, Davis & Davis, 2003), which is a behavioral-based model developed to unify the multiple existing theories about how users accept technology. In third place, *Uses and Gratifications theory* (Katz, Blumler & Gurevitch, 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.

#### *2.3.1. Technology 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 or system will be free of effort (Davis, 1989). Similarly, the UTAUT model -based on the perceived ease of use construct- incorporated the construct *effort expectancy*, referring to the level of ease related to the utilization of technology (Venkatesh et al., 2003). So, users who perceive a high ease of use of a technology system think that it is easy to use; in turn, generating the adoption of technology.

#### *2.3.2. Utility/Usefulness derived from technology*

Following Davis (1989) 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 are convinced by the fact that utilizing technology will help them to achieve benefits in the execution of their job (Venkatesh et al., 2003). This construct is tied to utility and has consistently been shown to be strongest predictor of the behavioral intention to use technology (Venkatesh et al., 2003).

#### *2.3.3. 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 and conditions, society and

the world; or seeking advice or opinion and decision choices; satisfying curiosity and general interest. So, we assume that the use of technology facilitates the acquisition of direct information, which influences the adoption and use of technology.

### *2.3.4. Socialization through technology*

As stated below, the *Uses and Gratifications* Theory (Katz et al., 1974) highlights 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 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. Further, other studies confirmed that one of the primary purposes for using internet-based technologies is to socialize with people and expend the circle of friends (Valenzuela et al., 2009), and some of the main tools that enable this interaction are social networking, blogs, virtual game communities and instant messaging.

### *2.3.5. Technophilia*

The affinity or positive attitude for technology could be defined as the degree to which a person likes or looks forward to being involved and learn about technology (Edison & Geissler, 2003). Similarly, while some individuals embrace new technology and enjoy the process of learning and the challenges associated with technology, other individuals are uncomfortable or fearful of technological change, thus feeling aversion to technology. Later, Miotto, Lessiter, Freeman, Carmichael and Ferrari (2013) named the positive attitude and inclination towards technology as *technophilia*. Thus, 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 functions more frequently, developing emotional and enduring associations with technologies, as well as 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, millennials could experience different levels of *technophilia*.

### *2.3.6. 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 and provides no 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 or fearful about the use of technology (Igbaria & Parasuraman, 1989). Therefore, individuals who show technology negativity are more likely to be reluctant to use them.

### *2.3.7. Technology pay per use*

The adoption and use of technology may involve some other factors acting as barriers, such as the cost. Following Venkatesh, Thong and Xu (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 technology 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 technology only if the associated costs are reasonable.

#### *2.3.8. Peers' interaction*

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

#### *2.3.9. Implication (temporal dissociation)*

In the context of technology use, 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 technology, users become so involved in interacting with IT that they are oblivious to other stimuli and lose track of time.

#### *2.3.10. Engagement (Flow Experience)*

The concept of *State of Flow* or *Flow experience* (Csikszentmihalyi, 1990), and the notion of cognitive engagement (Agarwal & 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 & Karahanna, 2000). Further, *engagement* is considered an intrinsic motivation variable, which involves a high level of concentration where irrelevant thoughts and perceptions are screened out, leaving no room for distractions (Agarwal & Karahanna, 2000). This term is not only conceptually identical to the *Flow Experience* concept, but it has also been commonly used as flow experience (Csikszentmihalyi, 1997). The engagement or flow has been widely applied to investigate the behavior and intention to use technology (Agarwal & Karahanna, 2000).

#### *2.3.11. Loyalty*

According to Oliver (1999) loyalty could be defined as a deep held 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) 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-. In this study, we assume that loyalty towards technology could be a consequence of the technology adoption.

#### *2.3.12. 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 & Ferguson, 2000).

#### *2.3.13. Word-of-Mouth*

Individuals accumulate their knowledge about products/services through what they hear and see from others or what they read from formal or informal sources, such as *word-of-mouth*. This term refers to the interpersonal communication concerning the evaluation of products or services of interest (Arndt, 1967), being one of the most influential sources of marketplace information for consumers. Considering the internet as a platform for interacting with other individuals, word-of-mouth on the web –or the electronic word-of-mouth- has a great impact on users' decisions (Riegner, 2007). Finally, prior research highlights the influence of word-of-mouth from users' peers in the intention to use technology (Shin, 2009), since users tend to voluntarily spread word of their experiences to peers.

## 3. Research questions

Our study aims to answer three main questions regarding the millennials' technology use and behavior, which are the following:

RQ1: "*Are millennials monolithic, or are there segments within this generation group regarding the technology use and behavior?"*. So, the first aim of this research is to ascertain whether different segments of millennials have a different behavior regarding technology, as well as to profile the different segments of millennials. That is, we aim to examine whether there are differences within this generation group.

RQ2: "*Are there important variances in the way that millennial segments use technology?*. We will examine the potential differences on the behavior and technology use by millennial segments. So, we propose that different millennial segments may behave differently when it comes to using and adopting technology.

Finally, considering the proposed research questions, we will address one research hypothesis: "*Not every millennial user has the same technology use and behavior".*

## 4. Methodology

### *4.1. Sampling and fieldwork*

In 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 campus 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. 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 gathering 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 scales*

Derived from previous literature, a list of 50 items measuring motivations and attitudes towards technology use was developed (Table 1). Regarding the drivers of technology use, we considered the *ease of use*, which was measured adapting a five-item scale from Davis (1989) and Wu and Wang (2005). We also considered the *information-seeking* motivation, measured through a four-item adopted from Calder, Malthouse and Schaedel (2009) and Baldus, Voorhees and Calantone (2015). Additionally, the *utility* or *usefulness* derived from the technology use was measured using a three-item scale adapted from Lu et al. (2005). Likewise, the *socialization* through technology was evaluated through a scale adapted from Calder et al. (2009) and Baldus et al. (2015); while *technophilia* was examined using the scale proposed by Miotto et al. (2013). Similarly, the *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, Monroe and Grewal (1991). We measured the *implication* or *temporal dissociation* when using technology, using a five-item scale proposed by Agarwal and Karahanna (2002). We evaluated the users' *interaction* though technology using a three-item scale adapted from Holebeek (2011) and Baldus et al. (2014). The *engagement* with technology was evaluated, using a scale adapted from Koufaris (2002) and Sharafi, Hedman and Montgomery (2016). 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, Papagiannidis and Cho (2012); and the *word-of-mouth* was measured through a two-item scale adopted from Gremler and Gwinner (2002).

### *4.3. Data analysis*

The data analysis was conducted in three stages through SPAW computer software. First, a principal components analysis was developed to the 50 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 component 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 $\chi^2$=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 Varimax factor rotation procedure, jointly accounting for 68.85% of the explained variance (Table 1).

TABLE 1: **List of items for each variable and their factor loadings.**

| ***VARIABLES*** | ***INDICATORS*** | ***Factor Loading*** | ***Cronbach Alpha*** |
|---|---|---|---|
| **Ease of use**<br>Davis (1989); Wu & Wang (2005) | EU1: I find technology easy to use<br>EU2: It is extremely easy to be familiarized with the use of technologies.<br>EU3: It is easy for me to become skilled at using technology<br>EU4: Learning to use technologies was easy for me<br>EU5: It is easy to become skillful at using technology | 0.682<br>0.674<br>0.671<br>0.667<br>0.654 | 0.756 |
| **Information-seeking motivation**<br>Calder et al. (2009); Baldus et al. (2015). | INFO1: I use technology to find breaking news events.<br>INFO2: I use technology to get updated information<br>INFO3: Technology provides me information that helps me make important decisions<br>INFO4: Technology is the best way to stay informed | 0.879<br>0.835<br>0.734<br>0.714 | 0.867 |
| **Utility/Usefulness** | UT1: The use of technology makes me save | 0.760 | 0.770 |

| | | | |
|---|---|---|---|
| Lu et al. (2005) | time<br>UT2: The use of technology can enhance the productivity of my life/work/ job performance<br>UT3: The use of technology can help me accomplish tasks in my life/work more easily/quickly | 0.687<br>0.647 | |
| **Socialization**<br>Calder et al. (2009); Baldus et al. (2015) | SOC1: I often use technology to contribute of provide feedback to other people<br>SOC2: Using technology will give me an opportunity to meet and to know people<br>SOC3: I often use technology to discuss arguments, my opinions and ideas<br>SOC4: I use technology to learn from other persons<br>SOC5: I often use technology to join social networking | 0.768<br>0.695<br>0.573<br>0.550<br>0.520 | 0.708 |
| **Technophilia**<br>Miotto et al. (2013) | TEC1: I enjoy exploring all the options that technology offers<br>TEC2: I would enjoy using the interactive technologies available<br>TEC3: I look forward to use technologies for new things and possibilities<br>TEC4: Using technologies could sharpen/open one's mind | 0.751<br>0.676<br>0.624<br>0.477 | 0.761 |
| **Technology Negativity**<br>Miotto et al. (2013) | NEG1: Using technology is a waste of time<br>NEG2: Using technology does not stimulate me/stimulate my brain<br>NEG3: I do not consider technology to have any educational value<br>NEG4: Technology does not interest me | -0.762<br>-0.758<br>-0.754<br>-0.675 | 0.795 |
| **Pay per use**<br>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.<br>PU2: I expect that technologies available would be reasonably priced<br>PU3: I would rather pay in order to Access the technology I want | 0.845<br>0.766<br>0.779 | 0.745 |
| **Implication (temporal dissociation)**<br>Agarwal & Karahanna (2000) | IMP1: Time flies when I am using technologies<br>IMP2: Time appears to go by very quickly when I am using technologies<br>IMP3: Sometimes I lose track of time when I am using technologies<br>IMP4: Most times when I get on to the technology, I end up spending more time than I had planned<br>IMP5: I often spend more time on the system than I had intended. | 0.643<br>0.772<br>0.764<br>0.700<br>0.603 | 0.800 |

| | | | |
|---|---|---|---|
| **Interaction**<br>Holebeek (2011);<br>Baldus et al. (2014) | INTER1: I share information and my experiences on the technologies I use<br>INTER2: When using technology I want to share my experience and knowledge with others.<br>INTER3: When using technology I want to receive sharing information from others | 0.779<br>0.709<br>0.703 | 0.804 |
| **Engagement**<br>Koufaris (2002); Sharafi et al. (2016) | ENG1: When using technology, I concentrate fully on the activity<br>ENG2: When using technology, I'm absorbed intensely in the activity<br>ENG3: While using technologies, I am immersed in the task I am performing | 0.764<br>0.752<br>0.652 | 0.735 |
| **Loyalty**<br>Davis (1989) | LOY1: I plan to use technology in the future<br>LOY2: I will continue using and adopting technologies<br>LOY3: I expect my use of technology to continue in the future | 0.787<br>0.736<br>0.704 | 0.704 |
| **Satisfaction**<br>See-To et al. (2012) | SAT1: The technology I use meets my needs and expectations<br>SAT2: I am satisfied with the decision to use technology<br>SAT3: The technology improves my quality of life | 0.771<br>0.718<br>0.619 | 0.842 |
| **Word of mouth**<br>Gremler & Gwinner (2000) | WOM1: I often recommend the technologies I like to my friends and relatives<br>WOM2: It is likely that I would recommend to my friends and relatives to use the technology I like | 0.782<br>0.766 | 0.702 |

### *5.2. Cluster analysis*

Cluster analysis uses information inherent in the factor scores, dividing the observations in such a manner that observations with similar factor score pattern will be grouped together into clearly identifiable groups. 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 most 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.

### *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. Therefore, these findings provide validation for the results that emerged 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, the obtained 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** | Gender | 47.2% men/ 52.8% women | 53.6% men/ 46.4% women | 46.3% men/ 53.7% women | 52.2% men/ 47.8% women | 52.3% men/ 47.7% women | | 0.603 |

### *5.4. Profiling millennials' segments*

Considering our findings, we provide a common typology of millennials, offering an overview of the characterization of millennials' technology use in general terms. The main characteristics that define each cluster are given below.

**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 on ease of use, information-seeking motivation, and socialization purposes, as well as on satisfaction and loyalty. 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.* Compared to the other millennial clusters, this group reports the greatest level of intention to develop word-of-mouth communication. 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; and therefore we have named them 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. Maybe this group prefers to engage in activities alone, rather than with other people. 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, word-of-mouth or 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 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; and consequently they could be described 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 technology 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. 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 less interested in adopting new technology and are the less 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*.

**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. So, 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, our study did not find evidence of differences between male and female millennials; thus not supporting gender as a significant moderator.

## 6. Conclusions

Millennials have been described as an enigma to most marketers and new marketing techniques are being developed to reach them more effectively. In this context, the present research provides segmentation and a comprehensive millennial typology categorization that constitutes distinct types of technology behavior. Accordingly, three research questions have been presented. The first research question is: "*Are millennials monolithic, or are there segments within them regarding the technology use and 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 use and behavior regarding technology, as well as to profile these potential segments. Our findings indicate that five clearly distinct millennial segments emerged, each one reporting different technology use and behavior, giving some idea of the complexity involving the relationship that millennials have towards technology.

The second research question is: "*Are there important variances in the way that millennial segments use technology?".* We aimed to ascertain whether the segments of millennial users develop different technology use and behavior. For this purpose, we examined the potential differences among the millennial generation related to their behavior and use of technology through Manova analysis, and our findings report behavior-base segments with different types of use. Consequently the answer would be "*Yes, there are significant differences within the millennial generation regarding their use of technology*". More precisely, our findings provide empirical support for a five-cluster solution, detecting millennial segments. Accordingly, the different millennial user types are categorized into technology "*devotees*", technology "*spectators*", "*circumspect"* users, "*adverse*" users and "*productivity enhancers".*

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 from 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 millennials' typology which will help to understand millennials and to evaluate their heterogeneity in technology use, determining the qualitative differences them.

Some limitations of the present study should be mentioned, when it comes to generalizing the results obtained. We should mention 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 millennial could be classified as a different user type regarding the specific technology. Second limitation derives from the fact that this research was conducted in one country, and according to prior 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.

## 7. References

Agarwal, R., & Karahanna, E. (2000).Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Quarterly*, 24(4), 665–694.

Arndt, J. (1967). Role of product-related conversations in the diffusion of a new product. *Journal of Marketing Research*, 4, 291–295.

Baldus, B.J., Voorhees, C., & Calantone, R. (2015). Online brand community engagement: Scale development and validation. *Journal of Business Research*, 68(5), 978-985.

Calder, B.J., Malthouse, E.C., & Schaedel, U. (2009). An Experimental Study of the Relationship between Online Engagment and Advertising Effectiveness. *Journal of Interactive Marketing*, 23, 321-331.

Close, A. G. (2012). *Online Consumer Behavior: Theory and Research in Social Media, Advertising and E-tail*. New York, NY: Routledge.

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.

Csikszentmihalyi, M. (1977). *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13, 319-340.

Dick, A.S., & Basu, K. (1994). Customer loyalty: Toward and integrated conceptual framework. *Journal of the Academy of Marketing Science*, 22(2), 99-113.

Dodds, W.B., Monroe, K.B., & Grewal, P. (1991). Effects of price, brand and store information on buyer's product evaluations. *Journal of Marketing Research*, 28(3), 307-319.

Edison, S.W., & Geissler, G.L. (2003). Measuring attitudes toward general technology: antecedents, hypotheses and scale development. *Journal of Targeting, Measurement and Analysis for Marketing*, 12 (2), 137-156.

Gremler, D.D., & Gwinner, K.P. (2000). Customer-Employee Rapport in Service Relationships. *Journal of Service Research*, 3(1), 82-104.

Gupta, M., Brantley, A., & Jackson, V.P. (2010). Product involvement as a predictor of Generation Y consumer decision making styles. *The Business Review*, 14 (2), 28-33.

Gurau, C. (2012). A life-stage analysis of consumer loyalty profile: comparing Generation X and Millennial consumers. *Journal of Consumer Marketing*, 29(2), 103-113.

Hair, J., Black, B., Babin, B., Anderson. R., & Tatham, R. (1998). *Multivariate Data Analysis*. Englewood Cliffs, NJ: Prentice-Hall.

Hershatter, A., & Epstein, M. (2010). Millennials and the world of work: an organization and management perspective. *Journal of Business Psychology*, 25(2), 211-223.

Hollebeek, L.D. (2011). Demystifying Customer Brand Engament: Exploring the Loyalty Nexus. *Journal of Marketing Management*, 27 (7/8), 785-807.

Igbaria, M., & Parasuraman, S. (1989). A path analytic study of individual characteristics, computer anxiety and attitudes toward microcomputers. *Journal of Management*, 15(3), 373-388.

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, CA: Sage Publishing.

Kotler, P., & Armstrong, G. (1999). *Principles of marketing* (14th ed.). Upper Saddle River, NJ: Prentice-Hall Pearson.

Koufaris, M. (2002). Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research*, 13, 205-223.

Kumar, A., & Lim, H. (2008). Age differences in mobile service perceptions: Comparison of Generation Y and Baby Boomers. *Journal of Services Marketing*, 22 (7), 568-577.

Lancaster, L.C., & Stillman, D. (2002). *When generations collide: Who they are, why they clash, how to solve the generational puzzle at work*. New York, NY: Harper Business.

Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010). *Social Media & Mobile Internet Use among Teens and Young Adults.* Pew Internet and American Life Project.

Levenson, A.R. (2010). Millennials and the world of work: An economist's perspective. *Journal of Business & Psychology*, 25, 257-264.

Lu, J., Yao, J.E., & Yu, C.S. (2005). Personal innovativeness, social influences and adoption of wireless internet services via mobile technology. *Journal of Strategic Information Systems*, 14, 245-268.

Miotto, A., Lessiter, J., Freeman, J., Carmichael, R., & Ferrari, E. (2013). Cognitive training via interactive television: drivers, barriers and potential users. *Universal Access in the Information Society*, 12, 37-54.

Oliver, R.L. (1999). Whence customer loyalty?. *Journal of Marketing*, 63, 33-44.

Palfrey, J., & Gasser, U. (2008). *Born digital: Understanding the first generation of digital natives*. New York, NY: Basic Books.

Perse, E., & Ferguson, D. (2000). The benefits and costs of web surfing. *Communication Quarterly*, 48, 343-359.

Prensky, M. (2001). *Digital game-based learning*. New York, NY: McGraw-Hill.

Riegner, C. (2007). Word of mouth on the web: The impact of Web 2.0. on consumer purchase decisions. *Journal of Advertising Research*, 47(4), 436-447.

See-To, E.W., Papagiannidis, S., & Cho, V. (2012). User experience on mobile video appreciation: How to engross users and to enhance their enjoyment in watching mobile video chips. *Technological Forecasting & Social Change*, 79, 1484-1494.

Sharafi, P., Hedman, L., & Montgomery, H. (2006). Using Information Technology: Engagement Modes, Flow Experience and Personality Orientations. *Computers in Human Behavior*, 22, 899-916.

Shin, D.-H. (2009). Towards an understanding of the consumer acceptance of mobile wallet. *Computers in Human Behavior*, 25, 1343-1354.

Strauss, W., & Howe, N. (1991). *Generations: The history of America's future: 1584 to 2069*. New York, NY: William Morrow & Company.

Twenge, J. M. (2010). A review of the empirical evidence on generational differences in work attitudes. *Journal of Business & Psychology*, 25, 201-210.

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

Valenzuela, S., Park, N., & Kee, K.F. (2009). Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust and participation. *Journal of Computer-Mediated Communications*, 14 (4), 875-901.

Venkatesh, V., Morris, M.G., Davis, G.B., & Davis, F.D. (2003). User Acceptance of Information Technology: Toward and Unified View. *MIS Quarterly*, 27 (3), 425-478.

Venkatesh, V., Thong, J.Y., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, 36 (1), 157-178.

Wolburg, J.M., & Pokrywcznski, J. (2001). A psychographic analysis of Generation Y college students. *Journal of Advertising Research*, 41(5), 33-52.

Wilson, M., & Gerber, L. E. (2008). How generational theory can improve teaching: Strategies for working with the Millennials. *Currents in Teaching and Learning*, 1(1), 29-44.