Chapter

Intention to Use WhatsApp

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Abstract

More than 1.8 billion people use WhatsApp nowadays, out of which 70% uses it daily. In this scenario, this study seeks modeling the variables that positively influence the intention to use WhatsApp. To this end, 579 surveys based on the unified theory of acceptance and use of technology are conducted. The descriptive results show that individuals use WhatsApp mainly motivated by leisure. In this sense, according to the structural equation model, the variable with the greatest influence on behavioral intention is hedonic motivation, followed by social influence, performance expectancy, and effort expectancy. These results indicate that most people use WhatsApp principally because they find it fun, enjoyable, and very entertaining, something more inherent to an entertainment application than to a messaging application. Nevertheless, a cluster analysis indicates the existence of two consumer segments: one showing a certain indifference and disagreement regarding the usefulness of WhatsApp for their activities and duties and the other manifesting that it uses WhatsApp not only for leisure but also for work, academic, and informative reasons. These differences in consumer drivers might have a great impact on WhatsApp and its competition marketing strategies.

Keywords: WhatsApp, social computing, leisure, social network, mobile apps

1. Introduction

It has become increasingly common to see people interacting with their smartphones while performing other activities at any time and place. There are millions of applications that can be used to keep in contact with family and friends, order food, take a taxi, book a hotel, set up a blind date, or simply to be reachable at work. However, despite this wide variety of applications and content to be created and visited, it is not surprising that most of the time spent on the phone is destined to the use of social networks. According to [1], smartphone, along with its cousin, tablet and a fast-expanding family of wearables and other smart devices are transforming the way people live, work, play, connect, and interact. Martin [2] suggests that the time spent in the digital world on mobile devices such as smartphones and tablets is longer than the time spent on traditional devices such as computers and laptops, in some countries like Indonesia or India, where the use of smartphones and tablets accounts for 90% of the time spent on digital media. Undoubtedly, this is due to a greater access to these devices, with increasingly cheaper purchasing options and better features, to the extent that today these technologies can perfectly replace laptops for many people. Additionally, another factor that indeed played an important role in the increased use of mobile devices is mobile apps. In this sense, we can confirm that mobile devices definitely changed digital entertainment.

The influence of mobile apps is evidenced by the fact that their use represents more than 90% of the time spent on smartphones and tablets, with Latin American countries on the top of the list: Argentina (94%), Mexico (92%), and Brazil (89%). In addition, mobile devices are used more than traditional devices like computers to access the digital world. This behavior is common in users of all ages, but it is more concentrated in women [2]. Regarding the reach of mobile apps, the app universe is dominated by a small group, with 96% of the time spent on no more than 10 apps [2], most of them corresponding to social networks such as Facebook, Instagram, and WhatsApp.

In connection, according to Smith [3], Facebook has more than 2.234 billion active users per month. Sixty-six percent of these users use the app daily, out of which 51% visit it several times per day, which translates to more than 2 trillion posts and 1.13 trillion likes since the launch of the app.

Another popular social network is Instagram. This app has 1 billion active users per month. Twenty-two percent of them use it daily, out of which 38% check the app multiple times during the day [3].

For its part, WhatsApp, a free app that offers messaging and calls in a simple, safe, and reliable way to phones all over the world, has more than 1.8 billion active users. Seventy percent of them use the app daily, which translates into 65 billion messages sent, 100 million voice calls, and 55 million video calls per day [3].

These data seem to indicate that the use of WhatsApp is more intensive than other popular social networks, even though it is not the most popular social network, and some people could categorize it as a messaging application instead of a social network. In view of this, the research question that arises is what makes users prefer this social network? Is an attractive proposal and design enough to capture a large quantity of people, or there is something else in play? Is it only on the users to decide what social networks will be used? This study seeks to answer these questions, specifically regarding the intention to use WhatsApp and using an adaptation of the technology acceptance model known as UTAUT2 to achieve this goal [4].

2. Development

2.1 Background

Created as an extension to the world of the theory of reasoned action [5], the technology acceptance model [6] corresponds to one of the most renowned, analyzed, and studied models in the literature. This model seeks to understand how and why users accept and use a technology, using perceived ease of use and perceived usefulness as prediction variables of the intention to use. TAM2 was created after TAM and explains the intentions to use a specific technology in terms of social influence and cognitive processes [7]. To this end, the model incorporates constructs such as subjective norm, image, job relevance, output quality, result demonstrability, experience, and voluntariness. Three years later, the unified theory of acceptance and use of technology come to the fore [8]. This theory seeks to predict the intention to use through the variable performance expectancy, effort expectancy, and social influence, which are defined in a way very similar to perceived usefulness, perceived ease of use, and subjective norm, respectively. This set of variables adds up to facilitating conditions, which have a direct effect on usage behavior, and is defined as the extent to which the individual believes that certain organizational and technical infrastructures exist to support the use of a system [8]. Two new variables incorporated into the model correspond to gender and age, which are moderating variables, as well as experience and voluntariness. The

UTAUT2 emerged more recently, as an extension of the UTAUT and to study the acceptance and use of technologies in a consumption context [4]. This model incorporates three new variables, namely, hedonic motivation, price value, and habit.

As for social networks, several authors attempt to explain the use of online social networks (OSNs). According to Schneider et al. [9], users commonly spend more than half an hour interacting with OSNs, and the byte contributions per OSN session are relatively small. From this result, we could assume that most users are consumers and not content creators. In the case of Facebook, Ellison et al. [10] propose that this network might provide greater benefits for users experiencing low self-esteem and low life satisfaction. As for Twitter, Java et al. [11] suggest that people use microblogging to talk about their daily activities and to seek or share information. With respect to Instagram, motives were positively associated with both usage and self-presentation [12]. People use social networks such as Facebook, Twitter, and Instagram for the sole purpose of entertainment and maintaining contacts with their friends' list [13]. As may be seen, the motivations to use social networks are varied. According to Brandtzæg and Heim [14], people use social networks to get in contact with new people, to keep in touch with their friends, and general socializing, and this could be closely related to the variable social influence proposed as a latent exogenous variable in the UTAUT2 [4]. Xu et al. [15] also suggested that user utilitarian gratifications of immediate access and coordination; hedonic gratifications of affection and leisure—which could be related to perceived usefulness and perceived ease of use, respectively; and website social presence were three positive predictors of social network site usage.

Regarding WhatsApp, there are specific motivators linked to cost, sense of community, and immediacy [16], as well as to unlocking new opportunities for intimate communication [17]; addictive behaviors have even been detected toward the application [18]. A number of studies about the use of this innovative technology have been conducted [19], which have detected a series of factors that positively or negatively influence the use of WhatsApp, such as the importance of family groups [20], the use of status within the application [21], interactions with the education field [22, 23], and concerns about privacy [24], among others. This study intends to analyze WhatsApp consumer behavior from the perspective of the variables that influence the intention to use this technology and to determine what these variables are and how they articulate to affect the intention to use WhatsApp, using the variables proposed in the UTAUT2 model [4].

2.2 Methodology

The proposed model considers the following latent exogenous variables that explain the intention to use WhatsApp. The model proposes that the following four variables positively influence the latent endogenous variable behavior.

H1: Hedonic motivation is defined as the pleasure individuals feel when they behave in a certain way or perform a specific activity [25].

H2: Performance expectancy is the extent to which using a technology will provide benefits to consumers in performing certain activities [4].

H3: Effort expectancy is the degree of ease associated with the consumers' use of technology [4].

H4: Social influence is the extent to which consumers perceive that importantly others believe that they should use a particular technology [4]. This social influence or subjective norm is closely related to the intention to use a social network [26–28].

Behavioral intention is defined as the set of motivational factors that indicate how willing people are to try or how much effort people intend to put forth to develop a particular behavior [29].

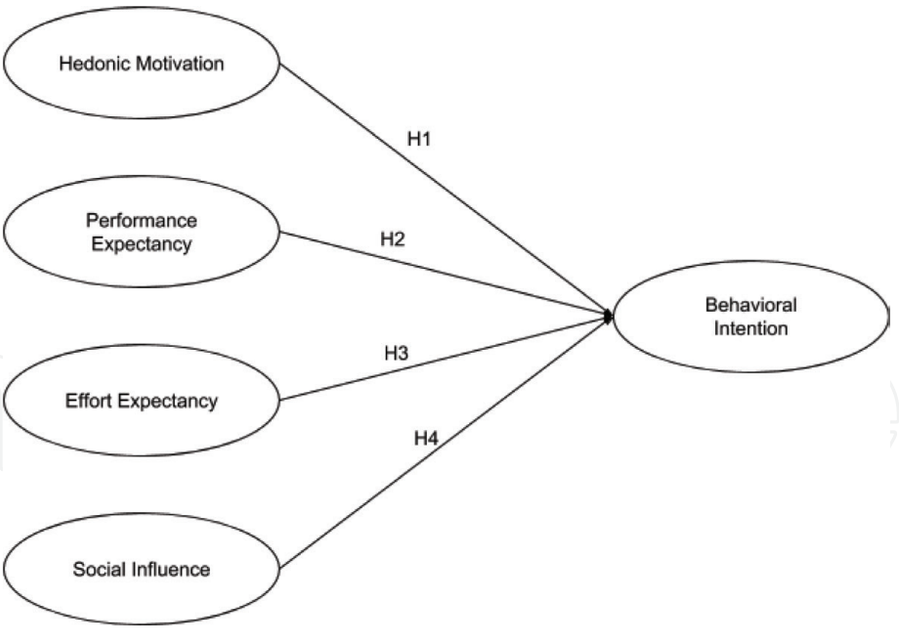

Figure 1.
Proposed model.

The structural model with the latent variables and their proposed relationships is shown in **Figure 1**.

In relation to the latent variables included in the structural model, **Table 1** shows the observable variables measured in the questionnaire. It must be noted that these variables were measured through a Likert scale that ranged from 1 to 5, where 1 means "totally disagree" and 5 "totally agree."

The first four variables refer to performance expectancy, while the four next questions refer to effort expectancy. Then, the following three variables refer to hedonic motivation and the next three to social influence. Finally, the last three questions refer to the behavioral intention of using WhatsApp. The questionnaire also contains variables to measure demographic information such as sex, age, and level of education completed, as well as questions to measure behavioral variables such as the number of hours per day spent using WhatsApp and the number of times per day that respondents use this application.

To conduct this study, a questionnaire was applied that contained the observable variables described above, as well as the questions for demographic characterization. The instrument was applied to 579 people through SurveyMonkey. Sampling was non-probabilistic and by convenience and targeted young people who use the Internet and social networks. The survey was sent through these two channels.

Once answers were collected, a univariate analysis was conducted to obtain the respondents' profile. Afterward, the reliability and internal consistency of each proposed construct were assessed by a Cronbach's alpha test. Finally, the structural analysis proposed in **Figure 1** was carried out using the software IBM SPSS Amos, taking care to obtain adequate absolute, incremental, and parsimony adjustments. Once the structural equation model analysis was completed, a cluster segmentation analysis was executed to determine the different profiles of WhatsApp users based on the answers of the attitude variables proposed in the model.

2.3 Results

First, with respect to the descriptive analysis of the questionnaire answers and as mentioned above, 579 questionnaires were filled out. Fifty-seven percent

I find WhatsApp useful in my daily life
Using WhatsApp increases my chances of achieving things that are important to me
Using WhatsApp helps me accomplish things more quickly
Using WhatsApp increases my productivity
Learning how to use WhatsApp is easy for me
My interaction with WhatsApp is clear and understandable
I find WhatsApp easy to use
It is easy for me to become skillful at using WhatsApp
Using WhatsApp is fun
Using WhatsApp is enjoyable
Using WhatsApp is very entertaining
People who are important to me think that I should use WhatsApp
People who influence my behavior think that I should use WhatsApp
People whose opinions that I value prefer that I use WhatsApp
I intend to continue using WhatsApp in the future
I will always try to use WhatsApp in my daily life
I plan to continue to use WhatsApp frequently

Table 1.
Observed variables.

of respondents are women, 60% of the sample are university students, and 25% completed higher education. In terms of age, the sample is concentrated in an age range from 20 to 40 years, with a mean age of 25.6 years.

Regarding the total of respondents, as shown in **Figure 2**, 62.3% express using WhatsApp for leisure, followed by 23.4% that use it for informative purposes.

When comparing the motives to use WhatsApp by sex, the trend remains constant, with 62.4% of men using WhatsApp for leisure, against 57.5% of women. No significant differences are observed by age and educational level.

Regarding frequency of use, most people report using WhatsApp several times per day (89%): 90.4% for women and 87.1% for men. In this same line, with respect to the observable variables of intention to use, 58.4% of men and 63.6% of women declare totally agreeing that they will continue to use WhatsApp in the future (I intend to continue using WhatsApp in the future), 36.4% of men and 40.0% of women totally agree that they use WhatsApp in their daily life (I will always try to use WhatsApp in my daily life), and 48.0% of men and 53.5% of women declare total agreement with using WhatsApp frequently (I plan to continue to use WhatsApp frequently). In sum, for the three observable variables of the factor intention to use, the percentage of women who totally agree is slightly higher than that of men, and therefore, we can assume that women are more likely to keep using WhatsApp in the future. As seen in the first section, women tend to use mobile devices to access online content more than men, and this trend evidently replicates itself in the use of a mobile app like WhatsApp.

Continuing with the analysis, a Cronbach's alpha reliability test is conducted. Results for each of the four factors proposed in the model from **Figure 1** as latent exogenous variables and the latent endogenous variable behavioral intention are shown in **Table 2**.

All five structural variables yielded satisfactory results in terms of construct reliability, with results over 0.700 in all cases.

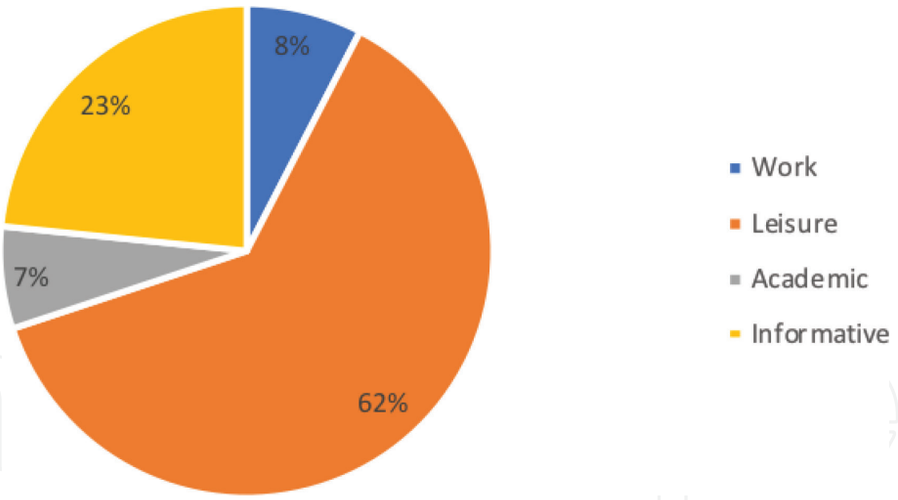

Figure 2.
Main reason why WhatsApp is used.

Performance expectancy	0.736
Effort expectancy	0.801
Social influence	0.867
Hedonic motivation	0.725
Behavioral intention	0.812

Table 2.
Cronbach's α reliability analysis.

Subsequently, the structural model was analyzed using IBM SPSS Amos, obtaining adequate absolute, incremental, and parsimony adjustment. **Figure 3** shows the structural equation modeling, in which all relations proposed are significant (p value < 0.001).

As shown in **Figure 3**, the model reaches R2 = 0.52 to model behavioral intention. In this sense, the most influencing variable is hedonic motivation, with a standardized regression weight of 0.499. Consequently, people use WhatsApp mainly motivated by pleasure, entertainment, and leisure. This is also related to the 62.3% of the sample that stated using WhatsApp for leisure. The other variables that explain the behavioral intention to use this instant messaging application are social influence with a standardized estimate of 0.333, followed by performance expectancy (0.305) and effort expectancy (0.256).

Revising observable variables, it must be noted first that for the factor hedonic motivation, the variable "using WhatsApp is fun" obtains a very high mean of 4.37, while the mode is 5, that is, "totally agree." Indeed, people find that using this app is fun (**Table 3**).

Additionally, it is interesting to observe social influence, in which the variable "people who are important to me think that I should use WhatsApp" obtains a mean of 3.57 and a mode of 3, which implies a certain degree of indifference to social influence. In fact, if the three observable variables of social influence are considered, the mean obtained is 3.75. This might be explained by the fact that individuals do not consider others' opinions to be very relevant when using WhatsApp. This is supported by the standardized regression coefficient 0.333 for this latent exogenous variable in the structural equation model, which albeit statistically significantly does not represent a high impact. A second reading of these results shows that people who are important to the respondent might not approve of the use of

Figure 3.
Result model.

	Mean	Std. deviation
Using WhatsApp is fun	4.37	0.84
Using WhatsApp is enjoyable	4.28	0.89
Using WhatsApp is very entertaining	4.28	0.83

Table 3.
Observable variables of hedonic motivation.

WhatsApp by the respondent, shedding some light on a control problem related to this behavior or perhaps an addiction, as mentioned in the literature review. A third reading leads us to conclude that as WhatsApp is widely used, the opinion of people important to the individual is not absolutely important to him, and what would probably matter would be whether those people use the app. Regardless of the underlying reason, the result is relevant because WhatsApp is an application that allows people to communicate with family and friends, and therefore, a high valuation was expected (between 4 and 5) for the social influence factor (**Table 4**).

Regarding the observable variables of effort expectancy, **Table 5** shows that all have a rather high mean, between 4 and 5, with a standard deviation lower than 0.80 in all cases. In fact, WhatsApp is perceived as easy to use, which, according to the structural equation model, positively contributes to the intention to use the application but to a lesser extent than the other latent variables proposed in the model.

In the case of performance expectancy, it is noteworthy that the observable variable "using WhatsApp increases my productivity" has a high dispersion, with a standard deviation of 1.366 and a mean of 3.07. This casts some doubts on the applicability of the variable to a technology of these characteristics. However, if this variable is removed from the study, the scale of performance expectancy maintains a Cronbach's α of 0.783; therefore, it should not be eliminated. Considering the high dispersion of the answers represented in the standard deviation, we will delve into this point by means of a cluster analysis, since the existence of different segments could help understand this result (**Table 6**).

	Mean	Std. deviation
People who are important to me think that I should use WhatsApp	3.85	1.07
People who influence my behavior think that I should use WhatsApp	3.57	1.09
People whose opinions that I value prefer that I use WhatsApp	3.84	1.08

Table 4.
Observable variables of social influence.

	Mean	Std. deviation
Learning how to use WhatsApp is easy for me	4.66	0.74
My interaction with WhatsApp is clear and understandable	4.54	0.74
I find WhatsApp easy to use	4.68	0.71
It is easy for me to become skillful at using WhatsApp	4.58	0.80

Table 5.
Observable variables of effort expectancy.

	Mean	Std. deviation
I find WhatsApp useful in my daily life	4.47	0.86
Using WhatsApp increases my chances of achieving things that are important to me	3.72	1.21
Using WhatsApp helps me accomplish things more quickly	4.02	1.12
Using WhatsApp increases my productivity	3.07	1.37

Table 6.
Observable variables of performance expectancy.

With the aim of elaborating on the results, a cluster analysis is conducted based on the observable variables of the proposed model. Two segments were found, which do not differ in sex or age but in the usefulness perception of WhatsApp. The values of the four observable variables of performance expectancy are presented in **Table 7**.

A very low valuation by users from Cluster 1 is observed for the variables "using WhatsApp increases my chances of achieving things that are important to me," "using WhatsApp increases my productivity," and "using WhatsApp helps me accomplish things more quickly." This seems to point to the existence of a certain degree of indifference and even disagreement with the contribution of WhatsApp in terms of productivity and utility for the user. In other words, although people from Cluster 1 perceive WhatsApp as useful for their daily routine, this usefulness is not understood as a contribution to their productivity and performance in matters important to them but as a self-referential usefulness. This is completely in agreement with the results, which indicate that people use WhatsApp motivated mainly by leisure, as observed in the first part of the analysis. In addition, individuals from Cluster 1 declare that WhatsApp is a useful app, but it does not help them in their tasks. From this, the following question arises: what is it useful for? Probably this answer has to do with certain degree of causality over other variables, for example, WhatsApp is useful to reach friends or to entertain yourself. But, it is definitely useful in contexts linked to leisure and unrelated to the user's productivity and duties.

It must be also noted that the highest educational level completed by people from Cluster 1 is concentrated in university education and secondary education, while Cluster 2 users have university education and postgraduate studies. This can help explain the differences in performance expectancy, since Cluster 1, represented by university students, does not perceive WhatsApp as a support to its tasks and duties, while Cluster 2, represented by people already in the world of work, does see WhatsApp as a supporting tool for their activities and obligations. This leads us to believe that albeit not the focus of this study, WhatsApp could have a positioning associated with social network and leisure for Cluster 1 and one associated with a messaging app for Cluster 2.

When analyzing the main motive that each cluster has for using WhatsApp, the trend remains constant, with leisure as the dominant motive for Cluster 1 (72.5%) and Cluster 2 (56.4%), although the percentage is slightly lower in the latter, as shown in **Table 8**.

Even when in both cases the major motivation is leisure, it must be noted that differences exist in terms of the distribution of the same. In the case of Cluster 2, the other motives become important, particularly the motive "informative" (21.4%). Moreover, if we had a dichotomy between leisure and non-leisure, in which non-leisure comprises work, study, and information, Cluster 2 would be totally balanced between people who use WhatsApp for leisure and people who use it for other reasons. This obviously helps understand the differences between both segments with respect to the latent exogenous variable "performance expectancy."

Then, an analysis of structural equations is performed seeking to test the proposed model through the samples of the two separate clusters. In this regard, although model fit indices are not optimal, it is necessary to emphasize that the relative weight of each latent exogenous variable on the intention to use WhatsApp responds to the differences shown by both clusters in the previous descriptive analysis. **Figures 4** and **5** show the results of each analysis of structural equations for each cluster.

As shown in **Figure 4**, the most influencing variable is hedonic motivation, with a standardized regression weight of 0.448. Consequently, Cluster 1 uses WhatsApp

	Cluster 1	**Cluster 2**
I find WhatsApp useful in my daily life	4.01	4.83
Using WhatsApp increases my chances of achieving things that are important to me	2.8	4.21
Using WhatsApp helps me accomplish things more quickly	3.22	4.54
Using WhatsApp increases my productivity	2.3	3.55

Table 7.
Cluster analysis and performance expectancy.

	Cluster 1 (%)	**Cluster 2 (%)**
Work	7.0	10.7
Leisure	72.5	56.4
Academic	4.2	11.4
Informative	16.2	21.4

Table 8.
Cluster analysis and motivation.

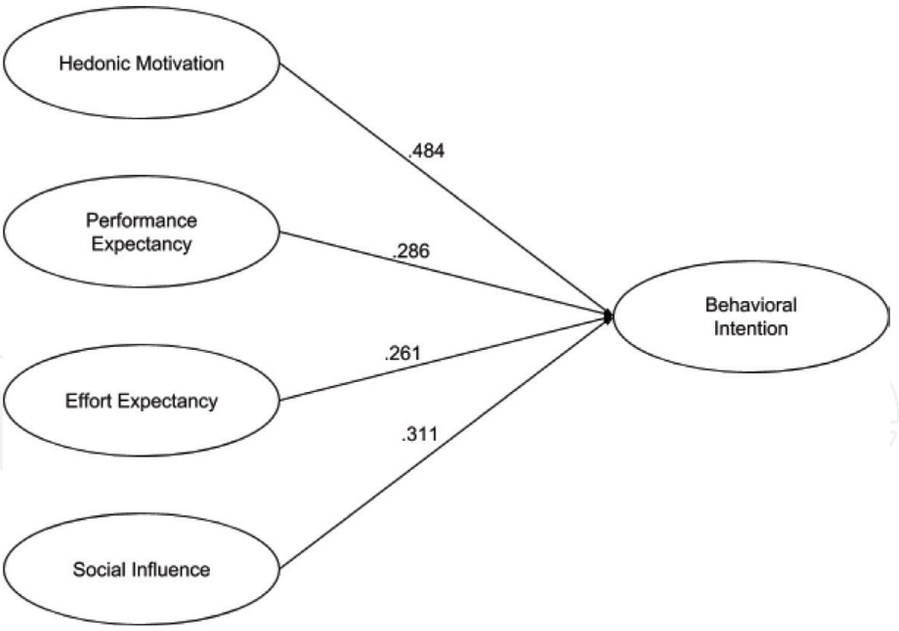

Figure 4.
Cluster 1 result model.

Figure 5.
Cluster 2 result model.

mainly motivated by pleasure, entertainment, and leisure. This is also related to the 72.5% of the cluster that stated using WhatsApp for leisure. The other variables that explain the behavioral intention to use this instant messaging application are social influence with a standardized estimate of 0.311, followed by performance expectancy (0.386) and effort expectancy (0.261). As can be seen, Cluster 1 highlights the importance of hedonic motivation against the other variables with respect to the total sample.

As shown in **Figure 5**, the most influencing variable is hedonic motivation, with a standardized regression weight of 0.442. Consequently, Cluster 2 also uses WhatsApp mainly motivated by pleasure, entertainment, and leisure. This is also related to more than a half of the cluster stated using WhatsApp for leisure. The other variables that explain the behavioral intention to use this instant messaging

application are social influence with a standardized estimate of 0.272, followed by performance expectancy (0.351) and effort expectancy (0.321). As can be seen, this cluster also highlights the importance of hedonic motivation against the other variables with respect to the total sample, but there is an increase in the relative weight of the effort expectancy.

To close this point, the results obtained invite us to revise whether the observable variables proposed for performance expectancy can be applied to a technology that is perceived as pertaining to leisure and entertainment.

3. Conclusions

Based on the results of this study, we observe that the most influential variable for the intention to use WhatsApp is hedonic motivation, i.e., people use WhatsApp because it is fun, enjoyable, and very entertaining. This adds up to what is expressed by respondents, who report that their main motivation to use WhatsApp is leisure, which lead us to think that this application is seen more as an entertainment than a communication tool or, in other words, people use this app to communicate with people they are close to and seek entertainment in that interaction, as well as new opportunities for intimate communication [17].

Although all the variables are significant in the proposed model, the low impact of the variable social influence must be highlighted, as this was expected to be much more influential, considering that WhatsApp is an instant messaging application that does not work if people important to the user are not using it. This may indicate that social influence, in the case of an application already in use, translates into whether or not people important to the user's decision-making process use the app and is not related to the opinion these people have regarding the user's conduct.

Furthermore, the variability of the responses in the observable variables of the dimension performance expectancy seems to indicate that WhatsApp may have use drivers that vary among groups of people. To support this hypothesis, the cluster analysis yields two groups of users, whose main difference is related to the valuation of the observable variables of the dimension performance expectancy as well as the main motivation to use this application. As mentioned above, people in general use WhatsApp for leisure and entertainment; however, a great part of Cluster 2 declares that they use the app for motives other than leisure. Consequently, Cluster 1 presents valuations of indifference and disagreement regarding the usefulness of WhatsApp for their activities and duties. Consequently, there are at least two different segments of WhatsApp users motivated by different reasons, even though cross-cutting leisure and entertainment is the main motivation to continue using this technology.

From an AI/ML perspective, this study helps to guide the way in which the software behind WhatsApp should conduct their different learning processes about the user. Indeed, if we consider the results described above where hedonic motivation and social influence are the variables with the greatest influence on behavioral intention, WhatsApp should aim to develop its ML in the sense of generating updates that allow greater fun and entertainment to its users, with virtual reality features, camera filters, new emojis, photo effects and filters, and even games. In summary, WhatsApp could guide their ML to know in a better way how the user enjoys using WhatsApp, making it an increasingly entertaining mobile application.

Likewise, considering the social influence, WhatsApp should guide its AI toward a greater social role as a messaging application, similar to Facebook and other social networks, where the user can connect with new "recommended friends," for example, according to their common interests and according to the number of

contacts in common. In summary, the development of AI in WhatsApp could be oriented to a social network role over a simple instant messaging application.

Finally, the present chapter helps to understand what variables are involved in the behavior of users of these applications, information that can be used for the development of AI/ML ability of this application, making it adaptive to the needs of the user that can vary according to the context and the expected benefit, as our cluster analysis shows, ergo, to find ways to present the right service at the right time and with the right quality [30]. As stated before, this study also evidences the existence of consumer clusters in which users satisfy different needs with this mobile application, which indeed represents new opportunities for similar applications that aim to challenge the dominance of WhatsApp on the instant messaging field.

Acknowledgements

WhatsApp, Instagram, and Facebook are registered trademarks, and the author only uses them as a reference in his study due to the high level of use by the world population.

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References

[1] Bock W, Field D, Zwillenberg P, Rogers K: The growth of the global mobile internet economy: The connected world. The Boston Consulting Group [Internet]. 2015. Available from: https://www.bcg.com/publications/2015/technology-industries-growth-global-mobile-internet-economy.aspx [Accessed: August 29, 2018]

[2] Martin B. The Global Mobile Report. comScore [Internet]. 2017. Available from: https://www.comscore.com/Insights/Presentations-and-Whitepapers/2017/The-Global-Mobile-Report [Accessed: August 29, 2018]

[3] Smith C. DMR [Internet]. 2018. Available from: http://expandedramblings.com [Accessed: August 22, 2018]

[4] Venkatesh V, Thong J, Xu X. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. MIS Quarterly. 2012;**36**(1):157-178

[5] Fishbein M, Ajzen I. Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. 4th ed. Vol. 578. Reading, MA: Addison-Wesley; 1980

[6] Davis F. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly. 1989;**13**(3):319-340

[7] Venkatesh V, Davis F. A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science. 2000;**46**(2):186-204

[8] Venkatesh V, Morris M, Davis G, Davis F. User acceptance of information technology: Toward a unified view. MIS Quarterly. 2003;**27**(3):425-478. DOI: 10.2307/30036540

[9] Schneider F, Feldmann A, Krishnamurthy B, Willinger W. Understanding online social network usage from a network perspective. In: Proceedings of the 9th ACM SIGCOMM Conference on Internet Measurement; November 2009; Chicago, Illinois, USA. pp. 35-48

[10] Ellison N, Steinfield C, Lampe C. The benefits of facebook "friends": Social capital and college students' use of online social network sites. Journal of Computer-Mediated Communication. 2007;**12**(4):1143-1168. DOI: 10.1111/j.1083-6101.2007.00367.x

[11] Java A, Song X, Finin T, Tseng B. Why we twitter: Understanding microblogging usage and communities. In: Proceedings of the 9th WebKDD and 1st SNA-KDD 2007 Workshop on Web Mining and Social Network Analysis; August 2007; San Jose, California: ACM. pp. 56-65

[12] Cheung T. A study on motives, usage, self-presentation and number of followers on Instagram [thesis]. Hong Kong: City University of Hong Kong; 2014

[13] Narula S, Jindal N. Use of social network sites by AUMP students: A comparative study on Facebook, Twitter and Instagram usage. Journal of Advanced Research. 2015;**2**(2):20-24

[14] Brandtzæg P, Heim J. Why people use social networking sites. Online Communities and Social Computing. 2009;**5621**:143-152. DOI: 10.1007/978-3-642-02774-1_16

[15] Xu C, Ryan S, Prybutok V, Wen C. It is not for fun: An examination of social network site usage. Information and Management. 2012;**49**(5):210-217. DOI: 10.1016/j.im.2012.05.001

[16] Church K, de Oliveira R. What's up with WhatsApp?: Comparing mobile

instant messaging behaviors with traditional SMS. In: Proceedings of the 15th International Conference on Human-Computer Interaction with Mobile Devices and Services; August 2013; Munich, Germany. pp. 352-361

[17] Karapanos E, Teixeira P, Gouveia R. Need fulfillment and experiences on social media: A case on Facebook and WhatsApp. Computers in Human Behavior. 2016;**55**:888-897. DOI: 10.1016/j.chb.2015.10.015

[18] Sultan A. Addiction to mobile text messaging applications is nothing to "lol" about. The Social Science Journal. 2014;**51**(1):57-69. DOI: 10.1016/j.soscij.2013.09.003

[19] Pielot M, de Oliveira R, Kwak H, Oliver N. Didn't you see my message?: Predicting attentiveness to mobile instant messages. In: Proceedings of the 32nd Annual ACM Conference on Human Factors in Computing Systems; May 2014; Toronto, Ontario, Canada. pp. 3319-3328

[20] Aharony N, Gazit T. The importance of the WhatsApp family group: An exploratory analysis. Aslib Journal of Information Management. 2016;**68**(2):174-192. DOI: 10.1108/AJIM-09-2015-0142

[21] Sánchez-Moya A, Cruz-Moya O. "Hey there! I am using WhatsApp": A preliminary study of recurrent discursive realisations in a corpus of WhatsApp statuses. Procedia - Social and Behavioral Sciences. 2015;**212**:52-60. DOI: 10.1016/j.sbspro.2015.11.298

[22] Bouhnik D, Deshen M. WhatsApp goes to school: Mobile instant messaging between teachers and students. Journal of Information Technology Education Research. 2014;**13**:217-231

[23] So S. Mobile instant messaging support for teaching and learning in higher education. The Internet and Higher Education. 2016;**31**:32-42. DOI: 10.1016/j.iheduc.2016.06.001

[24] Rashidi Y, Vanie, K, Camp L. Understanding Saudis' privacy concerns when using WhatsApp. In: Proceedings of the Workshop on Usable Security (USEC'16); February 2016; San Diego, California, USA. pp. 1-8

[25] Moon J, Kim Y. Extending the TAM for a world-wide-web context. Information and Management. 2001;**38**(4):217-230. DOI: 10.1016/S0378-7206(00)00061-6

[26] Chen Y. See you on Facebook: Exploring influences on Facebook continuous usage. Behaviour & Information Technology. 2014;**33**(11):1208-1218. DOI: 10.1080/0144929X.2013.826737

[27] Li D. Online social network acceptance: A social perspective. Internet Research. 2011;**21**(5):562-580. DOI: 10.1108/10662241111176371

[28] Pelling E, White K. The theory of planned behavior applied to young people's use of social networking web sites. CyberPsycholy & Behaviour. 2009;**12**(6):755-759. DOI: 10.1089/cpb.2009.0109

[29] Ajzen I. The theory of planned behavior. Organizational Behavior and Human Decision Processes. 1991;**50**(2):179-211. DOI: 10.1016/0749-5978(91)90020-T

[30] Harkut, D. (2011). e-CRM–Data Modeling Using Adaptive Neuro Fuzzy model. International Journal of Business and Information Technology. **1**(2): 130-136