

## Research Article

# The Influence of Social Networks on the Development of Recruitment Actions that Favor User Interface Design and Conversions in Mobile Applications Powered by Linked Data

Pedro R. Palos-Sanchez <sup>1,2</sup>, Jose Ramon Saura <sup>3</sup>, and Felipe Debasa <sup>4</sup>

<sup>1</sup>Department of Business Management, University of Extremadura, Av. Universidad, s/n, 10003 Cáceres, Spain

<sup>2</sup>Department of Business Organization, Marketing and Market Research, International University of La Rioja, Av. de la Paz 137, 26006 Logroño, Spain

<sup>3</sup>Department of Business and Economics, Rey Juan Carlos University, Madrid, Spain

<sup>4</sup>Department of Contemporary History and Actual World, Rey Juan Carlos University, Madrid, Spain

Correspondence should be addressed to Pedro R. Palos-Sanchez; [ppalos@unex.es](mailto:ppalos@unex.es)

Received 30 October 2017; Revised 12 December 2017; Accepted 24 December 2017; Published 19 February 2018

Academic Editor: José J. Pazos-Arias

Copyright © 2018 Pedro R. Palos-Sanchez et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This study analyzes the most important influence factors in the literature, which have the greatest influence on the conversions obtained in a mobile application powered by linked data. With the study of user interface design and a small user survey ( $n = 101,053$ ), we studied the influence of social networks, advertising, and promotional and recruitment actions in conversions for mobile applications powered by linked data. The analysis of the users' behavior and their application in the design of the actions to promote and capture constitutes an important part of the current theories of digital marketing. However, this study shows that its results may be contradictory and depend on other factors and circumstances when mobile applications powered by linked data are considered. The predictive value, reached by the developed model, may be useful for professionals and researchers in the field of digital marketing and the user interface design in mobile applications powered by linked data.

## 1. Introduction

The growing use of digital marketing strategies has led to a great deal of research being published on this subject in the first decade of the 21st century. Research such as that of [1], “The marketing communication and the World Wide Web,” gave rise to various studies of digital technologies and Internet marketing.

Also, over the last few years, there has been a great deal of academic research published in the field of digital mobile marketing that helps us understand what the influencing factors are in order to get conversions from the Internet and mobile applications.

In the work of Saura et al. [2], the concept of conversion in the field of digital marketing is explained in the following way: “Conversion depends on the marketing objective. It

could be a sent form, a click on an ad, or a purchase. It is an objective or goal.” This definition helps us to understand the reasons why companies develop their strategies focusing on obtaining conversions and investigating what influences how conversions are achieved.

Research such as that in [2], comparing new forms of Internet advertising versus off-line media, presents the new digital paradigm and focuses on the relevance of the Internet for mobile phones and mobile applications powered by linked data to compare the objectives achieved both online and off-line. In the work of Järvinen and Karjaluoto [3], the use of web analytics in digital marketing techniques in web pages and mobile applications is studied, and it helps us to understand which factors to measure to obtain conversions. In the work of Jayaram et al. [4], the user's behavior in social media and the influence on mobile devices, digital

campaigns like SEO, the acronym of Search Engine Optimization, and SEM, known as Search Engine Marketing, and mobile applications are analyzed and presented to give a global view of the digital ecosystem. Using the mathematical algorithm developed by Järvinen et al. [5], the effectiveness of SEO and SEM strategies in the financial sector is analyzed, and the algorithm also provides a relevant theoretical framework for the material being studied.

Also, in the study of Kannan and Li [6], a reference framework for digital marketing research that highlights each part of the online strategy process for desktop and mobile devices based on user interface design has been developed with the aim of increasing conversions. The results of the research conclude that emerging mobile technologies, such as linked data, will prospectively be the technologies that will have the greatest impact on the future of mobile digital marketing as they offer ease of use and accessibility and that, consequently, will be more effective in achieving conversions. In addition, the digital marketing strategies SEO and SEM are linked to social networks and user interface design in the framework developed for mobile and fixed devices, which is a fact that is linked to the objectives of the company with the development of these strategies.

Like the work of Saura et al. [2], studies such as [7] focus on the opportunities that digital marketing and the evolution of ICTs (Singular Scientific and Technological Infrastructures) offer to marketing in the mobile era [8] and which could be the future of the techniques that influence achieving conversions.

Likewise, Kireyev et al. [9] investigate the relevance of the brand by analyzing the queries made in search engines. This research reveals the relevance of the number of queries made on search engines that contain the brand name. They [9] also focus on the relationship between brand relevance and queries on Google by users who allowed their search behavior and search history to be monitored while specifying that SEO is a traffic capture strategy and, therefore, could influence the achievement of conversions on a web page or an application powered by linked data.

Mathews et al. [10] analyze the impact of traffic coming from queries in search engines. This research focuses on organic product searches on SERPs (Search Engine Results Pages) in Google and Bing search engines. In the research, a model for the prediction of search results in the retail sector is developed which shows that the names of retailers in organic search results are potentially useful to control the prominence and the impact on the traffic that comes from the SERPs and which is relevant to the objectives of the investigation.

Skiera et al. [11] present an analysis of the importance of “longtail” in SEM, indicating that SEM advertising is one of the most used strategies on the Internet. In the research, three SEM campaigns in three countries are analyzed, monitoring 4408 keywords in 36 weeks, covering a total of 10,014,015 searches and 492,735 clicks. The authors [11] conclude that 20% of all keywords attract 98.16% of the searches and that they also generate 97.21% of all the clicks which the campaign receives, presenting large differences compared to results from downloads by mobile devices

and apps, allowing us to understand what the influence of each type of campaign has on achieving conversions.

Like [4], the research of Roshan et al. [12] aims to analyze the use of social networks in business. It also focuses on companies in times of crisis. Communications from 17 Australian organizations made on Facebook and Twitter are analyzed, in which a total of 15,650 communications are considered. The results of the research suggest that the communications on social media of companies that are in crisis lack the potential awareness to face a crisis using communication in social networks by making use of speed when using mobile technologies powered by linked data, highlighting social networks as a source of quality traffic.

Like [4, 13], the research of Peters et al. [14] defines good practices for social network management in an organization in which a framework is proposed with three main components which define the main social media elements, based on marketing, sociology, and psychology theories, and baptize these terms as “motives,” “content,” “structure” and “roles and interactions,” based on the theoretical framework. The literature review suggests nine steps to evaluate and design an appropriate framework in social media using mobile traffic and applications. The results of this research offer an interesting perspective for the structure of a strategy based on obtaining and increasing the number of conversions by organizing and structuring each of the analytical indicators that influence conversions.

Also, few studies [5, 7, 10] carry out a thorough review of the social networking sector in B2B companies revealing the interest this type of businesses has in social networks. In addition, the results of the investigation indicate that these companies must update their knowledge regarding digital marketing and how to measure and monitor their activity in this area to increase the recruitment actions in mobile devices based on the user interface design and how this affects achieving conversions or goals.

Chunga et al. [15] follow the line of the research of Wang et al. [16], in which an empirical model is developed so that companies can make better decisions in social networks on the management and objectives raised in the strategy of social media marketing based on the interactions of the users of mobile applications for social networks.

Lohtia et al. [17] evaluate the effectiveness of banners and display advertisements on the Internet. The authors develop a data analysis taking into account different inputs and outputs to estimate and measure the efficiency of the banners. The conclusion is that the evaluation of how banners work on the Internet is a complex task since each company has different inputs and outputs when it comes to starting an online advertising campaign. Each click on these banners was considered a conversion.

Like [17, 18], the effects of the banners on the search behavior of the users are investigated based on other investigations that suggest that banners have little or no impact on user behavior and user experience with the interface design of applications powered by linked data. García-Álvarez et al. [19] conclude that the observation and the observation frequency on the banners increase with the perception that the users have of this type of publicity in applications and mobile

phones. This means that users' perception affects the number of conversions that are produced.

This research paper provides scientific evidence of interest to consultants and researchers in digital marketing and, in general, marketing managers and technicians in mobile application development who will find contributions that can help them to identify what the influencing factors are to achieve conversions in mobile applications powered by linked data and to determine a possible model of causal relations that explains why conversions occur.

This research offers the research hypothesis first and then presents and explains the methodology used, the sample, the scales and measurement of variables that form the proposed model of causal relationships, the method of data analysis, the analysis of the measurement model, and finally, the analysis of the results and conclusions.

## 2. Conceptual Framework and Hypothesis Development

As we have shown, the interest of researchers in the categories and subcategories present in digital marketing has been growing as a research topic during the last decade.

In this research, the study is based on the concepts of the use of social networks, Internet advertising, and promotional actions to achieve conversions in mobile applications powered by linked data.

The use of social networks is defined by [19] as an online community that makes it easy to publish, share, and disseminate information as an online collaboration to increase interactions and links to dynamic content on web pages or mobile applications powered by linked data.

Internet advertising is becoming a real fact. Aslam and Karjaluoto [20] indicate that Internet advertising has radically transformed how companies do business, especially with methodologies to increase sales of their products and services on the Internet. The paradigm of advertising now is not from the traditional to the digital but from the digital to the mobile. New advertising formats adapted to new mobile devices are highlighted.

Conversions are defined by Sumita and Zuo in their research [21] on mobile Internet access as an online indicator of particular interest, in which consumers perform a specific action on a website or an application, such as clicking on a button, making a call, or sending a form. Sumita and Zuo [21] propose a model to quantify the impact of mobile application access to the Internet and the conversions they make.

Promotional actions in the Internet are defined as different types of tactics carried out on the Internet such as discounts, coupons, or incentives. Crespo-Almendros and Barrio-García [22] analyze several investigations to determine, with respect to a sector, the level of optimization of the experience of a website or a mobile application—in this case for the sale of airline tickets—to increase sales on the Internet.

Based on the research presented, we developed the research hypotheses presented in this study:

H1: the use of social networks by users influences (+) Internet promotion actions.

Like [4, 12], the investigation of Wang et al. [16] analyzes the communications made by companies of a particular sector in social networks. The research develops a content analysis of 390 companies to examine the impact of Internet promotion actions on the Facebook social network, including metrics such as the number of likes, number of shares, and characteristics of posts and their links. The results of the research show that the tone and narrative used in the promotional actions are directly associated with the engagement of communications in social networks in mobile applications powered by linked data.

In addition, the research carried out by Bernabé-Moreno et al. [13] develops an enriched consumer recruitment system to increase retention of users in campaigns on social networks. The possibilities offered by the geolocation of mobile applications in social media open the door to new ways of listening to the consumer to improve promotional actions on the Internet. The authors develop a system that categorically extracts interactions in social networks according to location and industry and quantifies the impact over a period of time. Definitions for the capture and retention of users on social media are shown as conclusions of the research. These can improve the efficiency and profitability of the promotional actions in the Internet.

Vásquez and Escamilla [23], in their research, carry out a thorough analysis of the best practices for marketing on social networks using SMEs. The objective of the research is to propose the best practices in the use of social networks with SMEs. An exploratory study of successful case studies is carried out, providing, on one hand, the identification of best practices in the use of social networks and, on the other hand, developing a social media marketing strategy for the promotion of SMEs on the Internet. Consequently, the relationship between the use of social networks and promotional actions on mobile Internet is studied.

H2: advertising influences (+) Internet acquisition actions.

The research of Deane and Agarwal [24] in parallel to the research of Nabout and Skiera [8] shows that 23% of digital marketing strategies are based on online advertising. They [24] also propose a model to make this investment more effective by scheduling the appearance of ads at certain time slots. Therefore, we can state, according to their research, that advertising would indeed be related to the promotional actions that companies make on the Internet.

Studies [26, 2] investigate whether the Banners (Display Ads) on web pages, together with emails, have an influence on the searches that users make in search engines. This research develops a model of online advertising attribution, in which reflections are made on how advertising increases the number of clicks on search results and also on the cost of the campaigns, thus modifying the following promotional actions on the Internet.

H3: advertising influences (+) conversions on the Internet.

Other authors focus their attention on web analytics and the definition of KPIs for the optimal analysis of digital

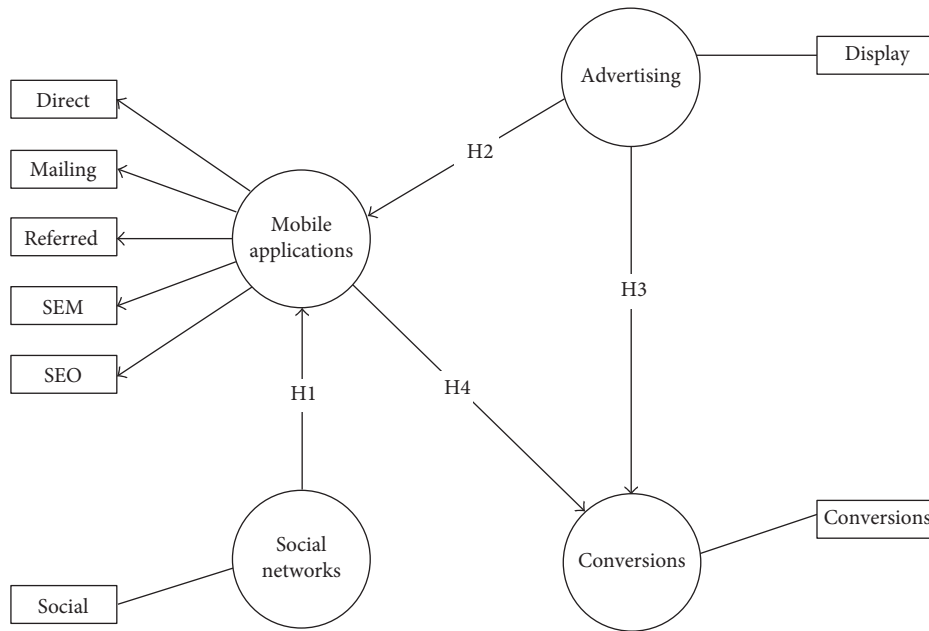


FIGURE 1: Structural model proposed for the development of hypotheses.

strategies. Condit [26] develops an investigation on the main indicators for digital analytics focusing the study on a library. Also in [27], the definition of web analytics is considered as an improvement in Internet communication with the measurement of conversions or leads achieved by the company. The work of Lee [28] focuses on the acquisition of users through the measurement of digital marketing actions by analyzing each purchase as a conversion.

The research of Nabout et al. [29] examines the optimal cost that companies as advertisers invest in SEM advertising, demonstrating that agencies achieve higher results than those demanded by advertisers by basing the analysis on the number of conversions achieved. In addition, this research provides insights on how to measure investment in SEM if earnings per conversion are not clearly defined by the client and agency.

H4: recruitment actions influence (+) Internet conversions.

Royle and Laing [30] focus their research on developing a measurement model for digital marketing techniques in search engines, taking SEO as a recruitment action on the Internet. The work of Nabout and Skiera [8] also focuses attention on improving the investment made in search engines and optimizing conversions, treating the SEO technique as an action to attract users on the Internet.

The research of Marinova [25] on permission e-mail marketing is focused on how companies use e-mail marketing to capture customers on the Internet. The research [25] also points out that it is common to create distribution lists to analyze the e-mails that reach the consumers that form the databases of the companies, indicating that it is a fact that the users are connected for more time, thanks to mobile devices, allowing the companies to acquire data on the use of traffic arriving at web pages.

In addition, the research of Ahangar and Dastuyi [31] provides solutions on the persuasive language that companies use in their communications for user recruitment. They [31] also identify and classify the types of persuasive messages that e-mails must contain and categorize them into ten types of e-mails and thirty-six steps to perform an effective e-mail marketing for recruitment of users by Internet companies.

Kim and Tse [32] conduct research in which they analyze the less popular search engines versus quality search services, aiming to improve conversions and leads on the Internet. Kim and Tse [32] conclude that the quality of the content that gets conversions depends on two variables, namely, the amount of content available on the Internet and the difference in search quality between a nonpopular search engine and a popular search engine.

With the development of these hypotheses, this research aims to identify what the influencing factors are in order to achieve conversions in mobile applications powered by linked data and find a model of causal relationships that explains why conversions occur and what influences their occurrence.

Figure 1 shows the structural model proposed for the development of hypotheses.

### 3. Methodology

**3.1. Sample.** The chosen methodology has been used to find the results of the user experience in 30 mobile applications powered by linked data and the subsequent survey answered by the users of those applications. To do this, the data were gathered with an electronically administered survey to users of 30 leading companies in mobile digital marketing which invoiced more than 3 million euros through digital marketing strategies, social media marketing, advertising, and



actions of recruitment and loyalty with mobile applications in the Internet in Spain during the last year.

The individuals surveyed were between the ages of 18 and 72 and were occasional users of the selected mobile applications. A simple probabilistic sampling was carried out on users who made use of the mobile applications powered by linked data. The study was conducted between January and June 2017. The total volume of visits that made up the population universe for the study was 2,010,535 million visits that were studied as user experiences from the information provided by Google Analytics. Of all those experiences based on optimization of the user interface design, finally, the representative sample consisted of 101,053 consumers who answered a brief survey to assess the user experience in the mobile applications powered by linked data that they accessed to make their purchases, when leaving the mobile application.

Demographic characteristics such as age and gender have been very significant in relation to the Internet and in the adoption of mobile commerce. These have been examined by different investigators, for example, those of [33–35].

It was observed that 60.35% of the respondents who accessed mobile applications are men, while 39.65% are women. The people who have accessed the most mobile applications are between the ages of 29 and 39 corresponding to women, followed by men ranging from 37 to 47 years. These data can be observed in Table 1.

The 30 companies from which 1,096,770 customer IDs have been analyzed are from the sectors corresponding to education (1), distribution (2), legal (3), health (4), leisure (5), real estate (6), automobile (7), financial (8), services (9), and logistics (10) and represent the best companies in terms of results in the digital marketing sector in Spain.

Table 2 shows the number of user IDs that have been analyzed in each sector.

The sample was reduced to 101,053 IDs because of the quality required to perform the analysis based on metrics such as rebound percentage or duration of the visit.

**3.2. Scales and Measurement of Variables.** The survey was performed using the Likert 5-point scale, which allowed us to measure attitudes and experiences on the degree of adequacy of the respondent to any statement we proposed (1: completely disagree; 5: completely agree) regarding the design and user experience on each website.

Data related to the user experience were extracted with web analytics measurement software on 2,010,535 customer IDs corresponding to the companies under study. When performing quality tests for each of the user IDs analyzed, the sample was reduced to 101,053 unique user IDs, mainly due to the high rebound count percentage of many of the sessions analyzed (greater than 87%). The rebound percentage is an indicator that marks the interaction percentage and the length of time the user has with the web page, and this determines the quality of the visit [8].

Any survey can have measurement errors which question the validity of the conclusions regarding the relationship that might exist between the measurements, and it is widely recognized that such errors have random as well as

TABLE 1: Samples' sex and average age.

Sex	Percentage	Average age
Women	39.65%	29–39 years
Men	60.35%	37–47 years

TABLE 2: IDs of analyzed users.

Company sector	User ID
Education (1)	134434
Distribution (2)	189201
Legal (3)	93043
Health (4)	217058
Leisure (5)	37997
Real estate (6)	17901
Automobile (7)	87867
Finance (8)	98160
Services (9)	201142
Logistics (10)	19967

systematic components. Therefore, it is important to take measurements so that there is no so-called “common method bias” associated with how to answer the various questions in the questionnaire. Thus, as a preventive measure of these errors, a number of recommendations were followed during the design of the questionnaire used in our study [36, 37]. To this end, clear and concise questions were formulated with terms that were very familiar to the users; the answers were guaranteed confidential so that users could answer as honestly as possible, and changes were also made in the way the questions were written for the different scales.

The order of some of the questions and the problem that this might entail was counteracted by changing them at random. After data collection, the Harman single-factor test was used as a measure of post hoc control of the common method bias [38].

**3.3. Method of Data Analysis.** The hypotheses of the conceptual model (Figure 1) were tested using the partial least squares (PLS) technique to estimate the structural equation models based on the variance. The SmartPLS 3 software [39] was chosen to evaluate the reliability and validity of the measurement model and to test the structural model, both for its graphical resolution capability and for the set of statistical methods applied. Structural equation models based on the variance are a good methodology choice when it comes to finding the simultaneous behavior of dependency relationships and allow us to go beyond other multivariate techniques, such as multiple regression and factor analysis.

## 4. Result Analysis

PLS is a specially recommended method for exploratory research and allows the modeling of latent constructs with both formative and reflective indicators [40]. In addition, PLS is more appropriate when the objective is to predict and

TABLE 3: AVE and CR.

Variable	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Recruitment actions	0.949	0.961	0.833
Conversions	1000	1000	1000
Advertising	1000	1000	1000
Social networks	1000	1000	1000

TABLE 4: Cross loads in PLS.

	Recruitment actions	Conversions	Advertising	Social networks
Conversions	0.292	1000	0.350	-0.018
Direct	0.879	0.439	0.202	0.335
Display	0.302	0.350	1000	0.060
Mailing	0.835	0.050	0.138	0.812
Referred	0.963	0.166	0.279	0.384
SEM	0.909	0.428	0.487	0.276
SEO	0.973	0.275	0.277	0.423
Social	0.511	-0.018	0.060	1000

investigate relatively new phenomena [41], such as the influence of social networks in obtaining conversions in digital marketing with mobile applications powered by linked data.

PLS was chosen for several reasons: first, PLS does not impose normality requirements on the data and is a technique that is adequate for predicting dependent variables in small samples, given a certain degree of quality in the measurement model [42, 43]. Therefore, it is a good choice for our final sample of 101,053 sample elements. In addition, PLS is more appropriate when the objective is to predict and investigate relatively new phenomena [44], as in the case of digital marketing conversions and the influence of social networks. Finally, PLS is an SEM evaluation method widely used in commercial management research in information systems [45–48], e-commerce [49], and cloud computing [49–52].

*4.1. Analysis of the Measurement Model.* The model was constructed with items with a reflective character, since they share concepts and, therefore, are interchangeable to be equivalent manifestations of the same construct [37, 53].

First, we measured the individual reliability of the load ( $\lambda$ ) for the indicator, where it is usual to establish the minimum level for acceptance as part of the construct in  $\lambda \geq 0.707$  [54].

However, other authors diverge from this rule, considering it to be excessively rigid in the initial stages of scale development and in little studied subjects, accepting in these cases minimum values greater than 0.5 or 0.6 [46, 55]. The commonality of a manifested variable ( $\lambda^2$ ) is the part of the variable which can be explained by the factor or constructs [56]. All values exceeded this minimum value [53].

To test the consistency of a construct, Cronbach's alpha and its composite reliability (CR) were used. These values measure the consistency of a construct based on its indicators [57], that is, the rigor with which these items are measuring the same latent variable.

Cronbach's alpha determines a consistency index for each construct and presents values between 0 and 1 [53].

The lower limit to accept the reliability of the construct is usually set between 0.6 and 0.7 [58].

The highest validity will be in values close to 1. As can be seen in Table 3, all variables passed those minimum values for validity.

AVE is defined as the average variance extracted and reports how much variance a construct obtains from its indicators in relation to the amount of variance due to the measurement error [53, 59]. The recommendation of these authors is that AVE is  $\geq 0.50$ , which we can interpret as more than 50% of the variance of the construct is due to its indicators.

Discriminate validity marks the extent to which a construct is different from others. A high value would indicate weak correlations between constructs. Two types of analysis are used for this test [53]. On one hand, as can be seen in Table 4 showing cross loads, no indicator shares more load with any other than that of the construct itself.

On the other hand, as can be seen in Table 5, it has been verified that the square root of the average variance extracted (AVE) is greater than the relationship between the construct and the rest of the model constructs [53, 59].

A construct should share more variance with its measurements or indicators than with other constructs in a given model [60]. To verify this, we must see if the square root of the AVE (given in bold in Table 5) is greater than the correlation between the construct and the rest of constructs of the model. In our case, this condition is true for all latent variables [53]. Therefore, we can affirm that the constructs share more variance with their indicators than with other constructs of the investigated model [60], and discriminate validity is shown based on this first analysis.

*4.2. Structural Model Analysis.* Standardized path coefficients ( $\beta$ ) provide the extent to which predictor variables contribute to the explained variance of endogenous variables [53].

TABLE 5: Fornell and Larcker criteria (1981).

	Recruitment actions	Conversions	Advertising	Social networks
Recruitment actions	<b>0.913</b>			
Conversions	0.292	<b>1000</b>		
Advertising	0.302	0.350	<b>1000</b>	
Social networks	0.511	-0.018	0.060	<b>1000</b>

TABLE 6: Path coefficients and statistical significance.

	Hypothesis	Original sample	T statistic	P values	Support
H1	Social networks → recruitment actions	0.495	1932	0.027	Yes*
H2	Advertising → recruitment actions	0.272	1091	0.138	Not
H3	Advertising → conversions	0.288	0.414	0.340	Not
H4	Recruitment actions → conversions	0.205	0.326	0.372	Not

The variance explained in an endogenous construct by another latent variable can be measured from the absolute value of the multiplication of the coefficient path by the correlation coefficient of the two variables [53, 61].

The analysis of these coefficients and their statistical significance will allow us to contrast the proposed research hypotheses. Several authors, for example, those of [46], consider that a value of  $\beta$  is considered acceptable if it is greater than or equal to 0.2, although it is desirable that it be above 0.3 [53].

In any case, the calculation of the path coefficients must be accompanied by some measure that reports its statistical significance and, ultimately, the acceptability of the adjustment made. The acceptability of the fit has been measured based on the  $t$ -statistic resulting from applying the bootstrap resampling test to 5000 subsamples. The single-line  $t$ -distribution of Student has been used, since the direction of relationships has been specified in the model [53].

From this, the following values are used as the reference of statistical significance:  $t = 1.64791345$  for 95% confidence,  $t = 2.333843952$  for 99%, and  $t = 3.106644601$  for 99.9%. The values reached in this test, together with the standard regression coefficients, have been collected in Table 6 and allow for the contrast of the proposed structural model hypotheses.

The influence of social networks on H1 recruitment actions is supported by their positive influence, although only having a significance of 95% ( $\beta = -0.495$ ;  $t = 1.932$ ).

The influence of advertising on recruitment actions reaches a minimum of 0.2, although not in terms of significance ( $\beta = 0.272$ ;  $t = 1.091$ ), so H2 is not fulfilled. With the influence of advertising on conversions, a very similar result ( $\beta = 0.288$ ;  $t = 0.413$ ) is obtained, and H3 is not confirmed; that is, advertising does not influence final conversions.

This structural analysis yields significant data that have been analyzed with the  $\beta$  of each construct. Thus, the influence of recruitment actions on conversions yields very low results ( $\beta = 0.205$ ;  $t = 0.326$ ), with H4 not being met [53].

The coefficient of determination  $R^2$  has been calculated (Figure 2), since it is a widely used statistic with the main

purpose of predicting future results. This coefficient determines the quality of the model to replicate the results and the variation of the results that can be explained by the model [62].

According to [44], the reference values of  $R^2$  of 0.67, 0.33, and 0.19, are considered strong, moderate, and weak, respectively. The research of Palos-Sanchez et al. [53] indicates that when the values of  $R^2$  are below 0.1, the relationships formulated as hypotheses have a very low predictive level, in spite of being statistically significant. This is the case of the independent variable conversions and recruitment actions [61].

The obtained results indicate that the model explains 51.7% of the total variance ( $R^2 = 0.517$ ), since this is the result obtained by the dependent variable conversions ( $R^2$ ). On the other hand, the other dependent variable recruitment actions explains 48.5% ( $R^2 = 0.485$ ). It can be seen that the values widely exceed the minimum 0.1, which is the threshold set by [53].

According to [53], the  $R^2$  value for conversions demonstrates the existence of a moderate predictive power, while for recruitment or promotional actions (0.485) a lower predictive power is obtained, but with a similar intensity. In summary, although it is evident that there are additional factors, the model can be declared highly predictive, and a great part of the variance of the variables is explained by the model itself [53].

Figure 2 shows the final structural model.

## 5. Conclusions

The interest of researchers in the categories and sub-categories present in digital marketing is a solid fact that has been growing as a topic for research during the last decade. This research has centered the study on the concepts of the use of social networks, Internet advertising, conversions and recruitment from promotion actions for mobile applications powered by linked data, and the optimization of the user interface design.

The results obtained show that it is a model with predictive capacity and that the model can be replicated, given

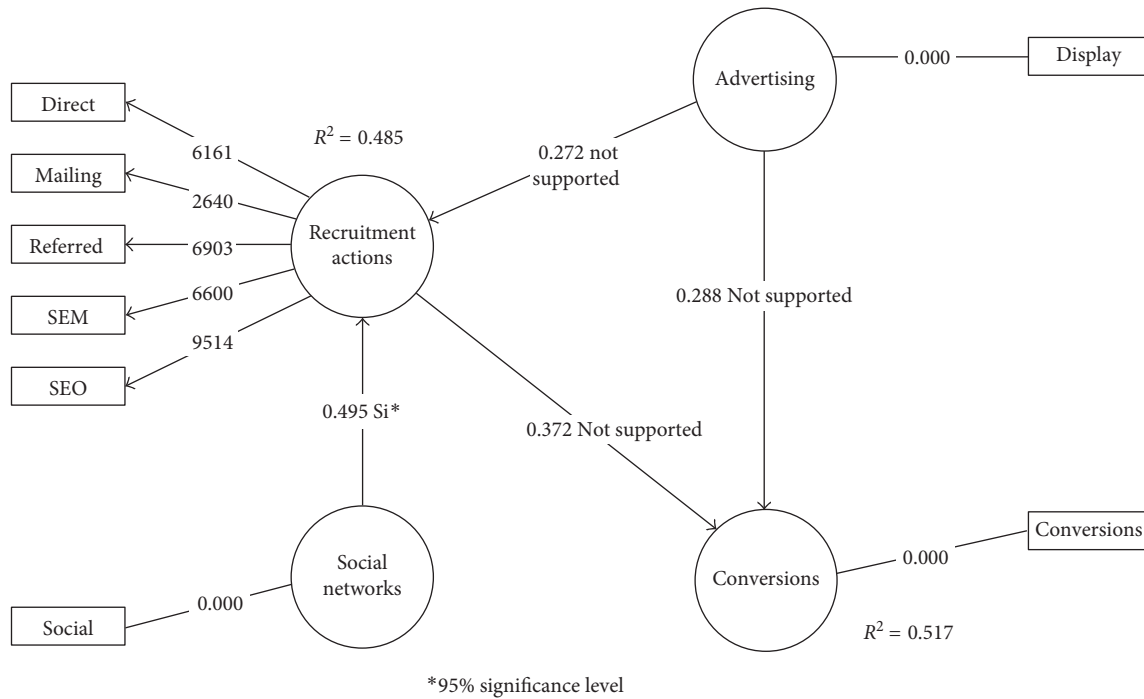


FIGURE 2: Final structural model.

the results obtained by the determination coefficients of the dependent variables: conversions and recruitment actions. In this way, the results of the research serve to measure the influence factor of the variables developed to achieve conversions in mobile applications powered by linked data.

The first of the contrasted hypotheses has been validated, which is why we show that the use of social networks by users has a positive influence on the promotion and recruitment actions on the Internet for mobile applications powered by linked data, and therefore, we can confirm previous studies [4, 12, 16]. This result shows that communications made on the social networks of companies in a given sector, including positive metrics such as the number of likes, the number of shares, and the characteristics of the posts and their links, influence promotional actions. The confirmation of this hypothesis also contributes to the positive results from other studies [13, 23, 63]. Therefore, it seems imperative that actions of promotion and recruitment are conditioned by social networks in mobile applications powered by linked data.

However, the results obtained do not confirm that advertising positively influences the recruitment actions in the Internet. This influence does not reach the minimum threshold of significance, confirming the low degree of influence that other authors have found in previous studies [64–66]. This may be due to the fact that advertising is still not widely used in digital marketing strategies and constitutes less than a quarter of the total investment.

These results have also been repeated for the case of the influence of advertising on Internet conversions [67]. It seems obvious that web analytics and, above all, their optimum analysis improve conversions, but not with the direct influence of advertising [68]. The improvement in communication as a result of a correct interpretation of these analyses is not

confirmed in this study. However, we find that the results have been highly positive and confirm interest in these analyses, as in previous studies [27, 69, 70]. Therefore, obtaining better results does not confirm the existence of a causal relationship between advertising and more conversions in mobile applications powered by linked data.

Finally, this research focused on demonstrating that recruitment actions have a positive influence on Internet conversions [71–73]. The existence of measurement models for the different techniques of digital marketing has frequently been seen in the literature over the last few years [14, 74–76], especially as regards the improvement of the investment made in search engines and the optimization of conversions, treating the SEO technique as a way to attract users on the Internet to achieve the objectives or conversions raised by the digital strategy of the company. Other studies studied e-mail marketing to capture customers on the Internet [25, 77–79]. However, the results obtained do not confirm that these recruitment actions have a significant influence on the conversions in mobile applications powered by linked data, which contradicts the results of these authors. Reasons for this could be that incorrect language causes confusion, and above all the design of the user interface of the mobile applications powered by linked data. Other studies explain the data in a similar way [32, 82, 83] and also identify the concern for user privacy as another possibility. These users find a real invasion of their privacy in some recruitment actions [53].

It therefore appears that the quality of the use of these actions is crucial, confirming previous studies [32], although the results have been very unequal depending on the recruitment technique that has been used.

The limitations of this study are linked to the size of the sample that could be expanded in the future to obtain results



with different statistical efficiency and representative margins. In addition, the possibility exists for the use of this model in different devices and mobile applications powered by linked data in different areas according to the target market and type of business using A/B testing for the different user interfaces used in different mobile applications powered by linked data.

## Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

## Authors' Contributions

Pedro R. Palos-Sanchez, Jose Ramon Saura, and Felipe Debas conceived and designed the review. Jose Ramon Saura performed the methodology. Pedro R. Palos-Sánchez and Felipe Debas analyzed the results. Jose Ramon Saura, Pedro R. Palos-Sanchez, and Felipe Debas wrote the paper.

## References

- [1] L. Pitt and R. Watson, "The World Wide Web as an advertising medium," *Journal of Advertising Research*, vol. 36, no. 1, pp. 432–445, 1996.
- [2] J. R. Saura, P. Palos-Sánchez, and L. M. Suárez, "Understanding the digital marketing environment with KPIs and web analytics," *Future Internet*, vol. 9, no. 4, p. 76, 2017.
- [3] J. Järvinen and H. Karjaluo, "The use of Web analytics for digital marketing performance measurement," *Industrial Marketing Management*, vol. 50, pp. 117–127, 2015.
- [4] D. Jayaram, A. K. Manrai, and L. A. Manrai, "Effective use of marketing technology in Eastern Europe: web analytics, social media, customer analytics, digital campaigns and mobile applications," *Journal of Economics, Finance and Administrative Science*, vol. 20, no. 39, pp. 118–132, 2015.
- [5] J. Järvinen, A. Töllinen, H. Karjaluo, and C. Jayawardhena, "Digital and social media marketing usage in B2B industrial section," *Marketing Management Journal*, vol. 22, no. 2, 2012.
- [6] P. Kannan and H. Li, "Digital marketing: a framework, review and research agenda," *International Journal of Research in Marketing*, vol. 34, no. 1, pp. 22–45, 2017.
- [7] R. D. Wilson, "Using web traffic analysis for customer acquisition and retention programs in marketing," *Services Marketing Quarterly*, vol. 26, no. 2, pp. 1–22, 2004.
- [8] N. A. Nabout and B. Skiera, "Return on quality improvements in search engine marketing," *Journal of Interactive Marketing*, vol. 26, no. 3, pp. 141–154, 2012.
- [9] P. Kireyev, K. Pauwels, and S. Gupta, "Do display ads influence search? Attribution and dynamics in online advertising," *International Journal of Research in Marketing*, vol. 33, no. 3, pp. 475–490, 2016.
- [10] S. Mathews, C. Bianchi, K. J. Perks, M. Healy, and R. Wickramasekera, "Internet marketing capabilities and international market growth," *International Business Review*, vol. 25, no. 4, pp. 820–830, 2016.
- [11] B. Skiera, J. Eckert, and O. Hinz, "An analysis of the importance of the long tail in search engine marketing," *Electronic Commerce Research and Applications*, vol. 9, no. 6, pp. 488–494, 2010.
- [12] M. Roshan, M. Warren, and R. Carr, "Understanding the use of social media by organisations for crisis communication," *Journal of Computers in Human Behavior*, vol. 63, pp. 350–361, 2016.
- [13] J. Bernabé-Moreno, A. Tejada-Lorente, C. Porcel, H. Fujita, and E. Herrera-Viedma, "A system to enrich marketing customers acquisition and retention campaigns using social media information," *Knowledge-Based Systems*, vol. 80, pp. 163–179, 2015.
- [14] K. Peters, Y. Chen, A. M. Kaplan, B. Ognibeni, and K. Pauwels, "Social media metrics—a framework and guidelines for managing social media," *Journal of Interactive Marketing*, vol. 27, no. 4, pp. 281–298, 2013.
- [15] A. Chunga, P. Andreeva, M. Benyoucef, A. Duane, and P. O'Reilly, "Managing an organisation's social media presence: an empirical stages of growth model," *International Journal of Information Management*, vol. 37, no. 1, pp. 1405–1417, 2017.
- [16] R. Wang, J. Kim, A. Xiao, and Y. Jung, "Networked narratives on humans of New York: a content analysis of social media engagement on Facebook," *Computers in Human Behavior*, vol. 66, pp. 149–153, 2017.
- [17] R. Lohtia, N. Donthu, and I. Yaveroglu, "Evaluating the efficiency of Internet banner advertisements," *Journal of Business Research*, vol. 60, no. 4, pp. 365–370, 2007.
- [18] K. C. Hamborg, M. Bruns, F. Ollermann, and K. Kaspar, "The effect of banner animation on fixation behavior and recall performance in search tasks," *Computers in Human Behavior*, vol. 28, no. 2, pp. 576–582, 2012.
- [19] M. T. García-Álvarez, I. Novo-Corti, and L. Varela-Candamio, "The effects of social networks on the assessment of virtual learning environments: a study for social sciences degrees," *Telematics and Informatics*, 2017.
- [20] B. Aslam and H. Karjaluo, "Digital advertising around paid spaces, e-advertising industry's revenue engine: a review and research agenda," *Telematics and Informatics*, vol. 34, no. 8, pp. 1650–1662, 2017.
- [21] U. Sumita and J. Zuo, "The impact of mobile access to the Internet on information search completion time and customer conversion," *Electronic Commerce Research and Applications*, vol. 9, no. 5, pp. 410–417, 2010.
- [22] E. Crespo-Almendros and S. D. Barrio-García, "Online airline ticket purchasing: influence of online sales promotion type and Internet experience," *Journal of Air Transport Management*, vol. 53, pp. 23–34, 2016.
- [23] G. A. Vásquez and E. M. Escamilla, "Best practice in the use of social networks marketing strategy as in SMEs," *Procedia-Social and Behavioral Sciences*, vol. 148, pp. 533–542, 2014.
- [24] J. Deane and A. Agarwal, "Scheduling online advertisements to maximize revenue under variable display frequency," *Omega*, vol. 40, no. 5, pp. 562–570, 2012.
- [25] A. Marinova, "Permission e-mail marketing: as a means of targeted promotion," *Cornell Hotel and Restaurant Administration Quarterly*, vol. 43, no. 1, pp. 61–69, 2002.
- [26] J. Condit, "The suitability of web analytics key performance indicators in the academic library environment," *Journal of Academic Librarianship*, vol. 40, no. 1, pp. 25–34, 2014.
- [27] M. L. Kent, B. J. Carr, R. A. Husted, and R. A. Pop, "Learning web analytics: a tool for strategic communication," *Public Relations Review*, vol. 37, no. 5, pp. 536–543, 2011.
- [28] G. Lee, "Death of 'last click wins': media attribution and the expanding use of media data," *Journal of Direct, Data and Digital Marketing Practice*, vol. 12, no. 1, pp. 16–26, 2010.
- [29] A. Nabout, B. Skiera, T. Stepanchuk, and E. Gerstmeier, "An analysis of the profitability of fee-based compensation

- plans for search engine marketing,” *International Journal of Research in Marketing*, vol. 29, no. 1, pp. 68–80, 2012.
- [30] J. Royle and A. Laing, “The digital marketing skills gap: Developing a Digital Marketer Model for the communication industries,” *International Journal of Information Management*, vol. 34, no. 2, pp. 65–73, 2014.
- [31] A. A. Ahangar and S. Z. Dastuyi, “Persuasive language in the subgenre of Persian sales e-mails,” *Language and Communication*, vol. 53, pp. 69–86, 2017.
- [32] K. Kim and E. Tse, “Inferior search engine’s optimal choice: knowledge-sharing service versus search quality,” *Electronic Commerce Research and Applications*, vol. 13, no. 6, pp. 387–401, 2014.
- [33] A. Chong, F. Chan, and O. Keng-Boon, “Predicting consumer decisions to adopt mobile commerce: cross country empirical examination between China and Malaysia,” *Decision Support Systems*, vol. 53, no. 1, pp. 34–43, 2012.
- [34] T. S. Teo, “Demographic and motivation variables associated with Internet usage activities,” *Internet Research*, vol. 11, no. 2, pp. 125–137, 2011.
- [35] L. A. Jackson, K. S. Ervin, P. D. Gardner, and N. Schmitt, “Gender and the Internet: women communicating and men searching,” *Sex Roles*, vol. 44, no. 5-6, pp. 363–379, 2011.
- [36] S. J. Chang, A. van Witteloostuijn, and L. Eden, “From the editors: common method variance in international business research,” *Journal of International Business Studies*, vol. 41, no. 2, pp. 178–184, 2010.
- [37] P. M. Podsakoff, S. B. MacKenzie, J. Y. Lee, and N. P. Podsakoff, “Common method biases in behavioral research: a critical review of the literature and recommended remedies,” *Journal of Applied Psychology*, vol. 88, no. 5, pp. 879–903, 2003.
- [38] C. Wang, S. Chow, Q. Wang, K. Ren, and W. Lou, “Privacy-preserving public auditing for secure cloud storage,” *IEEE Transactions on Computers*, vol. 62, no. 2, pp. 362–375, 2013.
- [39] C. M. Ringle, S. Wende, and J. M. Becker, “SmartPLS 3. Bonningstedt: SmartPLS,” 2015, <http://www.smartpls.com>.
- [40] J. Y. Son and I. Benbasat, “Organizational buyers’ adoption and use of B2B electronic marketplaces: efficiency- and legitimacy-oriented perspectives,” *Journal of Management Information Systems*, vol. 24, no. 1, pp. 55–99, 2007.
- [41] W. W. Chin and P. R. Newsted, “Structural equation modeling analysis with small samples using partial least squares,” in *Statistical Strategies for Small Sample Research*, R. H. Hoyle, Ed., pp. 307–341, Sage Publications, Thousand Oaks, CA, USA, 1999.
- [42] B. Rodríguez Herráez, D. Pérez Bustamante, and J. R. Saura Lacarcel, “Information classification on social networks. Content analysis of e-commerce companies on Twitter. Clasificación de información en redes sociales. Análisis de contenido en Twitter de empresas de comercio electrónico Espacios,” *Revista Espacios*, vol. 38, no. 52, 2017.
- [43] W. Reinartz, M. Haenlein, and J. Henseler, “An empirical comparison of the efficacy of covariance-based and variance-based SEM,” *International Journal of Research in Marketing*, vol. 26, no. 4, pp. 332–344, 2009.
- [44] W. W. Chin, “The partial least squares approach to structural equation modeling,” in *Modern Methods for Business Research*, G. A. Marcoulides, Ed., pp. 295–336, Lawrence Erlbaum Associates, Publisher, Mahwah, NJ, USA, 1998.
- [45] T. Cui, H. Ye, H. H. Teo, and J. Li, “Information technology and open innovation: a strategic alignment perspective,” *Information and Management*, vol. 52, no. 3, pp. 348–358, 2015.
- [46] D. Sedera, S. Lokuge, V. Grover, S. Sarker, and S. Sarker, “Innovating with enterprise systems and digital platforms: a contingent resource-based theory view,” *Information and Management*, vol. 53, no. 3, pp. 366–379, 2016.
- [47] K. Wang, “Determinants of mobile value-added service continuance: the mediating role of service experience,” *Information and Management*, vol. 52, no. 3, pp. 261–274, 2015.
- [48] P. R. Palos-Sanchez, E. Martín Cumbreño, and J. A. Folgado Fernandez, “Factores Condicionantes Del Marketing Móvil: Estudio Empírico De La Expansión de las apps. El caso de la ciudad de Cáceres,” *Revista de Estudios Económicos y Empresariales*, vol. 28, pp. 37–72, 2016.
- [49] P. R. Palos-Sanchez, F. J. Arenas-Marquez, and M. Aguayo-Camacho, “Cloud Computing (SaaS) adoption as a strategic technology: results of an empirical study,” *Mobile Information Systems*, vol. 2017, Article ID 2536040, 20 pages, 2017.
- [50] T. Oliveira, M. Thomas, and M. Espadanal, “Assessing the determinants of cloud computing adoption: an analysis of the manufacturing and services sectors,” *Information and Management*, vol. 51, no. 5, pp. 497–510, 2014.
- [51] C. M. Messerschmidt and O. Hinz, “Explaining the adoption of grid computing: an integrated institutional theory and organizational capability approach,” *Journal of Strategic Information Systems*, vol. 22, no. 2, pp. 137–156, 2013.
- [52] Z. Yang, Y. Shi, and B. Wang, “Search engine marketing, financing ability and firm performance in e-commerce,” *Procedia Computer Science*, vol. 55, pp. 1106–1112, 2015.
- [53] P. Palos-Sanchez, J. M. Hernandez-Mogollon, and A. Campon-Cerro, “The behavioral response to location based services: an examination of the influence of social and environmental benefits, and privacy,” *Sustainability*, vol. 9, no. 11, p. 1988, 2017.
- [54] E. G. Carmines and R. A. Zeller, *Reliability and Validity Assessment*, Sage Publications, Beverly Hills, CA, USA, 1979.
- [55] D. Barclay, C. Higgins, and R. Thompson, “The partial least squares (PLS) approach to causal modelling: personal computer adoption and use as an illustration,” *Technology Studies, Special Issue on Research Methodology*, vol. 2, no. 2, pp. 285–309, 1995.
- [56] K. A. Bollen, *Structural Equations with Latent Variables*, John Wiley & Sons, New York, NY, USA, 1989.
- [57] O. Götz, K. Liehr-Gobbers, and M. Krafft, “Evaluation of structural equation models using the partial least squares (PLS) approach,” in *Handbook of Partial Least Squares*, pp. 691–711, Springer, Heidelberg, Berlin, Germany, 2010.
- [58] J. Hair, B. Babin, A. Money, and P. Samouel, *Fundamentos de métodos de pesquisa em administração*, Bookman Companhia, Sao Paulo, Brazil, 2005.
- [59] C. Fornell and D. F. Larcker, “Evaluating structural equation models with unobservable variables and measurement error,” *Journal of Marketing Research*, vol. 18, no. 1, pp. 39–50, 1981.
- [60] J. Henseler, C. M. Ringle, and R. R. Sinkovics, “The use of partial least squares path modeling in international marketing,” *Advances in International Marketing*, vol. 20, no. 1, pp. 277–319, 2009.
- [61] R. F. Falk and N. B. Miller, *A Primer for Soft Modeling*, University of Akron Press, Akron, OH, USA, 1992.
- [62] R. G. D. Steel and J. H. Torrie, *Principles and Procedures of Statistics with Special Reference to the Biological Sciences*, pp. 187–287, McGraw-Hill, New York, NY, USA, 1960.
- [63] T. Mavridis and A. L. Symeonidis, “Identifying valid search engine ranking factors in a Web 2.0 and Web 3.0 context for building efficient SEO mechanisms,” *Engineering Applications of Artificial Intelligence*, vol. 41, pp. 75–91, 2015.

- [64] D. Qiao, J. Zhang, Q. Wei, and G. Chen, "Finding competitive keywords from query logs to enhance search engine advertising," *Information and Management*, vol. 54, no. 4, pp. 531–543, 2017.
- [65] D. Chaffey and M. Patron, "From WA to DM optimization: increasing the commercial value of digital analytics," *Journal of Direct, Data and Digital Marketing Practice*, vol. 14, no. 1, pp. 30–45, 2012.
- [66] F. Calisir and D. Karaali, "The impacts of banner location, banner content and navigation style on banner recognition," *Computers in Human Behavior*, vol. 24, no. 2, pp. 535–543, 2008.
- [67] M. R. Baye, B. I. Santos, and M. R. Wildenbeest, "What's in a name? Measuring prominence, and its impact on organic traffic from search engines," *SSRN Electronic Journal*, 2012.
- [68] K. Choudhari and V. K. Bhalla, "Video search engine optimization using keyword and feature analysis," *Procedia Computer Science*, vol. 58, pp. 691–697, 2015.
- [69] R. Welling and L. White, "Web site performance measurement: promise and reality," *Managing Service Quality*, vol. 16, no. 6, pp. 654–670, 2006.
- [70] J. P. Dotson, R. R. Fan, E. M. Feit, J. D. Oldham, and Y. Yeh, "Brand attitudes and search engine queries," *Journal of Interactive Marketing*, vol. 37, pp. 105–116, 2017.
- [71] P. M. Fiorini and L. R. Lipsky, "Search marketing traffic and performance models," *Computer Standards and Interfaces*, vol. 34, no. 6, pp. 517–526, 2012.
- [72] K. Li, G. Huang, and G. Bente, "The impacts of banner format and animation speed on banner effectiveness: evidence from eye movements," *Computers in Human Behavior*, vol. 54, pp. 522–530, 2016.
- [73] B. J. Jansen and P. R. Molina, "The effectiveness of Web search engines for retrieving relevant e-commerce links," *Information Processing and Management*, vol. 42, no. 4, pp. 1075–1098, 2006.
- [74] S. Huang, "The impact of context on display ad effectiveness: automatic attitude activation and applicability," *Electronic Commerce Research and Applications*, vol. 13, no. 5, pp. 341–354, 2014.
- [75] Z. Yang, J. Sun, Y. Zhang, and Y. Wang, "Understanding SaaS adoption from the perspective of organizational users: a tripod readiness model," *Computers in Human Behavior*, vol. 45, pp. 254–264, 2015.
- [76] J. H. Kahn, "Factor analysis in counseling psychology research, training, and practice: principles, advances, and applications," *The Counseling Psychologist*, vol. 34, no. 5, pp. 684–718, 2006.
- [77] J. Lee, J. H. Ahn, and B. Park, "The effect of repetition in Internet banner ads and the moderating role of animation," *Computers in Human Behavior*, vol. 46, pp. 202–209, 2015.
- [78] C. F. Hofacker and J. Murphy, "Clickable World Wide Web banner ads and content sites," *Journal of Interactive Marketing*, vol. 14, no. 1, pp. 49–59, 2000.
- [79] M. Hudák, E. Kianičková, and R. Madleňák, "The importance of e-mail marketing in e-commerce," *Procedia Engineering*, vol. 192, pp. 342–347, 2017.
- [80] A. Mandelli, "Banners, e-mail, advertainment and sponsored search: proposing a value perspective for online advertising," *International Journal of Internet Marketing and Advertising*, vol. 2, no. 1-2, p. 92, 2005.
- [81] R. F. Wilson and J. B. Pettijohn, "Affiliate management software: a premier," *Journal of Website Promotion*, vol. 3, no. 1/2, pp. 118–130, 2008.
- [82] B. Plaza, "Google analytics intelligence for information professionals," *Online*, vol. 34, no. 5, pp. 33–37, 2010.
- [83] P. R. Palos-Sanchez, "El cambio de las relaciones con el cliente a través de la adopción de APPS: Estudio de las variables de influencia en M-Commerce," *Revista Espacios*, vol. 38, no. 23, 2017.





Hindawi

Submit your manuscripts at  
[www.hindawi.com](http://www.hindawi.com)

