Diffusion and Adoption of Innovative Products: Studying Consumer Behavior in Social Networks

Difusão e Adoção de Produtos Inovadores: Estudando o Comportamento do Consumidor nas Redes Sociais

THIAGO AYRES BARREIRA DE CAMPOS BARROS

SAMUEL FAÇANHA CÂMARA

BRENNO BUARQUE

FABIANE DE BARROS FIGUEIRÊDO CAVALCANTE

Abstract

The purpose of this study was to analyze how the dynamics for the adoption of innovative products is affected by the behavior of consumers in social networks. To achieve this objective, a quantitative survey was carried out by 400 questionnaires on a Likert-type scale. The data were analyzed based on structural equation modeling techniques using *Partial Least Squares* (PLS). The results of this research present both theoretical and practical contributions. Regarding the theoretical contribution, the results provide subsidies to expand the innovation-diffusion models, since the literature lacks studies that jointly consider consumer behavior in social network and the dynamics for the adoption of innovative products. It was found that: i) self-perception of opinion disseminators influences acceptance of innovation; ii) self--perception of opinion seekers influence acceptance of innovation; (iii) collaborative attitudes influence acceptance of innovation; iv) risk aversion influences self-perception of opinion seekers; v) perceived attitude regarding risk consumption influences self-perception of opinion seekers; vi) risk aversion influences collaborative attitudes regarding collaboration. Concerning the practical contribution, the results of this study provide sources

for strategies concerning the diffusion of innovative products in social networks.
Keywords: innovative products; social networks; consumer behavior.

Introduction

The theoretical field of diffusion and adoption of innovation began with the seminal paper of Rogers and Cartano (1962). In the mid-1970s, the Social Cognitive Theory (SCT) and the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1975; Bandura, 1977) linked the diffusion of innovation to social networks. This connection became more evident with the Technology Acceptance Model Theory (TAMT), the Decomposed Theory of Planned Behavior (DTPB), and the Theory of Planned Behavior (TPB) (Davis, 1985; Davis, Bagozzi, & Warshaw, 1989; Venkatesh, 2008), given that variables such as attitude and subjective norms were inserted into the original models proposed by Rogers & Cartano (1962).

The proliferation of social networks and information and communication technologies has led to changes in consumer behavior (Santos, Alves, & Brambilla, 2016; Huete-Alcoecer, 2017). This is because the progress in communication technologies has provided various possibilities for connections between consumers of different profiles, resulting in a new market logic, which is oriented by interdependence between the various agents in social networks (Ozcan, 2007, Schwab, 2016) and by a faster diffusion of innovations (Kimura, Basso, & Martin, 2008; Pantano & Gandini, 2017).

Regarding social networks and the adoption of innovation, the main scopes are: interaction, intermediation, marketing, discourse of the adopters, formats, and network structures (Hinz, Schulze, & Takac, 2014; Kreindler & Young, 2014; Pelc, 2017). Specifically, concerning the adoption and continuity of using innovative products, research indicates that resistance to innovation is a significant reason for the mortality of new products (Heidenreich & Kraemer, 2016). However, the social and interpersonal influence have positive effects on the intention of using new products and new technologies by consumers (Thomas & Vinuales, 2017). Thus, studies that jointly focus on the behavior of consumers on social networks and the

adoption of innovative products, that was potentialized by the new media and by new information and communication technologies, are needed to facilitate both adoption and permanence of innovative products on the market. Moreover, since this is a central issue regarding the survival of innovative companies and their products, research connecting theoretical and practical business can foster an innovative environment (Gonzalez & Jiménez, 2014), which makes this study relevant.

Although researchers conclude that the dynamics of adopting innovative products are affected by consumer behavior in social networks, little is known about social influences, perceived barriers by consumers, and resistance to change concerning innovative products (Matsuo, Minami, & Matsuyama, 2018). Besides that, there is a theoretical gap related to the explanation of how the interaction between actors in social networks occurs with the adoption of innovative products. To contribute to the reduction of this gap, this study has as general objective to analyze how the dynamics of adoption of innovative products is affected by consumer behavior in social networks.

This general objective is achieved from the following specific objectives: i) to establish constructs that explain consumer behavior in the adoption of innovative products in social networks; ii) to establish the construct of self-perception in adopting innovations, iii) to identify the existence of a relationship between consumers' behavior in social networks and the consumers' self-perception in adopting innovations.

The results of this research, which were obtained from a quantitative survey, contribute both to the expansion of innovation-diffusion models and to support companies that use methods of diffusing new products and/or services through social networks since it provides useful sources for strategies regarding the diffusion of innovative products in social networks.

Theoretical Framework

The diffusion of innovation is traditionally accomplished via two types of channels: mass media (television, radio, newspaper) and interpersonal channels (Rogers, 1995), which is the focus of

this study. The social network is a representation of interpersonal channels, of the relationships and interactions between individuals, and it plays an important role in propagating ideas and influences (Kimura, Basso & Martin, 2008).

In the realm of innovation diffusion and social networks, two theories can be cited: Social Cognitive Theory (SCT) (Bandura, 1977) and the Theory of Reasoned Action (TRA) (Fishbein, 1975). The SCT assumes that the action of the individual is influenced by the observation of the behavior of surrounding people (Bandura, 1989). The objective of the TRA is the study of how conscious and intentional behavior originates and develops. According to this theory, the execution of any action or conduct comes from conscious and voluntary behavior. The Technological Acceptance Model, the Decomposed Theory of Planned Behavior (DTPB), and the Theory of Planned Behavior (TPB) are subjected to a more limited scope in the diffusion of innovation and consumer behavior. Instead of perceiving the relationship of voluntary and conscious controls of the individual (as in the TRA), the TPB presents external factors as contributors to the adoption of certain behavior.

The TPB adds a new factor called "control of the perceived behavior", which enables a prediction model based on both the intention and the final behavior of the individual (Celuch, Goodwin, & Taylor, 2007). Thus, it reinforces the link between behavior control and intention, but still preserves the concepts of the TRA.

Therefore, even though the TPB is an enhancement of the TRA, only the direct effects of the factors are considered, which does not include underlying beliefs (e.g., perceived behavioral control), which are difficult to measure (García, 2011). According to the Technology Acceptance Model (TAM), the beliefs, attitudes, and intentions of the consumer presented by the TRA explain the acceptance factors of information systems (Borges, 2015).

The idea for integration between TPB and TAM was proposed by Lee (GARCÍA, 2011), through the insertion of two new factors: awareness of the benefits and perceived risk. The former refers to the individual's perception of the direct and indirect advantages regarding the consequences of hers/his behavior, while the latter

refers to the prior calculation of potential losses when behaving in a certain way.

Electronic word-of-mouth is considered one of the most powerful informal media among consumers (Huete-Alcocer, 2017) and word-of-mouth advertising by consumers is the most powerful source of information due to the fact of being perceived as an unbiased source that helps reduce the uncertainties arising from an innovation (Santos, 2013). As risk perception is one of the factors that contribute to the slow adoption of innovative products (Borges, Matsuo, Minami, & Matsuyama, 2018) and to the intention of using innovative products (Natarajan, Balasubramanian, & Kasilingam, 2017; Thakur & Srivasta, 2014), information from groups of social network influences minimization of risk and the acceptance of innovative products (Lian & Yen, 2014, Messing & Westwood, 2014 and Thomas & Vinuales, 2017). Therefore, people who are influenced by opinion leaders use the search for an opinion as a risk reduction practice in decision making and/or are motivated by the desire to be part of a group, which leads them to adopt the values and beliefs of this group and its leader (Sohn, 2005).

The collaborative behavior of consumers in social networks, notably regarding the dissemination of information, may influence the dissemination of the innovation (Carraher, 2014; Dos Santos, 2012; Flynn & Eastman, 1996). Therefore, the creation of opinions by consumers depends on two main factors. The first concerns how leaders express their opinions and influence, other consumers, while the second concerns the process of propagating information in the network by seekers and disseminators of information (Bhalerao & Pandey, 2017). Therefore, the following hypotheses are suggested (see Figure 1):

H1: Risk propensity influences innovation acceptance;

H2: Self-perception of opinion leaders influences innovation acceptance;

H3: Self-perception of opinion seekers influences innovation acceptance;

H4: Attitudes regarding word-of-mouth influence innovation acceptance.

H5: Attitudes regarding collaboration influence the acceptance of the innovation.

Considering that risk propensity can indirectly impact the acceptance of innovation, from these five general hypotheses, other four are suggested as follows. The hypotheses are illustrated in the Estimation Framework (see Figure 1):

H6: Risk propensity influences the self-perception of opinion leaders.
H7: Risk propensity influences the self-perception of opinion seekers.
H8: Risk propensity influences attitudes regarding word-of-mouth.
H9: Risk propensity influences attitudes regarding collaboration.

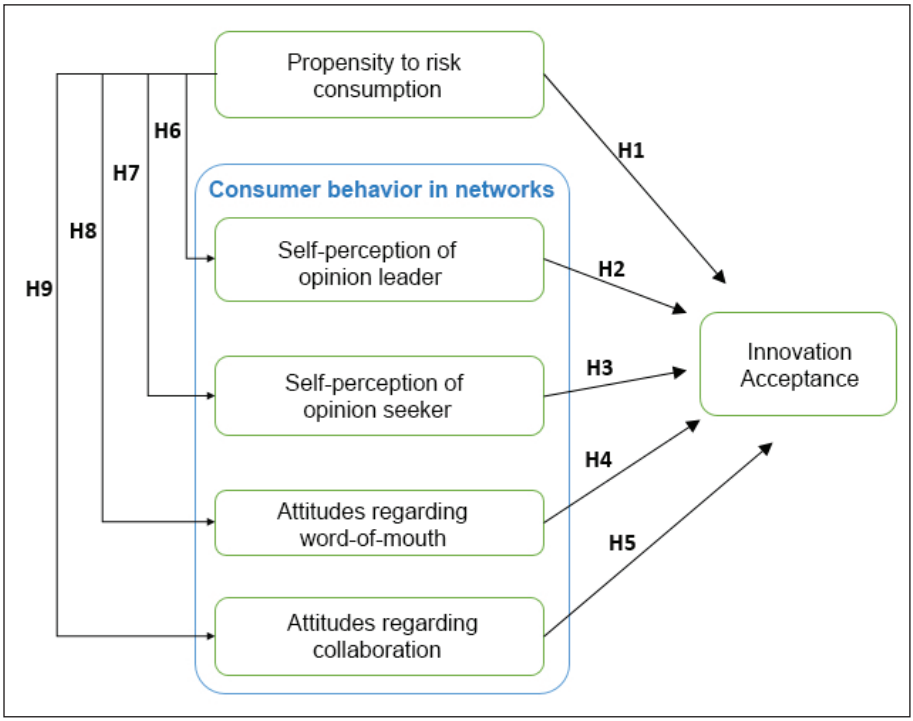

Figure 1. Estimation framework.

Method

Following the purpose of this study (i.e., to analyze how the dynamics for the adoption of innovative products are affected by the behavior of consumers in networks), this article is descriptive and explanatory. Descriptive because it seeks to establish a corre-

lation between variables related to the field of consumer behavior and the diffusion of innovation. Explanatory because it seeks to expose characteristics of individuals regarding the phenomenon of innovation acceptance.

The data collection occurred through a non-probabilistic sample. To validate and test the data collection instrument, two pre--tests were performed with 10 people each. After two pre-tests, the questionnaire was composed of 34 questions divided into six blocks, with each one corresponding to one construct of the study — self-perception of acceptance of innovations, self-perception of opinion leaders, self-perception of opinion seekers, perceived attitude regarding word-of-mouth, perceived attitude regarding collaboration, and perceived attitude regarding consumption risk (see Table 1). These six constructs were obtained from scales such as Flynn, Goldsmith, & Eastman, 1996; Parasuraman, 2000; Rogers & Cartano, 1962).

Data collection was accomplished via 423 survey questionnaires — using a Likert-type scale which was administered to people who used social networks. Of the 423 questionnaires collected, 23 were withdrawn, either due to completion errors or missing values, which were verified through the Statistical Package for Social Science (SPSS).

Data analysis

Data analysis was divided into two items: Descriptive data and Structural Model analysis.

Descriptive data analysis

The descriptive analysis aimed to characterize the profile of the respondents. Upon analyzing the 400 valid questionnaires, more than half of the respondents were found to be 15 to 30 years of age, and 62.3% were women. Regarding education level, 3.7% of the sample had completed high school. Most of the sample was composed of individuals with a higher education — incomplete, completed, or with graduate studies. The time on network products, such as WhatsApp, Facebook, Orkut, and Google+ — was analyzed on a scale of 1 to 4 points, from “little use” to “intense use” (see Table 2), which the majority is “intense use”.

Table 1. Variables of the study.

Variable	Construct
	Self-perception of acceptance of innovations
V1	People request my advice about new technologies.
V2	It seems like I am learning more about new technologies than my friends.
V3	In general, I am one of the first among my friends to acquire new technologies as soon as they are released in the market.
V4	I generally understand new high-tech products and services without help from others.
V5	I like the challenge of understanding high-tech products.
V6	Compared to other people, I think I have fewer problems using technology to benefit me.
V7	I like purchasing new technologies even before many people know they exist.
V8	I need to be the first to buy new technological devices.
	Self-perception of opinion leaders
V9	I tell my friends about new products that I have.
V10	My friends request my opinion before buying new products.
V11	I am the first to know when new products are released in the market.
V12	I generally influence the opinion of people close to me about new products.
	Self-perception of opinion seekers
V13	I need to speak with other people before using a new product.
V14	Other people influence my choice about using new products.
V15	I would not choose a new product or service before consulting someone
V16	I feel more comfortable using new products after hearing the opinion of other people.
	Perceived attitudes regarding word-of-mouth
V17	I have already talked to many people about these products, more than I generally do about other things I possess.
V18	I rarely miss an opportunity to talk about these products that I use.
V19	When I talk about the products, I talk in great detail.
	Perceived attitude regarding collaboration
V20	The groups I belong to are an important snapshot of who I am.
V21	When in a group, I generally feel that the group is an important part of who I am.
V22	I feel very proud when a group to which I belong achieves something big.
V23	I believe that one of the most important parts of who I am can be seen in the groups that I belong to.
V24	When I think about myself, I also think about the groups I belong to.
V25	If a person insults a group to which I belong, I also feel personally insulted.
V26	My sense of pride comes from the groups to which I belong
V27	When affiliated with a group, I develop a strong identification with it
	Perceived attitude regarding consumption risk
V28	Buying new products is risky
V29	New products can lead to bad results
V30	New products have uncertain results
V31	Acquiring a new product makes me worried.
V32	I would rather be safe than sorry.
V33	I like to be sure before buying anything.
V34	I avoid risky things.

Table 2. Time on networked products.

Time on network	Frequency	Valid percentage	Cumulative percentage
Little use	8	3.0	2.0
Moderate use	35	8.8	10.8
Constant use	133	33.3	44.0
Intense use	224	56.0	100.0
Total	400	100	

Structural Model Analysis

In the exploratory factor analysis, the extraction indicated a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of 0.864, with a significance level p = 0.000, which indicates that all the factors had sufficient correlation (Hair et al., 2009). In this analysis, the variables were grouped into six factors; however, some corrections were necessary to the model. The first modification was related to variables 3, 7, and 8 of the "self-perception of acceptance of innovations" factor (see Table 1). Because they had higher correlations with other factors, it was decided to withdraw them without adversely affecting the model given that the total variance increased from 14.57% to 15.4%. The second modification occurred in variable 12 of the "self-perception of opinion leaders" factor — it was decided to remove it because it had an index lower than 0.5. The third modification occurred with variables 9, 10, and 11 of the "self-perception of opinion leaders" factor and with variables 17, 18, and 19 of the "perceived attitude regarding word-of-mouth" factor, which was grouped in the same factor, referred to as "disseminator of opinions". The fourth modification occurred with the seven variables of the "perceived at"itude regarding consumption risk" factor: they were divided into two factors and referred to as "risk aversion" and "general risk". After these corrections to the model, the hypotheses originally proposed were modified (see Table 3).

To analyze the structural model, a measurement of convergent validity was initially performed to verify the quality of the measuring instrument. It was verified that the model has convergent validity given that the constructs "self-perception of acceptance of innovation" (AI), "opinion disseminator" (OD), "opinion seeker" (OS), "perceived attitude regarding collaboration" (COL), "perceived attitude regarding consumption risk" (RISK), and "risk aversion" (RA) had a mean load of 0.864= and a p-value equal to 0.001.

Regarding the validity of the constructs, they had p-values equal to 0.001 and Cronbach's alpha scores of AI = 0.813, OD = 0.847, OS = 0.819, COL = 0.883, RISK = 0.781, and RA = 0.75, which indicated internal consistency of the questionnaire given that all the indices were above 0.6 (Kock, 2014).

The constructs with low coefficients and/or without an acceptable level of significance were removed, which modified the relationship between the constructs and affected the measurement model, but they remained valid regarding the parameters proposed by the literature (Figure 2).

Table 3. Adjusted hypotheses of the estimation framework.

Hypotheses of the estimated framework	Adjusted hypotheses
H1: Risk propensity influences innovation acceptance.	H1. A. Perceived attitude regarding consumption risk influences innovation acceptance. H1. B. Risk aversion influences the self-perception of innovation acceptance.
H2. The self-perception of opinion leaders influences innovation acceptance. H4. Attitudes regarding word-of-mouth influence innovation.	H2+4. The self-perception of opinion disseminators influences innovation acceptance.
H3. The self-perception of opinion seekers influences innovation acceptance. .	
H5. Attitudes regarding collaboration influence the acceptance of the innovation.	
H6. Risk propensity influences the self-perception of opinion leaders.	H6.a. Risk aversion influences the self-perception of opinion disseminators. H6.b. Perceived attitude regarding consumption risk influences the self-perception of opinion disseminators.
H7. Risk propensity influences the self-perception of opinion seekers.	H7.a. Risk aversion influences the self-perception of opinion seekers. H7.b. Perceived attitude regarding the consumption risk influences the self-perception of opinion seekers.
H8. Risk propensity influences attitudes regarding word-of-mouth.	
H9. Risk propensity influences attitudes regarding collaboration.	H9.a. Risk aversion influences attitudes regarding collaboration. H9.b. Perceived attitude about risk consumption influences collaborative attitudes.

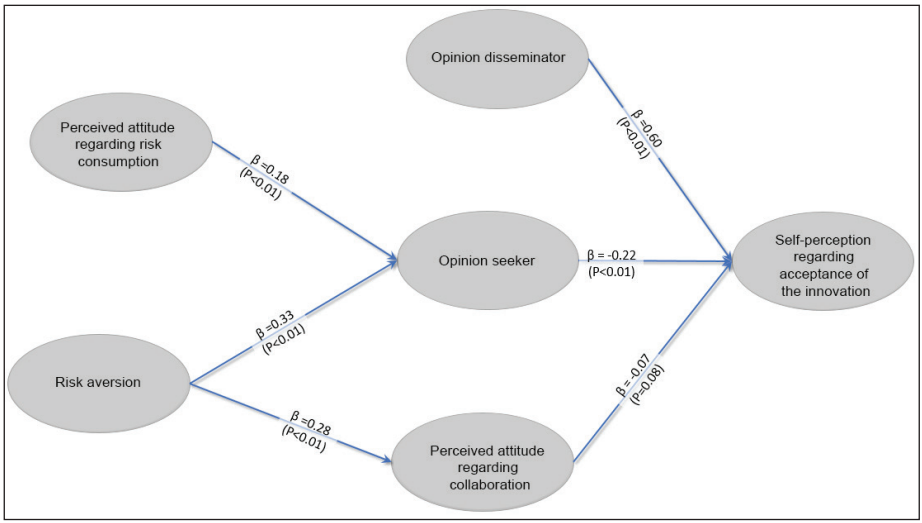

Figure 2. Adjusted structural equation model.

The difference in the modifications can be seen in the fit and quality indices of the model (see Table 4), in which the mean of the coefficients of the factors increased from 0.168 to 0.278, thus maintaining the level of significance. This improvement can be explained by the removal of non-significant relationships between the constructs. The fitting of the model also led to an increase in the mean squares, from 0.164 to 0.224, and maintaining the level of significance, which indicates that there was an increase in the explanatory power of the fitted model. Finally, the fitting caused an increase from 1.071 to 1.119 in the AVIF index but maintained the stability of the AFVIF index (see Table 4). In the next section, the analysis of the results presented here is discussed based on the hypotheses of the study and the literature presented in the theoretical framework.

Table 4. Fit and quality indices of the model.

	Initial model		Fitted model	
	Result	p-value	Result	p-value
APC	0.168	< 0.001	0.278	< 0.001
ARS	0.164	< 0.001	0.224	< 0.001
AVIF	1.071		1.119	
AFVIF	1.386		1.386	

Discussion

From the interpretation of β and significances (see Table 5), hypotheses H1a, H1b, H6b, and H9b were rejected; hypotheses H2+4, H3, H7a, H7b, and H9a were accepted; and hypothesis H5 was accepted (with restriction).

Table 5. Result of the hypotheses.

Hypotheses		Values		Situation
		β	p-value	
1 a	Perceived attitude regarding risk consumption influences innovation acceptance.	0.03	0.28	Rejected
1 b	Risk aversion influences the self-perception of innovation acceptance.	0.05	0.17	Rejected
2+4	The self-perception of opinion disseminators influences innovation acceptance.	0.60	0.01	Accepted
3	The self-perception of opinion seekers influences innovation acceptance.	0.22	0.01	Accepted
5	Attitudes regarding collaboration influence innovation acceptance.	0.07	0.08	Accepted
6 a	Risk aversion influences the self-perception of opinion disseminators.	0.04	0.23	Rejected
6 b	Perceived attitude regarding risk consumption influences the self-perception of opinion disseminators.	0.05	0.15	Rejected
7 a	Risk aversion influences the self-perception of opinion seekers.	0.33	0.01	Accepted
7 b	Perceived attitude regarding risk consumption influences the self-perception of opinion seekers.	0.18	0.01	Accepted
9 a	Risk aversion influences attitudes regarding collaboration.	0.28	0.01	Accepted
9b	Perceived attitude regarding risk consumption influences collaborative attitudes.	0.03	0.26	Rejected

"Perceived attitude regarding consumption risk" construct does not directly influence the "innovation acceptance" (H1a) (β=0.03; p = 0.28). The impact occurs indirectly and through the "self-perception of opinion seekers" (H7b) given that the perceived attitude regarding risk impacts on the latter construct (β = 0.18; p < 0.01. This relationship is established because the seek for opinions and recommendations increase the level of confidence in the new technology due to the opinion are accepted as neutral (Bentivegna,

2003), which allows an individual to minimize the risk of consuming something still little known.

Both hypotheses derived from risk — "risk aversion influences the self-perception of opinion disseminators" (H6a) and "perceived attitude regarding risk consumption influences the self-perception of opinion disseminators" (H6b) — were rejected, ($p = 0.23$; $p = 0.15$, respectively). The risk involved in the H6a hypothesis refers to a personal characteristic and is not related to consumption, given that self-confidence (probably arising from a large amount of knowledge about the product), a favorable attitude toward risk, a high level of social activity, and "open-mindedness" are characteristic of opinion leaders (Chan & Misra, 1990). In this case, the risk is not an impact factor for people who disseminate information (opinion leaders).

The hypothesis "Perceived attitude regarding risk consumption influences collaborative attitudes" (H9 b) has no significant relationship, which can be explained by the fact that the "Attitude regarding collaboration" construct seeks to measure how much individuals perceive themselves as being part of a group. The hypothesis that relates the influence that risk aversion has on collaborative attitudes (H9 a) has a relevant β (0.27) and a significance of $p < 0.01$; therefore, it can be inferred that risk aversion — this time without involving product consumption, but resulting from the individual character of pursuing risky attitudes — causes the individual to seek information and to be influenced by group decisions (Garcia, 2011; Borges, 2015).

The rejection of hypothesis (H1 b) "risk aversion influences the self-perception of innovation acceptance" can be explained by the fact that the "risk" construct in this study has a personal nature and is not related to consumption, given that it is formed by items such as "I would rather be safe than sorry". The hypothesis "Risk aversion influences the self-perception of opinion seekers" (H7 a) was accepted, which can be explained by it being a characteristic of the individual, which is related to the search for opinions as a way of reducing risk during decision making (Sohn, 2005).

The hypothesis "The self-perception of opinion disseminators influences innovation acceptance" (H2+4) was accepted and had the highest relationship index ($\beta = 0.60$), which shows the following:

to consumers, word-of-mouth communication is generally more trustworthy than advertising (Chan & Misra, 1990); leaders who disseminate such opinions influence others (Rogers & Cartano, 1962); and this influence is especially significant for the success of the diffusion of innovation (Della Flora, Ben Noro and Abbade, 2014).

The hypothesis "Attitudes regarding collaboration influence the acceptance of the innovation" (H5) was accepted in this study, even though it had a significance of 0.08. It was accepted because its variables attained the highest means in the study, showing that connection and identification of individuals with their social groups are important to be considered. The relevance of this to the adoption of innovations can be explained by the fact that the desire to be a member of a group leads the individual to adopt the values and beliefs of both the group and its leaders (Sohn, 2005). These relationships can result from both weak links (groups of colleagues and acquaintances) and strong links or influence groups (friends and family) and social influence those groups (Alwahaishi and Snásel, 2013; Granovetter, 2012; Bentivegna, 2002; Bhalerao & Pandey, 2017), both of which are important at the time of helping the individual to address the inherent uncertainties in adopting innovation (Bentivegna, 2002).

The hypothesis "The self-perception of opinion seekers influences the acceptance of the innovation" (H3) had a negative relation of 0.22, indicating that questions such as "I feel more comfortable using new products after hearing other people's opinions" make it possible to infer that individuals who perceive themselves to be opinion seekers are less likely to accept something new and its inherent risks; this is due to them not being very convinced at the time of consumption, since, according to Sohn (2005) and Bhalerao & Pandey (2017), opinion seeking is a risk reduction practice in decision making.

Conclusion

In this paper, it was analyzed how the dynamics of the adoption of innovative products are affected by consumers' behavior in networks. Using the quantitative approach methodology and structural equations, it was suggested constructs to explain how consumer behavior occurs in the adoption of innovative products in networks.

Regarding the first specific objective "to establish constructs that explain consumer behavior in the adoption of innovative products in social networks", we suggested five constructs: i) self-perception of opinion disseminators; ii) self-perception of opinion seekers; iii) perceived attitude regarding collaboration; iv) perceived attitude regarding risk consumption; and v) risk aversion. These constructs were explanatory in measuring the force of the impact that the search for opinions (Chan, & Misra, 1990; Sohn, 2005), the dissemination of opinions (Bentivegna, 2003; Rogers & Cartano, 1962; Rogers, 1983; Furlanetto & Santos, 2014; Thomas & Vinuales, 2017) and the attitudes of individuals regarding their groups (collaborative attitudes) (Carneiro et al., 2016; Thomas & Vinuales, 2017) have in the acceptance of innovative products in social networks.

Concerning the second specific objective, "to establish the construct of self-perception of consumers in adopting innovations", the translation and adaptation of constructs of innovativeness (Parasuraman, 2000) and the theoretical models of innovation diffusion (Ajzen & Fishbein, 1975; Bandura, 1977) were shown to be a robust construct to measure how the individual perceives him/herself more or less prone to adopt new technologies, except for three items as explained in the data analysis section.

Regarding the third specific objective, "to identify the existence of the relationship between the consumer' behavior in social networks and self-perception of consumers in adopting innovations", using structural equation modeling, through structural equations, a strong relationship between the variables reasonably explain the empirical framework.

Therefore, due to the literature does not address how the dynamics of adoption of innovative products can be affected by the behavior of the actors in social networks, the theoretical contribution of this work is the reduction of this gap, through the suggested constructs, which explains how the interaction between the actors in the social networks occurs concerning the adoption of innovative products. Based on these constructs, it is recommended that, for a deeper understanding of the constructs found in this study, qualitative research should be undertaken using the netnography method within consumers of different generations.

An important contribution of this study was to tie together the theoretical field of diffusion of innovation and the behavior of consumers in social networks. This integration allows analyzing the acceptance of innovation in the light of these constructs, through a new perspective, from an original and empirical point of view. Besides the theoretical support, the results of this research present practical contributions: relevant information for the companies that use methods for the diffusion of new products and services through social networks since they provide support for the formation of strategies for this kind of diffusion. They are: i) developing strategies of diffusion, taking into account the dissemination of opinions by key people (e.g., opinion leaders), since it is a way to reduce risk perception; ii) recognizing the dynamic of social network groups as a support for opinion seekers; iii) comprehending the role of social groups in minimizing risks related to the innovation acceptance in social networks.

References

Alwahaishi, S., & Snásel, V. (2013). Acceptance and use of information and communications technology: a UTAUT and flow based theoretical model. Journal of technology management & innovation, 8(2), 61-73.

Balbino, Fernando Cesar; Anacleto, Junia Coutinho (1977). Contagious: um framework para suporte à difusão de inovações em sites de redes sociais. In: Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215.

Bandura. A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44 (9), 1175-1184.

Bentivegna, Fernando Jucá. Boca-a-boca on-line e viral (2003). *RAE executivo*, 1 (2), p. 39-43.

Bhalerao, A., & Pandey, R. K. (2017). Consumer Behaviour: A Literature Review. *International Journal of Engineering Technology Science and Research*, 4(8), 1095-1103.

Borges, Jomar Fonteles (2015). Determinantes da intenção de uso de cartões de pagamentos no comércio eletrônico no brasil. (Doctoral dissertation, UNIFOR). 155.

Botti Abbade, Eduardo, Della Flora, Andiara, de Bem Noro, Greice (2014). A Influência Interpessoal em Redes Sociais Virtuais e as Decisões de Consumo. *Revista de Administração da Universidade Federal de Santa Maria*, 7 (2), 264-278.

Bredahl, L. (2001). Determinants of consumer attitudes and purchase intentions with regard to genetically modified foods – Results of a cross-national survey. Journal of Consumer Policy, 24, 23–61.

Carraher, S. (2014). Consumer Behavior, online communities, collaboration, IFRS, and Tung Dimmensions. *Journal of Technology Management in China*, 9, (1), 17-33.

Celuch, Kevin; Goodwin, Stephen; Taylor, Steven A (2007). Understanding small scale industrial user internet purchase and information management intentions: A test of two attitude models. *Industrial Marketing Management*, 36 (1), 109-120.

Chan, Kenny K; Misra, Shekhar (1990). Characteristics of the Opinion Leader: A new dimension. *Journal of Advertising*, Reino Unido, 19 (3), 53-60.

Dos Santos, M. A. (2012). Investigating consumer knowledge of global warming based on Rogers' knowledge stage of the innovation decision process. *International Journal of Consumer Studies*, *36*(4), 385-393.

Fishbein, Martin; Ajzen, Icek (1975). Belief. Attitude, Intention and Behavior: An Introduction to Theory and Research Reading, *MA: Addison-Wesley*.

Flynn L.; Eastman, J. (1996). Opinion Leaders and Opinion Seekers: Two New Measurement Scales. *Journal of the Academy of Marketing Science*. 24 (2), 137-147.

Furlanetto, Egídio Luiz; Santos, Edilene Dias (2014, jan). Difusão de Inovações Sustentáveis: o caso do biodiesel de mamona no Estado da Paraíba. *Teoria e Prática em Administração*, Paraíba, 1(4), 78-103.

García, Ángel Hernández. Desarrollo de un modelo unificado de adopción del comercio electrónico entre empresas y consumidores finales: aplicación al mercado español (2011). (Doctoral Dissertation, Universidad Politécnica de Madrid), 380.

Gonzalez, H.; Jiménez, A. (2014). Inserción Laboral de Nuevos Investigadores con Grado de Doctor en Chile Occupational Insertion of New PhD Researchers in Chile. J. Technol. Manag. Innov.,9 (4), 132-148.

Granovetter, M. (1983). The strength of weak ties: a network theory revisited. In: Sociological Theory. Ed. Randall Collins. San Franciso, Califórnia, pp. 2001-2233, Série Jossey-Bass.

Hair, Joseph F; Black, W. C.; Babin, B. J.; Anderson R. E.; Tatham, R. L (2009). *Análise Multivariada de Dados.* 6. ed. São Paulo: Bookman.

Hinz, O.; Schulze, C., Takac, C. (2014). New product adoption in social networks: Why direction matters. *Journal of Business Research*, 67 (1), 2836-2844.

Huete-Alcocer, N. (2017). A literature review of word of mouth and electronic word of mouth: implications for consumer behavior. Frontiers in Psychology, 1256, (8). Doi: 10.3389/fpsyg.2017.01256.

Kaufman, D. (2012). A força dos "laços fracos" de Mark Granovetter no ambiente do ciberespaço. *Galáxia,* (23), 207-218.

Kimura, H.; Basso, L.; Martin, D (2008). Redes sociais e o marketing de inovações. *RAM*, 9 (1), 157-181.

Kleijnen, M., Lee, N., & Wetzels, M. (2009). An exploration of consumer resistance to innovation and its antecedents. *Journal of economic psychology*, *30*(3), 344-357.

Klerck, D., & Sweeney, J. C. (2007). The effect of knowledge types on consumer-perceived risk and adoption of genetically modified foods. Psychology & Marketing, 24(2), 171–193.

Kock, Ned (2014). Advanced mediating effects tests, multi-group analyses, and measurement model assessments in PLS-Based SEM. *International Journal of e-Collaboration*, 10(1): 1-13.

Kosonen. M., Ellonen, H.-K. (2007), in IFIP International Federation for Infonnation Processing, 243, Establishing the Foundation of Collaborative Networks; cds. Camarinha-Matos, L., Afsannanesh, H., Novais, P., Analide, c.; (Boston: Springer), 391-398.

Kreindler, G.; Young, P. (2014). Rapid innovation diffusion in social networks. *Proceedings of the National Academy of Sciences*, 111 (Supplement 3).

Martinko, M. J., Henry, J. W., & Zmud, R. W. (1996). An attributional explanation of individual resistance to the introduction of information technologies in the workplace. Behaviour & Information Technology, 15(5), 313–330.

Matsuo, M.; Minami, C.; Matsuyama, T. (2018). Social influence on innovation resistance in internet banking services. *Journal of Retailing and Consumer Services*, 45, 42-51..

Maya, Paulo C.; Otero, W. I. (2002). A Influência do Consumidor na era da Internet. *Revista da FAE*, 5 (1), 71-81.

Maya, Paulo C.; Otero, W. I. (2002). A Influência do Consumidor na era da Internet. *Revista da FAE*, 5 (1), 71-81.

Messing, S., Westwood, S. J. (2014) Selective exposure in the age of social media: endorsements trump partisan source affiliation when selecting news online. Commun. Res., 41 (8), 1042-1063.

Natarajan, T., Balasubramanian, S. A., & Kasilingam, D. L. (2017). *Understanding the intention to use mobile shopping applications and its influence on price sensitivity. Journal of Retailing and Consumer Services, 37, 8–22. doi:10.1016/j.jretconser.2017.02.010*

Noussair, C., Robin, S., & Ruffieux, B. (2004). Do consumers really refuse to buy genetically modified food? Economic Journal, 114(492), 102–120.

Ozcan NK, Buzlu S. (2007). Internet use and its relation with the psychosocial situation for a sample of university students. *CyberPsychology & Behavior*, 10, 767–72.

Pantano, E., Gandini, A. (2017). Exploring the forms of sociality mediated by innovative technologies in retail settings. *Computers in Human Behavior*, 77, 367-373.

Pelc, K. (2017). Diffusion of innovation in Social Networking. In: Zacher L. (eds) *Technology, Society and Sustainability*. Springer, Cham.

Ram, S., & Sheth, J. N. (1989). Consumer resistance to innovations: The marketing problem and its solutions. Journal of Consumer Marketing, 6(2), 5–14

Rogers, E. (1995). Lessons for Guidelines from the Diffusion of Innovations. *Journal on Quality and Patient Safety*, 21 (7), 324-328.

Rogers, E., & Cartano, D. (1962). Methods of Measuring Opinion Leadership.*The Public Opinion Quarterly, 26*(3), 435-441.

Rogers, Everett M. (1993). *Diffusion of innovations.* 3. ed. Canadá: The Free Press, 483.

Saba, A., Rosati, S., & Vassallo, M. (2000). Biotechnology in agriculture: Perceived risk, benefits and attitudes in Italy. British Food Journal, 102(2), 114–122.

Santos, Alessandra Thoms; ALVES, Lilian; Brambilla, Flávio Régio (2016). Cocriação de valor no varejo através da utilização das mídias sociais. *Estudos do CEPE*, 43, 68-83.

Schwab, Klaus. A quarta revolução industrial. Trad. Daniel Moreira Miranda. São Paulo: Edipro, 2016.

Shoemaker, R. W., & Shoaf, F. R. (1975). Behavioural changes in the trail of new products. Journal of Consumer Research, 104, 109.

Sohn, Youngju. Opinion leaders and seekers in online brand communities: centered on korean digital camera brand communities (2005), 61 f. In: Dissertação (Mester Dissertation, Florida State University).

Thakur, R., Srivastava. M., 2014. Adoption readiness, personal innovativeness, perceived risk and usage intention across customer groups form mobile payment services in India. Internet Res. 24(3), 369-392.

Thomas, V. L., Vinuales, G. (2017). Understanding the role of social influence in piquing curiosity and influencing attitudes and behaviors in a social network environment. Psychol. Mark. 34, 894-907.

Yang, S., Chen, Y., Wei, J., 2015. Understanding cnsumer's web—mobbile commerce in Singapure.Telemat. Inform. 22(3), 257-277.

Recebido em: 26-9-2022
Aprovado em: 14-9-2023
Avaliado pelo sistema double blind review.
Disponível em http://mjs.metodista.br/index.php/roc