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FENG DU

DOMAIN SPECIFIC INNOVATIVENESS AND FRUGAL BEHAVIOR: a Cross-Cultural Investigation of their Impact on Consumer's Behavioral Intention in Smartphone Purchase

São Leopoldo
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(Orientador)

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“Nature is a source of truth. Experience does not ever err, it is only your judgment that errs in promising itself results which are not caused by your experiments.” (Leonardo da Vinci)

ABSTRACT

The globally growth of smartphone sales seems inevitable, and it opens new challenges and opportunities for businesses. Understanding consumer behavior in smartphone purchase in a cross cultural context is important for both marketers and consumers. For the development of this research, a theoretical model was proposed and tested in order to understand the impact of consumer's innovativeness and frugal behavior on smartphone purchase intention in a cross-cultural context. To this end, it was conducted a survey that covers analyzing the antecedents of innovativeness and frugal behavior, as well as understanding the cultural difference among consumer's smartphone purchase intention. In detail, the survey was developed in Qualtrics and distributed to participants from three countries (Brazil, China and India). The valid sample size was 349 participants in total. We used structural equation modeling to verify the proposed model and analyze the collected data. After adjustment of theoretical model, the study results indicated satisfactory indexes. The final model showed that opinion leadership, product involvement and symbolic value are factors that positively lead to domain specific innovativeness; as well as intrinsic religiosity is positive antecedent of frugal behavior; materialism also positively related to frugal behavior under economic pressure background; both consumer's domain specific innovativeness and frugal behavior are positively lead to smartphone purchase behavioral intention; the cultural orientation value such as collectivism, uncertainty avoidance and power distance have moderate effects on relations among consumer's Innovativeness, frugal and behavioral intention; other moderators such as status consumption and economic strain also showed significant moderate effects in the final model.

Keywords: *Consumer Behavior. Smartphone Consumption. Domain Specific Innovativeness. Frugal Behavior. Behavioral Intention. Cultural Relativity.*

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LIST OF ABREVIATIONS AND ACRONYMS

AMT	Amazon Mechanical Turk
AVE	Average Variance Extracted
BI	Behavioral Intention
CI	Consumer Independence
Col	Collectivism
CVS	Chinese Value Survey
DSI	Domain Specific Innovativeness
ES	Economic Strain
FB	Frugal Behavior
FESS	Family Economic Strain Scale
HV	Hedonic Value
IBM	Multinational Corporation
IR	Intrinsic Religiosity
Mat	Materialism
MVS	Material Value Scale
MWT	Mobile Wireless Technology
NIP	New Involvement Profile
NS	Novelty Seeking
OL	Opinion Leadership
PD	Power Distance
PEU	Perceived Ease of Use
PI	Product Involvement
PII	Personal Involvement Inventory
PU	Perceived Usefulness
SC	Status Consumption
SEM	Structural Equation Modelling
SPSS	Statistical Package for Social Science
Sym	Symbolism
TAM	Technology Acceptance Model
UA	Uncertainty Avoidance
VS	Voluntary Simplicity

SUMARY

1 INTRODUCTION

In an era of rampant materialism, where we are encouraged to buy two for one, buy now pay later, supersize/upgrade, ‘‘shop until you drop’’, throw away and replace, people simply buy too much, to the extent that they cannot consume much of what is purchased (Bove, Nagpal & Dorsett, 2009). However, the social norms and practices, which encourage this over-consumption, contribute to environmental depletion and degradation (Cohen, Comrov & Hoffner, 2005). Nowadays, natural materials and global environment problems are becoming severe, “frugality”, as a word reflects to constrained consumption and anti-materialism, has been frequently appeared in academic studies and other domains of society. Frugality is ‘‘that careful management of anything valuable which expends nothing unnecessarily, and applies what is used to a profitable purpose’’. The word ‘‘frugality’’ has its etymological root in the Latin word *frugalitas*, which means virtue or thriftiness (Goldsmith, Flynn & Clark, 2014). However, Burridge (2012) demonstrated that frugality is not confined to people and places directly affected by the recent (and renewed) global crisis. Moreover, according to Lastovicka, Bettencourt, Hughner, and Kuntze (1999), frugality is a unidimensional consumer lifestyle trait characterized by the degree to which consumers are both restrained in acquiring and in resourcefully using economic goods and services to achieve longer-term goals.

Frugality as a pattern of behavior can be motivated by external forces such as economic downturns and personal misfortune (Birkner, 2013; Egol, Clyde, Rangan & Sanderson, 2010), as well as by subjective individual differences among people that motivate them toward frugal behaviors (Bove et al., 2009; Lastovicka et al., 1999; Kadlec & Yahalom, 2011).

Product lifecycles are becoming increasingly short in a number of industries. Companies feel compelled to launch innovations at frequent intervals to satisfy the demands of their customers and keep up with their competitors. The failure rate of innovations is quite high, however, reaching 80% in some sectors (Wilke & Sorvillo, 2003). Between the time and money spent on manufacture and marketing, un-successful innovations bear a considerable cost (Hoffmann & Soyez, 2010). Hence, marketers need to address innovative consumers. “People who rules in certain products are more likely to see themselves innovations when they are released” (Goldsmith & Hofacker, 1991; Bartels & Reinders, 2011; Gao, Rohm, Sultan &

Pagani, 2013). The concept of domain specific innovativeness (DSI) consists of both attitudinal and behavioral elements. The former is exemplified by positive feelings consumer innovators have toward new products in the category. The latter consists of manifest behaviors resulting from their feelings (Goldsmith & Hofacker, 1991). Moreover, domain or product category specific innovativeness reflects the tendency to learn about and adopt innovations (new products) within a specific domain of interest. It mediates both conceptually and empirically the relationship between the generalized personality traits, innate innovativeness, and specific innovative behaviors (Midgley & Dowling 1978).

According to Tellis, Yin and Bell (2009), frugality is one of the consumer behaviors which reluctance to pay high prices for new products because of a desire to conserve and not to waste resources on uncertain new products. Moreover, frugality is an important dimension of innovativeness, especially in less developed economies value of conserving resources. With cultural relativity, it develops a deep sense of the value of conserving resources which will more likely lead to the purchase of older, trusted products than to the purchase of new products. In turn, prior studies of frugality and DSI indicate that frugality may stand on the opposite position of innovativeness behavior. Otherwise, in some situations they may also have positive connection; for example, innovative consumers with frugal characteristics might search and compare multichannel (e.g. Internet, factory etc.) to perceive a more cost-saving way to purchase certain new product they desired; In the meantime, innovative consumers without frugal traits will not do the same, they may just adapt the new product rapidly because of the emphasizing on utilitarian benefit without considering too much about the product's price.

Few studies had addressed the analysis of consumer behavior in different emerging markets. Hence, one of the objectives of this dissertation is to analyze the discrepancies of consumer frugal and innovativeness behavior within different emerging markets and cultural contexts. Thus, China, Brazil and India were adapted to reach one of the objectives. Hofstede(1980) argued that values are different when we compare people from different countries and cultures, it is reasonable to propose that an individual's value orientation influences his/her behavior in smartphone purchase intention, innovativeness and frugality (Matos & Leis, 2012). For example, Chinese consumerism may manifest less frugal and more innovativeness in smartphone purchase than Brazilian consumerism (Yu & Bastin, 2010). This may be

due to the rapidly development of Chinese economy resulting in Chinese consumer´s largest involvement with technology. The national high technology innovation status resulting in diversity high technology products in market, which caused Chinese consumer become more technology involvement and innovativeness. Hence, the technology orientation in China is the highest among the three countries. The national economy and technology status also make Chinese traditional consumerism value (e.g. the belief in an economical, frugal and simple life of Chinese consumerism) changed (Yu & Bastin, 2010). Although Brazilian market is also an emerging market, its characteristics are very different compared to Chinese and Indian market (Indian consumerism may manifest more technology product involvement and innovativeness than Chinese due to their high national informatics development, more frugality than Chinese and less frugality than Brazilian based their national economy status). The occurring of economic crisis resulted in economic recession in Brazil, which made Brazilian consumers more constrained frugality and less innovativeness in product purchase. The economic recession also alters Brazilian consumerism value (e.g. the belief in hedonism consumption, living in the moment of Brazilian consumerism). Due to the theoretical gap about lack of comparison of different emerging cultural values, one of the objective of this dissertation is to explore and gain valid evidences in this subject matter.

1.1 Research Question

For consumers, smartphone is a product of convergence of regular mobile phone and PDA (personal digital assistant), which can store critical information via personal computer or notebook computer. Nowadays, smartphone has become an emerging phenomenon for personal and business voice, data, e-mail, and Internet access (Chang, Chen & Zhou, 2009). For mobile marketers, smartphone has the capability to seamlessly integrate Bluetooth, location-based marketing and other technologies with web-based and physical store marketing to produce superior consumer experiences. It is seen as another key stage in the evolution of mobile marketing technology and practices (Persaud & Azhar, 2012).

On base of prior studies, the growth of smartphone sales seems inevitable, and it opens new challenges and opportunities for businesses (Chen, Chen & Yen, 2011). Understanding consumer behavior in smartphone purchase is important for

mobile marketers. they can acknowledge the consumers' perceived value and attitude toward smartphone, so they can implement appropriately marketing strategies. As mentioned before, frugal and innovation behavior are important topics both in academic research and in practice. Thus, here is the research question: **How and which are the influences on consumer's behavioral intention to purchase smartphone from consumer's DSI and frugal behavior?** In a cross-cultural context (Brazil, China and India) with a certain product category: smartphone, an empirical study is presented in this dissertation.

1.2 Objectives

1.2.1 General Objective

In order to solve the research question, a general objective of this dissertation is established, which is: analyzing the impact of consumer's DSI and frugal behavior on intention of smartphone purchase in a cross-cultural context. In order to accomplish the general objective, it is necessary to construct a group of four specific objectives.

1.2.2 Specific Objectives

As described below, the four specific objectives are:

a) Identifying the forming antecedents of consumer's DSI in smartphone purchase intention;
b) Identifying the forming antecedents of consumer's frugal behavior in smartphone purchase intention;
c) Evaluating aspects of construct formation of DSI and frugal behavior and the possible relation between them;
d) Analyzing the existence of cultural orientation differences through modeling method among the DSI, frugal behavior and behavioral intention in smartphone purchase.

1.3 Justification

Research from Digitimes projects notes that global smartphone shipments rose from 655 million in 2012 to 865 million in 2013, and the proportion of overall handset shipments of smartphones is 43.9% (Digitimes, 2012). According to forcasted data from eMarketer (digital marketing information online source), the number of smartphone users worldwide is projected to amount to nearly 2.7 billion by 2019. It is expected that, by 2017, over a third of the total global population will use a smartphone. Specifically, there are nearly 574.2 million Chinese smartphone users by 2015, representing half of all mobile phone users in the country. Looking even further ahead, more than half of the entire population of China will have a smartphone by 2018 as the number edges past 700 million. In the meanwhile, by 2017 there will be 70.5 million smartphone users in Brazil, during which smartphone usage increased to 20% of the country's population. Additionally, the number of smartphone users in India reached 167.9 million in 2015, and around 244 million people in India will use smartphone by 2017.

The data presented in the first paragraph described the different traits among smartphone users from different countries, not only the influences of cultural differences, but also technological condition and economical condition of each country are the critical factors. Therefore, it demonstrated that this study is not just a simple comparison among different national smartphone markets, it evolves how some emergent consumer behaviors can guide or impact the final decision to purchase smartphone with their culture, society and personal conditions. It is an interesting research topic just like prior studiy of Goldsmith and Hofstede (1983), and it also can give some propositions to product managers and marketers to observe the phenomenon and implement better strategy to their clients. For that, I would like to share subsection into four parts: a) Consumer innovativeness and its importance in managerial practices and academic studies; b) Frugal behavior and its importance in managerial practices and academic studies; c) Cultural relativity and its importance in managerial practices and academic studies; d) The emerging of behavioral intention to purchase high-technology products.

1.3.1 Consumer Innovativeness and its Importance in Managerial Practices and Academic Studies

Innovation is one of the main drivers for organizational success (Pauwels, Silva-Risso, Srinivasan & Hanssens, 2004). To minimize the risk of failure, marketers need to address innovative consumers, the most important target group in the diffusion process. Their publicly usage of new products stimulates other consumers to follow their opinions and acquire the same products. Moreover, successful innovations help the company by creating an image of market leadership and establishing entry barriers for competitors. In order to launch new products successfully, practitioners have to address innovative consumers efficiently. Only if marketers know about the needs and the behavioral patterns of consumers who are most likely to buy innovations, they can tailor their marketing mix (Hoffmann & Soyez, 2010).

In academic studies, although innovation has been studied in many independent research traditions (Hauser, Tellis & Griffin, 2006), the literature has mainly addressed the adoption and diffusion of innovations (Greenhalgh et al., 2005; Rogers, 1995; Wejnert, 2002). Most of these studies focus on organizational innovations and product characteristics. However, the failure of innovations is most often due to a firm's lack of understanding of consumer needs. Meanwhile, marketing researchers have discussed consumer innovativeness for half century. In this respect, a vast amount of literature (e.g. Cowart, Fox & Wilson, 2008; Gao et al., 2013; Lassar et al., 2005; Pagani, Hofacker & Goldsmith, 2011) on the acceptance of new products by consumers has focused on personal characteristics. More specifically, much attention has been paid to the concept of consumer innovativeness (e.g. Bartels et al., 2011; Goldsmith & Hofacker, 1991; Goldsmith et al., 1998; Midgley & Dowling, 1978; Steenkamp et al., 1999). Consumer innovativeness behavior as one important subject matter in marketing research, has been correlated with many other consumer behaviors (e.g. opinion leadership, product involvement, novelty seeking) in various product categories (e.g. automobile, clothes etc.) and cross-cultural context (e.g. Latin America, Europe, Asia etc.). However, in this dissertation, we aim to: a) confirm some antecedents of consumer innovativeness from previous studies; b) analyze the consumer innovativeness as consumer technology condition to behavioral intention with a new product category: smartphone

through three emerging economies and markets (Brazil, China and India); c) explore the possibly correlation between consumer innovativeness and another emerging consumer behavior: frugal behavior. These points can be considered contributions to consumer innovativeness theory.

1.3.2 Frugal Behavior and its Importance in Managerial Practices and Academic Studies

As Bouckaert, Opdebeeck and Zsolnai (2008) mentioned, the interests of nature, society and future generations require a considerable reduction of material throughout the economy and a reorientation of our economic activities. This could become possible by employing a more spiritual approach to life and economy, which means, spiritually based frugal practices may lead to rational outcomes such as reducing ecological destruction, social disintegration and the exploitation of future generations.

However, some academically suggestions highlight the need of frugality to be understood as a lifestyle choice. Alternative discussions of frugality posit it as either a personality trait or as a value (Todd & Lawson, 2003). This increase in a pattern of consumer behavior makes this topic important for a variety of concerned parties. Policy makers are interested in understanding frugality because it can be part of the response to detrimental effects of excessive consumption on the environment, on society as a whole, and on personal life satisfaction (Ballantine & Creery, 2010), and whether they are commercially provided or situated, created, and improvised, the coping strategies that can be generated by economic, ethical, and environmental pressure to consume frugally-characterized here as “frugality practices” - deserve to be mapped and explored as a specific group within practices of consumption more generally (Burridge, 2012). On the other hand, marketers are interested in understanding frugal consumers as a potential new market segment (Rick, Cryder & Loewenstein, 2008; Goldsmith et al., 2014). Therefore, dimensions of frugality are important for understanding choice and consumption of products that have environmental associations (Todd & Lawson, 2003). Moreover, understanding values that determine frugal behavior could thus have positive commercial benefits for marketers of older technologies, as well as the more obvious areas such as the DIY industry, which supports more frugal consumption (Todd & Lawson, 2003).

Scholarly interest in frugal behavior has grown in the past few years, there are two main reasons to be considered. First, concern for the environment seems to have induced increasing numbers of consumers to practice frugal consumption. Second, the recent and persistent severe economic downturn in some countries (e.g. Brazil) have experienced has compelled many consumers to become increasingly frugal (Birkner, 2013; Egol et al., 2010). Frugal behavior has become increasingly important in the field of consumer behavior. However, in this dissertation, we aim to: a) confirm some antecedents of frugal behavior from previous studies; b) analyze consumer frugal behavior as consumer economic condition resulted in behavioral intention in a specific product domain: smartphone and in a cross-cultural context, which can be considered a contribution to frugal behavior theory; and c) try to investigate the relation between consumer innovativeness and frugal behavior.

1.3.3 Three Emerging Markets and Cultural Differences

We chose Brazil, China and India as research objects not only they all are emerging countries from BRIC, but also there are cultural influences in each market. Thus, the cultural differences comparison among different emerging markets is a meaningful research object, little study had focused on emerging markets comparison either. The smartphone has gone on to be become a broad-based phenomenon in these emerging markets. The numbers speak for themselves.

A Brazilian website “Convergência Digital Uol (2013)” addressed that Brazil is a leader in the use of tablets and smartphones in the world according to a survey by CONECTA and by Worldwide Independent Network of Market Research (WIN). The survey showed that the Brazilian is on average 84 minutes a day fiddling with smartphone, while the world average is 74 minutes (Francisco, 2016). According to the website G1(2014) demonstrated the smartphone sales in Brazil, there are totally 13 million handsets sold during the second quarter of 2014, showing a growth of 22% over the same period of 2013. Between April and June, over 100 smartphones were sold per minute, and totally 17.9 million handsets were sold during the period within 13.3 million smartphones (75%).

As for India, there are more than 27 million smartphone users in urban India in 2013, which constitutes 9% of all mobile users in urban India. The numbers are

higher in the larger metros of the four million plus population with one smartphone user among ten mobile users (Malviya et al., 2013).

Although little study has addressed the purchase of smartphone in China, but the smartphone market in China have an increasingly enormous population of smartphone users. According to website INVESTOPEDIA, there were 1.28 billion mobile phone users in China by March 2016, by far the greatest number in any single country. Most sources cite 2011 as the start of the Chinese smartphone revolution. By 2012, China overtook the United States as the world's largest smartphone market, during which an estimated 208 million units reached Chinese consumers. There were as many smartphone users in China as all European countries combined by the end of 2012. Another study in 2015 by the Groupe Spécial Mobile Association (GSMA) found that there were 913 million smartphones in China specifically, up from 805 million in 2014. However, some individuals had multiple smartphones, so the number of unique smartphone subscribers was 691 million.

According to the proposition of Hofstede (1983), national and regional differences become one of the most crucial problems for management, in particular for the management of multinational, multicultural organizations, whether public or private and so do the people’s work-related values among different countries. Consumers in some countries (e.g. China) may be, on average, higher in innovativeness but lower in frugality than consumers in other countries due to systematic differences in the national environment. A country’s culture long has been identified as key environmental characteristic underlying systematic differences in consumer behavior. It is a power force shaping people’s perceptions, depositions, and behaviors. A nation’s culture affects the needs consumers satisfy through the acquisition and use of goods. This is not meant to imply that culture and country are the same. Culture can be conceptualized at different levels, including the national level. The effects of national culture indicate the existence of some meaningful degree of within-country commonality and between-country differences in national cultures (Steenkamp et al., 1999).

Prior searches using a variety of frameworks has shown that national cultural values are related to workplace behaviors, attitudes and other organizational outcomes (Kirkman, Lowe & Gibson, 2006), as well as to the behavioral intention to purchase high technology products. Novelty, the most influential of cultural classifications is that of Geert Hofstede. Over two decades have passed since the

publication of *Culture's Consequences: International Differences in Work-Related Values* inspiring thousands of empirical studies (Kirkman et al., 2006). Some empirical studies put culture as a main effect at the individual level of analysis, and some at the group/organization and country levels. Other findings incorporate culture as a moderator at all levels of analysis (Kirkman et al., 2006). However, in this dissertation we aim to investigate the moderate effect of individual's cultural orientation value through three emerging countries on the interactions between consumer innovativeness, frugal behavior and consumer intention in smartphone purchase. Thus, the research among three emerging countries (Brazil, China and India) can be considered another empirical study of Hofstede's cultural difference theory.

Here gives an example of cultural differences. According to data from Itim International, China and India both have restrained societies, which means people in this kind of society do not put much emphasis on leisure time and control the gratification of their desires. People with this orientation have the perception that their actions are restrained by social norms and feel that indulging themselves is somewhat wrong. In contrast to restrained society, Brazil has an indulgent society. People in this kind of society classified by a high score in Indulgence generally exhibit a willingness to realize their impulses and desires with regard to enjoying life and having fun. They possess a positive attitude and have a tendency towards optimism. In addition, they place a higher degree of importance on leisure time, act as they please and spend money as they wish.

1.3.4 The Emergence of Behavioral Intention to Buy High Technology Products

1.3.4.1 The emergence of smartphone technology

Mobile phone is one of a handful of consumer products to have gained global acceptance within a relatively short period of time (Barnes & Scornavacca, 2004). Today, mobile phone is central to the lives of most consumers, including the lives of teenagers. It is a device many consumers cannot seem to do without; they always have it on and check it almost everywhere they go. For these consumers, the mobile phone is not only a personal device used to stay connected with friends and family, but also an extension of their personality and individuality (Grant & O'Donohoe, 2007;

Persaud et al., 2012). Mobile marketing is still in its early stages, and mobile marketing practices will likely go through fundamental changes as the technology continues to evolve (Karjaluoto et al., 2008).

However, with the introduction of smartphones and the introduction of new technologies, such as radio frequency identification tags (RFID) and e-wallets that easily integrate with smartphones, marketers and consumers will be exposed to a whole range of marketing innovations that were not possible with the classic mobile phone. A smartphone can be defended as a portable mobile handset which is capable of doing multiple operation at the same time like a computer, typically characterized with a large screen and having an operating system capable of handling various general purpose applications (Sujata et al., 2015). In order to stay competitive, smartphones have become products that incorporate sophisticated technologies (Lau et al., 2016). For example, smartphone apps such as Amazon's Price Check and Google Shopper allow consumers in a physical retail store to use their smartphone to enter the bar code of a product or take a photo of a product and immediately receive price comparisons, customer reviews, discounts, coupons, and other information on their smartphones while also looking at the product in the store. The smartphone has the capability to transform consumers' shopping experiences and the value of marketing: consumers can now easily and quickly shop across multiple channels (physical store, web-based and mobile) with substantially greater level of convenience, flexibility, efficiency and personalization. However, this technology also has the potential to be intrusive and annoying (Persaud & Azhar, 2012). Thus, marketers must listen to their customers and develop appropriate strategies rather than simply adapting existing marketing strategies.

1.3.4.2 Behavioral intention in smartphone purchase

Research from Strategy Analytics revealed 1 billion of smartphones are being used worldwide, 17.3% of smartphone user´s age is between 20-24 years old. In current situation, consumers no longer view smartphone just as devices for calling and texting, instead as multi-use devices for gaming, socializing, and downloading applications which results in a radical shift in behavior patterns (Rahim et al., 2016). Research on smartphone marketing is also in its early stages, but the literature is growing. Since smartphone technology is rapidly evolving, an understanding of the

factors that influence the adaption of smartphone is an important topic of study (Lau et al., 2016). Prior research has focused on themes such as smartphone consumption (e.g. Andrews et al., 2005), consumer perceptions and attitudes towards mobile marketing (e.g. Roach, 2009), consumer responsiveness (e.g. Heinonen et al., 2007), adopter segments and cultural influences on adoption (e.g. Muk, 2007; Persaud & Azhar, 2012). According to the study of Rahim et al. (2016) and Lau et al. (2016), product features, brand name, social influence, perceived usefulness, perceived ease of use, perceived enjoyment, and perceived value are the factors that influencing purchase intention of smartphone among university students. Moreover, price, brand image, technology factors, functional values, perceived value, subjective norm and attitude may can influence the purchase intention of smartphone in senior citizens (people are older than 55 years of age) segment (Sujata et al., 2015).

However, it is needed to gain clearer insights into how consumers will react to smartphone marketing given the many technological and marketing capabilities that smartphones offer over traditional mobile phone; and how are the elements to influence consumer's behavioral intention in smartphone purchase (Persaud & Azhar, 2012). According to Turnar et al. (2010), behavioral intention is good at predicting actual product use than perceived usefulness and perceived ease of use (the other two important antecedents in Davis´s TAM model). Thus, the study of this dissertation is forward to seek out how consumer's purchase intention of smartphone is influenced by consumer innovativeness and consumer frugal in a cross-cultural context. It may also be considered as an alternative contribution to Davis's TAM model theory.

2 THEORETICAL BACKGROUND

The chapter of theoretical background is intended to objectively present the main approaches utilized in this dissertation. These approaches are: behavioral intention, domain specific innovativeness, frugality and cultural relativity. In next chapters these concepts are presented to support the central hypotheses of a theoretical model.

2.1 Behavioral Intention

Ajzen and Fishbein (1980) sustain that human behavior comprises intentionality. The Technology Acceptance Model (TAM) was proposed by Davis (1989) as an instrument to predict the likelihood of a new technology's acceptance and use can be explained in terms of a user's internal beliefs, attitudes and intentions. As a result, it should be possible to predict future technology use by applying at the time that a technology is introduced (Turner et al., 2010).

2.1.1 The Development of TAM

The original TAM model is applied to address why users accept or reject information technology. TAM is based on the theory of reasoned action (TRA) (Fishbein, & Ajzen, 1975), a psychological theory that seeks to explain behavior. TAM gauged the impact of four internal variables upon the actual usage of the technology, which were: perceived ease of use (PEU), perceived usefulness (PU), attitude toward use (A) and behavioral intention (BI), where TRA is assumed to be closely link to actual usage (King & He, 2006). PU and PEU determine the consumer's attitude (A) to finally influence their BI upon to actual usage. The original TAM used BI as both a dependent variable and independent variable. PEU as an independent variable have direct influence on PU and A, which both are determine the BI at the meantime (Kim, 2008). Fig.1 illustrates the original TAM model.

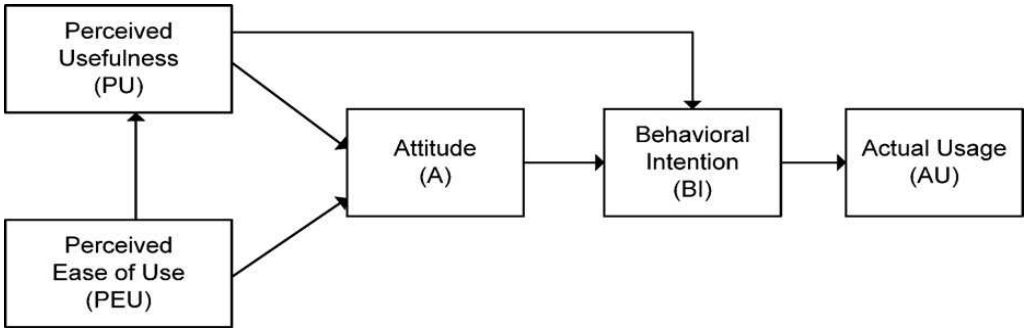


Figure 1. *The original technology acceptance model (TAM)*
Source: Davis (1989)

PU is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p. 320). This arises from the definition of the word useful: “capable of being used advantageously”. Within an organizational context, people are generally reinforced for good performance by raises, promotions, bonuses and other rewards. A system high perceived usefulness, in turn, is one for which a user believes in the existence of a positive use-performance relationship (Davis, 1989).

Perceived ease of use (PEU) refers to “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p. 320). This arises from the definition of "ease": “freedom from difficulty for great effort”. Effort is a finite resource that a person may allocate to the various activities for which he or she is responsible. Everything else being equal, it is claimed that, an application perceived to be easier to use than another is more likely to be accepted by users (Davis, 1989). Prior work has shown that PEU is significantly linked to BI via its impact on PU. It directly influences user acceptance and indirectly affects usefulness, where the direct impact was most relevant. However, non-significant interaction between PEU and PU were also found in some empirical studies (Chau, 1996).

Subsequently, Davis, Bagozzi and Warshaw (1989) proposed, tested, and revised the original TAM, referred to as two-version revised TAM. They reported an objective measure of technology acceptance, actual usage rather than self-report usage. The key purpose of the two-version revised TAM is to provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions (Davis et al., 1989). However, findings from other empirical studies in this area suggest that the original TAM may be more appropriate than the two-version revised

TAM, but the addition of an experience component may be a significant enhancement to the original TAM (Szanjna, 1996).

Moreover, Venkatesh and Davis (1996) suggested and tested an extension TAM of the antecedents of perceived ease of use without the attitude construct (Fig. 2), external variables include system characteristics, training, user involvement in design and the nature of the implementation process. This version of TAM is aim to understanding antecedents and determinants of perceived ease of use through three empirical studies of computer system.

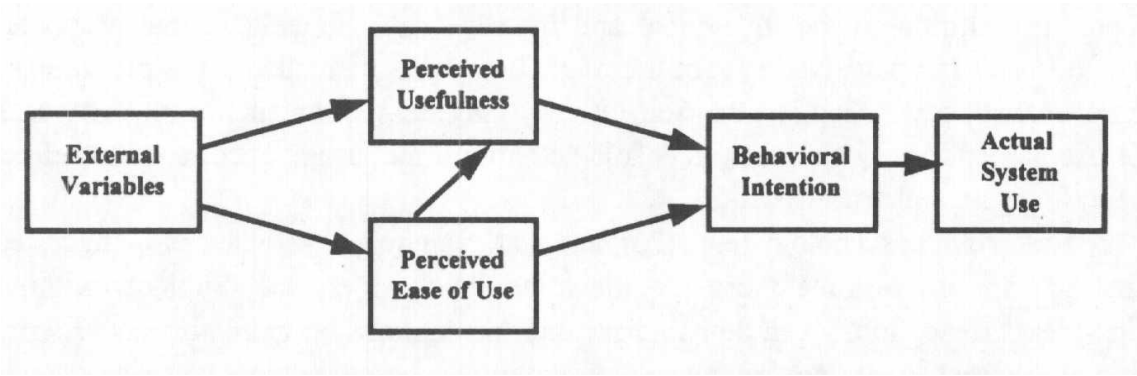


Figure 2. *The extension technology acceptance model (TAM)*
Source: Venkatesh and Davis (1996)

Additionally, Venkatesh and Davis (2000) proposed a revised and extension TAM through four longitudinal field studies, referred to as TAM2, which excluded attitude and incorporated additional variables (Fig. 3).The TAM 2 used TAM as the starting point, TAM2 incorporated additional theoretical constructs including social influence process (subjective norm, voluntariness and image) and cognitive instrumental processes (job relevance, output quality and result demonstrability), the variable intention to use was divided into voluntary usage and mandatory usage moderated by voluntariness and experience. The TAM 2 also addressed causal antecedents of one of its two belief constructs, perceived usefulness. However, the core ideology of the model remained unchanged (Turner et al., 2010).

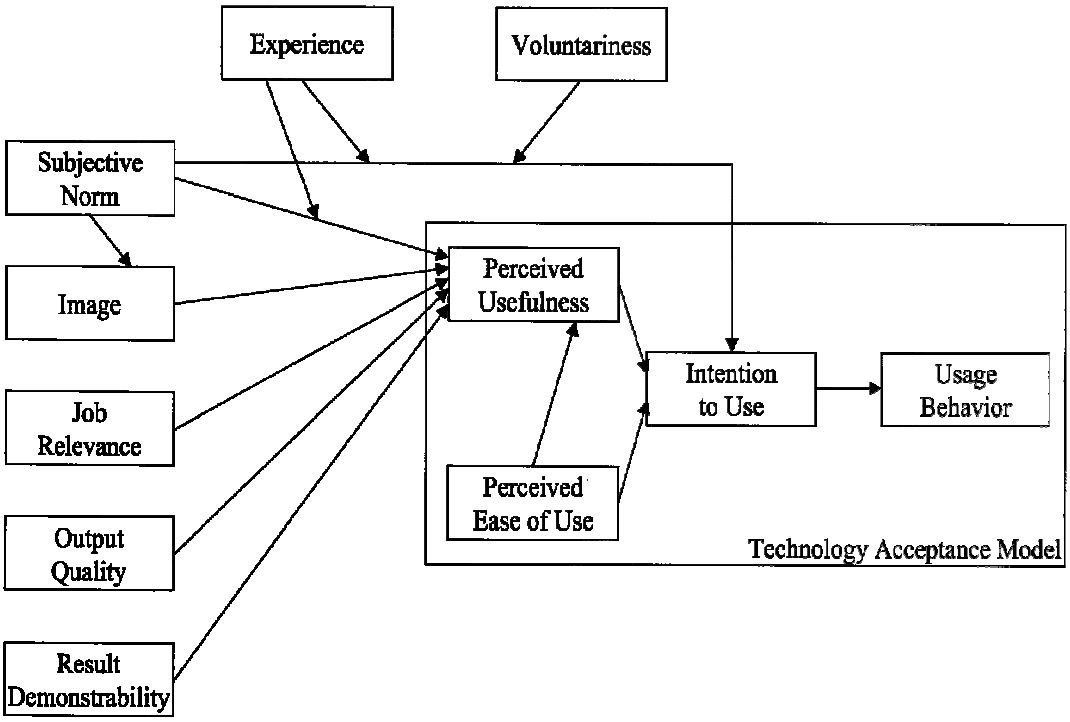


Figure 3. *The technology acceptance model 2 (TAM 2)*
Source: Venkatesh and Davis (2000)

2.1.2 The Modifications and Implications of TAM

TAM has applied in various fields and studies, in part because of its understandability and simplicity. However, it is imperfect; there is wide variation in the predicted effects in various studies with different types of users and systems (King & He, 2006). Specifically, Venkatesh, Morris, Davis, and Davis (2003) developed eight models from TAM literature to explain user acceptance of new technology which including a total of 32 identified constructs; the authors also proposed and tested an unfiled theory of acceptance and use of technology (UTAUT).

The meta-analysis of 88 TAM empirical studies by King and He (2006) showed TAM as the “core” of a broader evolutionary structure that has four major categories of modifications: a) the inclusion of external variables (prior factors) such as situational involvement; b) the incorporation of factors suggested by other theories that are intended to increase TAMs predictive capacity such as risk (Featherman & Pavlou, 2003) and subjective norm from TAM 2; c) the inclusion of contextual factors such as gender and culture (Huang, Lu & Wong, 2003) that may have moderator

effects; d) the inclusion of consequences measures such as attitude (Davis & Bagozzi, 1989) ,perceptual usage(Horton et al., 2001) (Fig. 4).

Moreover, a systematic TAM literature review conducted by Turner et al. (2010) was aim to understand whether the TAM can act as an accurate predictor of actual usage rather than BI to use when employing objective and subjective forms of usage measure. However, they found that PU and particularly PEU are not as good at predicting actual technology use as BI.

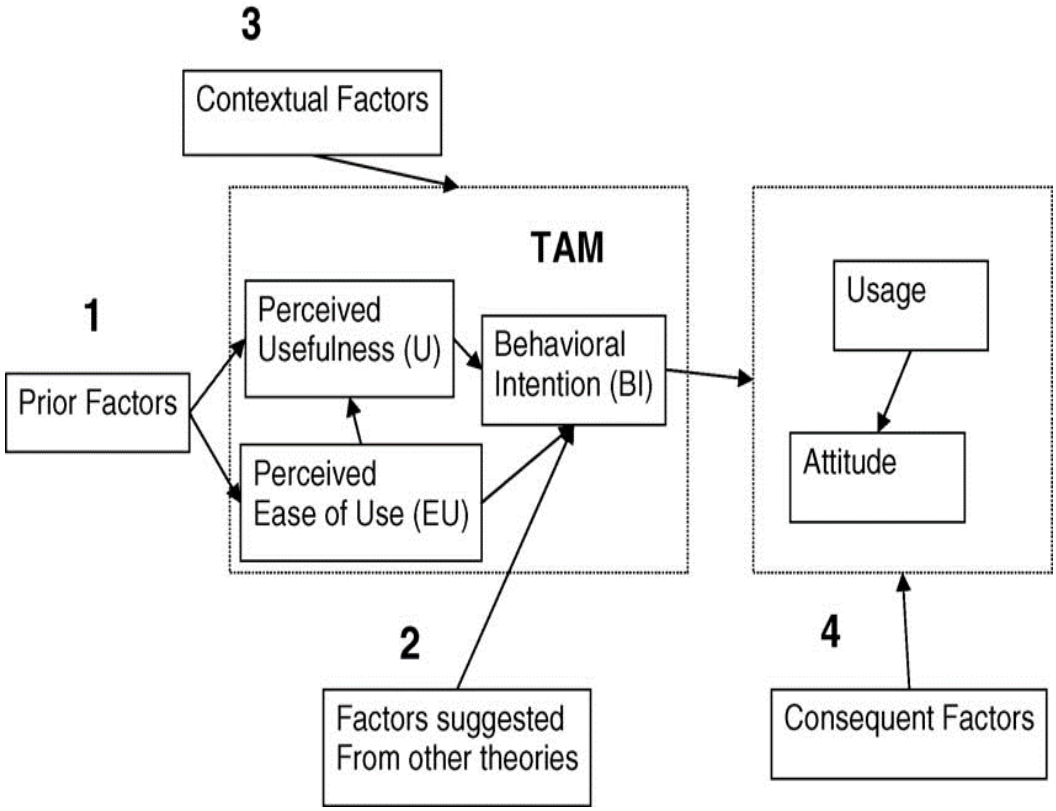


Figure 4. TAM and four categories of modifications
Source: King and He (2006)

2.2 Domain Specific Innovativeness

People who rules in certain products are more likely to see themselves innovations when they are released (Goldsmith & Hofacker, 1991; Bartels & Reinders, 2011).

In the psychology area, innovativeness itself is a hypothetical construct postulated to explain and/or predict the act and time of adoption or purchase of a new product, but existing only in the mind of the investigator and at a higher level of

abstraction (Midgley & Dowling, 1978). According to Hirschman (1980), the major difference between these two definitions is that Rogers's conceptualization is about actualized, not inherent innovativeness. It deals with product adoption (measurable behavior) rather than willingness to adopt (predisposition to act in a certain way).

The study of Baumgarten (1975) describes a general summary profile of the campus fashion innovative communicator: a freshman or sophomore who is very active socially, narcissistic, highly appearance-conscious, and strongly attuned to the rock culture, is prone to read more of the popular mass media, especially *Playboy*, *Time*, *Newsweek*, and *Sports Illustrated*. He/she tends to be, of course, highly involved with the fashion scene, and spends more on clothing, knows more about fashion, and owns more different styles than do others. He/she tends to be more exhibitionistic, more impulsive, and more limited in intellectual interest than other students. He/she tends to be strongly oriented toward more student power on campus (although this result may be temporally related to the then-popularity of the student cause) and inexplicably, significantly more racist than other students.

2.2.1 Three Approaches to Consumer Innovativeness

In previous literature, Midgley and Dowling (1978) suggest distinguishing between three levels of innovativeness, in order of increasing abstraction these are: actualized innovative behavior, domain-specific and innate innovativeness. The lowest level refers to Rogers' (1995) definition of innovativeness as the degree to which an individual adopts an innovation earlier than others. Innate innovativeness, the highest level of abstraction, is generally conceptualized as a trait-like construct (Roehrich, 2004)

According to Hirschman (1980), the major difference between innovative behavior and innate innovativeness is that the former’s conceptualization is about actualized, not inherent innovativeness. It deals with product adoption (measurable behavior) rather than willingness to adopt (predisposition to act in a certain way; Lee, 1990).

Innovativeness is operationalized in two ways: a) the relative time of adoption of innovation, and b) the ownership of new products (Rogers, 1995). The first technique, the temporal method, usually involves defining innovators as those individuals who purchased in the first X weeks, or months, etc., after the product was

launched. The second technique, which might be called the "ownership of new products" or "cross-sectional" method, determines how many of a pre-specified list of new products a particular individual purchased at the time of the survey (Lee, 1990).

2.2.1.1 Innovative behavior

Rogers and Shoemaker (1971, p. 27) defines innovativeness as the “degree to which an individual is relatively earlier in adopting an innovation than other members of his system” which indicated the actualized innovativeness: the lowest abstraction level of innovativeness (Goldsmith & Hofacker, 1991; Hoffmann & Soyez, 2010). Actualized innovativeness thus turned out to be a rather poor predictor of future innovative purchasing behavior (Goldsmith & Hofacker, 1991). From the literature review, the operational definition of innovative behavior is quite diverse: the ownership of new products, usage of new products (Cotte & Wood, 2004), purchase of new products, trial of new products, actualized novelty-seeking (Hirschman, 1980), and variety-seeking behavior.

2.2.1.2 Innate innovativeness

The study by Midgley and Dowling (1978, p. 236) is among the first to identify innovativeness as a generalized personality trait called “innate innovativeness.” They expressed the notion that innovativeness was "the degree to which an individual is receptive to new ideas and makes innovation decisions independently of the communicated experience of others”. It means that innovativeness is “a function of (yet to be specified) dimensions of the human personality” and that “all members of society possess a greater or lesser degree of innovativeness” (Midgley & Dowling, 1978, p. 235). According to Hirschman (1980), innovativeness as a personality trait reflects an innate tendency to seek out new information, stimuli or experiences.

As mentioned before, innate innovativeness as the highest abstraction level of innovativeness is a ‘‘predisposition to buy new and different products and brands rather than remain with previous choices and consumer patterns’’ (Steenkamp, Hofstede & Wedel, 1999, p. 56). Roehrich (2004) conceptualized four explanations of forces that may predict the innate innovativeness: a) stimulation need; b) novelty

seeking; c) independence toward others' communicated experience and; d) need for uniqueness.

2.2.1.3 Domain specific innovativeness

Although Summers (1971) suggests some contextual influence, the first important study on domain-specific innovativeness seems to have been Goldsmith and Hofacker's (1991) study. Over the last few years, DSI has been applied in different domains. The domain specific innovativeness plays an important role in studies of innovation and consumption providing additional predictive power to several others behaviors (Bartels & Reinders, 2011).

Moreover, in the psychology area, innovativeness itself is a hypothetical construct postulated to explain and/or predict the act and time of adoption or purchase of a new product, but existing only in the mind of the investigator and at a higher level of abstraction (Midgley & Dowling, 1978).

Product specific innovativeness is clearly described by Midgley and Dowling (1978) and by Gatignon and Robertson (1985). It is distinguished from the more abstract concept "innate innovativeness", which is a generalized personality trait reflecting the degree to which an individual makes innovative decisions independently of the communicated experience of others (Midgley & Dowling, 1978).

The relationship between specific category and overall innovation demonstrated that the domain specific innovation capacity has greater influence on innovative purchase within a specific category of products that the overall innovation or innovative consumers in a field may be delayed in another (Gatignon & Robertson, 1991; Goldsmith & Goldsmith, 1996).

2.2.2 Measurement of Domain Specific Innovativeness

Goldsmith and Hofacker (1991) developed a self-report measure method of innovativeness conceptualized and adopted new products in a specific domain of consumer behavior, it based on "frequent and prototypical" behavioral characteristics of innovators (Buss, 1989). It is a six-item scale where the items are scored on 5-point disagree-agree formats. Specifically, Item scores are summed to form an overall DSI score; and the DSI is considered unidimensional. There are two versions

of the DSI. Each version has three positively worded items and three negatively worded items. Therefore, versions can be used interchangeably and are considered applicable to a wide number of product domains (Bearden & Netemeyer, 1999).

The DSI scale is suitable for general products areas where consumer purchase is frequent, and can thus report on their actual or anticipated behavior (Goldsimith & Hofacker, 1991). The DSI scale used to measure innovation in a specific domain of a person, or the individual's predisposition to see the innovation in a product class. However, it is considered as to buy new and different products or brands, rather than remain with the previous choices and consumption patterns (Steenkamp et al., 1999). In management studies, there are many existing examples that demonstrate the use of this scale (Roehrich, 2004), especially when evaluating the consequence of this predisposition (Goldsmith et al., 1998). Over the past few years, with the increasing of this field, the DSI scale has been applied in different fields of product categories, industries and countries (Roehrich, 2004; Goldsmith & Flynn, 1992; Goldsmith, et al, 2005; Flynn & Goldsmith, 1993; Agarwal & Prasad, 1998; Agarwal & Karahanna, 2000). They provide various opportunities to evaluate the impact through cross-culture, different product categories from different industries to the DSI scale (Goldsmith & Flynn, 1992; Goldsmith et al, 2005; Flynn & Goldsmith, 1993; Goldsmith, d' Hauteville & Flynn, 1998; Lastovicka et al., 1999; Matos, Fernandes, Leis & Trez, 2011) even though some scholars sustain that the measure correlates highly with the King Summers Opinion Leadership Scale (Hoffman & Soyez, 2010).

2.2.3 Other Consumer Behaviors Associated with Innovativeness

Feldman et al. (1975) demonstrated that social, attitudinal and personality traits like opinion leadership, product interest, venturesome (defined as willingness to accept risk in purchasing new products) and personal competence (defined as a feeling of mastery over the self and the environment) have positively associated with innovativeness. According to Rogers (1995), the rate of diffusion of an innovation is positively related to consumers' perceptions of the innovation in terms of four characteristics: relative advantage over existing products; compatibility with existing norms, values, and behavior; its communicability or the ease with which its features can be communicated to others; and divisibility, the degree to which the product may

be tested on a limited basis. A fifth characteristic, complexity—the perceived difficulty in understanding or using the product—is negatively related to the diffusion rate (Feldman et al., 1975). Additionally, Tellis Yin and Bell (2009) developed measures for consumer innovativeness across countries and categories, tried to define consumer innovativeness with ten key dimensions from literature of innovativeness, which include novelty seeking, risk taking, variety seeking, opinion leadership, social dependence, stimulus variation, habituation, nostalgia, suspicious, effort and frugality.

According to literature review, there are other consumer behaviors, which are associated with DSI, such as: adoption of new product behavior (Citrin, Sprott, Silverman & Stem, 2000; Huotilainen, Pirttilä-Backman & Tuorila, 2006), the opinion leader (Goldsmith & Hofacker, 1991; Ruvio & Shoham, 2007), the use of the product and use intention (Agarwal & Karahanna, 2000), risk perception (Mitchell & Harris, 2005), searching for information (Black, 1982).

Innovational adaption, the process of adopting a new technology, product or service can be understood in the works of Rogers (1995), where it is intimately linked to the concept of consumer innovativeness. The tendency to adopt new products does not only depend on individual perception but also the context where it is inserted (Gatignon & Robertson, 1991).

As to product usage, which shows a significant positive relationship with DSI (Agarwal & Karahanna, 2000), the more consumers aware and realize innovative shopping within a specific category of products, the more this will be able to use this product.

Innovative consumers tend to be opinion leaders. The opinion leader reflects an individual's ability to influence other individuals, attitudes or overt behavior in a desired manner in a given domain (Ruvio & Shoham, 2007). It also refers to individuals' tendency to influence the purchase decisions of others (King & Summers, 1970). "Opinion leadership happens when individuals try to influence the purchasing behavior of other consumers" (Flynn, Goldsmith & Eastman, 1996, p. 138), making it situation-specific (Ruvio & Shoham, 2007). The non-opinion leaders are seen as the message receivers that receive the information through opinion leaders (Lazarsfeld, Berelson & Gaudet, 1944).

Consumers who have little knowledge or having insecurity is highly likely to seek advice from someone they know (Punj & Staelin, 1983). Goldsmith and

Hofacker (1991) reported a strong relationship between innovation and consumer information search.

Risk perception comes from the uncertainty that consumers face when you cannot predict the consequences of their buying decisions (Aldás-Manzano, Lassala-Navarré, Ruiz-Mafé & Sanz-Blas, 2009). Studies have suggested that the perception of risk may negatively influence the decision to adopt new products. However, others argue that this negative effect is not so obvious (Mitchell & Harris, 2005). Eastlick and Lotz (1999) focused on telesales and showed that the perceived risk was negatively related to the profile of one trend innovative. Nakata and Sivakumar (1996) show that risk behavior is a typical feature of innovative managers.

2.3 Frugality

As Argandoña (2010) sustains, frugality can mean controlling the quality of what one purchases, consumes or possesses: not higher-quality and more expensive goods, but healthy, sustainable products that do not adversely affect one's own health or that of others or the environment etc. (Scherhorn, 2006). Frugal, in this sense, describes a person who spends wisely (McCloskey, 2006) and makes informed decisions about how resources are used (Roberts, 1998). Specifically, Lastovicka et al. (1999)'s conceptualization of frugality as a lifestyle construct and takes their definition of frugality as "a unidimensional consumer lifestyle trait characterized by the degree to which consumers are both restrained in acquiring and in resourcefully using economic goods and services to achieve longer-term goals", which based on a thorough review of the literature across numerous disciplines(e.g. economics, early America studies, religion, self-help, psychology)and a qualitative study of 84 subjects (Todd & Lawson, 2003).

Frugality involves voluntary restraint and moderation in consumption (Lastovicka et al., 1999). It reflects the degree to which one is both restrained in acquiring and resourceful in using products and slowing down the process of environmental harm (Bove et al., 2009).

2.3.1 External Economic Factors to Frugality

Much overt frugal behavior derives from external events such as job loss (Goldsmith et al., 2014). The major reason people become frugal is because their economic circumstances compel them to: job loss, general economic downturns, or other negative economic conditions compel people to change consumption and spending behavior in a frugal direction (Egol et al., 2010). Goldsmith, Flynn, and Clark (2014) labeled the outcome of these external forces as “constrained frugality.”

Nowadays, what seems more prominent is frugality based on delayed economic gratification (Lastovicka et al., 1999). John Stuart Mill (1848) advanced a theory of capital based on frugality. Assuming satisfaction from current consumption is preferable to delayed satisfaction by most. More recently, Wilk’s (1996) economic model disciplined acquisition can be explained by the benefit to future generations. However, Reich and Zatura (1983) divide consumers’ daily activities into two classes, depending on their personal economic conditions: first, doing what is needed to maintain and frugality has, existence and, second, doing what is wanted and really desired.

2.3.2 Internal Psychological Factors to Frugality

There are values and individual personality differences that distinguish people psychologically. Psychological characteristics can be influenced by cultural influences. Psychological traits can predispose people to live a frugal lifestyle. “Frugality” refers to this lifestyle or personality-type trait that characterizes people who hold positive attitudes toward frugal behavior and who live in a manner characterized by multiple frugal behaviors. (Goldsmith et al., 2014)

2.3.2.1 Frugality as value orientation

Values provide guides for living the best way possible for individuals, social groups and cultures. Values are fairly distal influences on consumer behavior; their impact is mediated and moderated by factors such as worldviews, personal norms, the self-concept, attitudes, and situational or contextual influences (Rohan, 2000; Pepper, Jackson & Uzzell, 2009). Moreover, people usually use moral standards to

judge themselves and others, to influence the actions and thoughts of other people, and to judge what is right or wrong for them. These modes of conduct are covered by the concept of “values” (Rokeach, 1968), which are related to concepts, beliefs, and/or desirable ends (Matos et al., 2011; Matos & Leis, 2012).

However, values refer to the importance that an individual attribute to frugality or not as a guide to action and judgments across specific situations. This value transcends all of the world’s major religions, one promoted since antiquity and universally shared in the human family (Durning, 1992).

2.3.3 Frugality as a Lifestyle Trait

Some view frugality as a lifestyle trait (Lastovicka et al., 1999), others as a single value orientation (Todd & Lawson, 2003), while others see it simply as a pattern of behavior (Egol et al., 2010). Values and traits may mutually influence one another (Roccas et al., 2002). For example, frugality as a value serves as guiding principle for self-regulated consumer behavior. By comparison, as a behavioral trait, frugality is likely to increase the degree to which individuals value frugal goals as this allows them to justify their behavior (Bove et al., 2009).

Frugality is conceptualized as a lifestyle trait reflecting disciplined acquisition and resourcefulness in product and service use. Frugality is sacrifice in denying a series of short-term purchasing whims and industriousness by resourcefully using what is already owned or available for use. All of this is in service of achieving longer term goals (Lastovicka et al., 1999). Moreover, Lastovicka et al. (1999) define frugality is a unidimensional consumer lifestyle trait characterized by the degree to which consumers are both restrained in acquiring and in resourcefully using economic goods and services to achieve longer-term goals and they have been successful in developing a measure that reflects frugality as a lifestyle construct. The measure reflects attitudes towards a set of saving, shopping, consuming and recycling behaviors that provides a larger picture than would be reflected in any limited set of values (Todd & Lawson, 2003).

The study of Lhuissier (2012) presented that “frugality” corresponded to a way of managing and allocating family budget with a very specific aim: it was orientated toward a long-term project. For this reason, it applies both to families’ eating habits and their lifestyles. In poor families, food thus seems to be the main source of

expenditure, which families could modify in order to manage their budget Although, the frugality of poor families' daily diet is less a reflection of their poverty than an active factor in their savings behavior aimed at preserving their income and securing the family's future. Therefore, frugality in eating habits did not necessarily reflect hardship. Nevertheless, the frugality of their diet was synonymous with hardship compared with standard eating habits. In contrast, the rural working-class families perceived the frugality of their diet as renunciation (Lhuissier, 2012).

2.3.3.1 Constrained frugality and voluntary frugality

Pepper et al. (2009) demonstrated some factors that may most strongly facilitate the adoption of more frugal ways of living seem to be a decrease in personal materialism and/or a decrease in household income – whether voluntarily (e.g. down-shifting) or involuntarily (e.g. a recession).

Constrained frugality should not be confounded with a distinctive personality and motivational profile, and in fact may be counter to it. Hence, the return to materialistic ways when the constraints are lifted, or new opportunities present themselves to previously frugal-living individuals who did not have the resources or opportunities to engage in materialistic behavior (Goldsmith et al., 2014). Yet, material constraints associated with the production and distribution of food under capitalism have for a long time disproportionately affected those living in developing countries, and those of lower social class the world over, which in relation to long-term or "transcendental goals that they maximize as they carefully calculate how much and in what manner they spend their money" (Wherry, 2008, p. 371). Therefore, restricting their household's consumption of food was also an active practice—a form of voluntary food frugality—directed toward saving to enable future social mobility (Burridge, 2012).

In the case of voluntary frugality, which stems from more basic value and personality characteristics, those social judgments may matter less to the individual because voluntary frugality is linked to lower levels of materialism, status seeking through consumption, and to the need to use brands to express self-concept. Thus, these frugal individuals are self-consistent. Individuals constrained to live frugally, however, may experience social discomfort because this behavior is inconsistent with basic personality (Goldsmith et al., 2014).

2.3.3.2 Voluntary simplicity and voluntary frugality

In some frugal studies, the differences between frugality and voluntary simplicity (VS) are ambiguous; they put VS as a lifestyle choice, while the role of frugality is less well defined. In terms of definitions, there appears to be more of an emphasis on non-consumption as a means of meeting long term goals among those writing on frugality, while VS is not portrayed as a means to an end (Todd & Lawson, 2003). However, VS may be similar to the voluntary frugality in the case of the limit expenditures on consumer goods and services in an attempt to cultivate non-materialistic sources of satisfaction (Etzioni, 1998). They pursue simpler lifestyles as an alternative to stressful, consumption-driven and time-impoverished ways of living. They do this by adopting interdependent values such as material simplicity, human scale self-determination, ecological awareness and personal growth (Elgin & Mitchell, 1977). Although frugality may result in a simpler lifestyle, this is not the primary motive behind the behavior. The motive is to reduce waste rather than reach some higher-order goal such as personal growth. “Voluntary frugality” is related to voluntary simplicity in that voluntarily frugal consumers choose to live in a way that rejects excessive spending (Goldsmith et al., 2014).

2.3.4 Frugal Behavior

Frugal behavior reflects careful spending of money and both restraint and discipline in acquisition. Frugality is consisted of frugal behaviors. Therefore, there are some concrete manifestation of frugal behavior, frugal persons are less materialistic, are less subject to interpersonal influence, less compulsive in buying, less status conscious, less involved with brands than other consumers, but more price and value conscious (Lastovicka et al., 1999), repair or re-use items (Albinsson et al., 2010) and are more independent from the opinions of others in their consumer decision making (Goldsmith et al., 2014). Frugal persons are distinct from “tight-wads” in that they enjoy saving money rather than hate spending it (Rick et al., 2008). Although Tatzel (2002) argues that, some tightwads are also materialistic bargain seekers who enjoy price shopping.

Several manifestations of frugal behavior are the product of both external and internal motivations. People may behave in a similar way, but for different reasons.

Some are more or less externally compelled or persuaded to do so, others do so willingly. Ultimately, however, some people who are compelled to live in a frugal manner may learn to prefer the frugal lifestyle and continue frugal behavior after the external compunction is gone (Hodson et al., 2012). Moreover, the ingrained personality characteristic intrinsically motivates frugal behavior, such as voluntary simplicity (Shaw & Moraes, 2009), green consumption (Pinto, Nique, Añaña & Herter, 2011), and socially conscious consumption (Pepper et al., 2009). Moreover, others characteristics of consumers such as market mavenism, shopping antipathy and age were found to be positively associated with frugality as well (Bove et al., 2009).

2.3.5 The Influences and Impacts of Frugality

The paucity of research on modern frugality due to the conventional stereotype off frugality as penny-pinching, cheap-ness, stinginess, a loss of generosity rather than moderation, thrift, cost-effectiveness and satisfaction with material sufficiency (Nash, 1995). It is also perceived as an undesirable characteristic as it goes against society's values relating to power, stimulation and hedonism (Todd & Lawson, 2003), the desire to acquire and possess.

Nowadays, the world has urgent need of reducing the existing global inequalities of access to food (Burridge, 2012). To create a sustainable world for future generations it is necessary to encourage more modest consumption practices as each purchase has ethical, resource and waste implications (McDonald, Oates, Young & Hwang, 2006). All types of retailers can benefit from an improved understanding of the drivers of frugal shopping behaviors. This is because frugal shoppers are likely to represent a larger and growing market segment given the bleak economic climate and ageing population (Bove et al., 2009).

Over-consumption can often give rise to acute feelings of distress, frustration, uneasiness and/or malaise. Adopting the moral value of frugality to guide consumption behavior may not only help to slow down economic and ecological damage, but some believe it may assist in the meeting of the human higher-order need of authenticity (Zavestoski, 2002).

Frugality is a dimension of social behavior because frugal buying and prudent money management can reflect social standing and social image. Thus, individuals may be embarrassed or proud of their frugal behavior depending on how it is judged

by significant others. Making frugality a desirable characteristic would go a long way toward sustainable consumption (Goldsmith et al., 2014).

2.3.6 Measurement of Frugality

The frugality scale is an eight-item single-factor (unidimensional) scale, which developed by Lastovicka et al. (1999). All items are scored on 6-point definitely disagree to definitely agree scales. Item scores are summed to form an overall frugality score ranging from 8 to 48 (Bearden et al., 1999). Through six studies and seven samples, they provided strong evidence for the scale's discriminant, convergent, and nomological validity and for its reliability. The frugality scale has been widely used in others authors' studies, not only to test the frugality scale itself (e.g. Todd & Lawson, 2003; Argandoña, 2010; Burridge, 2012) and also the antecedent determinant behaviors, values and consequence behaviors of frugality (e.g. Shoham et al., 2004; Bardhi et al., 2005; Pepper et al., 2009; Bove et al., 2009; Goldsmith et al., 2014).

2.4 Cultural Relativity

What is culture? Here we have the Hofstede (1991, p. 5)'s operating definition: "The collective programming of the mind that distinguishes one group or category of people from another."

The "category of people" can be a nation, region, or ethnic group (national culture), women versus men (gender culture), old versus young (age group and generation culture), a social class, a profession or occupation (occupational culture), a type of business, a work organization or part of it (organizational culture), or even a family (Hofstede, 1994). This stress that, culture is a) a collective, not individual, attribute; b) not directly visible but manifested in behaviors; and c) common to some but not all people (Hofstede, 1984; Hofstede, 1993; Hofstede, 1998; Hofstede and McCrae, 2004).

Culture is reflected in the meanings people attach to various aspects of life; their way of looking at the world and their role in it; in their values, that is, in what they consider as "good" and as "evil"; in their collective beliefs, what they consider as "true" and as "false"; in their artistic expressions, what they consider as "beautiful"

and as "ugly". Culture, although basically resident in people's minds, becomes crystallized in the institutions and tangible products of a society, which reinforce the mental programs in their turn (Hofstede, 1984). It is not a characteristic of individuals; it encompasses a number of people who were conditioned by the same education and life experience. It refers to the collective mental programming that these people have in common; the programming that is different from that of other groups, tribes, regions, minorities or majorities, or nations (Hofstede, 1980).

Culture is a construct that means it is "not directly accessible to observation but inferable from verbal statements and other behaviors and useful in predicting still other observable and measurable verbal and nonverbal behavior." It should not be reified; it is an auxiliary concept that should be used as long it proves useful but bypassed where we can predict behaviors without it (Hofstede, 1993).

2.4.1 National Culture

According to the proposition of Hofstede (1983), the national and regional differences become one of the most crucial problems for management-in particular for the management of multinational, multicultural organizations, whether public or private and so do the people’s work-related values among different countries. Specifically, Hofstede described national cultures consisting in 5 different dimensions and are largely independent of each other: a) Individualism /Collectivism; b) Large or Small Power Distance; c) Strong or Weak Uncertainty Avoidance; and d) Masculinity versus Femininity and e) long-term orientation.

2.4.1.1 Five dimensions of national culture

Hofstede’s study of national culture differences used a database collected by a multinational corporation (IBM) in its subsidiaries in 71 countries, containing the scores on a series of employee attitude surveys held between 1967 and 1973, a total of around 117,000 questionnaires. Those respondents working for the same multinational, but in different countries, represent very well-matched samples from the populations of their countries, similar in all respects except nationality. Moreover, there are other two research projects among students in 10 and 23 countries.

Altogether five dimensions of national culture differences were identified (Hofstede, Neuijen & Ohayv, 1990; Hofstede, 1993; Hofstede & McCrae, 2004; Hofstede, 1994).

2.4.1.1.1 Individualism versus collectivism

This dimension refers to the degree to which individuals are integrated into groups.

In the individualist societies, the ties between individuals are very loose. Everybody is supposed to look after his or her own self-interest and maybe the interest of his or her immediate family. This is made possible by a large amount of freedom that such a society leaves individuals. For example, a child learns very early to think of itself as "I" instead of as part of "we". It expects one day to have to stand on its own feet and not to get protection from its group anymore; and therefore it also does not feel a need for strong loyalty. On the other hand, collectivist societies, the ties between individuals are very tight. People are born into collectivities or in-groups which may be their extended family (including grandparents, uncles, aunts, and so on), their tribe, or their village. Everybody is supposed to look after the interest of his or her in-group and to have no other opinions and beliefs than the opinions and beliefs in their in-group. In exchange, the in-group will protect them when they are in trouble (Hofstede, 1983; Hofstede et al., 1990; Hofstede, 1993; Hofstede, 1994; Hofstede, 1998; Hofstede & McCrae, 2004).

For example, a child learns to respect the group to which it belongs, usually the family, and to differentiate between in-group members and out-group members (that is, all other people). When children grow up they remain members of their group, and they expect the group to protect them when they are in trouble. In return, they have to remain loyal to their group throughout life (Hofstede, 1994; Hofstede, 1998).

Table 1 lists some of the difference between collectivist and individualist cultures. Most real cultures will be somewhere in between these extremes. Particularism is a way of thinking in which the standards for the way a person should be treated depend on the group or category to which this person belongs. Universalism is a way of thinking in which the standard for the way a person should be treated are the same for everybody (Hofstede, 1994).

Table 3. *Differences according to Collectivism/Individualism*

	Collectivist societies	Individualist societies
In the family	Education towards "we" consciousness	Education towards "I" consciousness
	Opinions pre-determined by group	Private opinion expected
	Obligations to family or in-group: harmony, respect, shame etc.	Obligations to self: self-interest, self-actualization, guilt
At school	learning is for the young only	Permanent education
	Learn how to do	Learn how to learn
At the work place	Value standards differ for in-group and out-group: particularism	Same value standards apply to all: universalism
	Other people are seen as members of their group	Other people seen as potential resources
	Relationship prevails over task	Task prevails over relationship
	Moral model of employer-employee relationship	Calculative model of employer-employee relationship

Source: Hofstede (1994)

2.4.1.1.2 Large/small power distance

Power Distance is related to the degree of centralization of authority and the degree of autocratic leadership in organizations, or, the extent to which the less powerful members of organizations and institutions (such as the family) accept and expect that power is distributed unequally (Hofstede et al., 1990).

This relationship shows that centralization and autocratic leadership are rooted in the "mental programming" of the members of a society, not only of those in power but also of those at the bottom of the power hierarchy. Societies in which power tends to be distributed unequally can remain so because this situation satisfies the psychological need for dependence of the people without power (Hofstede 1983). In turn, a society's power distance level is bred in its families through the extent to which its children are socialized toward obedience or toward initiative (Hofstede et al., 1990; Hofstede, 1994; Hofstede, 1998; Hofstede & McCrae, 2004).

Table 2 lists some of the differences in the family, the school, and the work situation between small and large power distance cultures (Hofstede, 1994).

Table 4. *Differences according to Power Distance*

	Small power distance societies	Large power distance Societies
In the family	Children encouraged to have a will of their own	Children educated towards obedience to parents
	Parents treated as equals	Parents treats as superiors
At school	Student-centered education(initiative)	Teacher-centered education(order)
	Learning represents impersonal “truth”	Learning represents personal “wisdom” from teacher (guru)
At the work place	Hierarchy means an inequality of roles, established for convenience	Hierarchy means existential inequality
	Subordinates expect to be consulted	Subordinates expect to be told what to do
	Ideal boss is resourceful democrat	Ideal boss is benevolent autocrat (good father)

Source: Hofstade (1994)

2.4.1.1.3 Strong/weak uncertainty avoidance

This dimension deals with a society’s tolerance for ambiguity. It indicates to what extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations. Unstructured situations are novel, unknown, surprising, and different than usual. (Hofstede & McCrae, 2004)

Some societies socialize their members into accepting this uncertainty about future and not becoming upset by it. People in such societies will tend to accept each day as it comes. They will take risks rather easily. They will be relatively tolerant of behavior and opinions different from their own because they do not feel threatened by them. Such societies can be called "weak Uncertainty Avoidance" societies. They are societies in which people have a natural tendency to feel relatively secure. On the other hand, some societies have a higher level of anxiety in people, which becomes manifest in greater nervousness, emotionality, and aggressiveness, and they search for absolute truth, such societies, called "strong Uncertainty Avoidance" societies (Hofstede, 1983; Hofstede et al., 1990; Hofstede, 1994; Hofstede, 1998). In countries where uncertainty avoidance is strong a feeling prevails of "what is different is dangerous." In weak uncertainty avoidance societies, the feeling would rather be "what is different is curious" (Hofstede, 1993).

Table 3 lists some of the differences in the family, the school, and the workplace, between weak and strong uncertainty avoidance cultures.

Table 5. *Differences according to Uncertainty Avoidance*

	Small power distance societies	Large power distance Societies
In the family	What is different, is ridiculous or curious	What is different, is dangerous
	Ease, indolence, low stress	Higher anxiety and stress
	Aggression and emotions not shown	Showing of aggression and emotions accepted
At school	Students comfortable with: - Unstructured learning situations - Vague objectives - Broad assignments - No time tables	Students comfortable with: - Structured learning situations - Precise objectives - Detailed assignments - Strict time table
	Teachers may say “I don’t know”	Teacher should have all the answers
At the work place	Dislike of rules – written or unwritten	Emotional need for rules – written or unwritten
	Less formalization and standardization	More formalization and standardized

Source: Hofstede (1994)

2.4.1.1.4 Masculinity versus femininity

This dimension refers to the distribution of emotional roles between genders, another fundamental problem for any society to which a range of solutions are found (Hofstede et al., 1990).

In masculine society with a maximized social gender role division, the distribution is always such that men take the more assertive and dominant roles and women the more service-oriented and caring roles, it values permeate the whole society even the way of thinking of the women. These values include the importance of showing off, of performing, of achieving something visible, of making money, of "big is beautiful. “On the other hand, the feminine society indicates those with a relatively small social gender role division. Specifically, the dominant values - for both men and women - are those more traditionally associated with the feminine role: not showing off, putting relationships with people before money, minding the quality of life and the preservation of the environment, helping others, in particular the weak, and "small is beautiful." Women's roles differ from men's roles in all countries; but in

tough societies, the differences are larger than in tender ones (Hofstede, 1983; Hofstede, 1993; Hofstede, 1994; Hofstede, 1998).

Table 4 lists some of the differences in the family, the school, and the work place, between the most feminine versus the most masculine cultures, in analogy to Table 1 and 2. However, the women in feminine countries have the same modest, caring values as the men; in masculine countries, they are somewhat assertive and competitive, but not as much as the men, so that these countries show a gap between men's values and women's values (Hofstede & McCrae, 2004).

Table 6. Differences according to Femininity/Masculinity

	Feminine societies	Masculine societies
In the family	Stress on relationship	Stress on achievement
	Solidarity	Competition
	Resolution of conflicts by compromise and negotiation	Resolution of conflicts by fighting them out
At school	Average student is norm	Best students are norm
	System rewards students' social adaptation	System rewards students' academic performance
	Student's failure at school is relatively minor accident	Student's failure at school is disaster – may lead to suicide
At the work place	Assertiveness ridiculed	Assertiveness appreciated
	Undersell yourself	Oversell yourself
	Stress on life quality	Stress on careers
	Intuition	Decisiveness

Source: Hofstede (1994)

2.4.1.1.5 Long-term versus short-term orientation

Futurologist Herman Kahn has labeled the cultures of the East Asian countries "neo Confucian"— that is, rooted in the teachings of Confucius. In turn, four key principles of Confucian teaching are presented: a) the stability of society is based on unequal relationships between people; b) the family is the prototype of all social organizations; c) virtuous behavior toward others consists of treating others as one would like to be treated oneself; d) Virtue with regard to one's tasks in life consists of trying to acquire skills and education, working hard, not spending more than necessary, being patient, and persevering (Hofstede & Bond, 1988).

With the influence of Confucian, Hofstede (1993), Hofstede and McCrae, (2004) developed a fifth dimension that called Long-term versus Short-term Orientation. This dimension was added to the four in 1980s, which based on a study that applied among 100 students in each of 23 countries around the world, using a questionnaire called “Chinese Value Survey (CVS)” designed by Chinese scholars. Generally, twenty countries were covered both in the IBM and CVS studies. It provides a cultural explanation for the economic success of East Asian countries in the past quarter century. (Hofstede, 1994; Hofstede et al., 1990)

This dimension can be said to deal with Virtue regardless of Truth. On the long-term side one finds values oriented towards the future, like thrift (saving) and persistence. On the short-term side one finds values rather oriented towards the past and present, like respect for tradition, fulfilling social obligations, and protecting one’s “face.” However, scores on the fifth dimension are only available for part of the countries covered by the first four (Hofstede & McCrae, 2004). In turn, it was originally called “Confucian dynamism” by Michael Bond, a Canadian collogue of Hofstede, because the values related to both on the positive and on the negative side, reminded him of the teachings of Confucius. However, the dimension also applies to countries without a Confucian heritage (Hofstede, 1994; Hofstede, 1994; Hofstede, 1998).

There has been insufficient research as yet on the implications of differences along this dimension to allow the composition of a Table of differences in the family, the school and the work place similar to those for the other four dimensions (Table1-4) (Hofstede, 1994).

2.4.2 Organizational Culture

The use of the term “culture” in the management literature is not limited to the national level. However, organizational cultures are a phenomenon of a different order from national cultures. Moreover, the organizational culture differences found resided mainly at the level of practices as perceived by members (Hofstede et al., 1990). Notably, organizational cultures are composed of practices rather than values, they are somewhat manageable. Generally, the values of employees cannot be changed by an employer, but can be changed through practice (Hofstede 1994).

Hofstede et al. (1990) demonstrated the dimensions of the organizational/corporate culture construct: they are a) holistic, b) historically determined, c) related to anthropological concepts, d) socially constructed, e) soft, and f) difficult to change. These characteristics have been recognized in the literature in the previous decades, and integrated in one construct.

2.4.3 Occupational Culture

In Figure 5, Hofstede et al. (1990) placed an occupational culture level halfway between nation and organization, suggesting that entering an occupational field means the acquisition of both values and practices; the place of socialization is the school or university, and the time is between childhood and entering work. As a result of his study, Occupation level was associated equally strongly with values as with practices. Moreover, we can observe that national cultures and organizational cultures are phenomena of different orders: using the term "cultures" for both is, in fact, somewhat misleading.

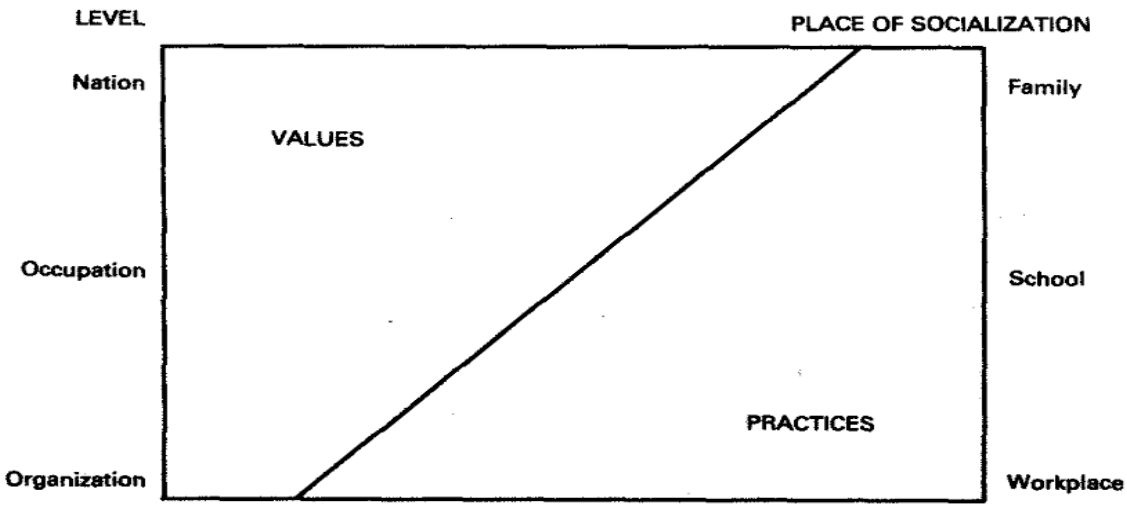


Figure 5. *Cultural differences: National, Occupational, and Organizational levels*
Source: Hofstede, Neuijen and Ohayy (1990)

3 CONCEPTUAL FRAMEWORKS

In this chapter, a conceptual model of this study is demonstrated in Figure 6. As described below, opinion leadership (King & Summers, 1970), novelty seeking (Goldsmith & Flynn, 1992), product involvement (Zaichkowsky, 1994; Jain & Srinivasan, 1990) and symbolic value (Bhat & Reddy, 1998) were chosen from literature review as antecedent behaviors of DSI. Materialism (e.g. Pepper et al., 2009; Bove et al., 2009; Lastovicka et al., 1999; Goldsmith et al., 2014; Todd & Lawson, 2003; Shoham et al., 2004), consumer independence (Lastovicka et al., 1999; Todd & Lawson, 2003) and intrinsic religiosity (Bove et al., 2009; Lastovicka et al., 1999) were selected from literature review as antecedent behaviors of consumer frugal behavior. Status consumption (Goldsmith et al., 2014; Clark, 2006) and economic strain (Hilton & Devall, 1997) were selected as moderators of consumer frugal behavior. Three dimensions of Hofstede's cultural relativity (collectivism, uncertainty avoidance and power distance) and hedonic value (Babin, Darden & Griffin, 1994) moderate the interactions between consumer DSI, frugal behavior and behavioral intention.

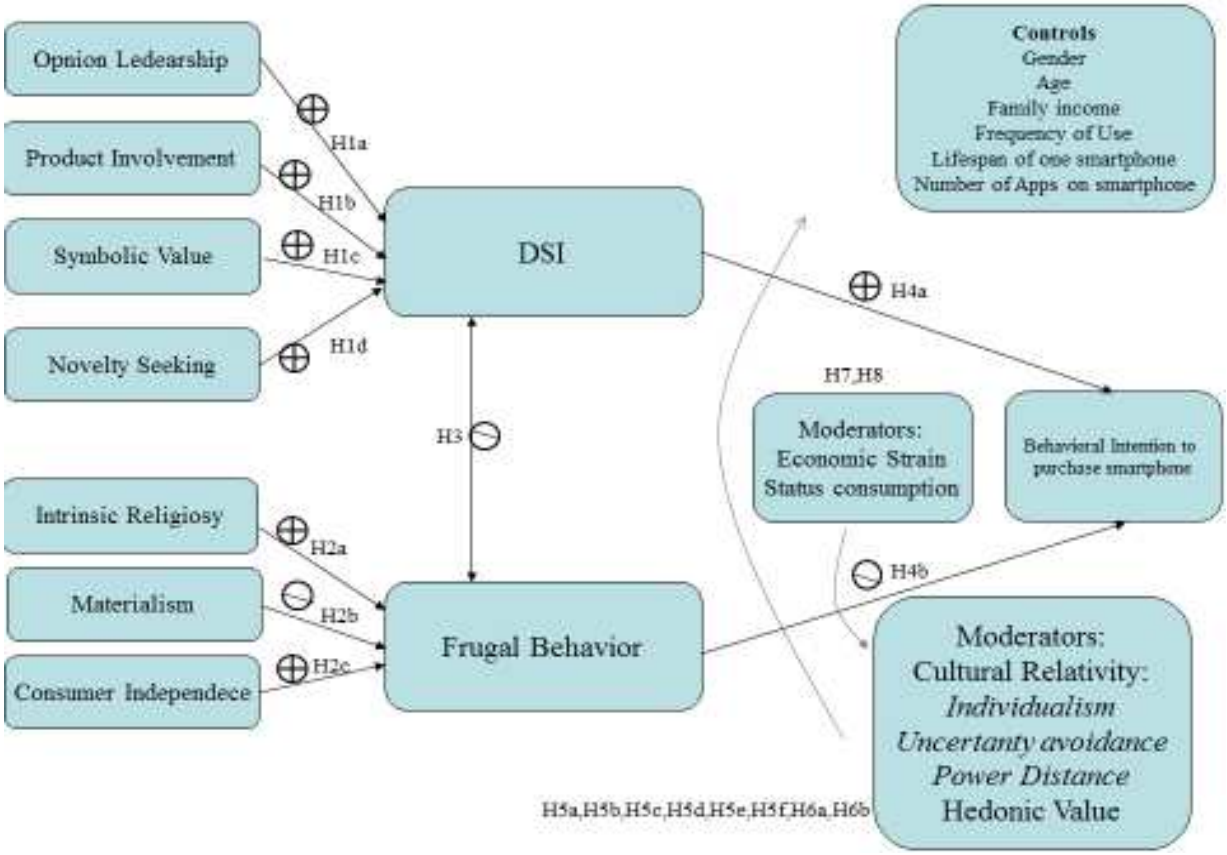


Figure 6. *Conceptual framework*

Source: Elaborated by the author

3.1 Antecedent Behaviors

3.1.1 Antecedent Behaviors of DSI

According to Hoffman and Soyez (2010), DSI predicts actualized innovative consuming behavior better than innovativeness measured on a higher or a lower level of generality. Moreover, he also suggested distinguishing between cognitive and affective antecedents of innovativeness. Presumably, the relative influence of these two groups of antecedents on domain-specific innovativeness depends on characteristics of the product category. This assumption is based on the statement of Batra and Ahtola (1991) that consumers purchase products because of the following two reasons: a) Consumers buy functional products to achieve a utilitarian benefit. Functional products are supposed to solve a special task (e.g., efficient and quick orientation via a navigation system). Therefore, they assume that cognitive constructs (e.g., need for cognition) predict innovativeness for functional products best. b) In contrary, consumers purchase lifestyle and symbolical innovations because of hedonic gratifications. For that reason, affective antecedents (e.g., enjoyment, symbolic value and product involvement) are most adequate to explain domain-specific innovativeness of symbolical product categories. However, antecedents conceptualized on the same level of abstraction are most adequate to explain the degree of domain-specific innovativeness (Hoffman & Soyez, 2010).

As stated above, this study claims to analyze the cognitive and affective way of influence on DSI because the smartphone can be viewed as a product both possess symbolic and functional value. Cognitive antecedents (e.g. novelty seeking, domain-specific opinion leadership) are supposed to predict domain-specific innovativeness for functional innovations best because these high technology products such as smartphone are mainly bought for consumer’s functional benefit. On the other hand, affective antecedents (e.g. symbolic value and product involvement) can’t be ignored because exist some smartphone brands (e.g. Apple etc.) also satisfy symbolical innovations. Thus, we choose two of cognitive correlates (novelty seeking and domain-specific opinion leadership) and two of affective correlates (symbolic value and product involvement) as behavioral antecedents of DSI in specific product category: smartphone.

3.1.1.1 Opinion leadership

As originally conceptualized, opinion leadership reflects the extent to which individuals give information about a topic and the extent to which information is sought by others from those individuals (King & Summers, 1970). Opinion leaders are individuals who strongly influence the attitudes, opinions, and behaviors of other consumers via interpersonal communication (Hoffmann & Soyez, 2010).

The construct of opinion leadership is commonly seen as domain-specific (Flynn et al., 1996). Although the overlap between opinion leadership and innovativeness is well-established, whether they share a causal relationship has been a source of controversy in social science for almost 40 years (e.g., Robertson & Myers, 1969), there are three factors may influence the level of opinion leadership: special interest media usage, frequency of use and the specific need for cognition (Hoffmann & Soyez, 2010). Moreover, opinion leadership is thought to be a critical determinant of word-of-mouth communication and interpersonal influences affecting the diffusion of new products, concepts and services (Bearden et al., 1999). Therefore, we hypothesize that the opinion leadership behavior has positive relation with innovativeness behavior.

H_{1a}: Consumer's domain specific opinion is positively associated with DSI.

3.1.1.2 Product involvement

Consumer involvement can be defined as an 'unobservable state reflecting the amount of interest, arousal, or emotional attachment a consumer has with a product' (Rothschild, 1984; Bloch, 1986). Consumer involvement can also be expressed as the personal relationship an individual has with a product or situation and is determined by both internal factors, such as values and attitudes, and external factors, such as environments or advertising (Guthrie & Kim, 2009).

Involvement can be classified into three types: situational, enduring and response. Situational involvement describes temporary arousal and interest induced by current environmental factors; enduring involvement corresponds to a long-term arousal and interest about a product; and response involvement corresponds to the consumer's relevant feelings that result from the product and situation (Guthrie &

Kim, 2009). In this study, smartphone involvement is considered as enduring involvement. Other studies (e.g., Goldsmith et al., 1998; Sun, Youn, Wu, & Kuntaraporn, 2006) have presented that the product involvement have positive strong correlation with DSI. Thus, we hypothesize:

H_{1b}: Product involvement is positively associated with DSI.

3.1.1.3 Symbolic value

Consumers purchase some products for their tangible and utilitarian benefits, but they also consume products that satisfy their emotional wants. For example, such as multisensory imagery, fantasy, fun and emotions associated with the consumption of products, which based on individual tastes and intangible product benefits, as hedonic consumption (Hirschman & Holbrook, 1982). In this perspective, individuals use personal or subjective criteria such as taste, pride, desire for adventure, and self-expression in their consumption decisions (Schffman & Kanuk, 1994).

As mentioned earlier, smartphone is a type of high technology product which are not just utilitarian/functional benefits but also possess perceived hedonic benefits/symbolic value to their consumer, thus, we hypothesize:

H_{1c}: Symbolic value that consumer perceived from smartphone is positively associated with DSI.

3.1.1.4 Novelty seeking

According to Hirschman's (1980) conceptual framework, actualized novelty seeking is one of the most important antecedents of innovativeness. This construct describes the consumer's actual behavior to acquire novel stimuli. Hirschman (1980) suggests measuring actualized novelty seeking by the usage of media (i.e., newspapers and magazines). Goldsmith and Flynn (1992) show that individuals who use mass media more often and search actively for information are more likely to be innovators. And it also associated with other consumer behaviors such as specific need for cognition and product use frequency (Hoffmann & Soyez, 2010). Thus, we

expect that the higher consumers with favorable in acquire novel products, the higher will be his or her DSI.

H_{1d}: Novelty seeking is positively associated with DSI.

3.1.2 Antecedents Behaviors of Frugal Behavior

In this chapter, Materialism (e.g. Pepper et al., 2009; Bove et al., 2009; Lastovicka et al., 1999; Goldsmith et al., 2014; Todd & Lawson, 2003; Shoham et al., 2004), consumer independence (Lastovicka et al., 1999; Todd & Lawson, 2003) and intrinsic religiosity (Bove et al., 2009; Lastovicka et al., 1999) were chosen from literature review as antecedent behaviors of consumer frugal behavior.

3.1.2.1 Intrinsic religiosity

Religiosity is defined as the extent of personal religious affiliation or spiritual commitment (Johnson, Jang, Larson & Li, 2001). Frugality has been a prominent moral norm and practice in world religions (Durning, 1992). Major religions discourage excess acquisition and encourage the ethic of restraint (Lastovicka et al., 1999). The more intrinsically religious would be expected to be more frugal than those who are less religious. This is because religion, similar to values, is concerned with the evaluation and justification of choices and actions (Roccas et al., 2002).

Moreover, according to the profile of frugal consumer proposed by Todd & Lawson (2003), frugality has been associated with various religions over many years, it has been a central concept in the religious traditions of American Indians, Buddhists, Christians, Jews, Taoists, and Hindus (Durning, 1992). It is thus perhaps not surprising to note that frugality is positively associated with church membership. In short, all major religions have normatively encouraged and embraced materialistic restraint (Shoham et al., 2004). Furthermore, religious protestants possess a greater concern about prices and purchasing items when on sale which is consistent with frugal shopping behavior. (Bove et al., 2009)

In contrast, there is also no significant relationship was found in intrinsic religiosity and frugal behavior according to the study of Bove et al. (2009). A reasonable explanation showed that religion is perpetuated through a structural

cultural system identifiable with collectivism, but consumers' decision-making in consumption motivated by personal (self-fulfillment) rather than group interests (Lindridge, 2005). However, from prior studies and common sense, consumers with religion may have more frugal behavior than those without religion.

H_{2a}: Intrinsic religiosity is positively associated with frugal behavior.

3.1.2.2 Materialism

Materialism holds materialist values, with values that relate to an individual's own behavior and goals (Mueller & Wornhoff, 1990). The popular image of a materialist is someone who surrounds him or herself with goods as substitutes for deeper interpersonal relationships, and frugal consumers, in the contrast, are not necessarily looking to spend less in order to build better relationships (Goldsmith et al., 2014).

Materialistic tendencies the results are consistent only for age. Social status and economic status are related to materialism (Goldsmith et al., 2014). Certain consumers feel goods will provide happiness and help them feel successful (Richins & Dawson, 1992). Materialistic traits have been found to be linked to psychologically base individual differences such as unhappiness and dissatisfaction with life (Millar & Thomas, 2009) and also with many consumer traits such as motivation to shop and positive attitudes towards advertising (Goldsmith et al., 2011).

Frugal consumer behavior relates primarily to low personal materialism and income constraints (Pepper et al., 2009). The motivations of the frugal individual to be economical, utilitarian, and careful with money, seem to be the opposite of those characterizing materialistic (Goldsmith et al., 2014). Moreover, according to Shoham et al. (2004), frugality is a mirror conceptual image of materialism. Materialism commonly refers to the degree to which consumers see goods and money as drivers of happiness and signals of social. Therefore, we can assume that money spent represents less frugal consumption; materialism and frugality appear to be conceptual opposites. In turn, we expect that materialism will be opposed to frugality.

H_{2b}: Materialism is negatively associated with frugal behavior.

3.1.2.3 Consumer independence

One of the most powerful influences on human behavior is social influence (Aronson, 2003). Consumers can succumb to social influence by conforming to the norms; they can rebel against the perceived normative pressure to express their uniqueness (Tian et al., 2001); or they can merely disregard social influence upon their behavior. An independent consumer is likely indifferent to existing social norms with regard to consumption and less likely to see social benefits associated with paying for a higher priced product owing to his or her lack of concern with the opinion of others (Goldsmith et al., 2014).

Lastovicka et al. (1999) show that frugality is negatively related to susceptibility to interpersonal influence; and, Todd and Lawson (2003) suggested that frugal consumers value "conformity" less than the non-frugal do. At these circumstances, we expect that consumers who have with a lack of concern for the opinions of others may have more frugal behavior than those whose consumption decisions depends on others' opinions.

H_{2c}: Consumer independence is positively associated with frugal behavior.

3.2 The Association Between DSI and Frugal Behavior

According to Feick and Price (1987), market mavens are "highly social individuals who have information about all types of products and places to shop", Lastovicka et al. (1999) found that market mavens to be positively associated with frugal behavior, and it was confirmed in empirical study of Bove et al. (2009). While many characteristics of market mavens (greater opinion leadership, more time spent with media) closely parallel those of innovators and opinion leaders (Rogers, 1995). Specifically, Goldsmith, Flynn and Goldsimth (2003) did a survey to compare the relations between the Consumer Innovativeness and Market Mavens, and conclude the consumer innovativeness and market maven scales are positively correlated because they describe similar construct. Then they proposed that these are two related but distinct construct. Moreover, they also suggested that consumer innovativeness did a better job than the Market Mavens of predicting time and money spent shopping. No surprise, Ruvio and Shoham (2007) developed Market

Mavenship and Opinion Leadership Nomological Models that successfully test his hypothesis: Consumer innovativeness is positively associated with market mavenship which through an empirical study in Israel. Moreover, according to Clark and Goldsmith (2005), the characteristics of market mavens include need for uniqueness expressed through their product and brand choices. All of them supporting that market mavens are fundamentally lead to opinion leadership and maybe it is a positive antecedent factor to consumer innovativeness, too.

On the other hand, market mavens as a consumer trait can positively influenced the frugal behavior of consumers (Bove et al., 2009).Thus, we may can predict the relation between frugal behavior and consumer Innovativeness. Since market mavens are fundamentally lead to opinion leaders, and It is also a positive antecedent factor of DSI (Clark & Goldsmith 2005). We can predict that there may exist a positive relation between consumer innovativeness and frugal behavior. Moreover, Todd and Lawson (2003) found that frugal consumers shop a lot for specials, but at the same time they are loyal to particular brands and shops. This phenomenon is corresponding to some innovative traits of consumers, which indicating they also have their own certain choices of brands or areas when purchase some innovative products.

However, the association between frugality and adoption of innovation seems logical to presume that consumers with more frugal behavior would be later adopters or laggards and less concerned about updating and revising ownership of products (Todd & Lawson, 2003). In turn, frugal consumers may be later adopters than others, which means they are negative associated with DSI consumers. On the other hand, frugal consumers' perceived value may loyal to some brands and don't hesitate to adapt it, which somehow indicating they positive associated with DSI consumers. Thus, it is hypothesized:

H_3: Frugal behavior is associated with DSI in smartphone purchase.

3.3 Economical and Technical Conditions to Behavioral Intention

3.3.1 Technological Condition

According to Crespo and Del Bosque (2008), the attitude of a person is a predisposition towards a conduct and can be understood with a favorable or unfavorable evaluation that the person does. The DSI can be considered an antecedent of consumer attitude, because it precedes and produces behavioral intentions. As Davis's TAM (Technology Acceptance Model) showed, the purchase attitude can result in consumer behavioral intention directly.

On the other hand, DSI as an antecedent factor directly lead to the intention to purchase (Ajzen, 1991). Purchase intention can be determined as a predisposition to execute a particular behavior (Zhang & Kim, 2013; Gao et al., 2013). Consumers likely to have specific domain of certain products or services will tend to have an intention to purchase larger than others do not have (Gao et al., 2013). Therefore, we suggested consumer's behavioral intention to purchase smartphone as a consequence and addressed DSI as technological antecedents of consumer's intention:

H_{4a}: DSI is positively associated with behavioral intention to purchase smartphone.

3.3.2 Economical Condition

Frugal consumers are less likely to own/be interested in owning Video players, second TV sets, mobile phones, internet connections and DVD players (Todd & Lawson, 2003). Frugal consumers' perceived value to the high technology products are inferior, whether due to strictly economic condition as external factor or their frugality lifestyle.

Lastovicka et al. (1999) argued that the nomological validity of frugality would be demonstrated if it would be a significant predictor of restrained consumption behavior. The results of their third study substantiate this expectation. Specifically, frugality was a significant predictor of an index of restrained consumption behaviors, which included eating leftovers, packing lunch for work, etc. (Shoham et al., 2004). In the study of Shoham et al. (2004), if consumers are frugal, they will be motivated to

adapt their behavioral tendencies accordingly. This will result in frugal consumers behaving in more restrained (and more frequently restrained) consumption behavior compared to other consumers. Self-perception theory provides a second explanation for the impact of dissonance (Bem, 1972). Therefore, individuals use their restrained behavioral patterns to infer their frugality attitudes.

In summary, frugal consumers seem more restrained to purchase high-technology products such as smartphone, they may have conservative attitudes toward new and expensive products. It is unusual if a frugal consumer adapted a new emergent smartphone quicker than others. Therefore, we suggested frugal behavior as an economical condition that resulted in consumer intention to purchase smartphone.

H_{4b}: Frugal behavior is negatively associated with behavioral intention to purchase smartphone.

3.4 Moderators

In this chapter, three dimensions of Hofstede's cultural relativity (collectivism, uncertainty avoidance and power distance), hedonic value, status consumption and economic strain as moderators will be presented.

3.4.1 Cultural Relativity Difference

Consumers are members of a particular national culture, which affects their attitudes and behavior (Triandis, 1989). Consumers in some countries may be, on average, bigger in behavioral intention to purchase high technology products than consumers in other countries due to systematic differences in the national environment. A country's culture long has been identified as key environmental characteristic underlying systematic differences in consumer behavior (Lynn, Zinkban & Harris, 1993). A nation's culture affects the needs consumers satisfy through the acquisition and use of goods (Roth, 1995). In turn, prior researches have demonstrated that the national cultural dimensions proposed by Hofstede (1980) have relevant influence when we consider the context of the social consumer behavior, including the consumer's behavioral intention to purchase.

Culture can be conceptualized at different levels, including the national level (Dawar & Parker, 1994). According to Hofstede, the theories of motivation (what makes people act) and the practices of motivating people can both be related to the Individualism-Collectivism, Uncertainty Avoidance and power distance dimensions (Hofstede, 1983). Moreover, Hofstede (1980) and Hofstede (1991) also identify these three dimensions of cultural relativity value that can be related to consumer behavior. In this study, we work with these three cultural dimensions because they should have more effect on consumer purchase behavior, influencing the way an individual interact with purchase intention (Hofstede, 1980; Hofstede, 1991).

Based on the literature review, collectivism pertains to the degree to which people in a country prefer to as members of group societies rather than act as individuals (Steenkamp et al.,1999). Several authors have emphasized that both consumer innovativeness and frugal behavior involve a tendency to initiate new behaviors, independently of others. Such predispositions should be valued positively in individualistic societies but valued negatively in collectivistic.

$H5_a$: Cultural relativity value collectivism moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of DSI on behavioral intention to purchase smartphone will be weaker when collectivism value is higher.

$H5_b$: Cultural relativity value collectivism moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of frugal behavior on behavioral intention to purchase smartphone will be weaker when collectivism value is higher.

Cultural relatively value uncertainty avoidance measures the degree to which societies tend to feel threatened by uncertain, risky, ambiguous, or undefined situations and the extent to which they try to avoid such situations by adopting strict codes of behavior societies (Steenkamp et al., 1999). In country where uncertainty avoidance is high, consumer is more resistant to change or take risk to purchase something new, include some high technology products but continue to use products they already familiar with less cost. Therefore, countries with high levels of uncertainty avoidance seem to provide a cultural environment that is less conducive to innovativeness behavior but more conducive to frugal behavior than countries

characterized by low levels of uncertainty avoidance, thus, we hypothesize the followings:

H5$_c$: Cultural relatively value uncertainty avoidance moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of DSI on behavioral intention to purchase smartphone will be weaker when uncertainty avoidance value is higher.

H5$_d$: Cultural relatively value uncertainty avoidance moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of frugal behavior on behavioral intention to purchase smartphone will be stronger when uncertainty avoidance value is higher.

Cultural relativity value power distance is the extent to which members accept and expect that power is distributed unequally in a given institution (e.g. company, family, association) (Matos & Leis, 2012). In lower power distance cultures, individuals minimize the differences and inequalities, so does the salary and status of individuals, they may found it unnecessary to live with a frugal behavior because there are not too much inequalities in salary and status among them, so they can just purchase something they want without considering too much about status or price when compared with higher power distance culture, and their DSI may also stay lower than those who live in higher power distance cultures. Consequently, two hypotheses are suggested:

H5$_e$: Cultural relatively value power distance moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of DSI on behavioral intention to purchase smartphone will be stronger when power distance value is higher.

H5$_f$: Cultural relatively value power distance moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of frugal behavior on behavioral intention to purchase smartphone will be stronger when power distance value is higher.

3.4.2 Hedonic Value

Some consumers purchase lifestyle and symbolic innovations because of hedonic gratifications (Batra & Ahtola, 1991). Hedonic benefits result “more from fun and playfulness than from task completion” (Babin et al., 1994). Moreover, “novelty” as one of five dimension of hedonic value by Yu and Bastin (2010) indicated that consumers seek novelty, excitement and surprise during the shopping process, which comes from both the product and shopping experience. Thus, one hypothesis was suggested below:

H_{6a}: Hedonic value moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of consumer´s DSI on behavioral intention to purchase smartphone will be stronger when consumer manifest higher hedonic value during the shopping process to purchase smartphone.

Hedonic shopping value reflects shopping’s potential entertainment and emotional worth (Bellenger et al., 1976). Specificity, in the study of Yu and Bastin (2010), they found an apparent shift in some traditional Chinese cultural values such as the belief in an economical, frugal and simple life of Chinese consumerism, which indicated that nowadays most of Chinese consumers seek to satisfy hedonic value during their shopping experience, such as need for fun, novelty, escapism, praise from others and social interaction. Thus, we hypothesize the following:

H_{6b}: Hedonic value moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of consumer´s frugal behavior on behavioral intention to purchase smartphone will be weaker when consumer manifests higher hedonic value during the shopping process to purchase smartphone.

3.4.3 Status Consumption

Status consumption (SC) refers to a specific marketplace (Goldsmith et al., 2014). Status consumers are opinion leaders and are more subject to normative social influence than are other consumers (Clark, 2006). Status seeking individuals

are those who spend in order to acquire status (Goldsmith et al., 2014). SC positively to materialistic tendencies (e.g. Goldsmith & Clark, 2012; Heaney et al., 2005) and negatively to role relaxed consumption, a consumption style emphasizing utilitarian benefits over superficial ones. While highly materialistic individuals are more likely than their less materialistic counterparts to use brands to express their self-concept (Sprott et al., 2009).

Frugality is linked to low levels of the value “social recognition,” a concept related to status seeking. However, frugal consumers are motivated by the pleasure they feel when they refrain from spending and status consumers actively display the fruits of their spending activities. It is possible that frugal consumers wear their frugality as something of a sign of status among other likeminded consumers. Frugal persons seek status but do it in other ways than through conspicuous consumption (Todd & Lawson, 2003). In turn, it is hypothesized as follow:

H_7: Status consumption moderates the effect of consumer’s frugal behavior on behavioral intention in smartphone purchase. The negative effect of consumer’s frugal behavior on behavioral intention to purchase smartphone will be weaker when consumers´ status consumption behavior is higher.

3.4.4 Economic Strain

Pearlin (1989) theorized that undesired life events lead to “strains” or stressors, which diminish self-esteem and mastery and alter psychological, emotional, or psychological responses. Economic strain is largely perceived as an inability to function effectively resulting from some primary stressor such as divorce or loss of employment. Economic strain generally defined as “a perception of inadequacy in one’s financial position, with attendant financial concerns and worries,” is the subject component of economic distress that has received the most attention in the literature (Mills et al., 1992; Hilton & Devall, 1997).

Apparently one consumer’s intention to purchase some specific products will be reduced if these products go beyond capacity of his/her financial position, which resulted in constrained frugal behavior. In turn, a hypothesis was suggested:

H_8: Economic strain moderates the effect of consumer's frugal behavior on behavioral intention in smartphone purchase. The negative effect of consumer's frugal behavior on behavioral intention to purchase smartphone will be stronger when consumer's family economic strain is higher.

3.5 Control Variables

Various studies have shown that innovative behavior depends strongly on how frequently a consumer uses other products in the same class (Gatignon & Robertson, 1985; Taylor, 1977). These findings can be traced back to the fact that heavy users have a more elaborate knowledge structure (Citrin et al., 2000; Hirschman, 1980), and thus understand the complexities of innovations with less cognitive effort. Based on these theories, frequency of smartphone usage is adapted as a control variable along with gender, age, family income, perceived lifespan of one smartphone usage and number of apps on smartphone in this study.

Table 7. *Summary of hypotheses*

No.	***Hypothesis***
H_{1a}	Consumer's domain specific opinion is positively associated with DSI.
H_{1b}	Product involvement is positively associated with DSI.
H_{1c}	Symbolic value that consumer perceived from smartphone is positively associated with DSI.
H_{1d}	Novelty seeking is positively associated with DSI.
H_{2a}	Intrinsic religiosity is positively associated with frugal behavior.
H_{2b}	Materialism is negatively associated with frugal behavior.
H_{2c}	Consumer independence is positively associated with frugal behavior.
H_{3}	Frugal behavior is associated with DSI in smartphone purchase
H_{4a}	DSI is positively associated with behavioral intention to purchase smartphone.
H_{4b}	Frugal behavior is negatively associated with behavioral intention to purchase smartphone.
H_{5a}	Cultural relativity value collectivism moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of DSI on behavioral intention to purchase smartphone will be weaker when collectivism value is higher.
H_{5b}	Cultural relativity value collectivism moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of frugal behavior on behavioral intention to purchase smartphone will be weaker when collectivism value is higher.
H_{5c}	Cultural relatively value uncertainty avoidance moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of DSI on behavioral intention to purchase smartphone will be weaker when uncertainty avoidance value is higher.
H_{5d}	Cultural relatively value uncertainty avoidance moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of frugal behavior on behavioral intention to purchase smartphone will be stronger when uncertainty avoidance value is higher.
H_{5e}	Cultural relatively value power distance moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of DSI on behavioral intention to purchase smartphone will be stronger when power distance value is higher.
H_{5f}	Cultural relatively value power distance moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of frugal behavior on behavioral intention to purchase smartphone will be stronger when power distance value is higher.
H_{6a}	Hedonic value moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of consumer´s DSI on behavioral intention to purchase smartphone will be stronger when consumer manifests higher hedonic value during the shopping process to purchase smartphone.
H_{6b}	Hedonic value moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of consumer´s frugal behavior on behavioral intention to purchase smartphone will be weaker when consumer manifests higher hedonic value during the shopping process to purchase smartphone.
H_{7}	Status consumption moderates the effect of consumer's frugal behavior on behavioral intention in smartphone purchase. The negative effect of consumer's frugal behavior on behavioral intention to purchase smartphone will be weaker when consumers´ status consumption behavior is higher.
H_{8}	Economic strain moderates the effect of consumer's frugal behavior on behavioral intention in smartphone purchase. The negative effect of consumer's frugal behavior on behavioral intention to purchase smartphone will be stronger when consumer's family economic strain is higher.

Source: Elaborated by author

4 METHODOLOGICAL ASPECTS

Based on observations and experimentation, science establishes laws that govern the course of the phenomena (deterministic causal models). The research method helps science to understand the course of the phenomena studied. In a general way, the term "research method" means the choice of systematic procedures for describing and explaining phenomena (Richardson, 1999). To achieve the description and explanation of the phenomenon, this chapter aims to present and clarify the research method of this study. Here will be discussed the study design to be used for data collection and data analysis. It wills also demonstrate thoroughly the outward structure of the field, data collection, population sampling, the way of data collection, collection instruments and adapted data analysis method. To better serve the overall objective of this study, the methods were structured according to the implementation of specific objectives. Therefore, Table 6 lists specific objectives, research types, collection instruments and data analysis techniques.

In summary, the methodological aspects of this study were segmented into four parts: a) initial research design and descriptive; b) sampling; c) data collection instruments; and d) data analysis techniques.

Table 8. *Methodological structure based on the specific objectives implementation*

Specific Objectives	Research Type	Instruments	Data Analysis Techniques
Identify the forming antecedents of consumer's DSI in smartphone purchase intention	Quantitative	Structured questionnaire by scales of Hoffman et al. (2010); Chan and Misra (1990); Venkatraman (1988); King and Summers (1970); Childers (1986); Chan and Misra (1990); King and Summers (1970); Childers (1986); Zaichokowsky (1994); Jain and Srinivsan (1990); Bhat and Reddy (1998); Babin, Darden and Griffin (1994)	Statistic Descriptive Analysis; ANOVA test Structural Equation Modeling
Identify the forming antecedents of consumer's frugal behavior in smartphone purchase intention;	Quantitative	Structured questionnaire by using scales of Bove et al. (2009); Goldsmith et al. (2014); Hilton and Devall (1997) Gorsuch and McPherson (1989); Clark's (2006); Eastman et al. (1999); Richins (1987)	Statistic Descriptive Analysis; ANOVA test Structural Equation Modeling
Evaluate aspects of construct formation of DSI and frugal behavior and the possible relation between them	Quantitative	Structured questionnaire by using scales of Goldsmith et al. (1991) and Lastovicka et al. (1999)	Statistic Descriptive Analysis; ANOVA test Structural Equation Modeling
Analyze the existence of cultural orientation differences through modeling method among the DSI, frugal behavior and behavioral intention in smartphone purchase.	Quantitative	Structured questionnaire by using scales of Davis (1989); Ting et al. (2011); Kim (2008) and Hofstede	Statistic Descriptive Analysis; ANOVA test Structural Equation Modeling

Source: Elaborated by author

4.1 Initial Research Design and Descriptive

The research design refers to planning in its widest dimension, involving both its layout as the forecast analysis and data interpretation (Köche, 2002). Within the initial planning research, it was made the choice for descriptive approach. Descriptive research is one that has as its primary objective the description of the characteristics of a given population or phenomena, establishing relationships between variables (Gil, 1999). Descriptive research is characterized by having well-defined objectives

and formal procedures to be well structured. They are also directed to solve problems or to evaluate alternative courses of action.

Focusing on the description of the phenomenon, it was made the choice for utilize the quantitative approach. Therefore, data were collected with a quantitative method to verify those hypotheses in previews chapters with a statistical approach to analyze. Influenced by positivism, it was considered that reality can only be understood based on the analysis of data, collected with the standardized and neutral instruments. Quantitative approach refers to the mathematical language to describe the causes of a phenomenon, the relationship between variables (Fonseca, 2002).

Focusing on the quantitative approach, the design is done by one of the quantitative method techniques: survey design, which provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. From sample observation, the researcher generalizes or makes claims about the population (Creswell, 2003). The word “survey” is used to describe a method of gathering information from a sample of individuals. Based on the research question and general objective of this study, plus with the structured framework and hypotheses in previous chapters, the survey method seems to be the fittest methodological approach for this study.

4.2 Data Collection Instruments

At this step, quantitative data collection can be achieved through questionnaire, which is the most common quantitative technique in marketing research for primary data collection. It is based on the assumption that all respondents involved must answer predetermined questions. This method is used to obtain information based on the interrogation of participants, where several standardized questions are made to investigate their behavior, intentions, attitudes, perception, motivations and demographic characteristics and lifestyle (Nique & Ladeira, 2013). Therefore, with survey we can develop same standardized questionnaire that may identify and relation the differences and similarities of consumer behaviors from different countries (Brazil, China and India).

To accomplish the objective of this study, a survey instrument was established with 14 multi-item scales based on literature review along with social-demographic

items and other smartphone consumption items. These scales were tested and have high evidence in reliability and validity. In survey design, items in scales were modified and reduced to target the usage of this dissertation. Trap questions were also added inside scales in order to trap individuals who are speeding or cheating as they take the survey. Moreover, each participant was asked to indicate the extent of agreement or disagreement (7-point) with statements. (see Table 7 and Appendix A).

Table 9. *Measures and their source*

Constructs		No. of original items	No. of items in this study	Adapted source
Novelty seeking		3	4	Chan and Misra (1990)
Opinion leadership		7	4	King and Summers (1970); Childers (1986)
Product Involvement		10 & 15	4	Zaichokowsky (1994); Jain and Srinivsan (1990)
Symbolic Value		20	4	Bhat and Reddy (1998)
Economic Strain		12	4	Hilton and Devall (1997)
Intrinsic religiosity		8	4	Gorsuch and McPherson (1989); Bove et al. (2009)
Consumer independence		5	4	Clark's (2006)
Status Consumption		5	4	Eastman et al. (1999)
Materialism		6	4	Richins (1987)
Hedonic Value		20	4	Babin, darden and Griffin (1994)
DSI		6	4	Goldsmith and Hofacker (1991)
Frugal behavior		8	5	Lastovicka et al. (1999)
Behavioral Intention		6	2	Davis (1989); Ting et al. (2011); Kim (2008).
Cultural Relativity	Collectivism	4	4	Hofstede
	Uncertainty Avoidance	4	4	
	Power Distance	4	4	
Trap Questions			5	

Source: Elaborated by author

For the measurement of actualized novelty seeking, Hirschman (1980) suggests measuring actualized novelty seeking by the usage of media (i.e., newspapers, magazines, TV, etc.). 5-point media usage 3 items unidimensional scale was mentioned in the study of Chan and Misra (1990), which subjects specified how often they seek information about automotive interiors in special interest media. However, to serve the purpose of this study, we add a new item (I watch

advertisements for smartphones frequently through Internet) into the media usage scale and adjusted it into 7-point disagree-agree scale (Table 7 and Appendix A).

In order to measure consumer opinion leadership, opinion leadership scale summarized by Childers (1986) was utilized in this study, as a more recent version of the King and Summers (1970)'s original scale. This 5-point scale contains seven items adaptable to different product categories. However, the measure contains a modified set of items, which is each operationalized via 5-place bipolar response formats (Bearden et al., 1999). In this study, 3 items (During the past six months, how many people have you told about smartphone? Compared with your circle of friends, how likely are you to be asked about smartphone? In discussions of smartphone, which of the following happens most often?) from the original scale were removed. We adjusted the answer categories to a 7-point scale as the standard scale of our study. We also reformulate the 4 items' format of sentences (from interrogative to statement) and replace smartphone as product category (Table 7 and Appendix A).

In order to measure consumer's smartphone involvement, we developed a 7-point disagree-agree unidimensional 4 items scale. Firstly, we reviewed the PII (Personal Involvement Inventory) scale by Zaichokowsky (1994) and NIP (New Involvement Profile) scale by Jain et al. (1990). Then, we built 4 items which based on 7 product characteristics to consumer (important, interesting, exciting, means a lot to me, appealing, fascinating, involving) from PII scale and pleasure dimension from NIP scale. From the results of factor analysis, they are gathered in one factor (Table 7 and Appendix A).

In order to measure consumer perceived symbolic value to smartphone, the 20-items multidimensional symbolic value scale by Bhat and Reddy (1998) was consulted. It has 3 dimensions: prestige, personality expression and functionality. However, we only chose four items (glamorous, sophisticated, successful and prestigious) from prestige dimension for the usage of our research (Table 7 and Appendix A).

In order to evaluate the perceived economic strain of customer, 12-items unidimensional family economic strain scale (FESS) by Hilton and Devall (1997) was used. The FESS is a highly reliable and valid instrument that was valuable to examine perceived economic stain whether in single-parent or two-parent families (Hilton & Devall, 1997). Except we reformulate the response format to 7-point disagree-agree, only 4 items were selected from FESS to measure consumers'

perceived economic strain based on the same loading factors from factor analysis results (Table 7 and Appendix A).

To measure consumer's intrinsic religion, 8 items scale of Gorsuch and McPherson (1989) was applied. With suggestions of Bove et al. (2009), three items were omitted based on they are gathered in one factor and the other five items were gathered in another. However, we omitted one more item (My whole approach to life is based on my religion) from the scale because it had a different loading factor from factor analysis and evaluated to 7-point disagree-agree scale in which to adapt the construct standard of this study. So this scale could be treated as unidimensional (Table 7 and Appendix A).

In order to measure consumer independence, 5-item consumer independence scale of Clark (2006) was adapted in our research. In order to fit the standard of this study, one item (When it comes to making purchases, I just do my own thing) was removed based results of factor analysis and the response format was reformulated to 7-point disagree-agree (Table 7 and Appendix A).

For the measurement of consumer status consumption, Eastman et al. (1999)'s 5-item status consumption was implemented. Some modifications were fulfilled: a) One item (I would buy a … just because it has status) was omitted in order to adapt the standard of our research; b) One reverse item (the status of a smartphone is irrelevant to me) was adjusted to positive meaning; c) the response format was reformulated to 7-point disagree-agree (Table 7 and Appendix A).

Richins and Dawson's (1992) and Richins' (1987) Material Values Scale (MVS) is the most widely used construct of 'personal materialism' (Ahuvia & Wong, 2002), and is defined as 'the importance ascribed to the ownership and acquisition of material goods in achieving major life goals or desired states' (Richins, 2004; Pepper et al., 2009). In our research, we implemented 7-point Likert-type disagree-agree MVS (Richins, 1987) to measure the consumer materialism, which include 6 items in the original scale. However, we removed two items based on results of factor analysis; one of them has an anti-materialism statement (People place too much emphasis on material things) and the other has a very similar meaning with existed one (it is important to me to have really nice things). Otherwise, one reverse item (It sometimes bothers me quite a bit that I can't afford to buy all the things I want) was adjusted to positive meaning (Table 7 and Appendix A).

To evaluate the customer perceived hedonic value in consumption activities, the 20-item hedonic value multidimensional scale by Babin et al. (1994) was implemented in our research. Two dimensions were included: hedonic and utilitarian. Specifically, only 4 items were extracted from hedonic dimension and utilized in our research according to the similar loading factors of factor analysis (Table 7 and Appendix A).

In order to measure the consumer's DSI, we developed a 7-point disagree-agree unidimensional 4-item scale based on 6-item DSI self-reported scale by Goldsmith and Hofacker (1991). Two items from the original scale (Compared to my friends I own a few of …; I will buy a new … if I haven't heard/tried it yet) were removed. Plus, two reverse items (In general, I am the last in my circle of friends to buy a new … when it appears.; In general, I am the last in my circle of friends to know the titles/brands of the latest …) were adjusted to positive meaning, other necessary adjustments were applied to serve the smartphone as product domain (Table 7 and Appendix A).

We imported the 8-item frugality scale by Lastovicka et al. (1999) with a 7-point disagree/agree response format to measure consumer frugal behavior. Furthermore, adjustments have been made. Three items (I believe in being careful in how I spend my money; There are many things that are normally thrown away that are still quite useful; If you can rescue an item you already have, there's no sense in buying something new.) were removed based on factor analysis outcomes which resulting in a different factor (Table 7 and Appendix A).

In order to measure customer behavior intention (BI), we developed BI's construct through two recent TAM studies by Ting et al. (2011) and Kim (2008). Two items were removed with another factor loading: usage (Assuming I have access to a smartphone, I intend to use it; given that I have access to a smartphone, I predict that I would use it). Besides, two more items were omitted due to they evaluate more in attitude than behavioral intention (Overall, my positive experience outweighs my negative experience with smartphone; on the whole, I´m satisfied with the experience I have had using smartphone) (Table 7 and Appendix A).

To measure cultural relativity influences, Hofstede's cultural dimension scale were implemented. Therefore, 7-point disagree-agree and three cultural dimension 12-item scales were selected for this study; the three cultural dimensions are collectivism, uncertainty avoidance and power distance (Table 7 and Appendix A).

Besides, we also put social-demographic items and other smartphone consumption items (e.g. frequency of use, gender, age, family income, perceived lifespan of one smartphone usage and number of apps on smartphone) in questionnaire (Table 7 and Appendix A).

We also designed some “trap” questions within some scales above in order to trap individuals who are speeding or cheating as they take the survey (e.g. The sun rises in the east). The intent of the questions is obvious and if seen would be answered correctly. However, the questions are also designed to 7 points disagree-agree scale and placed within a matrix question, thereby making them somewhat difficult for a speeder to spot. These questions are either answered correctly or not (see Appendix A, QT 1-5).

4.3 Sampling

The present study tests the conceptual model described above within the product category of all kinds of smartphone in three countries’ local markets. As our research instrument is survey, we applied a) online survey (e.g. Amazon Mechanical Turk) to consumers from China and India; b) Personal distributed survey to consumers from Brazil. Online survey enables research professionals to achieve great quick way of audience with very a reasonable cost, and the visual appeal and interactivity. At last, it happens in real time. However, because the researcher doesn’t know these respondents, he/she can’t get a more constant control of the sample due to its randomness (Nique & Ladeira, 2013). Overall, online survey is more objective and constant than regular survey.

In practice, we developed online questionnaire through Qualtrics and utilized Amazon Mechanical Turk (AMT) as a newly internet research tool to distribute the questionnaires to participants from two countries: India and China. But AMT is not familiar to Chinese participants. As result of that, we decided to use e-mail and some Chinese social networks (e.g. Wechat, QQ) to distribute the questionnaire survey. The questionnaire was developed in English and distributed to Indian participants through AMT, then translated into Chinese in order to distribute to Chinese participants. The respondents from India were paid to take part in the online survey. Specifically, we use AMT’s system to control the distributed region, and set up a restricted answering time (9 minutes); the respond page would automatically close if

any participants didn't finish the questionnaire in time. As for Brazil, we handed the questionnaires in paper to university students to respond. The questionnaire was translated into Portuguese and the answering time was manually controlled.

The regular survey was applied in March, 2016 and the online survey was applied in April, 2016. It spended about one month to conclude the online survey to Chinese participants. The main study involved a total sample of 458 non-probability participants from three countries, which are 196 respondents from China including 87 uncompleted responses, 123 respondents from India including 9 uncompleted responses, and 139 respondents from Brazil including 13 unfinished questionnaires. After adjusting for missing values and unfinished questionnaires, the final sample size was reduced to 349 participants and the final effective response rate was 76.2%. The relative (percentage) distribution of this final sample among the countries was very similar to that of the initial sample, with 126 participants from Brazil (36%), 109 from China (31%) and 114 from India (33%).

4.4 Data Analysis Technique: Structural Equation Modeling

To perform the quantitative analysis of this study, beside utilized SPSS for statistic descriptive analysis, we also applied Structural Equation Modeling (SEM) as analysis method through one computer program: AMOS™, which has the objective of analyzing the proposed model and collected data. Firstly, SEM is known as covariance analysis structures and structural linear relations, also known as causal modeling, causal analysis, modeling of simultaneous equations and analysis of covariance structures (Ullman, 2007). It is quite available to analyze large samples and multiple measures of constructs and covers various methods and aims to simultaneously analyze a wide range of relationships (Hair et al., 2002). In addition to this, SEM also seeks to specify the relationships between studied variables and describe the amount of verified variances (Steenkamp & Baumgartner, 2000). Moreover, SEM allows simultaneous estimates of causal relationships among multiple variables with a low level of measurement error too (Choo et al., 2014). Besides, it is capable of examining the interrelationships among observed and unobserved or latent variables at the same time; it also can calculate direct, indirect and total effects between predictors, mediators and dependent variables (Chao et al., 2013). In summary, SEM combines statistic factor analysis and regression analysis, allowing researchers to test factorial structure of

psychometrics measuring instruments through confirmatory factor analysis, explanatory and analyze relationships among multiple variables simultaneously whether they are latent or observed (Pilati & Laros, 2007). It has already been implemented in various studies of diversified fields until now.

According to Gao et al. (2013), the proper use of SEM requires a minimum sample of 100 valid questionnaires, and the ideal value is 200 valid questionnaires. Therefore, the sample we collected in this research possesses more than 100 valid questionnaires per country, it is in agreement with the proposition.

Validity is an important concept within a structural equation model. Hair et al. (1999) mention that validity is the extent to which a measure or set of measures representing the concept study, the degree that it is free of any systematic or not random error. To test the validity of the composed structural equation, we used a few measures that were described below (Table 8).

Table 10. Utilized measures to test the validity of the structural equation

Measures	Concepts
X^2(chi-square)	To evaluate the significant differences between the observed matrix and estimated matrix (Lomax & Schumacker, 2012).
Degrees of Freedom	The number of degrees of freedom is the number of values in the final calculation of a statistic that are free to vary (Stern et al., 2000).
Probability Level	It also named p-value, it is defined as the probability of obtaining a result equal to or "more extreme" than what was observed, when the null hypothesis is true. (Wasserstein & Lazar 2016).
R^2 (Coefficient of Determination	It indicates the proportion of the variance in the dependent variable that is predictable from the independent variable (Statrek website).
NFI (Normed Fit Index)	It indicates the extent to which the adjustment of the proposed model (Kline,1998).
RFI (Relative Fit Index)	It also called IFI (incremental Fit Index), compare the chi-square for the hypothesized model to one from a “null”, or “baseline” model (McDonald & Ho, 2002).
IFI (Incremental Fit Index)	It also called RFI (Relative Fit Index).
NNFI (Non-Normed Fit Index)	It indicates the extent to which the adjustment of the model and includes an adjustment to the complexity of the model (Pedhazur & Schmelkin, 2013).
CFI (Comparative Fit Index)	Comparative measure between the estimated models and null (Kline,1998).
RMSEA (Root Mean Square Error of Approximation)	Discrepancy between the observed and predicted matrixes, taking into account the degrees of freedom (Kline, 1998).

Source: Elaborated by author

With respect to the chi-square measure, it was sought to find statistical significance levels that indicate the probability that the difference achieved is due to sample variation. The intention is to get a non-significant χ^2 value, indicating that the data fit the model (Lomax & Schumacker, 2012). For RMSEA, values greater than 0.5 are considered acceptable (Hair et al., 1999). The CFI values can be explained by the model when their values are greater than 0.9; this is the desired value (Kline, 1998). If the NFI is equal to 0.8, for example, the total adjustment of the researcher's model is 805 better than the null model estimated with the same sample (Kline, 1998). Hair et al. (1999) mention that there is no absolute value which indicates an acceptable adjustment level, but it is recommended to be more than 0.9. The value of NNFI ranges from zero to one and it is recommended a level higher than 0.9 (Pedhazur & Schmelkin, 2013). Value of IFI or RFI close to 1.0 indicate a good fit (McDonald & Ho, 2002).

The validity refers to how well the concept is defined by the measures, while reliability refers to the consistency of the measurement, which means the degree that a variable or a set of variables is consistent with what is to be measured (Hair et al., 1999). If multiple measures are carried out, the reliable measurements are very consistent in their values. It is different from validity, which does not relate to what should be measured but to the way how should be measured. Then, three methods were used to test the reliability of the collected data in this study, as follow: a) simple reliability (or Cronbach´s alpha) index; b) composite reliability index greater than 0.7 (Hair et al.,1999); c) average variance extracted greater than 0.5 (Table 9).

Table 11. Other utilized measurements

Measures	Concepts
Simple Reliability (Cronbach´s Alpha)	It indicates that the items or individual indicators should measure the same construct and highly interrelated (Hair et al.,1999).
Composite reliability	It is the total amount of variance of true score in relation to variance of the total score (Malhotra, 2012).
AVE (Average Variance Extracted)	It is an indicator that can explain the indicators of the construct, in other words, how many of the total variance are being used to compose the evaluation of constructs (Fornell & Larcker, 1981).

Source: Elaborated by author

In the case of composite reliability, it is aimed to verify the measure degree in a set of indicators of a latent construct in internally consistency in their measurements, which is similar to simple reliability (Alpha's Cronbach) (Hair et al., 1999).

Moreover, the average variance extracted (AVE) is also a measure that is used to evaluate the convergent and discriminant validity (Malhotra, 2012). In convergent validity it verifies if the indicators of each construct are consistent with each other and in discriminant validity it verifies if each construct of model is distinguishing from others (Prado, 2006).

In order to measure the convergent validity, thus, the size of factor loadings provides evidence of convergent validity. Thus, all factor loadings should be statistically significant at least greater than 0.5, but ideally greater than 0.7.

In order to measure the discriminant validity, it should demonstrate that one construct is distinct from other constructs. The test applied in SEM is performed that the AVE values are greater than the mean of correlation. Equivalently, the discriminant validity is obtained from if the root mean of AVE is greater than the correlation coefficients (Hair et al., 1999).

5 RESULTS

The chapter of results is intended to present the main analysis results of this research. These results include: statistic descriptions, model test validation and SEM analysis of integrated model. These results are presented in the next sub-chapters.

5.1 Statistic Descriptive Analysis of Variances

The final sample size has a total of 349 participants. The relative (percentage) distribution of this final sample among the countries was very similar to that of the initial sample, with 109 from China (31%), 126 from Brazil (36%) and 114 from India (33%).

Additionally, of the 126 Brazilian participants, 73 (57.9% of Brazilian sample) are male and 53 (42.1% of Brazilian sample) are female. 36 (33% of Chinese sample) are male and 73 (67% of Chinese sample) are female among the 109 Chinese participants; there are 85 (74.6% of Indian sample) male respondents and 29 (25.4% of Indian sample) female respondents in the Indian sample of 114 participants. In summary, we have 194 (55.6%) male participants and 155 (44.4%) female participants in the total sample (Table 10).

Table 12. *Gender of participants from each country*

Gender	Brazil		China		India		All	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Male	73	57.9	36	33	85	74.6	194	55.6
Female	53	42.1	73	67	29	25.4	155	44.4
Total	126	100	109	100	114	100	349	100

Source: Elaborated by author

Table 13. *Age of participants from each country*

Age	Brazil		China		India		All	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
<18	0	0	1	0.9	0	0	1	0.3
19-29	99	78.5	60	55	64	56.1	223	63.9
30-39	21	16.7	9	8.3	41	36	71	20.3
40-60	6	4.8	34	31.2	9	7.9	49	14
>60	0	0	5	4.6	0	0	5	1.4
Total	126	100	109	100	114	100	349	100

Source: Elaborated by author

Age in the sample varied from 16 to 65 years (Table 11). Ages of 223 (63.9%) respondents are between 19 and 29, of which 99 (78.5% of Brazilian sample) Brazilian

participants, 60 (55% of Chinese sample) Chinese participants and 64 (56.1% of Indian sample) Indian participants. A total of 71 (20.3%) respondents are aged among 30 and 39 years, of which 21 (16.7% of Brazilian sample) from Brazil, 9 (8.3% from Chinese sample) from China and 41 (36% of Indian sample) from India. In the third age range, from 40 to 60 years old, 49 (14%) participants are fitted, with 6 (4.8% of Brazilian sample) from Brazil, 34 (31.2% of Chinese sample) from China and 9 (7.9% of Indian sample) from India. At last, 5 (1.4% of total sample) participants - all of them are Chinese - are older than 60 years old, and only 1 participant – also Chinese - is younger than 18 years of age.

Table 14. *Family income of participants from each country*

Family income	Brazil		China		India		All	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
<300 dollars	2	1.6	7	6.4	28	24.6	37	10.6
300-850 dollars	34	27	34	31.2	36	31.6	104	29.8
850-1,500 dollars	45	35.7	37	33.9	26	22.8	108	30.9
>1,500 dollars	45	35.7	31	28.4	24	21.1	100	28.7
Total	126	100	109	100	114	100	349	100

Source: Elaborated by author

Furthermore, for research standard and respondents´ convenience, we convert dollars into each country´s currency in distributed questionnaires. As we can see in Table 12, family income of 108 (30.9%) participants are between 850 and 1,500 dollars, of which 45 (35.7% of Brazilian sample) from Brazil, 37 (33.9% of Chinese sample) from China and 26 (22.8% of Indian sample) from India. Moreover, 104 (29.8%) respondents' family income is between 300 and 850 dollars, of which 34 (27% of Brazilian sample) from Brazil, 34 (31.2% of Chinese sample) from China and 36 (31.6% of Indian sample) from India. In the third range, 100 (28.7%) family income are more than 1,500 dollars, including 45 (35.7% of Brazilian sample) Brazilian families, 31 (28.4% of Chinese sample) Chinese families and 24 (21.1% of Indian sample) Indian families. Only 37 (10.6%) participants´ family income is less than 300 dollars. They are 2(1.6% of Brazilian sample) from Brazil, 7(6.4% of Chinese sample) from China and 28 (24.6% of Indian sample) from India.

Table 15. *Educational background of participants from each country*

Educational background	Brazil		China		India		All	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
High School Uncompleted	0	0	10	9.2	0	0	10	2.8
High School Completed	9	7.1	17	15.6	4	3.5	30	8.6
Undergraduate	83	65.9	3	2.8	1	0.9	87	25
Bachelor	32	25.4	70	64.2	71	62.2	173	49.6
Post Graduate	2	1.6	9	8.2	38	33.4	49	14
Total	126	100	109	100	114	100	349	100

Source: Elaborated by author

Concerning educational background, as presented in Table 13, 173 (49.6%) respondents have a bachelor degree, within which 32 (25.4% of Brazilian sample) from Brazil, 70 (64.2% of Chinese sample) from China and 71 (62.2% of Indian sample) from India. Plus, 87 (25%) respondents are undergraduate, including 83 Brazilians (65.9% of Brazilian sample), 3 Chinses (2.8% of Chinese sample) and 1 Indian (0.9% of Indian sample). Furthermore, 49 (14%) are in post graduate,2 from Brazil (1.6% of Brazilian sample), 9 (8.2% of Chinese sample) from China and 38 (33.4% of Indian sample) from India. In the fourth range, 30 (8.6%) respondents are high school completed, including 9 Brazilians (7.1% of Brazilian sample), 17 Chinses (15.6% of Chinese sample) and 4 Indians (3.5% of Indian sample), and there still are 10 (2.8% of total sample) Chinese participants didn´t finish high school.

Table 16. *Marital status of participants from each country*

Marital status	Brazil		China		India		All	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Single	89	70.6	11	10.1	40	35.1	140	40.1
Relationship	5	4	35	32.1	5	4.4	45	12.9
Married	31	24.6	62	56.9	69	60.5	162	46.4
Divorced	1	0.8	1	0.9	0	0	2	0.6
Total	126	100	109	100	114	100	349	100

Source: Elaborated by author

As Table 14 demonstrates, 162 (46.4%) participants are married in the total sample, which including 31 Brazilians (24.6% of Brazilian sample), 62 Chinese (56.9% of Chinese sample) and 69 Indians (60.5% of Indian sample). Secondly, 140 (40.1%) participants are single, 89 (70.6% of Brazilian sample) from Brazil, 11 (10.1% of Chinese sample) from China and 40 (35.1% of Indian sample) from India. Moreover, 45 (12.9%)

participants are in a relationship, which including 5 (4% of Brazilian sample) from Brazil, 35 (32.1% of Chinese sample) from China and 5 (4.4% of Indian sample) from India. The differences of cultural values in each country are maybe one of the reasons that there are much more single people in Brazil than the other two countries.

We also analyzed other factors in the total sample, results of respondents´ possess smartphone brands from each country are demonstrated in Table 15. It shows that international brands (such as Apple, Samsung) are very popular in all 3 countries´ national markets in addition to some particular brands (such as HUAWEI, Xiaomi from China and Micromax from India) are only common in each country´s proper market. Table 15 also refer that there are more diversity brands in India´s market than which in Brazil´s market (according to 23.7% of participants from India possess other smartphone brands correspond to only 4.7% of participants from Brazil and 8.2% of participants from China who use other smartphone brands). It means that Indian consumers may have more brands choices when purchasing smartphone in their national market than the ones in Brazil and China. On the other hand, it may also evidence the influences of the economic crisis which is occurring in Brazil to their national smartphone market. Some of multinational smartphone companies (such as Xiaomi Inc. from China) are reducing production quantity and have stopped launch new models in Brazilian market recently, resulting in less diversification of smartphone brands in Brazilian market in comparison to Chinese and Indian markets.

Table 17. *Possess smartphone brands from each country*

Possess Brands of Brazilian Respondents			Possess Brands of Chines Respondents			Possess Brands of Indian Respondents		
Brand name	Freq.	%	Brand name	Freq.	%	Brand name	Freq.	%
Apple	41	31.5	Apple	44	40.4	Samsung	44	38.6
Samsung	41	31.5	Huawei	22	20.2	Lenovo	17	14.9
Motorola	25	19.2	Samsung	17	15.6	Apple	10	8.8
LG	13	10	Xiaomi	11	10.1	Micromax	8	7
Sony	4	3.1	OPPO	6	5.5	Motorola	8	7
Other brands	6	4.7	Other brands	9	8.2	Other brands	27	23.7
Total	130	100	Total	109	100	Total	114	100

Source: Elaborated by author

Moreover, Table 16 demonstrates the desired brands of respondents from each country. According to the results, the most desirable smartphone brand in all 3 countries is Apple. Almost half and more than half of consumers from each country (43.7% of Brazilian

sample, 52.7% of Chinese sample and 43 % of Indian sample) put Apple as their desired smartphone brand. It endorses the successful brand influence and reputation of Apple in international market. Samsung comes in second in Brazilian participants (18.7% of Brazilian sample) and also in Indian participants (27.1% of Indian sample). Expect of that, there are 16.4% missing responses in Brazilian participants which higher than participants from other two countries. It may be due to the economic crisis which is occurring in Brazil reduce the consumers´ smartphone purchase desire, more specifically, most of Brazilian consumers may under economic stress due to high unemployed rate.

Table 18. *Desired brands from each country*

Desired Brands of Brazilian Respondents			Desired Brands of Chines Respondents			Desired brands of Indian Respondents		
Brand name	Freq.	%	Brand name	Freq.	%	Brand name	Freq.	%
Apple	56	43.7	Apple	59	52.7	Apple	49	43
Samsung	24	18.7	Huawei	26	23.2	Samsung	31	27.1
Motorola	15	11.7	Samsung	4	3.6	Lenovo	5	4.3
LG	4	3.1	MEIZU	2	1.8	HTC	4	3.5
Sony	3	2.4	Xiaomi	2	1.8	Micromax	4	3.5
Other brands	5	4	Other brands	7	6.2	Motorola	4	3.5
Missing	21	16.4	Missing	12	10.7	Other brands	17	15.1
Total	128	100	Total	112	100	Total	114	100

Source: Elaborated by author

Another descriptive result is about the circumstances of purchasing new smartphone. Participants were being asked a question: “in what circumstance you bought your last smartphone purchase?”. According to Table 17, the most frequent answer (32.1% of all participants) is “the last smartphone was broken”. This is also the most frequent answer in Brazilian participants (46.1% of Brazilian sample) and Chinese participants (34.9% of Chinese sample), but only 14% of Indian participants chosen this option. This option reflects traits of consumer’s frugal behavior (voluntary or constrained frugal), the economic crisis occurring in objective country (e.g. Brazil economic crisis) may cause a lot of consumers transform to constrained frugal consumers (Goldsmith et al., 2013).

Secondly, “my smartphone was working fine, but I decided to buy a newly released one at that time” is the second most frequent answer (28.9% of all participants). This also was the most frequent answer in Indian participants (51.8% of

Indian sample), second most frequent in Chines participants (24.8% of Chinese sample), but only 11.9 % of Brazilian participants chosen this option. Additionally, this option reflects one trait of DSI. Due to the economic crisis in Brazil, some Brazilian consumers can´t present their DSI because of restricted economic condition.

Thirdly, “my smartphone was working well, but with technological backward” is in third place of the responses of all participants (23. 2%).This was the second most frequent option to Brazilian respondents (20.6% of Brazilian sample), the third most frequent option to Chinese respondents (20.2% of Chinese sample) and the second most frequent option to Indian participants (28. 9% of Indian sample). This result may suggest that smartphone is a more symbolic and less functional product to Chinese consumers, compared to the consumers from other two countries.

Table 19. *Circumstances to purchase new smartphone*

Circumstances to purchase new smartphone	Brazil		China		India		All	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
My smartphone was broken	58	46.1	38	34.9	16	14	112	32.1
My smartphone was working fine. but I decided to buy a newly released at that time	15	11.9	27	24.8	59	51.8	101	28.9
My smartphone was working well. but with technological backward	26	20.6	22	20.2	33	28.9	81	23.2
My smartphone was stolen	8	6.3	10	9.2	4	3.5	22	6.3
Others	19	15.1	12	11	2	1.8	33	9.4
Total	126	100	109	100	114	100	349	100

Source: Elaborated by author

Table 20. *Average number of apps*

Numbers of apps in smartphone	Brazil		China		India		All	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
1 to 10	42	33.3	21	19.3	19	16.7	82	23.5
11 to 20	45	35.7	45	41.3	52	45.6	142	40.7
21 to 30	29	23.0	29	26.6	32	28.1	90	25.8
more than 31	10	7.9	14	12.8	11	9.6	35	10
Total	126	100	109	100	114	100	349	100

Source: Elaborated by author

Table 18 shows the number of apps in participants' smartphone. Notably, 40,7 % of all participants have 11 to 20 apps in their smartphone. In average, Brazilian participants have less apps in their smartphone than Chinese and Indian participants (33.3% of Brazilian participants only have 1-10 apps in their smartphones, but only 19.3 % of Chinese participants and 23.5% of Indian participants responded the same answer). It indicateing that Brazilian participants are less involved in smartphone than Chinese and Indian participants, maybe due to underdeveloped high technology in Brazilian society.

Table 21. *Perceived lifespan of smartphone usage*

Perceived Lifespan	Brazil		China		India		All	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
1 year	11	8.7	20	18.3	22	19.3	53	15.2
2-3 years	67	53.2	68	62.4	70	61.4	205	58.7
3-5 years	45	35.7	17	15.6	20	17.5	82	23.5
More than 6 years	3	2.4	4	3.7	2	1.8	9	2.6
Total	126	100	109	100	114	100	349	100

Source: Elaborated by author

Table 19 shows the average perceived lifespan of one smartphone usage to participants. More than half (58,7%) of all participants consider the smartphone's lifespan usage to them is 2-3 years according to their usage experiences. On the other hand, Table 19 also indicating that the average perceived lifespan of one smartphone to Brazilian participants are longer than to Chinese and Indian participants (only 8.7% of Brazilian participants considered one smartphone's lifespan usage is 1 year, but 18.3 % of Chinese participants and 19.3% of Indian participants responded the same answer). Maybe due to the economic crisis the smartphone consumption in Brazil are reduced, Brazilian consumers intend to use their smartphones longer in order to reduce the living expenses.

Table 20 shows results of means and standard deviation descriptive analysis of the constructs for each country.

We also conducted an ANOVA test to see if there are significant differences of constructs among countries (see Table 21). The results of all constructs were significant ($p<0.05$). Thus, there is significant evidence to reject the null hypothesis and conclude there are significant differences in the 16 constructs based on different countries (China, Brazil and India).

Table 22. *Means and standard deviation of variables in each country*

Constructs	Brazil		China		India	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Collectivism	3.93	1.46	5.16	0.9	5.27	1.08
Uncertainty Avoidance	5.12	1.27	5.38	0.85	5.76	1.07
Power distance	2.06	1.20	3.05	1.47	4.2	1.51
Novelty Seeking	4.15	1.39	4.15	1.26	4.9	1.03
Opinion Leadership	3.53	1.39	4.19	1.15	5.32	1.16
Intrinsic Religiosity	3.71	1.78	3.98	1.32	5.2	1.4
Status Consumption	2.39	1.36	4.43	1.36	5.44	1.16
Consumer Independence	4.6	1.77	5.05	0.95	4.7	1.19
Materialism	4.29	1.65	4.66	1.15	4.93	1.34
Economic Strain	3.26	1.37	3.6	1.19	4.44	1.46
DSI	1.87	1.26	3.16	1.32	4.8	1.37
Product Involvement	2.84	1.52	4.15	1.21	5.46	1.08
Behavioral Intention	5.01	1.46	5.25	0.81	5.54	1.09
Frugal Behavior	5.14	1.04	4.97	0.94	5.59	0.96
Hedonic Value	4.23	1.67	4.98	1.05	5.01	0.97
Symbolic	2.72	1.62	3.39	1.46	5.32	1.21

Source: Elaborated by author

Table 23. *Test ANOVA among countries*

Constructs	F	Sig.
Collectivism	47.92	0.00
Uncertainty Avoidance	10.40	0.00
Power distance	70.86	0.00
Novelty Seeking	14.10	0.00
Opinion Leadership	66.09	0.00
Intrinsic Religiosity	31.23	0.00
Status Consumption	171.84	0.00
Consumer Independence	3.38	0.04
Materialism	6.25	0.00
Economic Strain	23.94	0.00
DSI	148.72	0.00
Product Involvement	122.88	0.00
Behavioral Intention	6.26	0.00
Frugal Behavior	12.20	0.00
Hedonic Value	14.20	0.00
Symbolic	103.02	0.00

Source: Elaborated by author

Post hoc comparisons to evaluate pairwise differences among group means were conducted with the use of Turkey HSD test since equal variance were tenable (See Appendix C). Testes revealed significant pairwise differences between the mean scores of Chinese's and Brazilian´s collectivistic orientations, as well as Indian´s and Brazilin's collectivistic orientations, $p=0.00<0.05$. Chinese´s collectivistic orientation do not significantly differ from the Indian´s, $p=0.77>0.05$ (see Appendix C). Thus, according to table 20, Chinese and Indian respondents manifested significantly higher scores (5.16 and 5.27) on collectivism than the Brazilian ones (3.93), which is in keeping with expected outcomes of Hofstede (Hofstede & Bond, 1988). The results indicated that China and India are highly collectivist cultures where people act in the interests of the group and not necessarily of themselves. In-group considerations affect hiring and promotions with closer in-groups (such as family) are getting preferential treatment. Employee commitment to the organization (but not necessarily to the people in the organization) is low. Whereas relationships with colleagues are cooperative for in-groups they are cold or even hostile to out-groups. Personal relationships prevail over task and company.

Post hoc testes revealed no significant pairwise differences are found except Indian´s uncertainty avoidance orientation differs from Brazilian´s and Chinese´s ($p=0.00<0.05$ and $P=0.04<0.05$, see Appendix C). According to table 20, The mean values of uncertainty avoidance orientation are manifested high in all three countries (5.12, 5.38 and 5.76), and Indian is the highest. Since all three countries are developing countries and the value orientation of people either influenced by religious (such as India, Brazil) or new technologies (such as China, India) (Hofstede,1983). These societies especially India show a strong need for rules and elaborate legal systems in order to structure life. The individual's need to obey these laws, however, is weak. If rules however cannot be kept, additional rules are dictated. In these three societies, bureaucracy, laws and rules are very important to make the world a safer place to live in.

Additionally, post hoc testes revealed significant pairwise differences among the mean scores of all three countries´ power distance orientation, $p=0.00<0.05$ (see Appendix C). The mean value of power distance orientation in Brazil (2.06) is lower than in China (3.05) and in India (4.2), and India manifested the highest mean score (see Table 20). It indicating an appreciation for hierarchy and a top-down structure in society and organizations of India. If one were to encapsulate the Indian attitude, one could use the following words and phrases: dependent on the boss or the power holder for

direction, acceptance of un-equal rights between the power-privileged and those who are lesser down in the pecking order, immediate superiors accessible but one layer above less so, paternalistic leader, management directs, gives reason / meaning to ones work life and rewards in exchange for loyalty from employees. Real Power is centralized even though it may not appear to be and managers count on the obedience of their team members. Employees expect to be directed clearly as to their functions and what is expected of them. Control is familiar, even a psychological security, and attitude towards managers are formal even if one is on first name basis. Communication is top down and directive in its style and often feedback which is negative is never offered up the ladder. However, Chinese society believes that inequalities amongst people are acceptable. The subordinate-superior relationship tends to be polarized and there is no defense against power abuse by superiors. Individuals are influenced by formal authority and sanctions and are in general optimistic about people's capacity for leadership and initiative. People should not have aspirations beyond their rank.

Table 20 also shows that the mean value of intrinsic religiosity in India (5.2) is apparently higher than the ones in Brazil (3.71) and China (3.98). According to post hoc tests, there are significant pairwise differences between the mean scores of two pairs: China-India and Brazil-India, $p=0.00<0.05$. But no significant difference was found in pair Brazil-China (see Appendix C). Thus, it indicated India society being more religious than the other two.

On the other hand, the mean value of DSI is quite low in Brazil (1.87) compare to China (3.16) and India (4.8). Post hoc tests also evidenced that the mean scores of DSI were significant differ from each other among three countries, $p=0.00<0.05$ (Appendix C). The development of technology and innovation in Brazilian society is relatively backward than which in other two countries, which may be the reason for this finding. The average price of smartphones in Brazilian market is generally higher than in other countries. As a result of that, some Brazilian consumers may not have many brand choices in their local market, and with restricted economic condition they hardly find and/or purchase the newest launched models of smartphone. It also indicated that Indian may have more technology involvement than Chinses.

However, the depressed Brazilian economic situation can also explain the mean value of product involvement in Brazil (2.84) which manifested lower than the other two countries (4.15 and 5.46). As post hoc tests demonstrated, there are significant differences among the mean scores of PI of three countries, $p=0.00<0.05$ (Appendix C).

Moreover, the mean value of Indian´s frugal behavior (5.59) is higher than the Chinese´s and Brazilian´s (4.97 and 5.14). Post hoc tests showed that significant pairwise differences were found between the mean scores of two pairs: China-India and Brazil-India, which means Chinese's FB do not significantly differ from the Brazilin's, p=0.44>0.05 (see Appendix C). Thus, it indicated that Indian consumers manifest higher FB than Brazilian and Chinese consumers.

Mean values of hedonic value (4.23) and symbolic (2.72) in Brazil are both lower when compared to the ones in China (4.98 and 3.39) and India (5.01 and 5.32), and Indian manifested the highest mean value of symbolic. Post hoc tests also evidenced that significant differences are found in the mean scores of hedonic value of two pairs: Brazil-China and Brazil-India, no significant difference was found in the pair China-India, p=0.99>0.05. But significant pairwise differences were found among the mean scores of symbolic value of all three countries, p=0.00<0.05 (see Appendix C). Thus, it indicated that the process of purchasing smartphone of Brazilian consumers revealed more utilitarian value than hedonic value, and the product smartphone also have more functional value than symbolic value to them. As for Indian, the smartphone stands more symbolic value.

Table 24. *Frequency of smartphone usage per day*

Frequency of Use	Brazil		China		India		All	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Less than 1 hour	1	0.8	10	9.2	2	1.8	13	3.7
1 to 3 hours	34	27.0	42	38.5	32	28.1	108	30.9
4 to 6 hours	38	30.2	40	36.7	42	36.8	120	34.4
7 to 11 hours	32	25.4	10	9.2	28	24.6	70	20.1
More than 12 hours	21	16.7	7	6.4	10	8.8	38	10.9
Total	126	100	109	100	114	100	349	100

Source: Elaborated by author

Table 22 demonstrates the frequency of smartphone use per day. In the first place, 120 participants (34.4%) use smartphone in average from 4 to 6 hours per day, of which are 38 Brazilian users (30.2% of Brazilian sample),40 Chinese users (36.7% of Chinese sample) and 42 Indian users (36.8 % of Indian sample). Secondly, 108 participants (30.9%) use smartphone from 1 to 3 hours, of which 34 Brazilians (27%

of Brazilian sample), 42 Chinese (38.5% of Chinese sample) and 32 Indians (28.1% of Indian sample). Particularly, 53 Brazilian participants (42.1% of Brazilian sample) use smartphone beyond 7 hours per day compared to only 17 Chinese participants (15.6 % of Chinese sample) and 38 Indian participants (33.4% of Indian sample) do the same. It indicates that Brazilian participants seems more addicted to smartphone usage than Chinese and Indian participants.

5.2 Individual Validation of Each Construct

The conceptual model of this dissertation was built through the bibliography review. The constructs of conceptual model are consisting of four or five variables. The estimated coefficients provide information on the extent to which a given observable variable is capable of measuring a latent variable (Lomax & Schumacker, 2012; Anderson & Gerbing, 1988). It is observed that the estimated coefficients are positive and significant values, showing that the indicators are positively related to the construct. However, four constructs setting contents were not suitable in the initial analysis.

The chi-square test is significant, indicating there is a significant difference between the observed matrix and estimated matrix. The measures absolute adjustment that determines the degree to which the model predicts the observed covariance matrix, display values within acceptable limits: RMSEA less than 0.08. The two comparative adjustment measures (CFI and NFI) have values above 0.9; as recommended (Kline, 1998). The reliability was above 0.5 in most cases, but the probability level is less than 0.05 indicating that the internal consistency between the indicators is not satisfactory.

On the initial results, it was decided to modify the model. Following literature of structural equation to generate the modifications report, which is available on AMOS™, and promote the suggested changes to fit the model.

Considering the pooled sample, four observable variables (CI4, FB1, HV1, NS4) were removed from four constructs separately, and each latent variable remain measured by three or four observable variables (see Table 23). This procedure is in accordance with the proposition that observable variable whose coefficients manifested minors or not significant, in other words, obtain values less than 0.5 from

observable variables, and the minimum number of observable variables by each latent variable are three (Kline, 1998).

Table 25. *Coefficients of observable variables of 4 constructs*

		Observable Variables	Standardized Coefficient
CI1	<---	Consumer Independence	0.695
CI2	<---	Consumer Independence	0.840
CI3	<---	Consumer Independence	0.813
CI4	<---	Consumer Independence	0.407
FB1	<---	Frugal Behavior	0.415
FB2	<---	Frugal Behavior	0.628
FB3	<---	Frugal Behavior	0.808
FB4	<---	Frugal Behavior	0.787
FB5	<---	Frugal Behavior	0.647
HV1	<---	Hedonic Value	0.498
HV2	<---	Hedonic Value	0.703
HV3	<---	Hedonic Value	0.928
HV4	<---	Hedonic Value	0.830
NS1	<---	Novelty Seeking	0.781
NS2	<---	Novelty Seeking	0.791
NS3	<---	Novelty Seeking	0.641
NS4	<---	Novelty Seeking	0.512

Source: Elaborated by author

After adjusting, chi-square undergoes a significant reduction and not insignificant anymore. The indices of absolute adjustment measure and comparative measures showed satisfactory results compared to suggested minimum values. Regarding the constructs´ reliability, average variance extracted (AVE) and composite reliability were all become better than the indices of original model. In analysis of Cronbach´s Alpha, it was obtained a favorable rate above 0.8. According to the R squared, 13% of total variation of dependent variable FB is explained by the model (see Table 24).

Table 26. *Adjustment indexes of 4 constructs*

Indexes	Consumer Independence		Frugal Behavior		Hedonic Value		Novelty Seeking	
	Start	Final	Start	Final	Start	Final	Start	Final
X^2(chi-square)	5.122	0.000	25.599	0.789	8.495	0.000	6.247	0.000
Degrees of Freedom	2	0	5	2	2	0	2	0
Probability Level	0.077	--	0.000	0.674	0.014	--	0.044	--
R^2(R squared)	--	--	0.153	0.129	--	--	--	--
NFI	0.989	1.000	0.952	0.998	0.986	1.000	0.984	1.000
RFI	0.966	--	0.855	0.991	0.958	--	0.951	--
IFI	0.993	1.000	0.961	1.003	0.989	1.000	0.989	1.000
NNFI	0.979	--	0.880	1.014	0.968	--	0.966	--
CFI	0.993	1.000	0.960	1.000	0.989	1.000	0.989	1.000
RMSEA	0.067	0.610	0.109	0.000	0.097	0.701	0.078	0.533
AVE	0.618	0.739	0.568	0.645	0.688	0.788	0.600	0.678
Composite Reliability	0.859	0.894	0.863	0.877	0.894	0.917	0.853	0.863
Cronbach´s Alpha	0.776	0.824	0.793	0.804	0.828	0.855	0.770	0.782

Source: Elaborated by author

According to Fornell and Larcker (1981), Table 25 presents others constructs from proposed model. These constructs are no need to adjust because observable variables of each construct are capable of measuring a latent variable. The estimated coefficients are positive and significant values. We can see in Table 25, all scales with Cronbach´s Alpha greater than 0.82, indices of composite reliability higher than 0.89, and AVE rated more than 0.67. However, the indices of all scales are in suggested limit, which are higher than 0.70 for composite reliability and Cronbach´s alpha and greater than 0.50 for AVE. Moreover, the R squared scores indicated that 68% of total variation of dependent variable DSI is explained by the model and 16% of total variation of dependent variable BI is explained by the model.

Table 27. *Measurement properties of other constructs*

Indexes	OL	IR	SC	Mat	ES	DSI	PI	BI	Col	UA	PD	Sym
X^2(chi-square)	0.163	48.053	13.752	12.094	15.101	20.593	3.815	37.864	8.276	6.130	2.959	6.805
Df (Degrees of Freedom)	2	2	2	2	2	2	2	2	2	2	2	2
Probability Level	0.922	0.000	0.001	0.002	0.001	0.000	0.148	0.000	0.016	0.047	0.228	0.033
R^2(R squared)	--	--	--	--	--	0.683	--	0.161	--	--	--	--
NFI	1.000	0.937	0.991	0.979	0.971	0.984	0.996	0.945	0.989	0.992	0.997	0.996
RFI	0.999	0.812	0.972	0.936	0.912	0.952	0.989	0.835	0.968	0.976	0.992	0.987
IFI	1.003	0.940	0.992	0.982	0.974	0.958	0.998	0.948	0.992	0.995	0.999	0.997
NNFI	1.010	0.818	0.976	0.946	0.923	0.956	0.995	0.842	0.976	0.984	0.997	0.991
CFI	1.000	0.939	0.992	0.982	0.974	0.985	0.998	0.947	0.992	0.995	0.999	0.997
RMSEA	0.000	0.257	0.130	0.120	0.137	0.163	0.051	0.227	0.095	0.077	0.037	0.083
AVE	0.710	0.768	0.908	0.697	0.678	0.875	0.824	0.736	0.769	0.782	0.849	0.916
Composite Reliability	0.906	0.930	0.975	0.901	0.894	0.965	0.949	0.917	0.929	0.935	0.957	0.977
Cronbach's Alpha	0.845	0.880	0.954	0.836	0.828	0.938	0.910	0.862	0.879	0.887	0.923	0.958

Note. AVE=Average Variance Extracted; NS=Novelty Seeking; OL=Opinion Leadership; IR=Intrinsic Religiosity; SC=Status Consumption; CI=Consumer independence; Mat=Materialism; ES=Economic Strain; DSI=Domain Specific Innovativeness; PI=Product Involvement; BI=Behavioral Intention; FB=Frugal Behavior; Col=Collectivism; UA=Uncertainty avoidance; PD=Power Distance; HV=hedonic Value; Sym=Symbolism

Source: Elaborated by author

Discriminant validity was conducted by comparing the shared variance of constructs with the average variance extracted (AVE) of each construct (Fornell & Larcker, 1981). Findings are demonstrated in Table 26. Overall, a shared variance (0.732) was found between status consumption and opinion leadership, which was higher than the average AVE of opinion leadership (0.71). Additionally, there are other two combinations that produced similar results; the first was the shared variance (0.737) between product involvement and opinion leadership was higher than the average AVE of opinion leadership (0.71); and the second was the shared variance (0.851) between product involvement and domain specific innovativeness was higher than the AVE of product involvement (0.824). Thus, we conducted a chi-square difference test (Bagozzi & Philips, 1982), which supported the discriminant validity with the following results: $\triangle X^2$=92.76 (sig.<0.01) for the pair status consumption – opinion leadership; $\triangle X^2$=73.31 (sig.<0.01) for the pair product involvement – opinion leadership and $\triangle X^2$=42.16 (sig.<0.01) for the pair product involvement – DSI.

Moreover, all the other combinations were supporting discriminant validity (the shared variance of one combination was lower than AVE of each construct).

Table 28. *Shared variance and average variance extracted among each construct*

Constructs	NS	OL	IR	SC	CI	Mat	ES	DSI	PI	BI	FB	Col	UA	PD	HV	Sym
NS	**0.678**															
OL	0.552	**0.71**														
IR	0.488	0.484	**0.768**													
SC	0.456	0.732	0.486	**0.908**												
CI	0.170	0.187	0.149	0.198	**0.739**											
Mat	0.227	0.330	0.042	0.402	0.221	**0.697**										
ES	0.214	0.287	0.255	0.316	0.108	0.483	**0.678**									
DSI	0.384	0.654	0.364	0.720	0.188	0.357	0.409	**0.875**								
PI	0.366	0.737	0.376	0.776	0.192	0.386	0.405	0.851	**0.824**							
BI	0.214	0.486	0.090	0.308	0.226	0.490	0.183	0.268	0.470	**0.736**						
FB	0.296	0.351	0.289	0.272	0.087	0.205	0.098	0.272	0.298	0.457	**0.645**					
Col	0.214	0.341	0.438	0.498	0.201	0.203	0.226	0.367	0.433	0.268	0.341	**0.769**				
UA	0.321	0.414	0.407	0.362	0.189	0.266	0.245	0.273	0.355	0.518	0.491	0.513	**0.782**			
PD	0.230	0.337	0.331	0.482	0.062	0.141	0.475	0.561	0.480	0.075	0.140	0.275	0.066	**0.849**		
HV	0.345	0.322	0.264	0.423	0.210	0.396	0.266	0.372	0.358	0.390	0.207	0.256	0.349	0.297	**0.788**	
Sym	0.429	0.577	0.378	0.690	0.128	0.394	0.440	0.775	0.712	0.264	0.339	0.362	0.242	0.594	0.424	**0.916**

Source: Elaborated by author

5.3 Analysis of Integrated Model

The direct effects and the moderate effects of proposed model are presented in this chapter; the model analysis technique SEM is implemented through software AMOS™.

5.3.1 Direct Effects

With confirmatory factor analysis performed for the construction and validation of the constructs, we sought to evaluate the integrated model that combines the measurement model and the structural model. At this stage, the main objective was to assess the hypothesized theoretical structure, in other words, the relationships between the constructs and variables proposed in the model. Following the recommendation of several authors (e.g. Kline, 1998; Maruyama, 1997) the evaluation of the theoretical model was based on the model fit indices and the statistical significance of the estimated regression coefficients.

At this stage we used improvement strategy to model. It notes that the modification of the model was being removed from the non-significant regression coefficients and incorporated unforeseen covariance initially. The withdrawal of variables aimed to create a dynamic environment for a better understanding and/or explanation of the phenomenon studied. The addition of new relationships, even if suggested by AMOS™ modifications report, was only accepted if they had a theoretical argument or logic that would justify.

Table 29. *Indices of model justification*

Indexes	Final Analysis	
	Proposed Model	Final Model
X^2 (chi-square)	3303.041	1710.756
Df (Degrees of Freedom)	977	456
Probability Level	0	0
NFI	0.753	0.806
RFI	0.726	0.775
IFI	0.812	0.850
NNFI	0.790	0.824
CFI	0.811	0.848
RMSEA	0.083	0.089

Source: Elaborated by author

According to Table 27, the adjustment levels of the proposed model were not satisfactory. The chi-square is significant, probably due to test sensitivity to sample size. Even the chi-square relationship/degrees of freedom presented a value of 977 above the 3 recommended by Kline (1998). No adjustment index was within the recommended limit. Moreover, it is observed that several factors are not significant. Given these results, we adopted an improvement strategy to proposed model.

This strategy consisted basically of the withdrawal of no significant relationships and assessment of the changes suggested by AMOS™. The withdrawal process involving individual disposal of each no significant relationship since every withdrawal was necessary to model restoration due to changes in the significance of coefficients and other variables in the model.

After remove four observable variances from four constructs separately in factor analysis through AMOS™, there still are some insufficient indexes in the results of model fit of integrated model. Therefore, we removed two constructs from the integrated model, which are economic strain and status consumption as antecedents of frugal behavior. Not only they show insignificant effect on frugal behavior, but also those two showed interference to the indices of relationships among other constructs. This procedure is in accordance with the proposition that the variables whose coefficients are not significant should be removed (Kline, 1998). As an alternative solution, we put economic strain and status consumption as moderators, the effects of moderators will be presented in next section.

After the adjustment, the final model presented the adjustment indices described in Table 27: the chi-square test remained significant. Both absolute adjustment measure (RMSEA) and the comparative measures (e.g. CFI, NFI and NNFI) were within the desirable limits, indicating a good fit of the model. Therefore, the removal of non-significant relationship allowed a substantial improvement in the adjusted values when compared to which in the proposed model.

Table 30. *Interaction between constructs in modified model*

Constructs			Standardized Coefficient	Coefficient	S.E (Standard Error)	C.R	Sig.	Hypotheses
DSI	←	Opinion Leadership	0.081	0.074	0.035	2.114	0.035	H_{1a} (Supported)
DSI	←	Product Involvement	0.693	0.640	0.050	12.850	***	H_{1b} (Supported)
DSI	←	Symbolic Value	0.444	0.332	0.030	10.974	***	H_{1c} (Supported)
DSI	←	Novelty Seeking	0.003	0.002	0.028	0.077	0.939	H_{1d} (Not Significant)
Frugal Behavior	←	Intrinsic Religiosity	0.270	0.148	0.035	4.265	***	H_{2a} (Supported)
Frugal Behavior	←	Materialism	0.235	0.161	0.044	3.662	***	H_{2b} (Not Supported)
Frugal Behavior	←	Consumer Independence	0.049	0.022	0.025	0.868	0.385	H_{2c} (Not Significant)
Frugal Behavior	<-->	DSI	-0.102	-0.060	0.041	-1.449	0.147	H_{3}(Not Significant)
Behavioral Intention	←	DSI	0.169	0.133	0.044	3.018	0.003	H_{4a} (Supported)
Behavioral Intention	←	Frugal Behavior	0.445	0.552	0.087	6.321	***	H_{4b} (Not Supported)

Note. The model included the following variables as controls (i.e., DSI and frugal behavior): frequency of use (not significant), gender (not significant), age (not significant), family income (not significant), Perceived lifespan of one smartphone usage (frugal behavior: B=0.151, sig.=0.006, DSI: not significant) and number of apps on smartphone (not significant).

Source: Elaborated by author

After analyzing the modified model with AMOS™, the parameters results were demonstrated in Table 28.

According to Table 28, H_{1a} predicated that consumer's domain specific opinion is positively associated with DSI. Table 28 shows that opinion leadership has significant positive effect on DSI (0.081, p=0.035<0.05). Considering the finding, the result confirmed the proposed hypothesis H_{1a} and in agreement with theoretic review.

On the other hand, H_{1b} predicated that product involvement is positively associated with DSI. Table 28 demonstrated that product involvement has significant strongly positive effect on DSI (0.693, p<0.05). Hence, H_{1b} was supported.

Moreover, H_{1c} predicted that symbolic value that consumer perceived from smartphone is positively associated with DSI. Table 28 presented that the relation between symbolic value and DSI is positive (0.444, p<0.05). Thus, it is supporting the $H_{1c.}$

H_{1d} predicted that novelty seeking is positively associated with DSI. However, Table 28 shows that novelty seeking did not present a significant effect on DSI (0.003, p=0.939>0.05). Considering the finding, H_{1d} was not supported. The reasonable explanation of this result maybe because nowadays people can receive massive of novelty information every day from the global internet whether you are a novelty seeker or not.

Conversely, H_{2a} predicated that intrinsic religiosity is positively associated with frugal behavior. From Table 28, intrinsic religiosity has a significant positive effect on frugal behavior (0.270, p<0.05). Thus, the result is supporting H_{2a}.

Secondly, H_{2b} predicated that materialism is negatively associated with frugal behavior. Table 28 shows that materialism have a significant effect on frugal behavior which is positive (0.235, p<0.05). It indicates that the more materialistic consumers are, the more frugal behavior they manifest. Considering the result, H_{2b} was not supported. Reasonable explanations may concern the economic crisis occurring in objective country brings economic pressure on a lot of materialistic consumers, under such circumstances they live with a constrained frugal behavior to sustain their daily expenses.

Moreover, H_{2c} predicated that consumer independence is positively associated with frugal behavior. However, the result of Table 28 shows that there is no significant effect (0.049, p=0.385>0.05) in the relation between consumer independence and frugal behavior. Hence, H_{2c} was not supported. Maybe due to during the period of

economic crisis, all consumers are forced to stay frugality no matter they used to lack of concern with the opinion of others.

Above all, H_3 predicated that frugal behavior is associated with DSI in smartphone purchase. In practice, we correlate the errors of frugal behavior and DSI constructs in AMOS™ to see if there is a relation between them. However, the result of Table 28 presents that the negative relation is too weak and no significant (-0.102, p=0.147>0.05). Considering the result, H_3 was not supported. It indicating that there may be more factors and circumstances of DSI and frugal behavior which are not presented in this research are need to be considering.

At last, H_{4a} predicated that DSI is positively associated with behavioral intention to purchase smartphone. According to Table 28, we found DSI has significant positive effect (0.169, p=0.003<0.05) on behavior intention, which is supporting H_{4a}.

H_{4b} predicted that frugal behavior is negatively associated with behavioral intention to purchase smartphone. However, from Table 28 we found that the frugal behavior has positive effect (0.445, p<0.05) on behavioral intention, which is not supporting H_{4b}. Probably, the economic crisis occurring in objective country may cause this phenomenon. Most of willing to purchase consumers are under economic stress and become constrained frugal consumers, in the meantime they stay high behavioral intention to purchase but they didn't actually buy the smartphone with currency. That also explained why frugal behavior has stronger positive effect on behavioral intention than DSI; DSI consumers under economic stress manifest less innovative behavior in smartphone purchase intention when compared to constrained frugal consumers. At last, after removing the none-significant interactions, the final model with parameters is demonstrated in Figure 7.

The test of direct effects also controlled for frequency of use, gender, age, family income, perceived lifespan of one smartphone usage and number of apps on smartphone. After achieved data through AMOS™, results demonstrated that none of these controls had significant impact on DSI and frugal behavior except frugal behavior was significantly influenced by perceived lifespan of one smartphone usage (B=0.151, p=0.006), meaning that the more customers' perceived lifespan of one smartphone usage, the more frugal behavior they possess.

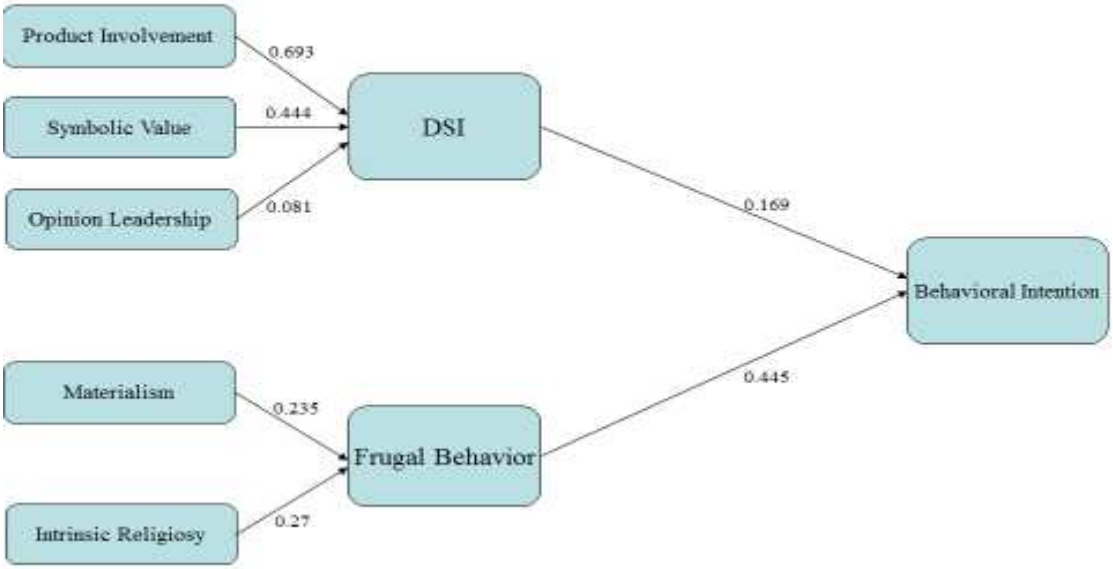


Figure 7. *Final model and results*
Source: Elaborated by author

5.3.2 Moderating Effects

We utilized Hofstede's cultural relativity theory as moderators in our model to analyze the effect of cultural relativity interactions. Three dimensions (collectivism, uncertainty avoidance and power distance) had been implemented. In this dissertation, the cultural values were demonstrated by individuals from different countries (Brazil, China and India), in other words, it was presented through the orientation of individual's cultural value. Thus, differences may exist compared to national cultural value. The result of the moderated effect in AMOS ™ analyses are presented in Table 29.

Hypothesis 5_a predicted that cultural relativity value collectivism moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of DSI on behavioral intention to purchase smartphone will be weaker when collectivism value is higher. Table 29 shows that when the collectivism value is higher, which significant strengthened the positive effect of DSI on behavioral intention to purchase smartphone (0.242, $p<0.5$), compared the positive effect when collectivism value is

lower (0.138, p<0.5). It indicates that when the individual´s collectivistic orientation is higher, the positive interaction between DSI and behavioral intention to purchase smartphone will be stronger. Considering these findings, $H5_a$ was not supported. One reasonable explanation of this result maybe is the cultural dimension value we collected from our survey is not at the national level, but it reflects the cultural value orientation of individual. Thus, it may vary when compare to the national level cultural value.

Hypothesis 5_b sustained that cultural relativity value collectivism moderates the negative effect of frugal behavior on behavioral intention to purchase smartphone. The effect of frugal behavior on behavioral intention to purchase smartphone will be weaker when collectivism value is higher. However, Table 29 shows that there is no significant moderate effect of collectivism on the interaction between frugal behavior and behavioral intention, indicating that the individual´s collectivistic orientation dose not moderate the association between frugal behavior and behavioral intention. Based on these findings, $H5_b$ was not supported. The reasonable explanation may also due to cultural value we analyzed is at the individual level, not national.

Hypothesis 5_c predicated that cultural relatively value uncertainty avoidance moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of DSI on behavioral intention to purchase smartphone will be weaker when uncertainty avoidance value is higher. Conversely, Table 29 demonstrated that when the uncertainty avoidance is higher which significant strengthened (0.230, p<0.5) the effect of DSI on behavioral intention compared to when it is lower (0.158, p<0.5). It indicating that when individual´s uncertainty avoidance orientation is higher, the association between DSI and behavioral intention to purchase smartphone will be stronger. According to these findings, $H5_c$ was not supported.

Hypothesis 5_d predicated that cultural relatively value uncertainty avoidance moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of frugal behavior on behavioral intention to purchase smartphone will be stronger when uncertainty avoidance value is higher. However, Table 29 shows that uncertainty avoidance didn´t have significant moderator impact on the association between frugal behavior and behavioral intention, indicating that the uncertainty avoidance orientation of individual dose not moderate the interaction between frugal behavior and behavior intention to purchase smartphone. Based on these findings, $H5_d$ was not supported.

Hypothesis 5_e predicated that cultural relatively value power distance moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of DSI on behavioral intention to purchase smartphone will be stronger when power distance value is higher. According to Table 29, power distance didn´t show significant moderator effect on the interaction between DSI and behavioral intention, indicating that individual´s power distance orientation does not have moderate effect on the relation between DSI and behavioral intention. Thus, $H5_e$ was not supported.

Hypothesis 5_f predicated that cultural relatively value power distance moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of frugal behavior on behavioral intention to purchase smartphone will be stronger when power distance value is higher. As demonstrated by Table 29, power distance does have a moderator effect on interaction between frugal behavior and behavioral intention; when power distance value is higher, the frugal behavior´s effect on behavioral intention is increased (0.593, $p<0.05$), and conversely, the effect is decreased (0.343, $p<0.05$). Results indicate that when power distance orientation of individual is higher, the positive relation between frugal behavior and behavioral intention to purchase smartphone will be stronger. But since we predicted negative association between frugal behavior and behavioral intention in H_{4b}, H_{5f} was not supported.

Hypothesis 6_a predicated that hedonic value moderates the effect of DSI on behavioral intention to purchase smartphone. The positive effect of consumer´s DSI on behavioral intention to purchase smartphone will be stronger when consumer manifest higher hedonic value during the shopping process to purchase smartphone. In opposite, Table 29 shows that no significant result was found in this interaction, which indicating the hedonic value dos not moderate the relation between DSI and behavioral intention to purchase smartphone, which indicating innovativeness consumer search for both hedonic value and utilitarian value in smartphone purchase in agreement with literature review. Thus, $H6_a$ was not supported.

Table 31. *Effects of moderators*

Path – **Collectivism**	Low	High	P	Hypotheses
DSI → Behavioral Intention	0.138**	0.242**	**	H_{5a} **(Not Supported)**
Frugal Behavior → Behavioral Intention	0.416**	0.347**	ns	H_{5b} **(Not Significant)**
Control				
Perceived lifespan of one smartphone usage → Frugal Behavior	0.200**	0.047^{ns}	ns	
Path – **Uncertainty Avoidance**	Low	High	P	Hypotheses
DSI → Behavioral Intention	0.158**	0.230**	**	H_{5c} **(Not Supported)**
Frugal Behavior → Behavioral Intention	0.361**	0.341**	ns	H_{5d} **(Not Significant)**
Control				
Perceived lifespan of one smartphone usage → Frugal Behavior	0.112 ^{ns}	0.11 ^{ns}	ns	
Path – **Power distance**	Low	High	P	Hypotheses
DSI → Behavioral Intention	0.210**	0.280**	ns	H_{5e} **(Not Significant)**
Frugal Behavior → Behavioral Intention	0.343**	0.593**	**	H_{5f} **(Not Supported)**
Control				
Perceived lifespan of one smartphone usage → Frugal Behavior	0.157 ^{ns}	0.022 ^{ns}	ns	
Path – **Hedonic Value**	Low	High	P	Hypotheses
DSI → Behavioral Intention	0.107**	0.161**	ns	H_{6a} **(Not Significant)**
Frugal→ Behavioral Intention	0.381**	0.439**	ns	H_{6b} **(Not Significant)**
Control				
Perceived lifespan of one smartphone usage → Frugal Behavior	0.204**	0.064 ^{ns}	ns	
Path – **Status Consumption**	Low	High	P	Hypotheses
Frugal Behavior → Behavioral Intention	0.335**	461**	**	H_{7}**(Not Supported)**
Control				
Perceived lifespan of one smartphone usage → Frugal Behavior	0.165**	0.088^{ns}	ns	
Path – **Economic Strain**	Low	High	P	Hypotheses
Frugal Behavior → Behavioral Intention	0.400**	0.473**	**	H_{8}**(Not Supported)**
Control				
Perceived lifespan of one smartphone usage → Frugal Behavior	0.126^{ns}	0.108^{ns}	ns	

Note: *(**) = sig. < 0.05; ns = not significant*
Source: Elaborated by author

Hypothesis 6_b predicated that hedonic value moderates the effect of frugal behavior on behavioral intention to purchase smartphone. The negative effect of consumer´s frugal behavior on behavioral intention to purchase smartphone will be weaker when consumer manifests higher hedonic value during the shopping process to purchase smartphone. According to Table 29, no significant result was found in this moderator, indicating the hedonic value dos not moderate the association between frugal behavior and behavioral intention to purchase smartphone. Hence, $H6_b$ was not supported. It indicates that consumers with frugal behavior have no interference effect on whether they prefer hedonic or utilitarian shopping process in smartphone purchase.

As we described in the last chapter, we extracted the economic strain and status consumption constructs from the antecedents and allocate them as moderators in the final framework. Hypothesis 7 predicted that status consumption moderates the effect of consumer's frugal behavior on behavioral intention in smartphone purchase. The negative effect of consumer's frugal behavior on behavioral intention to purchase smartphone will be weaker when consumers´ status consumption behavior is higher. According to Table 29, when the status consumption value is higher, the effect of frugal behavior on intention to purchase smartphone was significantly strengthened (0.461, $p<0.05$) compared to when it is lower (0.335, $p<0.05$). It indicates that when people´s status consumption needs are higher, the association between frugal behavior and behavioral intention to purchase smartphone are stronger. Thus, H_7 was not supported. The appropriate explanation may reside the economic crisis occurring in objective country, consumers with strong status consumption behavior obtain the capacity to pay their special needs in smartphone purchase through stay constrained frugality. In the meantime, consumers without status consumption behavior may not need to stay frugality.

Hypothesis 8 predicated that economic strain moderates the effect of consumer's frugal behavior on behavioral intention in smartphone purchase. The negative effect of consumer's frugal behavior on behavioral intention to purchase smartphone will be stronger when consumer's family economic strain is higher. Prospectively, Table 29 showed that the economic strain significate moderates the effect of frugal behavior on behavioral intention to purchase smartphone. When economic strain is higher, consumers manifested more frugal behavior on behavioral intention to purchase smartphone ($0.473>0.400$, $p<0.05$) compare when it is lower,

which is in agreement with the previous theories. But since our H_{4b} predicated frugal behavior is negatively associated with behavior intention, H_8 was not supported.

6 DISCUSSIONS AND CONCLUSIONS

Discussions, addressed results and conclusions achieved in this research will be demonstrated in this chapter. In the same way, emphases of achieved objectives, contributions of results for academic research, the implications of results for enterprises, the limitations of this research and suggestions for future research will be presented in this chapter.

6.1 Research Objectives

Smartphone as a communication tool with high technology and innovations is become essential as a part of people´s daily life. In order to solve the research question: How and which are the influences on consumer's behavioral intention to purchase smartphone from consumer's DSI and frugal behavior? This dissertation established a general research objective which is analyzing the impact of consumer's DSI and frugal behavior on intention of smartphone purchase in a cross-cultural context. An approach to utilize smartphone domain as product category to detect the antecedents and consequences factors of consumers´ DSI and frugal behaviors across cultural differences (Brazil, China and India) in the study field of consumer behavior.

For the purpose of accomplish the general objective of this dissertation, the research was achieved through four specific objectives. They are a) identifying the forming antecedents of DSI in smartphone purchase intention; b) identifying the forming antecedents of frugal behavior in smartphone purchase intention; c) evaluating aspects of construct formation of DSI and frugal behavior and the possible relation between them; d) analyzing the existence of cultural orientation differences through modeling method among the DSI, frugal behavior and behavioral intention in smartphone purchase.

The first objective of research was achieved through literature review and the modeling analysis results. Specifically, study of Goldsmith and Hofacker (1991) which create the general six-item, self-report DSI measuring scale with across domains was be mentioned; Other important studies such as Goldsmith and Flynn (1992), Flynn and Goldsmith (1993), Lafferty and Goldsmith (2004), Hoffmann and Soyez (2010), which created new model for DSI analysis, optimized new approaches and applied in

various studies with diversities domains of products; Study of Bartels and Reinders (2011) did a literature review of all consumer innovativeness and its correlations; Studies of Chan and Misra (1990), Venkatraman (1988), King and Summers (1970) , Childers (1986) , Jain and Srinivasan (1990), Belton and Clinton (2007), Bhat and Reddy(1998) which analyzed and correlated antecedents and consequences of DSI (e.g. opinion leadership, product involvement ,acquisition attitudes etc.).

Moreover, we get the forming antecedents of DSI as product involvement, symbolic value and opinion leadership are all positive correlated with DSI from the analysis method (SEM) which be applied in this dissertation. During the accomplishment of the first objective, observed that some correlations highlighted in others studies from the literature review were confirmed (e.g. product involvement, symbolic value, opinion leadership) in the application of this research, and some of them (e.g. novelty seeking) were not confirmed. Then, it is a good way to test validity and reliability of these models through the identified methodologies in quantitative study.

Likewise, it was possible to accomplish the second specific objective, which was accomplished through literature review and the modeling analysis results, too. Through the highlight previous studies of frugal behavior, for example, in the study of Lastovicka (1999) created a multi-item frugality measurement scale and applied in six empirical studies; Studies of Shoham et al. (2004), Pepper et al. (2009), Bove and Nagpal et al. (2009), Goldsmith and Flynn et al. (2014), which identified and analyzed the antecedents and consequences factors correlation with consumer’s frugal behavior.

In the chapter of results, this dissertation demonstrated the correlations between forming antecedents and frugal behavior in practice. Some results were confirmed the previous studies (e.g. intrinsic religiosity, economic strain), some were not confirmed but with a rational circumstance and explanation (e.g. materialism, status consumption), some were not significant in this research (e.g. hedonic value, consumer independence). Once again, this research tested the reliability and validity of the models which were proposed by other authors in the identified aspects of quantitative study.

Otherwise, through literature review and results of SEM (structural equation modeling) applied in this study, it was possible to accomplish the third objective. Through the studies of Lastovicka (1999) and Goldsmith and Hofacker (1991) which

helped the formation of constructs of DSI and frugal behavior to applied in questionnaires of survey. Thus, received necessary sample through survey method and analyze the sample with technique: SEM (structural equation modeling). After repeatedly tentative and adjustment of modeling, the analytical results of final model didn't present significant correlation between DSI and frugal behavior. Other environmental factors need to be considered in further researches.

At last, the forth objective was accomplished in literature review and data analysis with SEM. The studies of Hofstede (1980), Hofstede (1983), Hofstede (1984), Hofstede and Bond (1984), Hofstede (1985), Hofstede and McCrae (2004), which specifically demonstrated the cultural differences among behaviors, management, learning, organizations and personal values. Additionally, studies of Steenkamp et al. (1999), Matos et al. (2011) and Matos and Leis (2012) have examined antecedents and consequences of consumer behaviors in a cross-cultural context. Hence, each constructs were formed based on literature review.

During the survey data collection, we collected data from three different countries (Brazil, China and India) to reach the objective. In the final model of this study, utilize the cultural differences moderate the relations between DSI and behavioral intention, frugal behavior and behavioral intention in structural equation modeling. After analyze the data with SEM, the results showed that cultural individual´s collectivistic orientation and uncertainty avoidance orientation significantly moderate the relation between DSI and BI in smartphone purchase, but not they are not in agreement with hypotheses; individual´s power distance orientation, status consumption and economic strain significantly moderate the relation between FB and BI in smartphone purchase, but not combine with suggested hypotheses. Moreover, collectivistic orientation and uncertainty avoidance orientation showed no significant moderate effects in the relation between FB and BI, as well as power distance showed no significant effect in the relation between DSI and BI. Hedonic value showed no significant moderate effects in the results. Eventually, the cultural differences moderators and other moderators were well applied in quantitative method of analysis in this study, but for those no significant results further in depth researches need to consider.

6.2 Theoretical Implications

In the field of consumer innovation behavior, various previous empirical studies had addressed to analyze the antecedents and consequences of consumer innovativeness in a cross-culture context, but little study had investigated how is the behavior of innovative consumers from different emerging cultures in one specific product purchase. However, this study conducted an empirical research which investigated the behaviors of DSI consumer from different emerging markets in smartphone purchase.

On the other hand, little study had addressed consumer frugal behavior in a specific product domain and/or in different emerging cultures. This study contributed to the gap, by conducted an empirical study to investigate the behavior of frugal consumer from different markets in smartphone purchase.

At last, little paper had tried to correlate the relations between DSI and frugal behavior in one specific product purchase and cross-culture context. In this study, we tried to explore the possible relation between DSI and FB, even it was failed.

In summary, we conducted a survey to consumers from three emerging countries (Brazil, China and India) in order to a) test a theoretical model that integrated the main antecedent variables of DSI and FB; b) try to explore the possible relation between DSI and FB; c) fill the gap of lack empirical study of investigate the consumer frugal behavior in specific product domain; d) fill the gap of lack empirical studies of DSI and frugal behavior across different emerging cultural value orientations; e) try to understand how DSI consumers and frugal consumers with different emerging cultural value orientations in behavioral intention to purchase smartphone.

6.3 Managerial Implications

On the initial results, it was decided to modify the model. Following literature of structural equation to generate the modifications report, which is available on AMOS ™, and promote the suggested changes to fit the model.

Considering the rapidly development of smartphone industry and the intense of competition in the global market environment as a context. However, many smartphone enterprises which carried out smartphone marketing did not achieve the

desired effects, which means understanding and conducting customers' intention to purchase smartphone is necessary for smartphone companies. The conclusions of this study showed that product involvement, opinion leader, symbolic value in product, consumer innovativeness (social technological condition), materialism and constrained frugality (social economical condition) have direct or indirect impact on customer's intention, individual's economic strain and cultural orientation also have moderate effects on intention.

Behavioral intention is more reliable indicator of actual acquisition than perceived usefulness and perceived ease of use (Turner et al., 2010). Therefore, a) enterprise can promote the improvement of smartphone technology, which can enhance the consumer innovativeness as well as social technological condition; b) enterprise can put more symbolic value in their new smartphone model (e.g. creative model design combine with popular color, premium model development and innovation material usage); c) do better smartphone marketing (e.g. advertisement, product knowledge palestra, high quality of sale service and after sale service etc.) to orient consumer's opinions; d) enhance consumer smartphone involvement(new model launch event with celebrity, unforgettable advertisement through diversity canals, outstanding decoration of retails ,creative uniforms of clerks, add more practical features in new model of smartphone); e) enterprise can develop diversity models and peripheral products (e.g. mascot, earphone, stereo speaker etc.), establish more production lines, which not only can active social economical movement but also can offer more job opportunities to consumers; f) Multinational smartphone companies need to understand the differences of cultural relativity, social economical condition and social technology condition in each country, develop and provide appropriated products that can satisfy consumers with different cultural orientation.

In summary, one purpose of this study is help smartphone marketers to identify and analyze the factors which influence behavioral intention of consumers to purchase smartphone, and advise them to launch new project of smartphone appropriately with considering all the relevant factors.

6.4 Research Limitations and Propositions for Future Studies

Despite the methodological rigor in the development of this research, it has theoretical and practical limitations. Understanding the limitations is crucial to identify the relevant elements of the investigated context and to understand the results achieved with the study. Furthermore, to develop and build this research, along the steps, elements have been identified that provide and instigate the development of future studies, which point out advancement possibilities in contributions to the proposed conceptual model, which can minimize the constraints faced in this research.

First of all, the non-significant interactions in results could be attributed to the utilized sample in this study (e.g. interaction between DSI and NS, interaction between FB and CI, association between DSI and FB). Thus, the conceptual model in this study need further modifications. For example, add more antecedents or consequences of FB and/or DSI in the conceptual model; expand the survey sample size and change the research countries; introduce other theoretical models from literature review and append into current framework).

The second limitation is some moderators showed no significant moderate effects in the final model (e.g. neither collectivism nor uncertainty avoidance have significant moderate effects in relation between FB and BI; power distance has no significant moderate effect in association between DSI and BI; hedonic value has no significant moderate effect in relation between DSI and BI as well as in relation between FB and BI). During the data analysis, statistical method dichotomization was adapted to calculate the moderate effects through AMOS^{TM}. Dichotomization is literally a good way to calculate the moderate effects of variables, but in meanwhile the process may generated a lot of statistic power which can interfere the results.

The third limitation was the composition of survey sample of each country is not at the same standard. Brazilian sample is composed by university students with relatively young age (78.5% of Brazilian participants are at the age range of 19-29 years old), but both Indian and Chinese sample varied more social classes and ages (only 55% of Chinese participants and 56.1% of Indian participants are at the age range of 19-29 years old). Thus, it may cause uncertain results. Although many features of smartphone may easily attract young generations or people who are technology savvy, it is may be an up-hill battle if it is introduced to a totally different

audience (Chen et al., 2011). Future studies should consider this factor in survey distribution, maintain the composition percentage of objects of each sample at the same standard.

The fourth limitation is in conceptual model design, we only adapted one dependent variable of FB and DSI: behavioral intention; Further studies can append more customer behaviors as dependent variables (e.g. actual intention to acquire smartphone, attitudes toward smartphone and intention to exchange etc.).

The fifth limitation is during the data collection phase, the questionnaire (research instrument) was described in three languages (the questionnaire was developed in English, then translated into Portuguese to serve the Brazilians participants and Chinese to serve the Chinese participants) in order to distribute to people from three countries. Thus, the different language versions of questionnaire may bring different meanings for participants from different countries, which may cause intangible errors during data collection; further studies can search a more precise alternative way to control the distribution of survey;

The sixth limitation is the methods we utilized to collect data from each country were not the same due to the restricted research condition. Specifically, the Indian sample was collected through Amazon Mechanical Turk, the Brazilian sample was collected through personal distribution and the Chines sample was collected through social network. Further studies might need to maintain the same standards of data collection in each country.

The seventh limitation is the same model and brand of smartphone in each country´s market may have different prices (e.g. the price in dollars of IPhone 6s launched in Chinese market is relatively cheaper than which launched in Brazilian market). Moreover, currency like family income was adjusted in all versions of questionnaires. But there may exist different standards to distinguish the social classes of each country based on family income. The standard vary depend on target country´s economic circumstance and other factors. Future research can establish an evaluate scale of social classes in their survey to understand each country´s social class standard.

The eighth limitation is that we collected data from one country in Latin America, one in South Asia and one in East Asia, all of them are developing countries within emerging markets. Future research could expand this sample to

include countries in North America, Europe, Africa, Central Asia and the Pacific Region. The sample size can also be expanded.

The ninth limitation is the measurement of cultural values was based on Hofstede´s cultural dimension theory, future studies might investigate others cultural values from different theories to compare whether can obtain convergent results or not.

The tenth limitation and opportunity for future studies is to investigate what are the characteristics of customers whom possess both innovative behavior and frugal behavior in intention of smartphone purchase.

At last, future studies can substitute smartphone with other high technology products (e.g. tablet, notebook, domestic robot, google glass etc.) or other product categories (e.g. clothes, cars etc.).

APPENDIX A: QUESTIONNARIE ITEMS WHICH APPLIED IN RESEARCH

Introduction

Hello, thanks for your attention.

My name is Feng, I'm a master student of the University of Vale do Rio dos Sinos (Brazil) and I'm conducting an academic survey about smartphones. The objective of this research is "to analyze the impact of the Domain Specific Innovativeness and Frugal Behavior on Intention to Purchase Smartphones. “We need to understand your opinion about smartphone usage. Your answers will just for academic use and will help to complete the research of my master dissertation. Please noticed that no personal identification is required, please answer these questions carefully and in an appropriate period of time (9 minutes).

At last, I appreciate for your collaboration!

1) To answer the statements below you will utilize a scale from 1 to 7, which the number 1 means you strongly disagree with the statement and 7 means you strongly agree.

Items	*Statements*	*Strongly disagree*	*Disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q1	*I watch advertisements for smartphones frequently on TV.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q2	*I watch advertisements for smartphones frequently on magazines and newspaper.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q3	*I watch advertisements for smartphones frequently on billboard ads.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q4	*I watch advertisements for smartphones frequently through Internet*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Novelty Seeking (Chan and Misra 1990)								

Items	Statements	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	agree	Strongly agree
Q5	In general, you looking for group of people to discuss about smartphones.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q6	When speaking of smartphones with your friends you advocate your ideas.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TQ1	You have one mouth	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q7	In smartphones discussions people usually respect your ideas.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q8	You try to advise your friends to use certain types of smartphones	(1)	(2)	(3)	(4)	(5)	(6)	(7)

Opinion leadership (King and Summer s 1970; Childer s 1986)

Items	Statements	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	agree	Strongly agree
Q9	I enjoy reading about my religion	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q10	It is important to me to spend time in private prayer and thought	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q11	I have often had a strong sense of God's presence	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q12	I try hard to live all my life according to my religious beliefs	(1)	(2)	(3)	(4)	(5)	(6)	(7)

Intrinsic religiosity (Gorsuch and McPherson 1989; Bove et al., 2009)

Items	Statements	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	agree	Strongly agree
Q13	I buy new smartphone that are best for me without worry of what others will think	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q14	I buy new smartphone that I like whether others agree or not	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q15	I do not care if the new smartphones I buy conform to the expectations of others	(1)	(2)	(3)	(4)	(5)	(6)	(7)

Q16	*When I'm buying a new smartphone, my personal preferences and likes are more important to me than the opinions of others*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
TQ2	*New York is the capital of USA*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Consumer Independence (Clark's ,2006)								

Items	*Statements*	*Strongly disagree*	*Disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q17	*I am always interested in new smartphones which can give me more status*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q18	*The status that a smartphone can offer is something important to me.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q19	*I would pay a little more for a new smartphone if it had more status*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q20	*The more status a smartphone has, the more valuable it will be for me*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Status Consumption Scale (Eastman et al., 1996)								

Items	*Statements*	*Strongly disagree*	*Disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q21	*I would like to be rich enough to buy anything I want.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q22	*I'd be happier if I could afford to buy more things in my life*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q23	*I believe that money can buy happiness.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q24	*To buy everything I want is something that I dream in this life.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Materialism (Richins, 1987)								

Items	Statements	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	agree	Strongly agree
Q25	In general, it is hard for me and my family to live on our present income.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q26	I have had problems with lack of money recently.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TQ3	Michael Jackson is Chinese	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q27	It sometimes bothers me quite a bit that I can't afford to buy all the things I want.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q28	Financial problems interfere with my relationship with other people.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

Economic Strain (Hilton and Devall, 1997)

Items	Statements	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	agree	Strongly agree
Q29	In general, I am the first in my circle of friends to buy a new smartphone when it appears.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q30	If a new smartphone lunched in market, I do like to buy before other people do.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q31	In general, I am the first in my circle of friends to have the knowledge of the latest smartphone.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q32	When a new smartphone is lunched, I am one of the earliest persons to get heard about.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

Domain Specific Innovativeness (Goldsmith and Hofacker, 1991)

Items	Statements	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	agree	Strongly agree
Q33	I like to get involved directly on a smartphone purchase.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q34	I consider myself an enthusiast when it comes to smartphone.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

Q35	*I feel attracted to smartphones issues.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q36	*Having a new smartphone is something that makes me very excited.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*

Product Involvement (Belton and Clinton, 2007)

Items	*Statements*	*Strongly disagree*	*Disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q37	*I intend to keep continuing use smartphone in the future.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q38	*I intend to have a better purchase of smartphone in the future from my experience.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*

Behavioral Intention (Ting et al.,2011 and Kim,2008)

Items	*Statements*	*Strongly disagree*	*Disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q39	*Making better use of my resources makes me feel good.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q40	*I discipline myself to get the most from my money*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q41	*I am willing to wait on a purchase I want so that I can save money*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q42	*There are things I resist buying today so I can save for tomorrow*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q43	*If I take care of my possessions I will definitely save money in the long run.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*

Frugal Behavior (Lastovicka et al., 1999)

Items	*Statements*	*Strongly disagree*	*Disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q44	*I make purchase because I like it, not by obligation*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q45	*Making purchase is a real distraction for me*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
TQ4	*Human live on*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*

	Earth							
Q46	*Making purchase is a really cool way to spend leisure time.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q47	*I enjoy making purchases*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*

Hedonic value (Babin, darden and Griffin, 1994)

Items	*Statements*	*Strongly disagree*	*Disag ree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q48	*Having a smartphone is a sign of prestige*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q49	*Having a smartphone is a sign of sophistication*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q50	*Having a smartphone is a sign of success*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q51	*Having a smartphone is a sign of glamour*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*

Symbolic Value (Bhat and Reddy, 1998)

Items	*Statements*	*Strongly disagree*	*Disag ree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q52	*Individuals should only pursue their personal goals after considering group goals.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q53	*Group welfare is more important than individual reward.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q54	*Group success is more important than individual success.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q55	*Group loyalty should be encouraged even if individual's goals suffer*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*

Cultural Relativity: Collectivism (Hofstede)

Items	*Statements*	*Strongly disagree*	*Disag ree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q56	*It is important to closely follow instructions and procedures.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q57	*Standardized*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*

	work procedures are helpful.							
Q58	*Instructions for operations are important.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
TQ5	*The sun rises in the east*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q59	*Rules and regulations are important because they inform me of what is expected.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Cultural Relativity: Uncertainty Avoidance (Hofstede)								

Items	*Statements*	*Strongly disagree*	*Disag ree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*agree*	*Strongly agree*
Q60	*People in higher positions should make most decisions without consulting people in lower positions*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q61	*People in higher positions should avoid social contact with people in lower positions*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q62	*People in lower positions should not disagree with people in higher positions.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Q63	*People in higher positions should not delegate important tasks to people in lower positions*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Cultural Relativity: Power Distance (Hofstede)								

2) Social-demographic Items and Smartphone Consumption

1. Gender: ( ) Male ( ) Female
2. Age: ( ) Less than 18
   ( ) Between 19 and 29
   ( ) Between 30 and 39
   ( ) Between 40 e 60
   ( ) More than de 60

3. Family income: ( ) Less than 300 dollars/1000 reais/2000 yuan

( ) Between 300 and 850 dollars/ 1000 and 3000 reais/2000 and 6000 yuan

( ) Between 850 and 1500 dollars/3000 and 5000 reais/6000 and 10000 yuan

( ) More than 1500 dollars/5000 reais/10000 yuan

4. Educational background: _____

5. Marital status: _____

6. Which brand of smartphone you possess? _____

7. Which brand of smartphone you would like to purchase? _____

8. In which circumstances that you bought your last smartphone?

( ) My smartphone was broken

( ) My smartphone was working fine, but I decided to buy a newly released one at that period of time

( ) My smartphone was working well, but with technological backward.

( ) My smartphone was stolen

( ) Others: _____

9. In average which life span of a smartphone to you?

( ) 1 year ( ) 2 to 3 years ( ) 3 to 5 years ( ) More than 6 years

10. In average how many apps do you have on your smartphone?

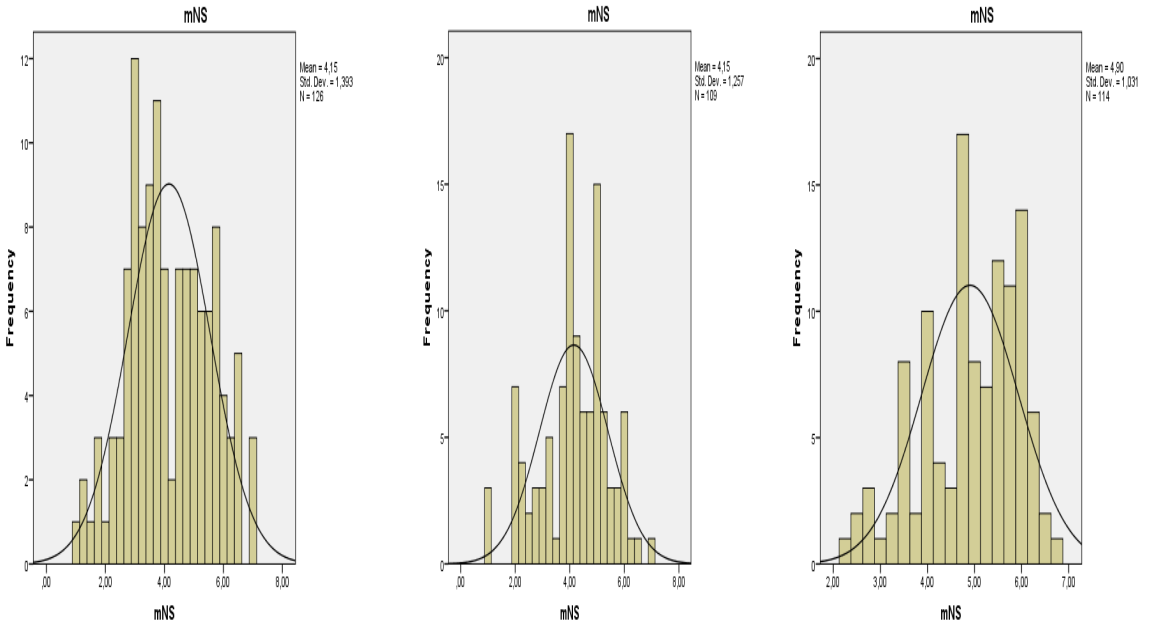
( ) 1 to 10 ( ) 11 to 20 ( ) 21 to 30 ( ) More than 31

11. How many hours do you use smartphone per day? (Venkatraman 1988)

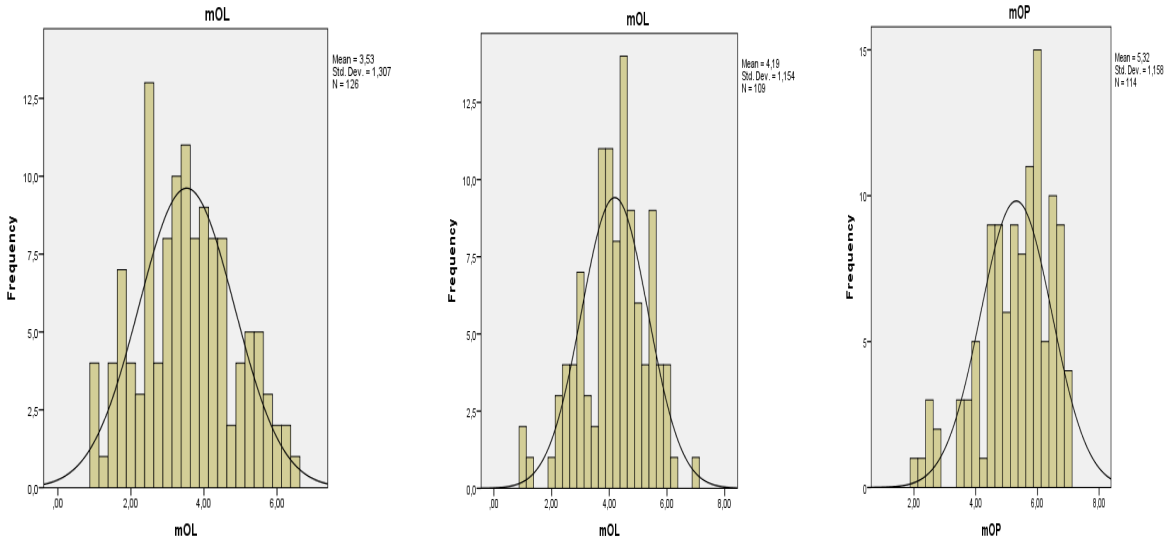
( ) Less than 1 hour ( ) 1 to 3 hours ( ) 4 to 6 hours ( )7 to 11 hours

( ) More than 12 hours

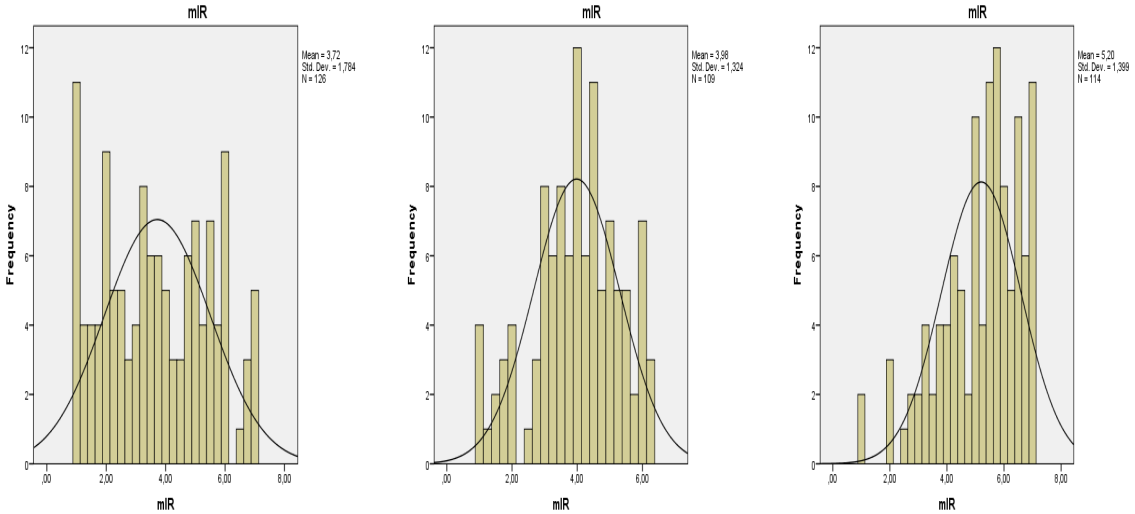
APPENDIX B: NORMALITY CURVE OF EACH CONSTRUCT



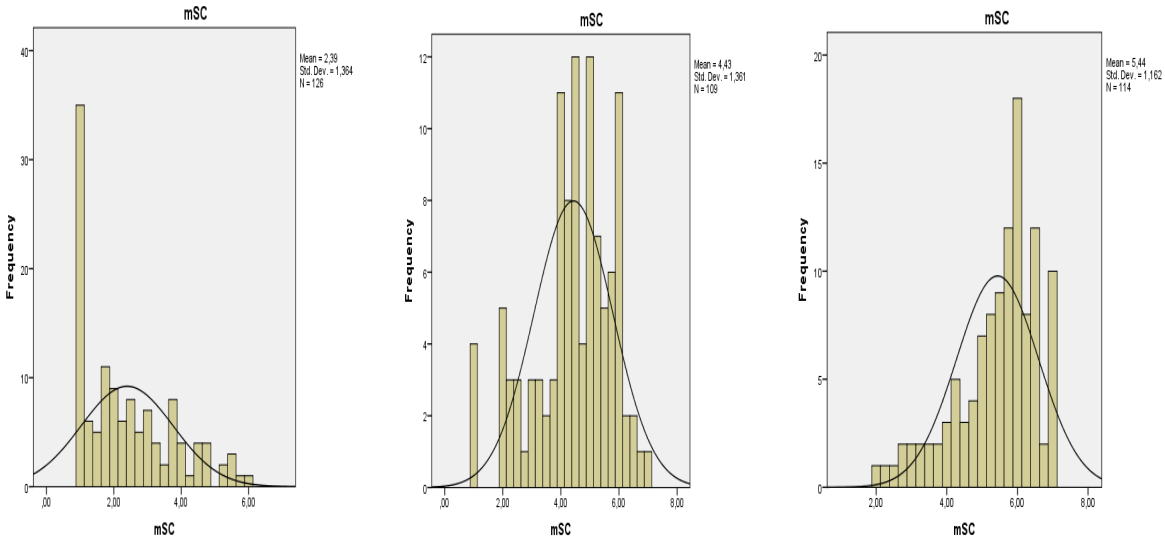
Note. Normality curve of novelty seeking from Brazilian sample, Chinese sample and Indian sample (left to right).



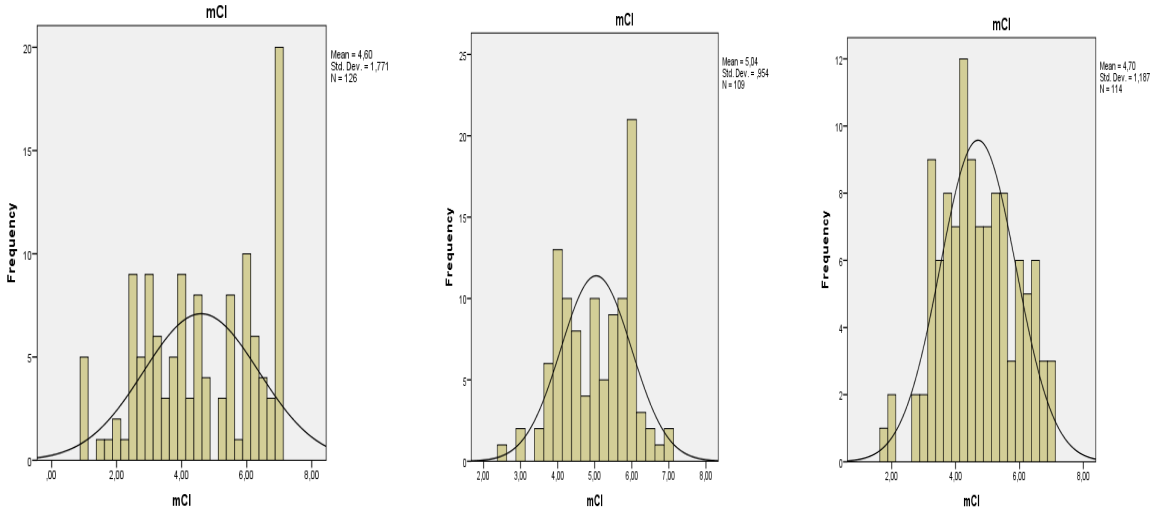
Note. Normality curve of opinion leadership from Brazilian sample, Chinese sample and Indian sample (left to right).



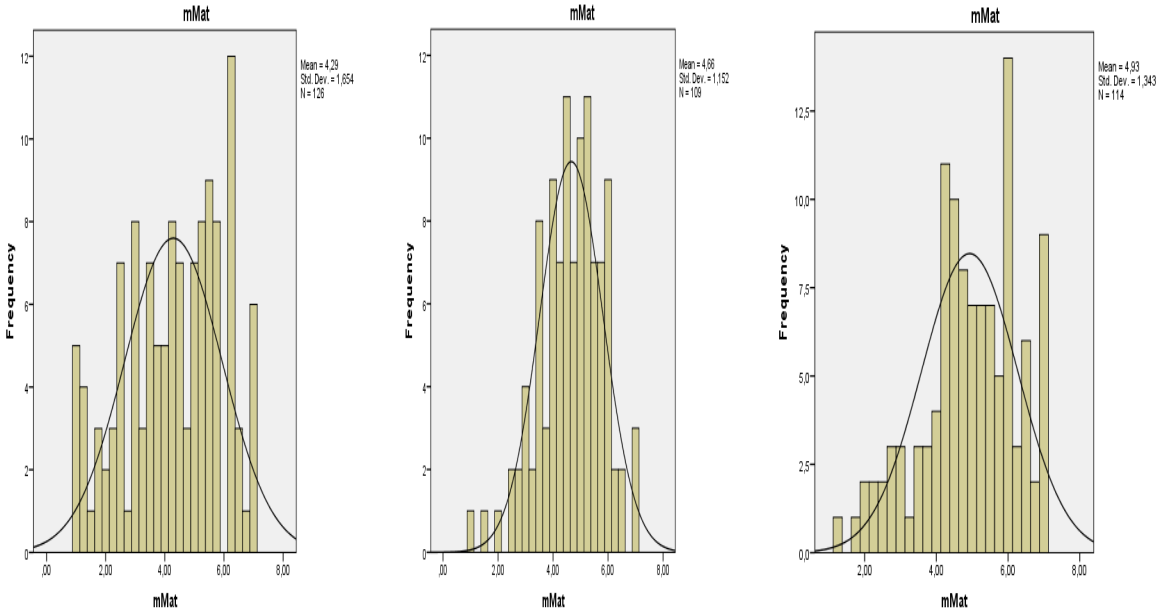
Note. Normality curve of intrinsic religiosity from Brazilian sample, Chinese sample and Indian sample (left to right).



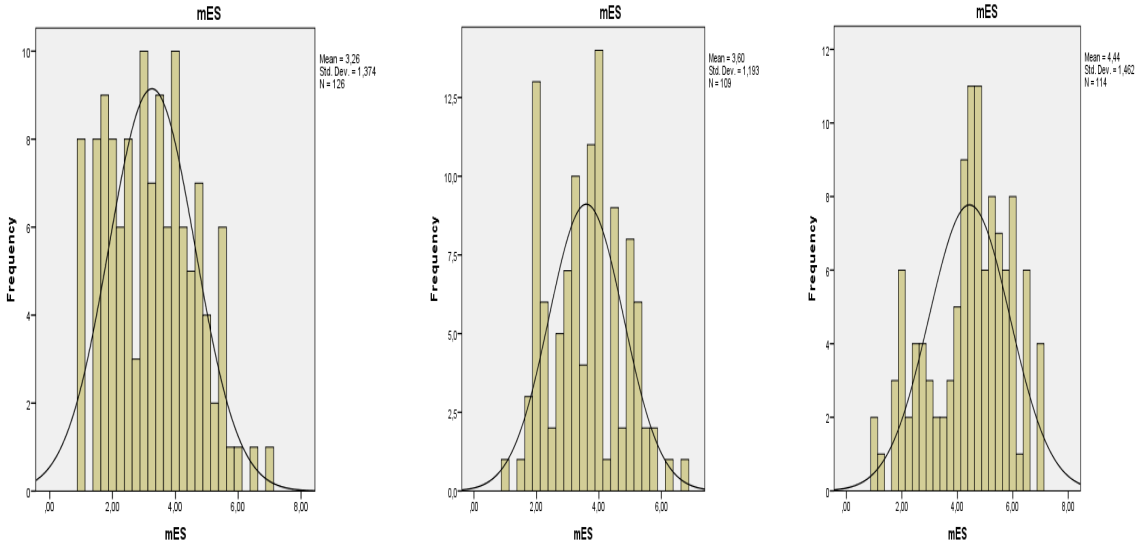
Note. Normality curve of status consumption from Brazilian sample, Chinese sample and Indian sample (left to right).



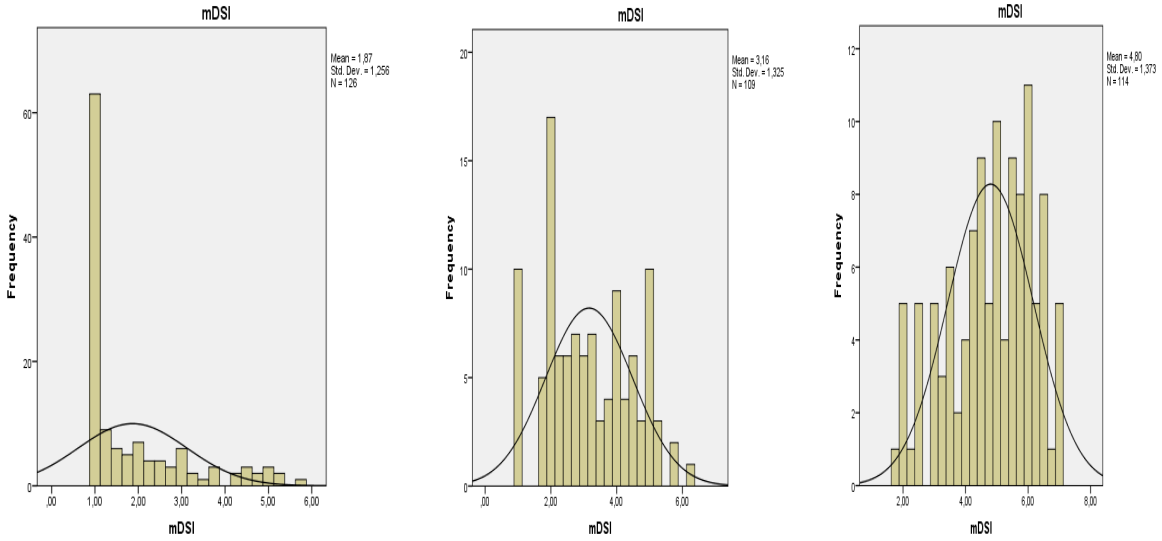
Note. Normality curve of consumer independence from Brazilian sample, Chinese sample and Indian sample (left to right).



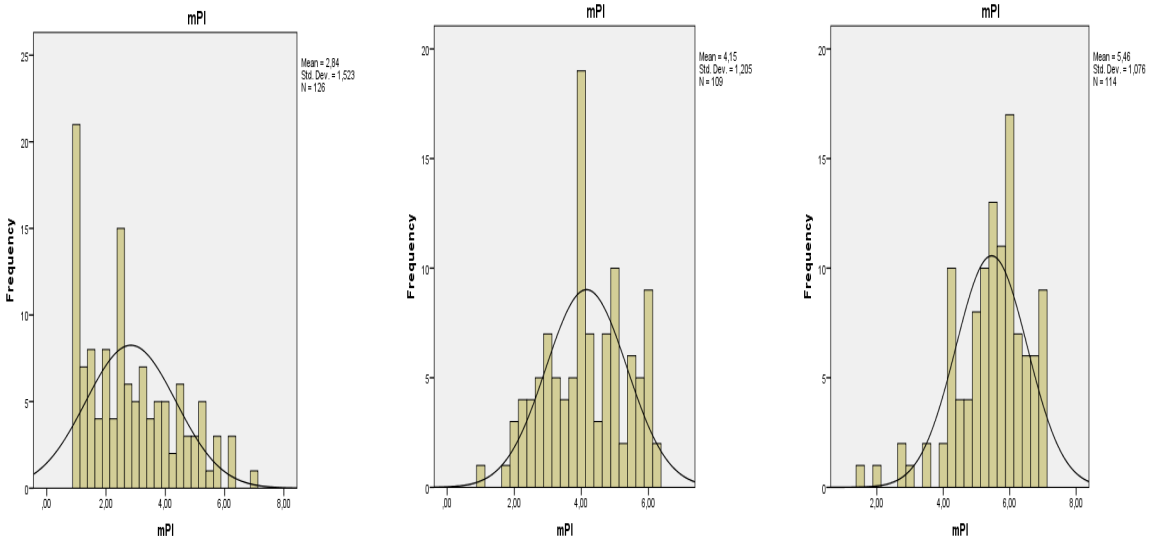
Note. Normality curve of Materialism from Brazilian sample, Chinese sample and Indian sample (left to right).



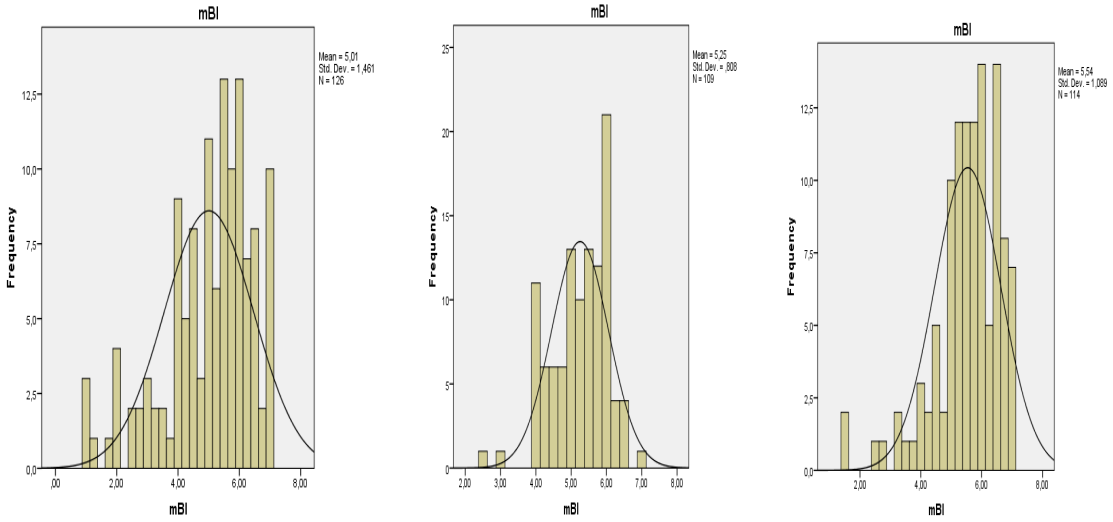
Note. Normality curve of Economic strain from Brazilian sample, Chinese sample and Indian sample (left to right).



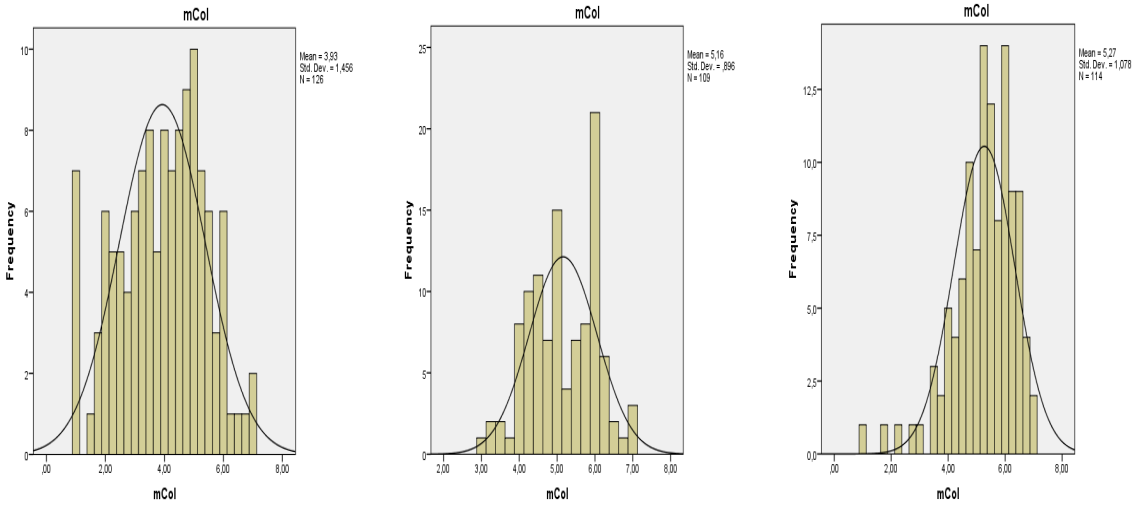
Note. Normality curve of Domain specific innovativeness from Brazilian sample, Chinese sample and Indian sample (left to right).



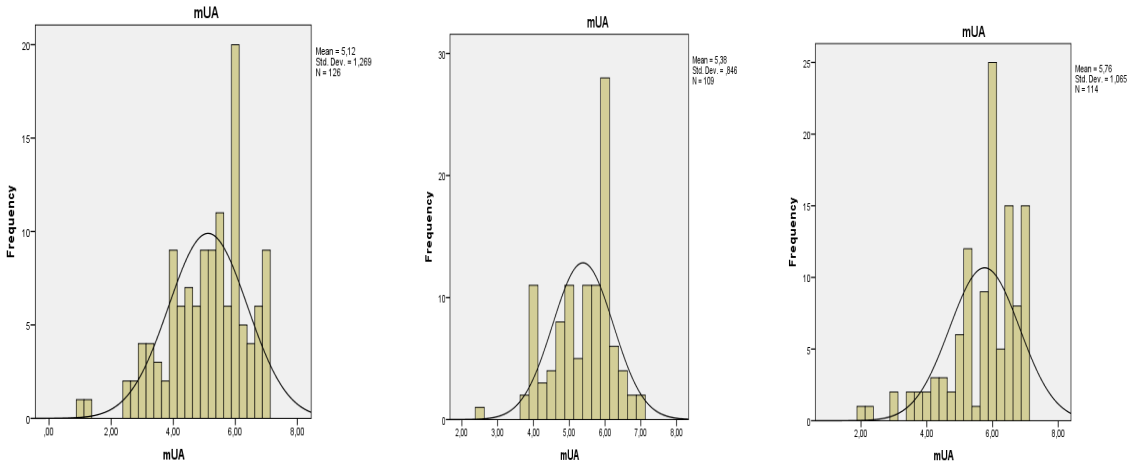
Note. Normality curve of Product involvement from Brazilian sample, Chinese sample and Indian sample (left to right).



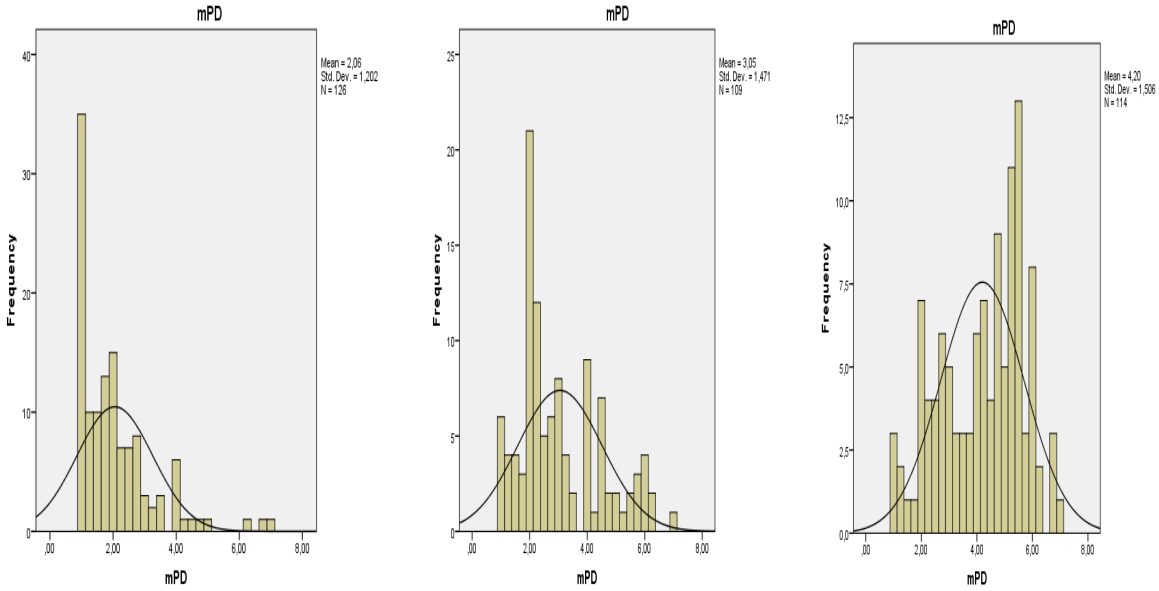
Note. Normality curve of Behavioral intention from Brazilian sample, Chinese sample and Indian sample (left to right).



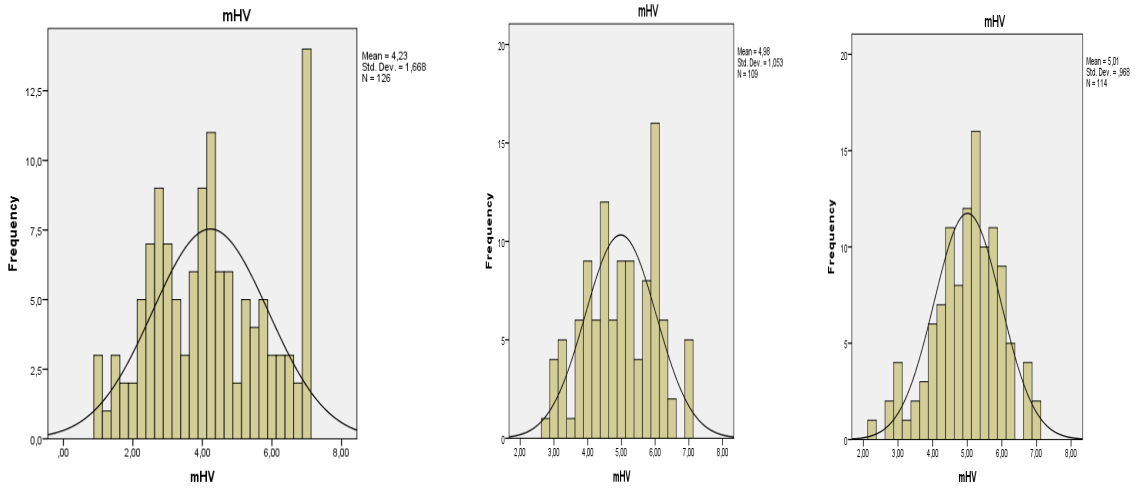
Note. Normality curve of collectivism from Brazilian sample, Chinese sample and Indian sample (left to right).



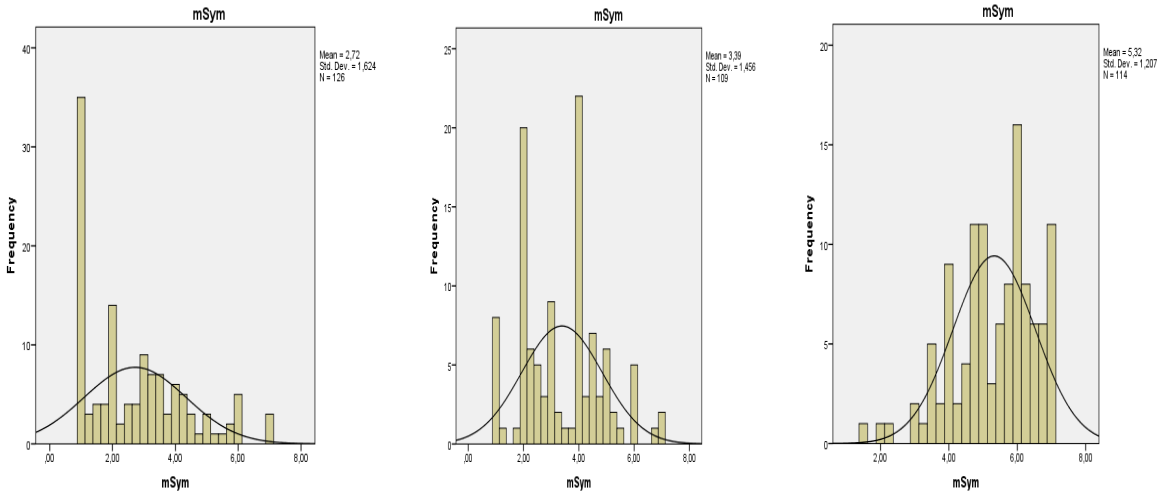
Note. Normality curve of Uncertainty avoidance from Brazilian sample, Chinese sample and Indian sample (left to right).



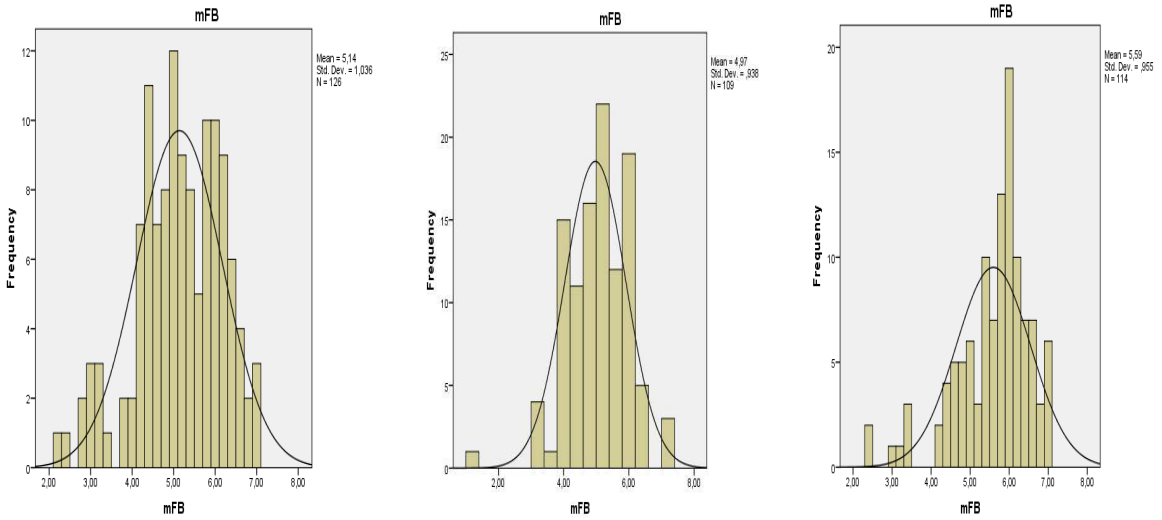
Note. Normality curve of Power distance from Brazilian sample, Chinese sample and Indian sample (left to right).



Note. Normality curve of Hedonic value from Brazilian sample, Chinese sample and Indian sample (left to right).



Note. Normality curve of Symbolic value from Brazilian sample, Chinese sample and Indian sample (left to right).



Note. Normality curve of Frugal behavior from Brazilian sample, Chinese sample and Indian sample (left to right).

APPENDIX C: POST HOC TESTS AMONG COUNTRIES

Dependent Variable	(I) Countries	(J) Countries	Mean Difference (I-J)	Std. Error	Sig.
Col	China	Brazil	1,22969*	,15452	,000
		India	-,10929	,15824	,788
	Brazil	China	-1,22969*	,15452	,000
		India	-1,33897*	,15269	,000
	India	China	,10929	,15824	,788
		Brazil	1,33897*	,15269	,000
UA	China	Brazil	,26200	,14185	,183
		India	-,37574*	,14528	,036
	Brazil	China	-,26200	,14185	,183
		India	-,63774*	,14018	,000
	India	China	,37574*	,14528	,036
		Brazil	,63774*	,14018	,000
PD	China	Brazil	,99490*	,18208	,000
		India	-1,14691*	,18647	,000
	Brazil	China	-,99490*	,18208	,000
		India	-2,14181*	,17993	,000
	India	China	1,14691*	,18647	,000
		Brazil	2,14181*	,17993	,000
NS	China	Brazil	-,00797	,16238	,999
		India	-,75672*	,16630	,000
	Brazil	China	,00797	,16238	,999
		India	-,74875*	,16046	,000
	India	China	,75672*	,16630	,000
		Brazil	,74875*	,16046	,000
OP	China	Brazil	,66228*	,15864	,000
		India	-1,12772*	,16246	,000
	Brazil	China	-,66228*	,15864	,000
		India	-1,79000*	,15676	,000

IR	India	China	1,12772*	,16246	,000
		Brazil	1,79000*	,15676	,000
	China	Brazil	,26340	,19988	,421
		India	-1,21791*	,20470	,000
	Brazil	China	-,26340	,19988	,421
		India	-1,48131*	,19751	,000
SC	India	China	1,21791*	,20470	,000
		Brazil	1,48131*	,19751	,000
	China	Brazil	2,03834*	,17014	,000
		India	-1,00740*	,17424	,000
	Brazil	China	-2,03834*	,17014	,000
		India	-3,04574*	,16813	,000
CI	India	China	1,00740*	,17424	,000
		Brazil	3,04574*	,16813	,000
	China	Brazil	,44896*	,17878	,044
		India	,34641	,18309	,169
	Brazil	China	-,44896*	,17878	,044
		India	-,10255	,17666	,845
Mat	India	China	-,34641	,18309	,169
		Brazil	,10255	,17666	,845
	China	Brazil	,37515	,18459	,128
		India	-,26479	,18904	,376
	Brazil	China	-,37515	,18459	,128
		India	-,63993*	,18241	,002
ES	India	China	,26479	,18904	,376
		Brazil	,63993*	,18241	,002
	China	Brazil	,34038	,17670	,158
		India	-,84227*	,18096	,000
	Brazil	China	-,34038	,17670	,158
		India	-1,18264*	,17461	,000
DSI	India	China	,84227*	,18096	,000
		Brazil	1,18264*	,17461	,000
	China	Brazil	1,29349*	,17224	,000

PI	Brazil	India	-1,63989*	,17640	,000
		China	-1,29349*	,17224	,000
		India	-2,93338*	,17021	,000
	India	China	1,63989*	,17640	,000
		Brazil	2,93338*	,17021	,000
	China	Brazil	1,31438*	,16901	,000
		India	-1,30247*	,17308	,000
	Brazil	China	-1,31438*	,16901	,000
		India	-2,61685*	,16701	,000
	India	China	1,30247*	,17308	,000
		Brazil	2,61685*	,16701	,000
BI	China	Brazil	,24436	,15267	,279
		India	-,28937	,15635	,182
	Brazil	China	-,24436	,15267	,279
		India	-,53373*	,15086	,002
	India	China	,28937	,15635	,182
		Brazil	,53373*	,15086	,002
HV	China	Brazil	,74920*	,16835	,000
		India	-,02941	,17241	,986
	Brazil	China	-,74920*	,16835	,000
		India	-,77861*	,16636	,000
	India	China	,02941	,17241	,986
		Brazil	,77861*	,16636	,000
Sym	China	Brazil	,66936*	,18914	,002
		India	-1,93695*	,19371	,000
	Brazil	China	-,66936*	,18914	,002
		India	-2,60631*	,18691	,000
	India	China	1,93695*	,19371	,000
		Brazil	2,60631*	,18691	,000
FB	China	Brazil	-,16562	,12822	,435
		India	-,62226*	,13131	,000
	Brazil	China	,16562	,12822	,435
		India	-,45664*	,12670	,002

	India	China	,62226*	,13131	,000
		Brazil	,45664*	,12670	,002

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