Are We Ready for New Technologies? The Relation Between Human Values and Technology Readiness Applied to M-Commerce in Brazil

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Abstract

This study describes the relation between human values and technology readiness in Brazilian mobile commerce (m-commerce). This study consisted of an online survey including the Portrait Values Questionnaire-Revised (PVQ-R), the Technology Readiness Index 2.0, and SES items in all Brazilian states (N=2,171). Our structural equation modeling showed that human values predicted technology readiness; and attitude, intention to purchase online via mobiles. Self-enhancement and openness to change positively influenced the technology readiness contributor factor, whereas self-transcendence negatively influenced the technology inhibitor factor, and conservation positively influenced it. Theoretical and managerial contributions developed a conceptual model involving human values, technology readiness, and intention to purchase online via mobiles. This study can help develop public policies related to information security, aiming to increase consumer confidence in using new technologies in m-commerce.

Introduction

In the digital era, demands via the internet seem to have become a primary need for people, with online orders for transportation, food, and entertainment (Silitonga, Fakhrorazi, & Ikhsan, 2020). E-commerce has changed consumer behavior and become very important over recent years, especially due to the virtual means adopted in relations between customers and companies (Fujihara & Montezano, 2018). Moreover, online commerce has intensively increased, which has led to new motivating and limiting factors for the use of electronic commerce (Dannenberg, Fuchs, Riedler, & Wiedemann, 2020).

Consumers can shop using their smartphones simply by searching and paying for products to receive them at home (Shaw & Sergueeva, 2019). Smartphones have become essential for people (Chung & Lai, 2017; Haucke, 2018), enabling several new activities, access to the internet, and different resources, anywhere, anytime, including mobile commerce (Chong, 2013). Mobile commerce (m-commerce) further expanded the limits of the virtual commerce revolution (Al-Adwan, Alrousan, Al-Soud, & Al-Yaseen, 2019). With the rapid development of m-commerce in the last decade, studies have aimed to understand consumers' decision-making regarding the use of m-commerce (Sun & Chi, 2017). This need is even more critical considering the context of fast changes that organizations had to face to initiate or intensify their electronic sales of products and services due to the new pandemic scenario (Dwivedi et al., 2020)

Even though m-commerce is getting stronger, some industries face consumer resistance with increased purchases and expansion trends (Heinze, Thomann, & Fischer, 2017). Koenigstorfer and Groeppel-Klein (2012) corroborate this idea by emphasizing that, although technological innovations optimize consumers' time, some consumers refuse to use them or reduce their use over time. Heinze et al. (2017) investigated consumers' resistance to m-commerce and listed several studies on barriers to adopting technology innovations. These studies showed cognitive, affective, and attitudinal aspects concerning resistance to change which characterizes the barriers to adopting new technologies.

To understand people's resistance and barriers regarding new technology readiness and the use of m-commerce, this study chose the Technology Readiness Index (TRI 2.0) by Parasuraman and Colby (2014) to analyze consumers from the perspective of human values (Schwartz, 1994). Schwartz's theory of values is widely used to predict attitudes and behaviors. It is considered a landmark in studies worldwide, in different contexts and situations (Sousa & Fontenele, 2019), including cases of consumer behavior (Arruda, Bandeira, Silva, & Rebouças, 2016). The choice of the TRI 2.0 model was still little explored and allows working with individual consumers in the market environment. TRI segments can profile mobile users' overall technology readiness (Wiese & Humbani, 2019).

One of the goals of this study is to contribute to studies involving the values-attitude-behavior triad, especially evaluating the predictive relations between these constructs. Bellini (2018) described that digital effectiveness manifests itself in three dimensions: access, cognition, and behavior. According to Radons and collaborators (Radons, Scoott, Estivalete, & Lobler, 2020),

personal values are relevant factors for technology use. Principles or beliefs about behaviors will determine the positive or negative inclination consumers will have toward technologies.

Therefore, this research assumes that studies have indicated the relation of influence within the triad values-attitudes-behavioral intention, which is the core of this study. Personal, organizational, and cultural values have been explored in research involving the social and corporate world, considering that values are predictors of attitudes and behaviors. Nevertheless, the literature contains only a few studies involving the predictive relation between human values, technology readiness (TRI 2.0), and m-commerce purchasing intention explicitly via mobiles. Hence, the objective of this study is to evaluate the relation between human values and technology readiness applied to Brazilian mobile commerce.

Literature review

This section shows the theoretical foundations required for understanding the context and the constructs used in this research: mobile commerce, technology readiness, the relation between attitude and intention to use technologies, and human values.

Mobile commerce (m-commerce)

Mobile commerce has become a worldwide phenomenon due to the proliferation of mobile technologies and the growing popularity of mobile devices (Zheng, Men, Yang, & Gong, 2019). Mobile payments have disrupted and dominated markets in both the developing and the developed world (Humbani & Wiese, 2019). M-commerce is an electronic transaction carried out by a mobile device via a wireless connection (Sissing, Dlamini, & Johnston, 2017), with barriers and benefits to consumers.

Several studies explore this theme. For example, factors which influence the use of m-commerce (Eastin, Brinson, Doorey, & Wilcox, 2016; Sun & Chi, 2017); the paradox between personalization and privacy in the use of location-based mobile commerce (Lee & Rha, 2016); and the cannibalization effect of adopting m-commerce on purchases over the web channel (Huang, Lu, & Ba, 2016).

In addition to identifying the global multiplicity of studies, recent research on m-commerce also mention contributors of m-commerce's customer satisfaction (Marinkovic & Kalinic, 2017) and the intention behind m-commerce use (Chi, 2018). Chi (2018) claims that positive attitudes toward m-commerce lead consumers to shop via mobiles and that people tend to use a mobile device to the extent that they believe it will help them (Moraes, Ferreira, Freitas, Giovannini, & Silva, 2014).

Trust has been one of the main topics of studies on m-commerce (Hillman & Neustaedter, 2017), with security, design, and content being the leading trust factors in using m-commerce websites (Nilashi, Ibrahim, Mirabi, Ebrahimi, & Zare, 2015). Nevertheless, according to Gao and Waechter (2017), who studied payments via mobiles, the nature of the virtual transaction creates risk and uncertainty about online purchases since it physically distances people from service providers.

Sarkar, Chauhan, and Khare (2020), by a meta-analysis with 118 empirical studies, identified that the antecedents of trust in m-commerce are perceived usefulness and ease-of-use; system, information, and service quality; user interface; perceived risk and security; structural assurance; ubiquity; and disposition to trust. Moreover, the authors pointed out that the consequences of trust in mobile commerce are attitude, user satisfaction, behavioral intention, and loyalty.

Given this scenario, people's relationship with m-commerce can occur from different perspectives and involve perceptions about technology, attitudes, and behavioral intention. Hence, this study assumes that human values are important in using m-commerce since they involve affective, cognitive, and behavioral issues. To this, we add the technology readiness theory, which brings up the duality between the positive aspects of optimism and innovation and the negative aspects of insecurity and discomfort with technology.

Technology readiness (TRI)

Technology readiness refers to people's propensity to adopt and use new technologies to achieve personal goals at home and work (Parasuraman, 2000). The technology readiness theory (TRI) contains two phases that developed two scales: the TRI (Parasuraman, 2000) and the TRI 2.0 (Parasuraman & Colby, 2014). The theory involves two study dimensions, classifying optimism and innovation as contributors to technology readiness and discomfort and insecurity as inhibitors of technology readiness, thus indicating that contributing factors promote people's technology use and inhibiting ones might prevent it (Parasuraman, 2000).

The first proposed TRI scale had 36 items to assess individuals' perception of new technologies within four analytical aspects: optimism, innovation, insecurity, and discomfort (Parasuraman, 2000). As studies progressed, a new and optimized scale (TRI 2.0) was developed with only 16 items (Parasuraman & Colby, 2014), maintaining the objective of assessing people's readiness to adopt and use new technologies, covering the same four aspects of analysis.

The first TRI scale applications have taken place in several research fields in different countries and in combination with other technology acceptance models. A study in Japan and the United Kingdom showed that technology availability alone might not necessarily become the most significant predictor of online public services (Shirahada, Ho, & Wilson, 2019). A study in health showed that discomfort was an aspect related to lack of control over technology or overload of technology-based programs, indicating users' hesitation about using computers (Marhefka, Turner, & Lockhart, 2019). Kim and Chiu (2019) analyzed TRI in sports, concluding that contributing factors positively influence the perception of sports technology use and that the inhibitor factors negatively influence it.

Publications started to mention the TRI 2.0 scale in 2016. Penz, Amorim, Nascimento, and Rossetto (2017) mentioned the TRI 2.0 but did not apply it. Zaidi and Faizal (2017) also mentioned it. They acknowledged the difficulty of finding articles that used the TRI 2.0. Since it is still a recent instrument, it is still going through a lengthy approval cycle in publications. The first influential publications using the referred instrument began in 2018. Mukerjee, Deshmukh, and Prasad (2018) used the TRI 2.0 to assess smartphone use in self-checkout services and concluded that Indian consumers were moderately ready to use new technologies. Wiese and Humbani (2019) applied the TRI 2.0, highlighting that mobile users are optimistic about using them but are still unsure about

their purchasing experience. For Huy et al. (2019), optimism and innovation influence the perception of technology use in Vietnam hotels, with statistically significant results. In Brazil, Mazzucatto, Dolnei, and Papi (2019) used the TRI 2.0 scale in a circular economy network study, and Caldeira, Ferreira, Freitas, and Falcão (2021), in a mobile payment context.

This study is motivated by the lack of research using the TRI 2.0 scale, especially in Brazil. Also, changes in consumer behavior due to technological advances involve not only consumers' technical level but also their socio-cognitive aspects (Lin & Bhattacherjee, 2009; Venkatesh, Tong, & Xu, 2016). Therefore, we related the technology readiness theory dimensions to human values, attitude, and intention to using mobile commerce.

Attitude and intention to use technologies

Attitude has been a central object of studies in social psychology and has been used in behavioral assessments (Edison & Geissler, 2003). Attitude is considered one of the most important concepts for social and consumer psychology studies (Cacioppo, Gardner, & Berntson, 1999) since it influences decisions and behaviors (Nowlis, Kahn, & Dhar, 2002). This research adopted the concept of attitude in Rosenberg and Hovland (1960), according to a hierarchical model composed of three components: affective, cognitive, and behavioral. Consumers learn via their relationship with social and physical environments (Moschis & Churchill, 1978) and acquire knowledge by accumulating information absorbed in the face of influence from social and environmental factors. Suppose, for example, that consumers believe that a specific technology can provide benefits. In that case, they will use it, and their attitude, benefits, and convenience perception will serve as the basis for their interest in using it (Masudin, Pangenggar, Restuputri, Kusumadewi, & Ibrahim 2018).

Beliefs and evaluations about objects, people, and situations form attitudes (Ajzen & Fishbein, 1980). Kundu and Rani (2008) also state that the cognitive dimension relates to beliefs and thoughts about an attitude object. The study of attitudes toward internet is a multidisciplinary topic and some measurement scales have assessed them (Mota, 2020).

This study evaluated attitudes toward m-commerce, specifically mobile phone use for online purchases, asking questions which address the affective, cognitive, and behavioral intention dimensions focused on using new technologies. For technology, Shirahada, Ho, and Wilson (2019) point out that attitudes toward social interaction can affect the level of trust in online interactions. According to Rojas-Méndez, Parasuraman, and Papadopoulos (2017), the consistency between attitude and behavior can vary among countries due to cultural factors. Therefore, it is crucial to conduct research in different countries for comparative purposes.

Intention to use technology is a dependent variable in the technology acceptance model – TAM (Davis, Bagozzi, & Warshaw, 1989) – and in the unified theory of acceptance and use of technology – UTAUT (Venkatesh, Morris, Davis, & Davis, 2003). Therefore, perceived usefulness and ease of use are the variables that especially explain intention to use technology. By adopting the TAM model, intention to use technology was the object of a study with mobile assessing m-commerce and m-payment (Kim, Mirusmonov, & Lee, 2010), topics of interest to technology companies, financial institutions, and the retail market.

The UTAUT model analyzes intention to use technology by performance expectations, expected results, facilitating conditions, and social influence. In this study, intention to use was carried out from the direct perspective of users' attitude toward purchases via mobiles. In their multi-level framework of technology acceptance and use, Venkatesh, Tong, and Xu (2016) related behavioral intentions to individual beliefs, which include social influence and hedonic motivation. Cheng, Sharma, Sharma, and Kulathunga (2020) showed that performance expectation, habit, hedonic motivation, and facilitating conditions have positively affected mobile application users' intention (of continuous use), confirming that attitudes precede behaviors and predict behavioral intentions of use.

In an empirical study with Canadian smartphone users, Shaw and Sergueeva (2018) showed that perceived value and hedonic motivation strongly affect intention to use technologies. The research by Sun and Chi (2017) highlights that perceived usefulness positively influences intention to use m-commerce in the clothing market. The literature offers adequate explanations for consumers' intention to use m-commerce. Considering the technology readiness model TRI 2.0 and the interest in analyzing how human values influence attitudes toward m-commerce use, we describe the theory of human values below.

Human values

Another construct adopted in this study is that of human values by Schwartz (1994), widely used to predict attitudes and behaviors. Published articles involving human values using Schwartz's instrument have focused on quantitative research, adopting different versions of the Schwartz scales in different contexts. We can mention the Schwartz Value Survey (SVS) with 56 items (Coelho, Hanel, Johansen, & Maio, 2019); the Portrait Values Questionnaire-21 (PVQ- 21) (Madarie, 2017); and the Portrait Values Questionnaire-52 (PVQ-52) (Martinez, Samaniego, & Moretin, 2015). The refined theory of human values (Schwartz et al., 2012) is configured in two ways: four motivational types and 19 values. Table 1 describes its concepts.

Table 1

Conceptual definitions of human values in the refined model by Schwartz et al. (2012)

Categories	Motivational Types	Values	Conceptual definitions according to motivational goals
Growth – Self-Expansion	Openness to Change	Self-direction (Thought)	Freedom to cultivate one's own ideas and abilities
		Self-direction (Action)	Freedom to determine one's own actions
		Stimulation	Excitement, novelty, and change
	Self-Transcendence	Humility	Recognizing one's insignificance in the larger scheme of things
		Benevolence (Dependability)	Being a reliable and trustworthy member of an ingroup
		Benevolence (Caring)	Devotion to the welfare of ingroup members
		Universalism (Concern)	Commitment to equality, justice, and protection for all people
		Universalism (Nature)	Preservation of the natural environment
		Universalism (Tolerance)	Acceptance and understanding of those who are different from oneself
Self-Protection – Anxiety-Avoidance	Self-Enhancement	Hedonism	Pleasure and sensuous gratification
		Achievement	Success according to social standards
		Power (Dominance)	Power via control over people
		Power (Resources)	Power by control of material and social resources
	Conservation	Face	Security and power by maintaining one's public image and avoiding humiliation
		Security (Personal)	Safety in one's immediate environment
		Security (Societal)	Safety and stability in the wider society
		Tradition	Maintaining and preserving cultural, family, or religious traditions
Self-Protection – Anxiety-Avoidance (cont.)		Conformity (Rules)	Compliance with rules, laws, and formal obligations
		Conformity (Interpersonal)	Avoidance of upsetting or harming other people

Categories	Motivational Types	Values	Conceptual definitions according to motivational goals

Source: Schwartz et al. (2012).

With the refinement of the theory, some values (e.g., universalism) were broken down into subtypes, considering the adjacency in their understanding. Hence, universalism came to have three values: concern, nature, and tolerance (Schwartz et al., 2012).

It is worth highlighting the meta-analysis developed to test the variance of basic human values in Brazil using the Schwartz Values Inventory, which identified systematic differences in basic personal values between the five regions of Brazil (Torres, Porto, Vargas, & Fischer, 2015). Torres, Schwartz, and Nascimento (2016) indicated that the instrument measuring refined values is suitable for use with Brazilian samples since it can discriminate all 19 values in Brazil, representing an advancement in the previously used measure.

Some studies relating Schwartz's value model to technology were identified in the literature. Martinez et al. (2015) is an example of this type of research. The authors analyzed the relation between values and video game consumption habits of 110 adolescents, highlighting individualist and collectivist values. Capacity, success, and social recognition appear in six out of the seven examined games whereas daring, helpful, and loyalty appear in five of the seven video games most used by teenagers (Martinez et al., 2015). Bezerra (2016) emphasizes the questioning of the "self" in the dialogue and use of technology, characteristic of the self-enhancement value when the "self" is reflexively organized, seeking promotion and favoring competition in social media.

Madarie (2017) analyzed the behavior of computer hackers and their motivations for debugging existing programs and designing new programs for destructive purposes. She found characteristics related to self-transcendence and openness to change in her entire sample, indicating that intellectual challenge and curiosity stood out as the most important motivators for circumventing security systems. Nevertheless, Madarie also characterized aversion to conservation values, indicating that hackers seem to be more motivated by what they dislike, rather than by what they value (Madarie, 2017).

White, McMurray, and Rudito (2017), in turn, carried out a study with theories of values and the technology readiness index (TRI), focusing on customer perceived value (CPV). Their proposed model dealt with the relation between values of conservation, self-enhancement, and openness to change as predictors of technology readiness, using customers' perceived values on quality, price, emotion, and social aspects as mediators. Their reduced value instrument with only ten items was used, and their 36-item TRI and 19-item CPV instruments differed from the one proposed in this study. Results indicated that the perceived values mediate the relation between values and TRI.

Human values and TRI – hypotheses

Regarding the use of technology, the study by Jayawardhena (2004) indicates that values such as self-direction, pleasure, and self-fulfillment have a positive and significant effect on favorable attitudes toward e-shopping and subsequently result in behavior related to e-shopping. This study indicates that attitude is a mediating variable between personal values and behavior. Based on this example and the revised literature on the relation between values and attitude, in which personal values have been used to predict attitudes and behavior (Porto & Tamayo, 2003), we offer our first hypothesis: H1) human values influence attitudes regarding technology readiness factors.

Stimulation, self-determination, and traits of hedonism represent values that establish the second-order factor of motivational types conceptualized as openness to change, which involves issues related to independent actions, creation, exploration, pleasure, and stimulation for challenges. These characteristics resemble entrepreneurs', as described by McClelland (1972), who identified characteristics of entrepreneurial people such as perseverance, diligence, skill, creativity, independence, and self-confidence. According to Schmidt and Bohnenberger (2009), entrepreneurs innovate and creatively relates ideas, facts, needs, and market demands (Carland, Hoy, & Carland, 1988; Filion, 2000). Given these characteristics, our second hypothesis establishes that: H2) openness to change positively influences TRI drivers.

Analyzing Schwartz's (1992) human values, self-enhancement is a second-order factor involving values of self-fulfillment power, in addition to face and hedonism features. Entrepreneurs are an example of this profile. McClelland (1972) relates entrepreneurs to the need for success, recognition, power, and control based on psychological motivation theory. People are motivated by three needs: achievement, power, and affiliation. Entrepreneurship is associated with creativity and innovation, aiming to generate wealth and value for individuals and society (Bruyat & Julien, 2000; Filion, 2004). Although entrepreneurs have a specific professional profile, it characterizes the association between values and innovativeness. Considering that innovativeness indicates that people are highly motivated to adopt high-tech products (Parasuraman & Colby, 2002), we offer our third hypothesis: H3) self-enhancement positively influences TRI drivers.

Self-transcendence involves universalism, benevolence, dependence, and care values, as opposed to the values in the self-promotion component (Schwartz et al., 2012). In this case, we chose to observe only the motivational circle theory of Schwartz et al. (2012). They place these motivational types at opposite poles, which leads us to formulate our fourth hypothesis: H4) self-transcendence positively influences the TRI inhibitory factor. Those who value the well-being of people and nature are adept at what is natural and, for Cupani (2011), the technological society that results from behaviors with a technological mindset values the artificial more than the natural, reinforcing our established hypothesis.

Conservation is considered another second-order factor of motivational types, including safety, tradition, conformity, and humility traits. Consumers feel insecure when offering their personal and financial information such as credit card identification while shopping on the internet (Li & Huang, 2009). Thus, security value deals with harmony and one's own security related to self-stability, relations, and society (Schwartz, 1992) which may be active in individuals in this situation.

As for compliance, Fritsche (2002) exemplifies that when a person is on the bus, and an older woman is standing, the social norm of helping others is violated. The person feels uncomfortable with the situation. Schwartz (1977) and Weiner, Amirkhan, Folkes, and Vereth (1987) already dealt with the negative psychological effects caused by the violation of social norms. People who restrict their actions and impulses that may harm others and violate rules tend to feel uncomfortable and insecure when violating the rules. On the other hand, when living socially in an environment in which most people are adept at technology, individuals' chances of adopting technology to avoid violating the rules are high. Therefore, this factor may show a result opposite to the one hypothesized.

The same reasoning can be used for tradition and respect for the customs and ideas of a culture. This respect leads to compliance with norms, as it helps maintain an image of self-esteem and social reinforcement and meet the need for social approval (Fritsche, 2002). Considering that discomfort with technology refers to a perception of lack of control and the feeling of being oppressed by technology, and insecurity refers to distrust and concerns about its possible negative consequences (Parasuraman & Colby, 2002), our fifth hypothesis states that (H5) conservation positively influences people's relationship with the TRI inhibitory factor.

TRI and attitude – hypotheses

To establish the relation between TRI and attitudes, we suggest that the driving factor in TRI involves optimism and innovativeness. Whereas the dimension of optimism brings us the idea that technology helps people's daily lives and represents something positive (Parasuraman & Colby, 2002), innovativeness is also defined as a desire to seek new stimuli (Hirschman, 1980), which can affect attitudes toward new technologies. Innovativeness measures how quickly and to what extent an individual adopts innovations related to internet shopping, which can be treated as an innovative attitude toward physical store purchases (Zhou, Daí, & Zhang, 2007). Both variables of the driver factor can influence consumer attitudes toward the use of new technologies, leading to our sixth and seventh hypotheses: H6) the driving factor positively influences the attitude of virtual shopping via mobiles; and H7) the inhibitor factor negatively influences the attitude of online shopping by cell phones.

According to Parasuraman and Colby (2002), people with a high level of optimism are more willing to buy and consume high-tech products and innovative people are consumers willing to use technology (Bhattacherjee, 2001). The greater the subjects' innovativeness, the more positive their attitude toward the use of technology (Dabholkar & Bagozzi, 2002). On the other hand, the inhibitory factor of TRI involves the dimensions of discomfort and insecurity. Whereas discomfort relates to lack of control over technology and negative beliefs regarding the lack of technical support services, insecurity refers to skepticism about the correct functioning of technology and distrust regarding the transfer of personal information (Parasuraman & Colby, 2002). These dimensions can influence attitudes related to virtual purchases by cell phone. People with feelings of discomfort and insecurity may prefer to maintain the traditional method of consumption via physical rather than electronic means.

Attitude and behavioral intention – hypothesis

Behavioral intentions related to the use of new technologies will be evaluated based on the theory of rational action (TRA) by Fishbein and Ajzen (1975). Behavioral intention is a conative component of attitude related to affection, which leads to a strong assumption of the relation between attitudes and intentions (Fishbein & Ajzen, 1975). Beliefs about behavior consequences are attitude predictors toward behavior, which predicts the intention to carry out that behavior.

The relation between attitude and behavioral intention (Fishbein & Ajzen, 1975) leads us to our eighth hypothesis: H8) the online purchase attitude of using a mobile (m-commerce) positively influences online purchase intention via that means (m-commerce).

In this context, Indahingwati et al. (2019) state that consumers' buying decisions involve emotional perceptions and that consumption can occur rationally or irrationally. This article proposes an analysis of the relations between human values, technology readiness, attitude, and intention to use m-commerce defining the hypotheses, as shown in Figure 1 and Table 2.
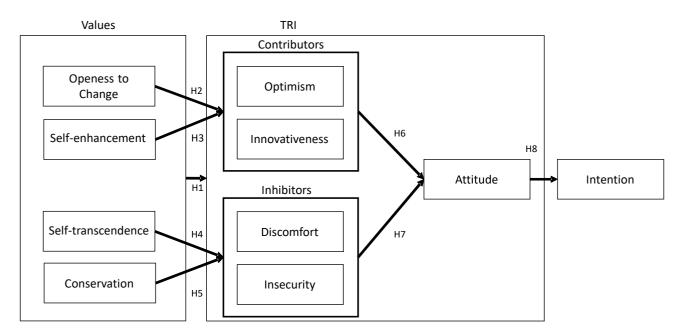

Figure 1. Theoretical-conceptual model of the relation between human values and the technology readiness index (TRI 2.0)

Sources: Elaborated by the authors.

Table 2
Hypotheses

Code	Hypotheses
H1	Motivational types influence attitudes regarding technology readiness.
H2	Openness to change positively influences the TRI contributor factor.
H3	Self-enhancement positively influences the TRI contributor factor.
H4	Self-transcendence positively influences the TRI inhibitor factor.
H5	Conservation positively influences the TRI inhibitor factor.
H6	The contributor factor positively influences online purchase intention via mobile (m-commerce).
H7	The inhibitor factor negatively influences online purchase intention via mobile (m-commerce).
H8	The attitude of using a mobile for online purchases (m-commerce) positively influences online purchase intention via mobiles (m-commerce).

Sources: Elaborated by the authors.

Method

The literature review above enabled us to construct the proposed theoretical-conceptual model, empirically comparing human values, technology readiness, and purchase intention for mobile users. To evaluate our model (Figure 1), the adopted method involved a quantitative approach with multivariate, inferential, and descriptive analyses based on cross-sectionally collected data via an electronic questionnaire.

Participants

The population defined for this research was Brazilians aged 16 years old or above, aiming at covering different ages, genders, and regions of the country. Our final sample was composed of 2,171 people from all five geopolitical regions of Brazil. Since our target population tends to infinity, it was possible to use non-probabilistic convenience sampling (Cochran, 2007).

Survey participants showed the following profile by geographic region: North (5.9%); Northeast (17.3%); Midwest (30.2%); Southeast (32.8%), and South (13.4%). Distribution by gender was balanced, with 50.3% of women and 49.7% of men. Income frequency was distributed as follows: Class A (14.7%), Class B (26.5%), Class C (44.2%), Class D (11.0%), and Class E (2.9%) (0.8% of respondents failed to indicate income). Distribution by age group was composed of youth (between 15 and 29 years old) (9.9%); adults (between 30 to 59 years old) (82.0%); and older adults (older than 59 years old) (8.1%). Age distribution was based on Brazilian legislation regarding the elderly and youth statutes.

Instrument

Our research instrument was composed of four blocks: research presentation and informed consent forms, the scale of technology readiness, frequency of technology use, online purchase intention using the mobile, and the scale of human values. In the first block, participants were

informed about the purposes of this research, our guarantee of their anonymity, information about the fact that this research obeyed the ethical principles of academic research, and, finally, the question of consent for voluntary participation. This research complied with Brazilian Law 12.965/2014 on the security and anonymity of research using the internet. Moreover, Resolution 510/16 of the Brazilian National Health Council (CNS) establishes that public opinion surveys with unidentified subjects are exempted from ethical analysis by the Research Ethics Committee (CEP) and the National Research Ethics Commission (CONEP).

The second block contained the technology readiness index – TRI 2.0 by Parasuraman and Colby (2014), adapted for Brazil. The third block contained a scale of intention to use mobile phones for online purchases; and the fourth one, the refined scale of human values for Brazil by Torres et al. (2016). In the end, questions were asked to assess participants' sociodemographic data.

To translate the TRI 2.0 scale, we followed the back-translation procedures suggested by Brislin (1970). Six bilingual translators were consulted, including one certified translator, three of which translated the scale from English into Portuguese and three from Portuguese into English. Then, the questionnaire was subjected to content validation (Hernández-Nieto, 2002). Its content validation coefficient (CVC) was calculated to assess the agreement between evaluators on language clarity, representativeness (practical relevance), and the theoretical relevance of the items. Overall, five experts participated in the evaluation. The 16-item scale, segmented into two factors, showed a Cronbach's alpha of 0.632 for the inhibiting factor and a 0.736 for the contributing factor. A 5-point Likert scale was used (1- Strongly disagree, 2- Disagree; 3- Neither Agree nor Disagree; 4- Agree; 5- Strongly agree), consisting of 16 questions segmented into four factors: optimism, innovativeness, insecurity, and discomfort.

The second scale had two parts. The first one assessed frequency of use of the technology in a 5-point Likert type scale (1- Never; 2- Rarely; 3- Sometimes; 4- Frequently; 5- Always). The second one evaluated attitudes and online purchase intention via mobiles with a 5-point Likert scale (1- Strongly disagree, 2- Disagree; 3- Neither Agree nor Disagree; 4- Agree; 5- Strongly agree). These 14 items were established based on the literature (Kim, Mirusmonov, & Lee, 2010; Moore & Benbasat, 1991; Parasuraman, 2000; Van der Heijden, Verhagen, & Creemers, 2003; Venkatesh & Davis, 2000; Yang & Yoo, 2004) and adapted to the research theme. Our questionnaire followed the same content validation procedure (Cassepp-Borges, Balbinoti, & Teodoro, 2010) with CVC calculation (Hernández-Nieto, 2002). The scale was composed of two factors: frequency of use of the technology ($\alpha = 0.717$) and online purchase intention via mobiles ($\alpha = 0.902$).

The third adopted scale was the PVQ-R (Portrait Values Questionnaire-Revised) by Schwartz et al. (2012), already validated for Brazil (Torres et al., 2016) but still unexplored on the influence of technology consumption in the country. The scale contains 57 items segmented into 19 motivational types, with Cronbach's alphas ranging from 0.676 to 0.891, in a 6-point scale, ranging from 1 (not like me at all) to 6 (very much like me).

Data collection and analysis procedures

Data collection was performed electronically, online, via dissemination on social networks and e-mails. The self-administered questionnaire was made available by an access link to the SurveyMonkey platform.

First, data were analyzed in detail and treated to meet the requirements established for the use of multivariate analysis (Marôco, 2010) via the SPSS software. The first step was a general database check-out, which initially showed 2,412 respondents. After analyzing missing data and outliers with descriptive and graphical statistical analyses, 241 questionnaires were removed from the original database, leaving us with 2,171 valid cases.

Our final sample was adequate to meet the assumptions of multivariate statistical techniques (Hair, Anderson, Tathan, & Black, 2005). It showed no collinearity between variables since tolerance values were higher than 0.1 (Myers, 1990) and the Variance Inflation Factor (VIF) was lower than 10 (Myers, 1990).

Structural equation modeling was used to analyze the influence of human-value motivational types on technology readiness factors, considering attitudes and online purchase intention using mobiles. The parameters of the proposed model were estimated using the maximum likelihood method since it produces consistent, centered, and unbiased estimates (Hair et al., 2005; Marôco, 2010). This method dispenses with linearity between variables and it is robust against the violated assumption of multivariate normality, if distribution asymmetry and kurtosis indices are fairly low (Marôco, 2010).

To assess the influence of human values and technology readiness applied to m-commerce, the SPSS 22.0 AMOS software was used, which indicated the identifiability of the model with 569 degrees of freedom. After analyzing adjustment indices, residual covariance, estimated regression weights, non-significant relations, and the variables with high residual correlation were excluded. Then, covariance relations between the indicated variables were established to re-specify the model (Marôco, 2010; Hair et al., 2005).

Results

We found high standardized residual covariance in the symmetric matrix, indicating that the variables may distort the model once they influence normal distribution. Hence, we removed the following variables: (a) human values: stimulation (ST), hedonism (HE), face (FAC), universalism-nature (UNN), benevolence-dependability (BED), and benevolence-care (BEC); (b) technology readiness: figuring out technology without help from others (INN3), freedom of mobility (OPT2), dependence on technology (INS1); and (c) attitudes related to the use of mobiles: ease-of-use when purchasing using mobiles (USECEL4), laziness in learning how to purchase using mobiles (USECEL7), and using personal information on mobiles (USECEL10). In the model, human values were reduced from 19 to 12 variables; TRI 2.0, from 16 to 13; attitude, from 10 to 7; and intention remained the same. The modification indices in the analysis indicated the correlation between the variables. We then re-specified the model as shown in Figure 2.
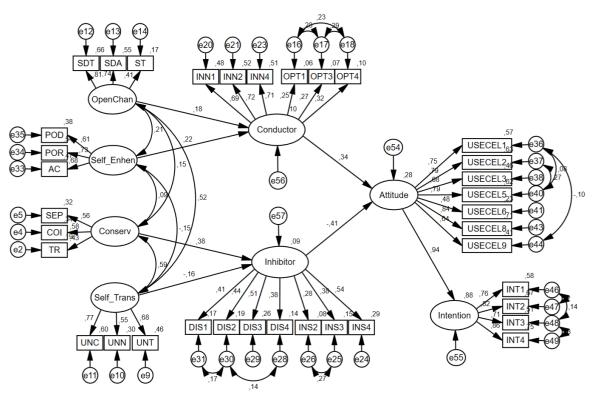
Figure 2. Re-specified global model of the relation between human values, technology readiness, and attitude related to purchases with mobiles

Sources: Elaborated by the authors.

Analysis of the re-specified model shows significant results (X^2/g.l. = 5.242; PGFI = 0.792; CFI = 0.911; GFI = 0.927; PCFI = 0.823; and RMSEA=0.044) with indices meeting the criteria established by the literature (Hair et al., 2005), as shown in Table 3.

Table 3
Re-specified global model indices

Adjustment indices	Index	Result for the initial model	Result for the re-specified model	Criteria (Hair et al., 2005)
Absolute indices	χ2/g.l.	7.991	5.242	1 ≤ χ2/g.l. ≤5
	p	0.000	0.000	<0.05
	GFI (AGFI)	0.836 (0.819)	0.927 (0.914)	>0.90
	SRMR	0.0706	0.0599	<0.10
Relative indices	CFI	0.801	0.911	>0.90
	TLI	0.758	0.902	>0.90
Parsimony indices	PCFI	0.757	0.823	>0.60
	PGFI	0.758	0.792	>0.60
Population discrepancy indices	RMSEA	0.057	0.044	<0.10
Model comparison indices	AIC	9106.495	3176.615	The lower, the better
	BIC	9754.351	3727.860	The lower, the better
	CAIC	9868.351	3824.860	The lower, the better
	ECVI	4.197	1.464	The lower, the better

Sources: Elaborated by the authors.

For the factorial validation of the model, we analyzed convergent and discriminant validity by calculating average extracted variance – AVE – and composite reliability – CR (Marôco, 2010). Results met discriminant validity, considering that AVE was higher than SV2, as shown in Table 4. In the criteria in Marôco (2010), our composite reliability proved to be adequate. Moreover, average variance extracted, according to Valentini and Damásio (2016), evaluates mean standard deviations for factor loading. In this case, the cut-off criterion for AVE would be around 0.15, indicating the accuracy and acceptance of the results presented for contributing (mean = 0.452; standard deviation (SD) = 0.256) and inhibitory factors (mean = 0.391; SD = 0.146).

Table 4
Discriminant Validity

Factor	Composite Reliability (CR)	Average Variance Extracted (AVE)	Shared Variance (SV)	SV2
Conductors	0.6886	0.2615	0.33	0.1089
Inhibitors	0.5644	0.1717		

Sources: Elaborated by the authors.

The Harman's test was used to evaluate the risk of common method bias. Then, an exploratory factor analysis without rotation with all model items was run. The first factor explained less than 50% of the variance showing no evidence of bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Hypotheses analysis

Table 5 shows the relations between motivational types (MT) and technology readiness factors (TRI) estimates. The p-value column indicates that all relations were significant at a 5% level. These results confirm hypothesis 1 that all motivational types influence attitudes toward technology readiness (H1).

Table 5
Relationship estimates MT x TRI

MT	→	TRI	Estimate	S.E.	C.R.	p-value	Hypothesis
OpenChan	→	Contributors	0.153	0.024	6.258	0.001	H2
SelfEnh	→	Contributors	0.191	0.025	7.504	0.000	H3
SelfTrans	→	Inhibitors	-0.083	0.024	-3.500	0.000	H4
Conserv	→	Inhibitors	0.193	0.028	6.800	0.000	H5

Note. S.E.: Standard Error; C.R.: Critical Ratio.

Sources: Elaborated by the authors.

Results show that the openness to change and self-enhancement motivational types positively influence the technology contributing factor. On the other hand, the conservation motivational type positively influences technology inhibitor factor, whereas the self-transcendence one negatively influences it. Table 6 shows standardized estimates of the relations between motivational types and technology readiness indices.

Table 6

Standardized estimates of the relationship MT x TRI

MT	→	TRI	Estimate	Hypothesis
OpenChan	→	Contributors	0.176	H2
SelfEnh	→	Contributors	0.219	H3
SelfTrans	→	Inhibitors	-0.163	H4
Conserv	→	Inhibitors	0.376	H5

Sources: Elaborated by the authors.

Table 7 shows the estimates of the relations between technology readiness factors (TRI) and attitude to online purchases via mobiles. The p-value column indicates that all relations were significant.

Table 7

Estimates of the relation TRI X attitude to online purchases

TRI	→	Attitude to online purchases	Estimate	S.E.	C.R.	p-value	Hypothesis
Contributors	→	Attitude	0.354	0.027	13.188	0.000	H6
Inhibitors	→	Attitude	-0.741	0.068	-10.839	0.000	H7

Sources: Elaborated by the authors.

The technology contributing factor positively influences attitudes to online purchases via mobiles, whereas the inhibiting factor negatively affects it. Table 8 shows our standardized estimates of the relations between technology readiness and attitude factors to online purchases via mobiles.

Table 8

Standardized estimates of the relation TRI x attitude to online purchases

TRI	→	Attitude to online purchases	Standardized estimate	Hypothesis
Contributors	→	Attitude	0.337	H6
Inhibitors	→	Attitude	-0.415	H7

Sources: Elaborated by the authors.

Table 9 shows the estimate of the relation between attitudes to online purchases using mobiles, purchase intention, and the standardized estimate, indicating a significant result at 5% level. We found a positive influence of online purchase attitude on purchase intention via mobiles.

When attitude grows by one standard deviation, intention grows by 0.936, indicating a strong positive relation between these variables.

Table 9
Estimates of the relation attitude x purchase intention, and the standardized estimate

Purchase	→	Intention	Estimate	S.E.	C.R.	p-value	Hypothesis
Attitude	→	Intention	1.127	0.027	41.090	0.000	H8

Purchase	→	Intention	Standardized estimate	Hypothesis
Attitude	→	Intention	0.936	H8

Sources: Elaborated by the authors.

According to human value variables, regression coefficients justify the dependent variables which, in the relation explain 9.5% of the technology inhibiting factor and 9.5% of the technology contributing factor. TRI variables explain 28.3% of purchasing attitude variability, which has a high explanatory power over purchase intention variability (87.7%).

According to our results, the tested model shows adjustment indices we considered to be very good according to the analysis criteria (Hair et al., 2005) established by the literature. In the next section, we discuss all statistical results found considering the literature review above.

Discussion

According to our analysis of the theoretical-conceptual model proposed in this research, results indicate that second-order motivational types of human values predict technology readiness.

Openness to change positively influenced the technology contributing factor via self-direction (thought), self-direction (action), and stimulation (H2), indicating that people who seek novelty, change, and freedom to cultivate their own ideas and determine their own actions have greater willingness to use new technologies. According to Baumeister (2010), the self is related to interpersonal relationships since, rather than emerging from within the person, it is formed by interactions and relationships with others. Technology, via social media, increases these relationships and helps individuals understand their selves.

Via power-dominance, power-resources, and achievement, self-enhancement positively influences the technology contributing factor (H3). It indicated that people who seek success, excitement, challenges, and power by exercising control over people, material, and social resources are more willing to use technology. This result corroborates a study by Bezerra (2016), which states that people emphasize social media aspects that competitively promote and favor their "selves."

Self-transcendence negatively influenced the TRI inhibitor factor by Universalism (H4). Thus, we rejected this hypothesis. At first, we expected people who scored high on Universalism to be unwilling to use technologies. However, results showed an opposite relation with technology inhibiting factors, indicating that those who value Universalism may be predisposed to it. Arruda et

al. (2016) highlight, for instance, that collaborative consumption is a global trend which is leveraged by individual, environmental, social, and economic motivations as a way to use technology to foster more conscious and sustainable consumption, intrinsic characteristics of Universalism.

Conservation by (interpersonal) conformity, tradition, and (personal) security positively influence the TRI inhibiting factor (H5), indicating that people who seek safety in their environment, preserve traditions, and comply with rules are indisposed toward technology. Hillman and Neustaedter (2017) highlight that, historically, one of the problems involving the adoption and use of electronic commerce is the trust that involves quality and security control. In their study about trust and m-commerce in North America, surveyed groups showed reliability regarding security while entering personal information over wireless networks.

Results related to the relation between TRI and online purchase attitude using mobiles show that contributing factors positively predict attitude (H6), indicating that innovativeness and optimism lead people to purchase via mobiles. This result follows what Moraes et al. (2014) state about purchases using mobiles and the ability to use them, showing that the higher the ease of use of mobiles, the greater the consumers' motivation to use the service.

On the other hand, inhibiting factors negatively predict attitudes (H7), indicating that insecurity and discomfort lead people to avoid purchasing via mobiles. Walczuch, Lemmink, and Streukens (2007) conducted a survey, indicating that discomfort, an inhibiting variable, influences ease-of-use perception in which people feel overwhelmed by technology complexity. Moreover, insecurity leads people to perceive technology as less valuable and challenging to use. Rojas-Méndez et al. (2017) found that younger individuals score lower in discomfort and insecurity than older adults. TRI results collaborate with management issues since companies launch educational programs for consumers who are unfamiliar with new technologies (older adults, for instance) to reduce their discomfort and insecurity (Kim & Chiu, 2019).

At last, results showed that purchasing attitude positively influences online purchase intention via mobiles (H8). Optimism, i.e., having a positive view toward technology and the belief it offers greater control, flexibility, and efficiency to people's lives, can partly explain intention of continued use (Pires & Costa e Filho, 2008). The results shown were based on the analysis of the proposed theoretical-conceptual model, indicating that only hypothesis 4 was rejected, as shown in Table 10.

Table 10
Hypothesis conclusion

Code	Hypothesis	Conclusion
H1	Motivational types influence attitudes regarding technology readiness.	Not rejected
H2	Self-enhancement positively influences the TRI contributing factor.	Not rejected
H3	Openness to change positively influences the TRI contributing factor	Not rejected
H4	Self-transcendence positively influences the TRI inhibiting factor.	Rejected
H5	Conservation positively influences the TRI inhibiting factor.	Not rejected
H6	The contributing factor positively influences online purchase intention via mobiles (m-commerce).	Not rejected
H7	The inhibiting factor negatively influences online purchase intention via mobiles (m-commerce).	Not rejected
H8	Online purchase attitude via mobiles (m-commerce) positively influences online purchase intention via mobiles (m-commerce).	Not rejected

Sources: Elaborated by the authors.

Conclusion

The main objective of this study was to evaluate the relation between human values and technology readiness in mobile commerce in Brazil. In total, seven hypotheses were confirmed, showing the influence of human values on technology factors. This result follows the findings in Radons et al. (2020) in which personal values are relevant factors for the propensity to use technologies.

The theoretical contributions of this study relate to research on human values and technology readiness (TRI) by validating and applying the new TRI 2.0 instrument in Brazil and by constructing a theoretical-conceptual model that relates human values, attitudes toward technology, and purchase intention via mobiles. The proposed model complements the studies on the triad values-attitude-behavioral intention. Moreover, this study contributed to a sequence of studies on technology acceptance and readiness (Davis, 1989; Parasuraman, 2000; Parasuraman & Colby, 2014; Venkatesh et al., 2003), in addition to being rare among the few studies which jointly analyze human values related to the technology readiness theory in the perspective of the use of mobile phones for purchases. We evaluated the TRI 2.0 research instrument, indicated the need for a review, and contributed to future studies on technology readiness.

From a market perspective, a managerial contribution of this research was to evaluate online purchase intention via mobiles. This study indicated that the researched group is highly connected to technology and mobile phones and shows a substantial purchase intention via mobiles. Identifying factors related to technology consumption behavior yielded information essential for companies dealing with services influenced by technological advances. The high explanatory power of purchase intention via mobiles shows a potential market for applications and purchase stores for the entrepreneurial corporate world. Moreover, marketing professionals can reach consumers with greater accuracy and ultimate success by working with human values.

As Bellini (2018) discusses, digital effectiveness relates to individuals' capabilities and limitations, including accessing cognitive and behavioral limitations, which reinforce that human values exert an important influence on the use of technology. People who feel insecure about new technologies relate security to conservation and will delay using new technologies. People who seek success are more willing to use technology and relate achievement to self-enhancement. These people will adopt new technologies and disseminate them as much as possible.

Despite our valuable results, this study has limitations which need to be considered when evaluating our analyses. Although it was carried out in all Brazilian states, our sample fails to be representative of all of them. Our questionnaire was disseminated online using e-mail and social networks, via the SurveyMonkey software, de-characterizing the non-probabilistic sample of the survey. Hence, it is impossible to extrapolate this research since it addresses only those with access to the internet, turning it into research by convenience. Another limitation is that other models related to technology adoption have already used other variables, such as social norms, which could increase the prediction capacity of the developed model. Nevertheless, the objective proposed here focused on the relation between human values and the specific theory of technology readiness (TRI 2.0) by Parasuraman and Colby (2014).

Our research specifically focused on m-commerce via mobile purchases. Other technological services can also be studied based on the model proposed and tested in this study, such as, for instance, the use of mobile applications and the consumption of virtual currencies, such as bitcoin, a new and current topic. Another study to be conducted refers to evaluating the model in other countries for comparing attitudes toward new technologies and the use of m-commerce. Analyzing consumers, and bank and telephone companies' customers' human values can generate insights, sales, and advertising actions. Other theories related to human values, such as, for example, the functional theory of human value (Gouveia, Milfont, & Guerra, 2014), can be studied in the same technological context. It is also possible to explore the inclusion of variables or other technology models, such as TAM and UTAUT, along with human values theory. Finally, we suggest that future models investigate the influence of profile variables such as region, age, and gender.

References

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs: Prentice Hall.

Al-Adwan, A., Alrousan, S.M., Al-Soud A., & Al-Yaseen, H. (2019). Revealing the black box of shifting from electronic commerce to mobile commerce: The case of Jordan. *Journal Theoretical and Applied Electronic Commerce Research*, *14*(1), 51-67. doi:10.4067/S0718-18762019000100105

Arruda, H. R., Bandeira, E. L., Silva, A. L. L., & Rebouças, S. M. D. P. (2016). Collaborative consumption and personal values: the case of bicycle-sharing system. *Revista Brasileira de Marketing – ReMark*, *15*(5), 683-698. doi:10.5585/remark.v15i5.3370

Baumeister, R. F. (2010). The Self. In R. F. Baumeister, & E. J. Finkel, *Advanced social psychology: The state of the science* (pp. 139-175). New York: Oxford University Press.

Bellini, C. G. P. (2018). The ABCs of Effectiveness in the Digital Society. *Communications of the ACM*, *61*(7), 84-91. doi:10.1145/3205945

Bezerra, B. B. (2016, December). *Redes sociais digitais e intimidade: o uso da tecnologia na formação midiática e agenciamento do self contemporâneo*. Paper presented at the IX Simpósio Nacional da ABCiber, São Paulo, SP.

Bhattacherjee, A. (2001). An empirical analysis of the antecedents of electronic commerce service continuance. *Decision Support Systems*, *32*, 201-214. doi:10.1016/S0167-9236(01)00111-7

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of cross-cultural psychology*, *1*(3), 185-216. doi:10.1177/135910457000100301

Bruyat, C., & Julien, P-A. (2000). Defining the field of research in entrepreneurship. *Journal of Business Venturing*, *16*(2), 165-180. doi:10.1016/S0883-9026(99)00043-9

Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology*, *76*(5), 839-855. doi:10.1037/0022-3514.76.5.839

Caldeira, T. A., Ferreira, J., Freitas, A., & Falcão, R. (2021). Adoption of mobile payments in Brazil: technology readiness, trust and perceived quality. *Brazilian Business Review*, *18*(4), 415-432. doi:10.15728/bbr.2021.18.4.4

Carland, J. W., Hoy, F., & Carland, J. A. C. (1988). Who is an entrepreneur? Is a question worth asking. *American Journal of Small Business*, *12*(4), 33-39. doi:10.1177/104225878801200402

Cassepp-Borges, V., Balbinotti, M. A., & Teodoro, M. L. M. (2010). Tradução e validação de conteúdo: uma proposta para a adaptação de instrumentos. In L. Pasquali, & Cols, *Instrumentação Psicológica: fundamentos e práticas* (pp. 506-520). Porto Alegre, RS: Artmed.

Cheng, Y., Sharma, S., Sharma, P., & Kulathunga, K. (2020). Role of personalization in continuous use intention of Mobile news apps in India: Extending the UTAUT2 model. *Information*, *11*(1), 1-24. doi:10.3390/info11010033

Chi, T. (2018). Understanding Chinese consumer adoption of apparel mobile commerce: An extended TAM approach. *Journal of Retailing and Consumer Services*, *44*(7), 274-284. doi:10.1016/j.jretconser.2018.07.019

Chong, A. Y. (2013). A two –staged SEM-neural network approach for understanding and predicting the determinants of *m-commerce* adoption. *Expert Systems with Applications*, *40*(4), 1240-1247. doi:10.1016/j.eswa.2012.08.067

Chung, J-C., & Lai, Y-H. (2017). Consumer Behavior in the Smartphone Segment Market: An Analysis of College Students. *International Journal of Supply Chain Management*, *6*(3), 218-221. Recuperado de https://bit.ly/3PxbTLH

Cochran, W. G. (2007). *Sampling techniques*. New York: John Wiley & Sons.

Coelho, G. L. H., Hanel, P. H. P, Johansen, M. K., & Maio, G. R. (2019). Mapping the structure of human values through conceptual representations. *European Journal of personality*, *33*(1), 34-51. doi:10.1002/per.2170.

Cupani, A. (2011). *A filosofia da tecnologia: um convite*. Florianópolis, SC: UFSC.

Dabholkar, P. A., & Bagozzi, R. P. (2002). An attitudinal model of technology – based self- service: Moderating effects of consumer traits and situational factors. *Journal of the Academy of Marketing Science*, *30*(3), 184-201. doi:10.1177/0092070302303001

Dannenberg, P., Fuchs, M., Riedler, T., & Wiedemann, C. (2020). Digital transition by covid-19 pandemic? The German food online retail. *Journal of Economic and Social Geography*, *111*(3), 543-560. doi:10.1111/tesg.12453

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319-340. doi:10.2307/249008

Davis, F. D., & Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer Technology: a comparison of two theoretical models. *Management Science*, *35*(8), 982-1002. doi:10.1287/mnsc.35.8.982

Dwivedi, Y. K., Hughes, L. L., Coombs, C., Constantiou, I., Duan, Y., Edwards, J. S., . . . Udpadhyay, N. (2020). Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life. *International Journal of Information Management*, *55,* 1-20. doi:10.1016/j.ijinfomgt.2020.102211.

Eastin, M. S., Brinson, N. H., Doorey, A., & Wilcox, G. (2016). Living in a big data world: Predicting mobile commerce activity through privacy concerns. *Computers in Human Behavior*, *58*, 214-220. doi:10.1016/j.chb.2015.12.050

Edison, S. W., & Geissler, G. L. (2003). Measuring attitudes towards general technology: Antecedents, hypotheses and scale development. *Journal of Targeting, Measurement and Analysis for Marketing*, *12*(2), 137-156. doi:10.1057/palgrave.jt.5740104

Filion, L. J. (2000). Empreendedorismo e gerenciamento: processos distintos, porém complementares. *Revista de Administração da Universidade de São Paulo*, *7*(3), 2-7. doi:10.1590/S0034-75902000000300013

Filion, L. J. (2004). Entendendo os intraempreendedores como visionistas. *Revista de Negócios*, *9*(2), 65-79. Recuperado de https://bit.ly/3NnjYRo

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to Theory and Research*. Reading: Addison-Wesley.

Fritsche, I. (2002). Account strategies for the violation of social norms: Integration and extension of sociological and social psychological typologies. *Journal for the Theory of Social Behaviour*, *32*(4), 371-394. doi:10.1111/1468-5914.00194

Fujihara, R. K., & Montezano, L. (2018). Motivos e restrições de compras pela internet sob à ótica dos modelos TRI e TAM. In C. Ramos, C. Ramos, P. Cascada, M. B. Correia, & R. Guerreiro, *O*

futuro hoje: novas tecnologias, social media e negócio digital (pp. 89-108). Algarve: Universidade do Algarve.

Gao, L., & Waechter, K. A. (2017). Examining the role of initial trust in user adoption of mobile payment services: An empirical investigation. *Information Systems Frontiers*, *19*(3), 525-548. doi:10.1007/s10796-015-9611-0

Gouveia, V. V., Milfont, T. L., & Guerra, V. M. (2014). Functional theory of human values: Testing its content and structure hypotheses*. Personality and Individual Differences*, *60*, 41-47. doi:10.1016/j.paid.2013.12.012

Hair, J. F., Anderson, R. E., Tathan, R. L., & Black, W. C. (2005). *Análise multivariada de dados*. Porto Alegre, RS: Bookman.

Haucke, F. V. (2018). Smartphone-enabled social change: evidence from the Fairphone case? *Journal of Cleaner Production*, *197*(2), 1719-1730. doi:10.1016/j.jclepro.2017.07.014

Heinze, J., Thomann, M., & Fischer, P. (2017). Ladders to m-commerce resistance: A qualitative means-end approach. *Computers in Human Behavior*, *73*, 362-374. doi:10.1016/j.chb.2017.03.059

Hernández-Nieto, R. (2002). *Contributions to statistical analysis*. Mérida: Los Andes University Press.

Hillman, S., & Neustaedter, C. (2017). Trust and mobile commerce in North America. *Computers in Human Behavior*, *70*, 10-21. doi:10.1016/j.chb.2016.12.061

Hirschman, E. C. (1980). Innovativeness, novelty seeking and consumer creativity. *Journal of Consumer Research*, *7*(3), 283-295. doi:10.1086/208816

Huang, L., Lu, X., & Ba, S. (2016). An empirical study of the cross-channel effects between web and mobile shopping channels. *Information & Management*, *53*(2), 265-278. doi:10.1016/j.im.2015.10.006

Humbani, M., Wiese, M., (2019). An integrated framework for the adoption and continuance intention to use mobile payment apps. *International Journal of Bank Marketing*, 37(2), 646-664. doi:10.1108/IJBM-03-2018-0072.

Huy, L., Nguyen, P., Pham, L., & Berry, R. (2019). Technology readiness and satisfaction in Vietnam's luxury hotels*. International Journal of Management and Decision Making*, *18*(2), 183-208. doi:10.1504/IJMDM.2019.098648

Indahingwati, A., Launtu, A., Tamsah, H., Firman, A., Putra, A. H. P. K., & Aswari, A. (2019). How Digital Technology Driven Millennial Consumer Behaviour in Indonesia. *Journal of Distribution Science*, *17*(8), 25-34. doi:10.15722/jds.17.08.201908.25

Jayawardhena, C. (2004). Personal values' influence on e-shopping attitude and behaviour. *Internet Research*, *14*(2), 127-138. doi:10.1108/10662240410530844

Kim, T., & Chiu, W. (2019). Consumer acceptance of sports wearable technology: The role of technology readiness. *International Journal of Sports Marketing & Sponsorship*, *20*(1), 109-126. doi:10.1108/IJSMS-06-2017-0050

Kim, C., Mirusmonov, M., & Lee, I. (2010). An empirical examination of factors influencing the intention to use mobile payment. *Computers in Human Behavior*, *26*(3), 310-322. doi:10.1016/j.chb.2009.10.013

Koenigstorfer, J., & Groeppel-Klein, A. (2012). Consumer acceptance of the mobile internet. *Marketing Letters*, *23*, 917-928. doi:10.1007/s11002-012-9206-1

Kundu, S. C., & Rani, S. (2008). Human resources' entrepreneurial attitude orientation by gender and background: a study of Indian Air Force trainees*. International Journal of Management and Enterprise Development*, *5*(1), 77-101. doi:10.1504/IJMED.2008.015908

Lee, J. M., & Rha, J. Y. (2016). Personalization-privacy paradox and consumer conflict with the use of location-based mobile commerce. *Computers in Human Behavior*, *63*, 453-462. doi:10.1016/j.chb.2016.05.056

Li, Y., & Huang, J. (2009). Applying theory of perceived risk and technology acceptance model in the online shopping channel. *World Academy of Science, Engineering and Technology*, *3*(5), 505-511. doi:10.1.1.193.6343&rep=rep1&type=pdf

Lin, C. P., & Bhattacherjee, A. (2009). Understanding online social support and its antecedents: A socio-cognitive model. *The Social Science Journal*, *46*(4), 724-737. doi:10.1016/j.soscij.2009.03.004

Madarie, R. (2017). Hackers' Motivations: Testing Schwartz's Theory of Motivational Types of Values in a Sample of Hackers. *International Journal of Cyber Criminology*, *11*(1), 78-97. doi:10.5281/zenodo.495773

Marhefka, S., Turner, D., & Lockhart, E. (2019). Understanding women's willingness to use ehealth for HIV-related services: a novel application of the technology readiness and acceptance model to highly stigmatized medical condition. *Telemedicine Journal and e-Health*, *25*(6), 511-518. doi:10.1089/tmj.2018.0066

Marinkovic, V., & Kalinic, Z. (2017). Antecedents of customer satisfaction in mobile commerce: exploring the moderating effect of customization. *Online Information Review*, *41*(2), 138-154. doi:10.1108/OIR-11-2015-0364

Marôco, J. (2010). *Análise de equações estruturais*: *fundamentos teóricos, software e aplicações*. Pero Pinheiro: Report Number.

Martinez, J. S., Samaniego, C. M., & Morentin, J. I. M. (2015). Transmission of values in adolescents: an analysis with video games. *Revista Latina de Comunicación Social*, *70*, 230-251. doi:10.4185/RLCS-2015-1044

Masudin, I., Pangenggar, I. L. T., Restuputri, D. P., Kusumadewi, S., & Ibrahim, M. F. (2018). *A review of technology readiness index (TRI) on retail industry: approach and application*. Paper presented in Seminar Nasional Teknologi dan Rekayasa (SENTRA), Indonésia.

Mazzucatto, T., Dolnei, L., & Papi, P. P. (2019, December). *Propensão dos consumidores e varejistas em participar de uma economia circular: estudo realizado no mercado de Guarapuava*. Paper presented at the IX Congresso Brasileiro de Engenharia de Produção, Ponta Grossa, PR.

McClelland, D. C. (1972). *A sociedade competitiva: realização e progresso social*. Rio de Janeiro, RJ: Expressão e Cultura.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, *2*(3), 192-222. doi:10.1287/isre.2.3.192

Moraes, A. C. S., Ferreira, J. B., Freitas, A., Giovannini, C. J., & Silva, J. F. (2014). Compras via celular: a intenção de uso pelo consumidor. *Pretexto*, *15*(1), 86-105. doi:10.21714/pretexto.v15i1.2151

Moschis, G., & Churchill, G. (1978). Consumer socialization: a theoretical and empirical analysis. *Journal of Marketing Research*, *15*(4), 599-609. doi:10.1177/002224377801500409

Mota, F. P. B. (2020). Atitudes em relação ao uso da internet: desenvolvimento e Proposta de uma escala de mensuração. *Revista Gestão & Tecnologia*, *20*(3), 266-286. doi:10.20397/2177-6652/2020.v20i3.1541

Mukerjee, H. S., Deshmukh, G. K., & Prasad, U. D. (2018). Technology readiness and likelihood to use self-checkout services using smartphone in retail grocery stores: empirical evidences from Hyderabad, India. *Business Perspectives and Research*, *7*(4), 1-15. doi:10.1177/2278533718800118

Myers, R. H. (1990). *Classical and modern regression with applications*. Belmont: Duxbury Press.

Nilashi, M., Ibrahim, O., Mirabi, V. R., Ebrahimi, L., & Zare, M. (2015). The role of Security, Design and Content factors on customer trust in mobile commerce. *Journal of Retailing and Consumer Services*, *26*(1), 57-69. doi:10.1016/j.jretconser.2015.05.002

Nowlis, S. M., Kahn, B. E., & Dhar, R. (2002). Coping with ambivalence: the effect of removing a neutral option on consumer attitude and preference judgments. *Journal of Consumer Research*, *29*(3), 319-334. doi:10.1086/344431

Parasuraman, A. (2000). Technology Readiness Index (TRI) – A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, *2*(4), 307-320. doi:10.1177/109467050024001

Parasuraman, A., & Colby, C. L. (2002). *Marketing para produtos inovadores: como e por que seus clientes adotam tecnologia*. Porto Alegre, RS: Bookman.

Parasuraman, A., & Colby, C. L. (2014). An updated and streamlined technology readiness index: TRI 2.0. *Journal of Service Research*, *18*(1), 1-15. doi:10.1177/1094670514539730

Penz, D., Amorim, B. C., Nascimento, S., & Rossetto, C. R. (2017). The influence of technology readiness index in entrepreneurial orientation: a study with Brazilian entrepreneurs in the

United States of America. *International Journal of Innovation*, *5*(1), 66-76. doi:10.5585/iji.v5i1.150

Pires. P. J., & Costa Filho, B. A. (2008). Fatores do índice de prontidão à tecnologia (TRI) como elementos diferenciadores entre usuários e não usuários de internet banking e como antecedentes do modelo de aceitação de tecnologia (TAM). *Revista de Administração Contemporânea*, *12*(2), 429-456. doi:10.1590/S1415-65552008000200007

Podsakoff, P. M., MacKenzie, S. B., Lee, J-Y, & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879-903. doi:10.1037/0021-9010.88.5.879.

Porto, J. B., & Tamayo, A. (2003). Escala de valores relativos ao trabalho. *Psicologia: Teoria e Pesquisa*, *19*(2), 145-152. doi:10.1590/S0102-37722003000200006

Radons, D. L., Scoott, C. R. C., Estivalete, V. F. B., & Lobler, M. L. (2020). Compreendendo a influência dos valores pessoais na prontidão e na intenção de uso de tecnologias. *Revista Gestão Organizacional*, *13*(3), 6-31. doi:10.22277/rgo.v13i3.5086.

Rojas-Méndez, J. I., Parasuraman, A., & Papadopoulos, N. (2017). Demographics, attitudes, and technology readiness A cross-cultural analysis and model validation. *Marketing Intelligence & Planning*, *35*(1), 18-39. doi:10.1108/MIP-08-2015-0163

Rosenberg, M. J., & Hovland, C. I. (1960). *Attitude organization and change*. New Haven: Yale University Press.

Sarkar, S., Chauhan, S., & Khare, A. (2020). A meta-analysis of antecedents and consequences of trust in mobile commerce. *International Journal of Information Management*, *50*, 286-301. doi:10.1016/j.ijinfomgt.2019.08.008

Schmidt, S., & Bohnenberger, M. C. (2009). Perfil empreendedor e desempenho organizacional. *Revista de Administração Contemporânea*, *13*(3), 450-467. doi:10.1590/S1415-65552009000300007

Schwartz, S. H. (1977). Normative influences on altruism. In L. Berkowitz, *Advances in experimental social psychology* (pp. 221-279). New York: Academic Press.

Schwartz, S. H. (1992). Universal in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna, *Advanced in experimental social psychology* (pp. 1-65). New York: Academic Press.

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, *50*(4), 19-45. doi:10.1111/j.1540-4560.1994.tb01196.x

Schwartz, S. H., Cieciuch, J., Vecchione, M., Davidov, E., Fischer, R., Beierlein, C., . . . & Konty, M. (2012). Refining the theory of basic individual values. *Journal of Personality and Social Psychology*, *103*(4), 663-688. doi:10.1037/a0029393

Shaw, N., & Sergueeva, K. (2019). The non-monetary benefits of mobile commerce: Extending UTAUT2 with perceived value. *International Journal of Information Management*, *45*, 44-55. doi:10.1016/j.ijinfomgt.2018.10.024

Shirahada, K., Ho, B.Q., & Wilson, A. (2019). Online public services usage and the elderly: assessing determinants of technology readiness in Japan and the UK. *Technology in Society*, *58*, 1-9. doi:10.1016/j.techsoc.2019.02.001

Sissing, J., Dlamini, N. N., & Johnston, K. (2017). Using m-commerce to achieve strategic objectives in South African retail organizations. *Journal of Applied and Physical Sciences*, *3*(1), 7-16. doi:10.20474/japs-3.1.2

Silitonga, K. A. A, Fakhrorazi, A., & Ikhsan, R. B. (2020). Drivers of buyer retention in e-commerce: The role of transaction characteristics and trust. *Management Science Letters*, *10*, 3485-3494. doi:10.5267/j.msl.2020.6.046

Sousa, E. S., & Fontenele, R. E. S. (2019). Mapeamento da produção científica internacional sobre Valores Humanos Básicos. *Em questão*, *25*(3), 214-245. doi:10.19132/1808-5245253.214-245

Sun, J., & Chi, T. (2017). Key factors influencing the adoption of apparel mobile commerce: An empirical study of Chinese consumers. *The Journal of The Textile Institute*, *109*(6) 1-13. doi:10.1080/00405000.2017.1371828

Torres, C. V., Porto, J. B., Vargas, L. M., & Fischer, R. (2015). A meta-analysis of basic human values in brazil: observed differences within the country. *Revista Psicologia Organizações e Trabalho*, *15*(1), 89-102. doi:10.17652/rpot/2015.1.356

Torres, C. V., Schwartz, S. H., & Nascimento, T. G. (2016). A Teoria de valores refinada: associações com comportamento e evidências de validade discriminante e preditiva. *Revista Psicologia USP*, *27*(2), 341-356. doi:10.1590/0103-656420150045

Valentini, F., & Damásio, B. F. (2016). Variância média extraída e confiabilidade composta: indicadores de precisão. *Psicologia: Teoria e Pesquisa*, *32*(2), 1-7. doi:10.1590/0102-3772e322225

Van der Heijden, H., Verhagen, T., & Creemers, M. (2003). Understanding online purchase intentions: contributions from technology and trust perspectives. *European Journal of Information Systems*, *12*(1), 41-48. doi:10.1057/palgrave.ejis.3000445

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186-204. doi:10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: toward a unified view. *MIS Quarterly*, *27*(3), 425-478. doi:10.2307/30036540

Venkatesh, V., Thong, J. Y., & Xu, X. (2016). Unified theory of acceptance and use of technology: a synthesis and the road ahead. *Journal of the Association for Information Systems*, *17*(5), 328-376. doi:10.17705/1jais.00428

Walczuch, R., Lemmink, J., & Streukens, S. (2007). The effect of service employees' technology readiness on technology acceptance. *Information & Management*, *44*(2), 206-215. doi: 10.1016/j.im.2006.12.005

Weiner, B., Amirkhan, J., Folkes, V. S., & Vereth, J. A. (1987). An attributional analysis of excuse giving: Studies of a naive theory of emotion. *Journal of Personality and Social Psychology*, *52*(2), 316–324. doi:10.1037/0022-3514.52.2.316

White, C., McMurray, A., & Rudito, P. (2017). Human values and technology readiness: the mediating role of consumer perceived value. *International Journal of Services Technology and Management*, *23*(4), 331-347. doi:10.1504/IJSTM.2017.088154

Wiese, M., & Humbani, M. (2019). Exploring technology readiness for mobile payment app users. The International Review of Retail. *Distribution and Consumer Research*, *30*(2), 1-20. doi:10.1080/09593969.2019.1626260.

Yang, H. D., & Yoo, Y. (2004). It's all about attitude: revisiting the technology acceptance model. *Decision Support Systems*, *38*(1), 19-31. doi:10.1016/S0167-9236(03)00062-9

Zaidi, A., & Faizal, M. (2017, august). *The IoT readiness of SMEs in Malaysia: are they worthwhile for investigation?* Paper presented in International Conference on International Business, Marketing and Humanities, Malaysia.

Zheng, X., Men, J., Yang, F., & Gong, X. (2019). Understanding impulse buying in mobile commerce: An investigation into hedonic and utilitarian browsing. *International Journal of Information Management*, *48*, 151-160. doi:10.1016/j.ijinfomgt.2019.02.010

Zhou, L., Dai, L., & Zhang, D. (2007). Online shopping acceptance model – A critical survey of consumer factors in online shopping. *Journal of Electronic Commerce Research*, *8*(1), 41-62. Recuperado de https://bit.ly/3PyWD19

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