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CONSUMERS' READINESS TO ACCEPT TECHNOLOGY-BASED PRODUCTS AND SERVICES IN DEVELOPING COUNTRIES: THE CHILEAN EXPERIENCE

DISPOSICIÓN DE LOS CONSUMIDORES A ACEPTAR LOS PRODUCTOS Y SERVICIOS DE BASE TECNOLÓGICA EN LOS PAÍSES EN DESARROLLO: LA EXPERIENCIA CHILENA

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Abstract

The objective of this study was to test the external validity of the Technology Readiness Index (TRI) in a developing country. A hypothesis was formulated in order to test predictability of demographics and attitudinal variables with intention to embrace and use technology-based products and services. The TRI taxonomy of five-segments was also tested with a hypothesis. The survey was conducted in Spanish using a professionally translated version of the 36-item TRI, with the same 5-point scale format as the original TRI study (Parasuraman, 2000). Results indicate that demographic variables still matter when explaining people's willingness to adopt new technology, age being the most consistent predictor. Results also provide evidence that attitude gets more importance than demographics when the potential adoption of a new technology may carry some potential risks of being affected either economically or physically. The cluster analysis procedure indicated that a four-cluster solution provided the best grouping of respondents into meaningful segments. Only 13% of Chileans can be classified as explorers (compared to around 15-20% in the U.S.). The explorers combined with 27% of Chileans classified as pioneers, constitute 40% of the Chilean population that is likely to be ready to immediately accept new technologies. Also, a discussion of the potential effect of specific national cultural dimensions is provided.

Keywords: Technology Readiness Index (TRI), demographics versus attitude, TRI taxonomy, national cultural dimensions, Chile.

Resumen

El objetivo de este estudio es probar la validez externa del índice que mide la disposición a adoptar tecnologías (TRI, por su nombre en inglés) en un país en vías de desarrollo. La principal hipótesis fue formulada con el fin de probar la utilidad como variables predictivas de la demografía y actitud sobre la intención de adoptar y utilizar los nuevos productos y servicios de base tecnológica. La taxonomía TRI de cinco segmentos también se probó con una hipótesis. La encuesta se realizó en español utilizando una versión traducida profesionalmente de los 36 ítems del TRI, con el mismo formato de escala de 5 puntos, como en el estudio TRI original (Parasuraman, 2000). Los resultados indican que las variables demográficas todavía importan a la hora de explicar la voluntad de las personas para adoptar nuevas tecnologías, siendo la edad el predictor más consistente. Los resultados también demuestran que la actitud se vuelve más importante que la demografía cuando la posible adopción de una nueva tecnología puede conllevar

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algunos riesgos potenciales, sean éstos económicos o físicos. El análisis de conglomerados indicó que una solución de cuatro segmentos proporciona la mejor agrupación de los encuestados. Sólo el 13% de los chilenos se puede clasificar como exploradores (en comparación con alrededor de 15 a 20% en los EE.UU.). Los exploradores combinados con un 27% de los chilenos clasificados como pioneros, constituyen el 40% de la población chilena que pueda estar listo para aceptar inmediatamente las nuevas tecnologías. Finalmente, se presenta una explicación del efecto potencial que tienen las dimensiones culturales nacionales en los resultados obtenidos.

Palabras clave: Índice de disposición a adoptar tecnología, demografía versus actitud, taxonomía TRI, dimensiones de la cultura nacional, Chile.

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Introduction

Technology-based products and services are being introduced at an accelerating pace. A report by The Economist Intelligence Unit (2007) revealed that the e-readiness gap (measured on a scale of 1 to 10) is decreasing between the most e-ready countries and the least, from 6.08 points in 2006 to 5.80 in 2007. This index is a compound measurement of the following six different categories: connectivity and technology infrastructure, business environment, social and cultural environment, legal environment, government policy and vision, and consumer and business adoption.

As a result of this tendency towards technology convergence among countries, many multinational companies have embraced the use of technologies into their marketing and operations. In particular, technology is now changing the way services are conceived, developed and delivered (Meuter, Bitner, Ostrom, and Brown 2005). Many companies are making this move in order to reduce costs (the primary reason in many cases), customer demand, a desire to increase customer satisfaction, increase service efficiency towards customers, and a need for new delivery channels to reach new customer segments (Bitner, Ostrom & Meuter, 2002; Liljander, Gillberg, Gummerus & van Riel, 2006). For instance, we can see that banks, airlines, retailers across industries, governments, and schools, to cite just a few, are all adding new developments in technology in order to achieve their goals, and hopefully those of their customers. One example is Canadian Tire, a retailer that has implemented a co-production of the service in their stores. It gives the customer the option of scanning, paying for, and bagging their own items without any employee assistance. However, despite the wide availability of new technological developments, Meuter, Ostrom, Bitner and Roundtree (2003) argue that very little is known about the factors influencing customer usage of self-service technology options.

An implicit assumption made by companies that is behind this behaviour is that consumers will adopt and actually prefer these self-service technology developments over the traditional ones given the functional benefits they can offer. These include convenience, freedom and control (*i.e.* account holders do not need to personally go to the bank anymore; air travellers can perform the check-in process by Internet, mobile phone, or check-in kiosks; income tax declaration can be done on-line; purchases from some retailers can be made without in-person interaction, etc.). Similarly, Jaafar Abdul, Ramayah and Saad (2007) argue that technology adoption by companies will contribute to them performing tasks faster (time reduction benefit), being more competitive (locally and internationally), and achieving higher profits (minimizing errors). No doubt, the role of technology, particularly in customer service, has brought major changes for both companies and consumers (Lin & Hsieh, 2007).

However, not everyone (i.e. customers and employees) may be mentally ready to embrace and use technologies in their personal and professional lives. From the point of view of technology, some services have become too sophisticated for consumers (Lin & Hsieh, 2007); they involve too much effort, time and/or risk (Bateson, 1985). Consequently, many consumers are experiencing feelings of anxiety (Meuter et al. 2003), or technophobia (Tsikriktsis, 2004), which affect their beliefs and behaviour toward technologies. Yen (2005) provides evidence that consumers do not equally appreciate the value created by technology, as is advertised by companies. Therefore, companies' profits from the incorporation of new technologies cannot be realized if customers are not willing to embrace and use new technology they might have available (Meuter, Bitner, Ostrom, and Brown 2005).

Theoretical Framework

Several theoretical models have been used in order to gain more knowledge on how technology innovation influences peoples' intention or actual behaviour. Among these we can mention the Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980); the Theory of Planned

Behaviour, (TPB; Ajzen & Madden, 1986); the Technology Acceptance Model, which is rooted in the TRA (TAM; Davies, 1989); and the Technology Readiness Index (TRI; Parasuraman, 2000). The last two have been explicitly developed for technology adoption. The TAM paradigm, for instance, was designed to predict employee's technology adoption behaviour in a work environment (Davies, 1989), while the TRI paradigm is an attitudinal variable that has been developed to measure "*people's propensity to embrace and use new technologies for accomplishing goals in home and at work*" (Parasuraman, 2000, p. 308).

Parasuraman (2000) has developed a multiple-item scale— called the Technology Readiness Index – to measure people's propensity to adopt and use new technology-based products and services. Technology Readiness (TR) is much more a reflection of people's mental attraction towards —or avoidance of— technology-based systems than it is a reflection of peoples' technical competence. TR is a multi-dimensional construct, consisting of four distinct factors:

Optimism: A positive view of technology and a belief that it offers people increased control, flexibility and efficiency in their lives.
Innovativeness: A tendency to be a technology pioneer and thought leader.
Discomfort: A perceived lack of control over technology and a feeling of being overwhelmed by it.
Insecurity: Distrust of technology and scepticism about its ability to work properly.

The first two dimensions are "contributors" that increase a person's TR because high levels of these attributes will boost a person's overall TR. The last two dimensions are "inhibitors" that suppress a person's TR, because high levels of these attributes will depress TR. As a result, each individual can be located in a technology-beliefs continuum ranging from resistant to technology to receptive to technology. It is interesting to note that in an unrelated qualitative study focusing on consumers in India, Adhikari and Rao (2006) confirmed the existence of positive and negative feelings toward technology based products and services, as well as the presence of the four factors.

Based on several empirical studies that have shown consistent support for this four-dimensional structure of TR, Parasuraman (2000) developed a 36-item measurement instrument to assess peoples' TR. These studies also offer strong evidence that peoples' TR is an important predictor of the degree to which they are likely to adopt and use a variety of technology-based products and services. Moreover, studies have shown that people can be meaningfully segmented into five distinct clusters —labelled *explorers, pioneers, skeptics, paranoids* and *laggards* —based on their scores on the four dimensions of TR (Parasuraman & Colby, 2001). These segments have distinct psychographic and demographic profiles, and they differ significantly in terms of their technology-related preferences and behaviours, as well as the time these different segments take to enter into the technology market (explorers, pioneers, skeptics, paranoids, and laggards, in that order). A detailed discussion of these differences and their implications is beyond the scope of this paper, but is available in Parasuraman and Colby (2001).

The rapid globalization process is leading to a proliferation of technologies, not only in developed countries such as the U.S., but also in developing countries around the world. Therefore, the issue of studying consumers' reactions to technology-based products and services needs to go beyond just developed countries and should also include developing countries. However, to date, studies of consumers' technology readiness have focused mainly on developed countries. With this in mind, we carried out a formal study of technology readiness of consumers in Chile, a developing country and one that has been considered a leader in Latin America.

Hypothesis Formation

One of the preferred sets of variables used by researchers to explain technology adoption has been a demographics characteristic. According to Rogers (1995) there is a long tradition of focusing on innovations' demographic variables and characteristics as the primary predictors of innovation. More recently, Bobbitt and Dabholkar (2001) argue that one way to truly understand what drives consumer decisions is to examine underlying consumer attitudes. Davies *et al*. (1989) report that attitude is an antecedent of intentions to adopt computer technologies. Similarly, Meuter *et al*. (2003) find that the construct of technology anxiety, defined as the user's state of mind regarding their ability and willingness to use technology-related tools, is a better predictor of self-service technology usage than traditional demographic characteristics such as age and gender. However, following the suggestion made by Bobbitt and Dabholkar (2001), it is better to first understand more generalized attitudes toward technology, because this will allow researchers to more fully capture underlying motivation. Precisely, TR has a wider spectrum since it was designed to measure peoples' attitudes toward technology adoption in general,

and was not focused on a particular new device. Therefore, the following hypothesis is formulated:

H1: Attitude toward technology adoption (TRI) is more important than demographic variables in explaining intention to adopt technological innovations.

A review of the TR in the literature from 2000 finds that very few studies have used such a paradigm to test for the taxonomy of five clusters originally proposed by Parasuraman (2000). A replication and extension of the original study performed by Parasuraman (2000) was performed in the UK by Tsikriktsis (2004). Although he confirms the original structure related to the four dimensions identified by Parasuraman (2000), he does not confirm the existence of the five-cluster taxonomy. The segment labelled "paranoids" in the U.S. study did not emerge from the UK data. Yen (2005), using a sample of 459 Taiwanese respondents, found only three out of the five segments: explorers, pioneers, and skeptics (paranoids and laggards were not found). However, her sample was quite biased since she included only experienced users of online travel agencies or bookstores, who are undoubtedly more ready to embrace and use new technology. More recently Massey, Khatri, and Montoya-Weiss (2007) report the emergence of the five segments with a small sample of university students. Therefore, the following hypothesis is formulated:

H2: The Chilean data will yield the same five clusters reported by Parasuraman (2000) based on U.S. data.

Methodology

Questionnaire

Data collection was carried out by means of a survey. The questionnaire was administered via telephone to a random sample of 501 respondents older than 18, belonging to all regions and social classes within the country. The sampling procedure sought to keep the gender distribution and size of the sample from different regions to be as representative of the populations in those regions as possible. Other sections of the survey questionnaire included questions regarding current use of technology-based products/services, as well as demographic and background information.

The technology readiness scale items used in this study were adopted from Parasuraman (2000). The original questionnaire was developed in English and then translated into Spanish for the data collection to be carried out in Chile. To ensure consistency in translation, back translation was also performed. The survey instrument consisted of three main sections. Section 1 asked the respondents to answer 36 technology readiness oriented questions. These questions were structured on a Likert scale model (1 to 5) with "strongly disagree," "disagree," "neither agree nor disagree," "agree," and "strongly agree" as the choices. Section 2 of the questionnaire included questions regarding the current and potential use of technology-based products and services. Finally, section 3 included questions about respondent demographics. In order to avoid a response bias due to question order, four different random arrangements were prepared and one quarter of the sample responded to each version.

Data Collection

The study sample consisted of a national cross-section of adults (18 or older), chosen through a random selection of household telephone numbers from all over Chile. When no one answered when called during the initial contact, up to three callbacks were made at different times before replacing the number with another randomly chosen one. A total of 2,198 different telephone numbers were dialled, among which 826 did not answer, 91 were not in service, 555 householders refused to participate in the study and 225 did not qualify to be interviewed. Finally, 501 interviews were completed, representing 39% of the actual contacts made. In Chile, 51.5% of households have a landline telephone (www.ine.cl).

Table 1 shows that the final sample consisted of an even number of male and female respondents, that the great majority of respondents have completed high school or at least have some college education, and that there were respondents from all age ranges, with a mean of 40 years of age. The sample size by region was equivalent to that of the population on a national level, thus Santiago, the metropolitan area, had 33% of the total sample. Besides, only 15% of those sampled were working in a technology related profession, such as computing, programming, systems engineering, systems consulting or technology sales, 52% were married, and only 7.6% considered the place where they were living as rural area.

Results

Assessment of Reliability and Validity

According to the latest officially approved census in Chile (www.ine.cl), 51% of the households have mobile phones (73% in the sample), 20.5% have a computer at home (61% in the sample), 10.2% have internet connection (40% in

Table 1. Sample Profile

Characteristics	Frequency	% in the Sample	% in Population
Region			
I	16	3.2	2.8
II	16	3.2	3.2
III	8	1.6	1.6
IV	24	4.8	3.9
V	56	11.2	10.4
VI	33	6.6	5.1
VII	32	6.4	5.9
VIII	64	12.8	12.2
IX	32	6.4	5.6
X	40	8.0	7.0
XI	8	1.6	0.6
XII	8	1.6	1.0
Metropolitan Area (Capital)	164	32.7	40.8
Total Sample	501	100.0	100.0
Gender			
Male	248	49.5	49.3
Female	253	50.5	50.7
Education level			
Incomplete high school or less	96	19.2	54.1
High school degree	144	28.7	21.5
Some college	134	26.7	18.8
College graduate (bachelor degree)	97	19.4	4.9
Graduate degree (master or higher degree)	29	5.8	0.7
Missing	1	0.2	
Age			
18-24 years old	99	19.8	16.3
25-34 years old	107	21.4	22.9
35-44 years old	111	22.2	22.7
45-54 years old	93	18.6	15.9
55-64 years old	45	9.0	10.6
65 + years old	46	9.2	11.7

Source: Authors' own.

the sample) and 23.9% have TV cable or satellite (61% in the sample). Based on Table 1 we can see that, overall, the sample for this study very well resembles the profile of the population revealed by the latest accepted census in Chile. Geographic distribution, gender and age are almost equal between the sample and the population. The exception is for the educational level, which is more educated than the average population in the sample.

As shown in Table 2, all constructs have good or acceptable fit. Discriminant validity refers to the extent to which a certain construct is different from other constructs. A test for discrimination is to investigate if the correlation between one scale and another is not as high as each scale's Cronbach's coefficient alpha (Andaleeb, 1995; Gaski & Nevin, 1985). The results displayed in Table 2 reveal that there is enough support of good discrimination, considering that correlations between those constructs were in all cases below the coefficient alpha of individual constructs. The reliability coefficient (Cronbach alpha) for each of the four factors is as follows: Innovativeness 0.70; Optimism 0.69; Discomfort 0.68; and Insecurity 0.74.

Table 2. Correlation and Cronbach Alpha Coefficients

	INN	OPT	DIS	INS
Innovativeness (INN)	***0.70***			
Optimism (OPT)	0.49**	***0.69***		
Discomfort (DIS)	-0.34**	-0.26**	***0.68***	
Insecurity (INS)	-0.26**	-0.25**	0.60**	***0.74***

** Correlations are significant at $p < 0.01$.

Main diagonal shows the Cronbach alpha coefficients.

Source: Authors' own.

A review of the mean scores in Table 3 reveals that, for Chileans, the most prominent of the four dimensions is Insecurity (4.14), followed by Optimism (3.81), Discomfort (3.66) and Innovation (3.15). The average score for the overall TRI is 2.77. On average, the inhibitors are

scoring much higher than the contributors regarding the adoption of technology.

Hypotheses Testing

The first hypothesis is tested using hierarchical multiple regression, and H2 was reached by means of cluster and discriminant analyses.

Regression Analyses by Country Sample

To examine the effects of demographic variables and attitude toward technology on the intention to adopt new technology devices, a hierarchical multiple regression, enter procedure, was used. The independent variables were grouped in two separate blocks. Demographic variables (gender, age and education) were entered in the first block. The four attitudinal dimensions relating to TR (innovativeness, optimism, discomfort and insecurity) were entered in the second block. The score for each factor was computed using the mean of the variables comprising each factor.

Thirteen separate regressions were run for the dependent variables that relate to the intention of adopting several new technological products/services. Results are presented in Table 4.

Both demographic and attitudinal independent variables explain some of the variance in the dependent variables. Demographic variables explain between 1% to 20.2% of the variance of the dependent variables, while TR variables explain between 2.4% to 10.6%. In nine of the thirteen dependent variables, demographics are better predictors than attitude ('maintain a family home page on the internet', 'watch an interactive television

Table 3. Summary Statistics for the Technology Readiness Index (TRI) and Its Components

TR Components	Mean	S.D.	Skewness	Kurtosis	Correlation Coefficients [a]			
					INN	OPT	DIS	INS
Innovativeness (INN)	3.15	0.60	-0.02	-0.13	1.00			
Optimism (OPT)	3.81	0.45	-0.41	0.71	0.49	1.00		
Discomfort (DIS)	3.66	0.49	-0.49	-0.05	-0.34	-0.26	1.00	
Insecurity (INS)	4.14	0.50	-1.22	2.07	-0.26	-0.25	0.60	1.00
Overall TRI	2.79	0.37	0.47	0.60	0.75	0.67	-0.75	-0.72

Note: All mean values are on a 5-point scale where 1 = strongly disagree and 5 = strongly agree. The overall TRI score for each respondent was obtained by averaging the scores on the four components (after reverse coding the scores on the discomfort and insecurity components).
a. All correlations are significant at $p < 0.01$.

Table 4. Hierarchical Multiple Regression Explaining the Intention of Adopting Technological Products / Services

	Maintain a family home page on the Internet	Use a robot at the checkout at the supermarket	Watch an interactive television that allows customization of program content	Vote in a parliamentary election from a home computer	Purchase a large item like a car or furniture over the Internet	Make phone call with full two-way video	Send a voice message over the Internet	Visit the World Wide Web through Web TV rather than a computer	Attend to classes over the Internet	Read a book on a CD or the Internet	Allow a computer to help to diagnose and treat a medical problem	Apply for a loan over the Internet	Own an emergency beacon for identifying a person's location
Demographics													
Age	-0.135**	-0.076	-0.259**	-0.165**	-0.140**	-0.193**	-0.242**	-0.237**	-0.166**	-0.265**	-0.005	-0.133**	-0.160**
Education level	0.010	-0.054	-0.028	0.086	-0.083	0.127**	0.146**	0.037	0.038	-0.050	-0.119*	-0.009	0.054
Gender	-0.014	-0.054	0.011	0.043	-0.049	-0.081	-0.022	-0.071	-0.007	-0.054	-0.031	-0.099*	-0.010
R^2	**0.044**	**0.044**	**0.088**	**0.107**	**0.060**	**0.176**	**0.202**	**0.129**	**0.062**	**0.089**	**0.009**	**0.107**	**0.055**
Attitude Toward Technology													
Innovativeness	0.061	0.142**	0.108*	0.097	0.023	0.134**	0.123*	0.118*	0.081	-0.006	0.050	0.088	0.107
Optimism	0.126*	0.133**	0.095	0.199**	0.157**	0.143**	0.139**	0.085	0.116*	0.186**	0.136**	0.163**	0.080
Discomfort	-0.119*	-0.021	-0.021	-0.060	-0.102	-0.116*	-0.119*	-0.065	-0.017	-0.066	-0.041	-0.016	-0.063
Insecurity	0.080	-0.119*	0.045	-0.076	-0.156**	-0.012	-0.028	-0.034	-0.023	0.098	-0.044	-0.229**	0.090
R^2	**0.033**	**0.070**	**0.024**	**0.079**	**0.083**	**0.068**	**0.067**	**0.036**	**0.027**	**0.035**	**0.032**	**0.106**	**0.025**
Total R^2	**0.077**	**0.114**	**0.112**	**0.187**	**0.143**	**0.244**	**0.269**	**0.165**	**0.089**	**0.124**	**0.041**	**0.213**	**0.080**

* Significant at $p < 0.05$.
** Significant at $p < 0.01$.
Source: Author's own.

that allows customisation of programme content', 'vote in a parliamentary election from a home computer', 'make a phone call with full two-way video', 'send a voice message over the Internet', 'visit the World Wide Web through Web TV rather than a computer', 'attend classes over the Internet', 'read a book from a CD or the internet', and 'own an emergency beacon for identifying a person's location'). For three dependent variables TR is a better predictor (use a robot at a supermarket checkout, purchase a large item like a car or furniture over the internet, and allow a computer to help to diagnose and treat a medical problem). Finally, one dependent variable is equally predicted by both demographics and TR (applying for a loan over the internet).

These results reveal an interesting tendency among Chileans. Whenever there is a potential risk associated with the technology adoption, either economic or physical, then the set of attitudinal variables emerges as a more important predictor. However, conversely, when there is no potential risk for the respondents, then demographics consistently are better predictors than attitudinal variables.

Among the demographic variables, 'age' by far resulted to be the most significant independent variable. It is significant in eleven out of the thirteen regressions run. Younger people tend to consistently report higher levels of willingness to adopt technological innovations. Surprisingly, the two regressions for which age was not significant were related to new technological developments where some potential economic and physical risks are associated (use a robot at a supermarket checkout and allow a computer to help to diagnose and treat a medical problem). Educational level was significantly related to three technological products/services considered. A positive relationship was found with "make a phone call with full two-way video" and "send a voice mail message over the internet". Then, the higher the educational level that was attained by respondents the higher the willingness to adopt the corresponding technological development. However, for the other significant regressions for which educational level resulted to be a significant independent variable, the relationship is negative ('allow a computer to help to diagnose and treat a medical problem'). Here is can be seen that there is again an issue with a type of technological service, the adoption of which is related some form of physical risk. For this, the higher level of education achieved resulted in a lower disposition to adopt the new technology that has some associated risk for the adopter. Finally, the variable 'gender' was found to be negatively significant for only one regression ('apply for a loan over the internet'). Females are less willing to perform such a transaction over the internet.

Among independent attitudinal variables, the dimension of 'optimism' is significant in ten of the regressions, 'innovativeness' in five, and 'discomfort' and 'insecurity' in three. The first two dimensions, which contribute to technology adoption, have a positive impact for all the regressions. The last two dimensions, which are inhibitors, have a negative effect on the dependent variables.

Overall, the aggregated results from this study reveal that demographic variables are better predictors of technology adoption when there is no risk associated for consumers. For instance, it is expected that the adoption of new products designed for entertainment, leisure activities and communication, can be better explained by traditional demographic variables such as age, education and gender. On the contrary, the adoption of products and services designed for medical purposes, financial investment and purchases is much better predicted by the attitude toward technology, particularly by the contributors of 'optimism' and 'innovativeness'. Therefore, H1 is partially supported.

Market Segmentation

Previous studies have demonstrated that TR can be used to segment markets (Lin, Hsin & Sher, 2007; Tsikriktsis, 2004; Yen, 2005). To explore the different levels of technology adoption by consumers, we used cluster analysis. The independent variables for clustering were the four factors: 'innovativeness', 'optimism', 'discomfort', and 'insecurity'. Investigation of the different clustering partitions revealed that a four-cluster solution provided the best grouping of respondents into meaningful segments. Based on the results presented in Tables 5, 6, and 7, the four segments are described as follows:

Segment 1, comprising 35.1% of the respondents is called Laggards. The Laggards are mainly female, with an average age of 45, and with a low level of education.

Segment 2, comprising 27.3% of the total sample is called Pioneers. These are mainly males, around 40 years of age, quite well educated but on average less so than the explorers.

Segment 3, grouping 13.2% of the sample is called Explorers. This group is mainly comprised of males (67%), is younger than any other group (mean = 34 years), and has the highest level of education.

Finally, segment 4, comprising 24.4% of the respondents is called *Skeptics*. This group is evenly divided between males and females, who are on average slightly older than the explorers (mean = 35 years), and have a medium-low level of education.

Surprisingly, the fifth segment found by Parasuraman (2000) with the US sample (*i.e.* Paranoids) did not

Table 5. Technology Readiness Segments (Mean Scores) #

Attributes	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Sample Mean
Innovativeness	2.62	3.66	3.74	3.02	3.15
Optimism	3.52	4.06	4.18	3.76	3.81
Discomfort	4.01	3.82	2.98	3.35	3.66
Insecurity	4.44	4.33	3.30	3.95	4.14
Frequency	176	137	66	122	501
Percentage	35.1	27.3	13.2	24.4	100

Underlined scores correspond to those that are higher that the mean of the total sample.
Source: Authors' own.

Table 6. Technology Readiness Segments by Presence of the Attributes

Attributes	Cluster 1 Laggards (35.1%)	Cluster 2 Pioneers (27.3%)	Cluster 3 Explorers (13.2%)	Cluster 4 Skeptics (24.4%)
Innovativeness	Low	High	High	Low
Optimism	Low	High	High	Low
Discomfort	High	High	Low	Low
Insecurity	High	High	Low	Low

Source: Authors' own

Table 7. Demographic Segments Profiles

Demographic Variables	Test & Significance	Explorers	Pioneers	Skeptics	Laggards
Gender	$\chi 2$ (0.05)	Males (67%)	Males (65%)	Males (50%) Females (50%)	Females (70%)
Age Means	ANOVA	34.4 [c]	39.1 [b]	35.3 [b,c]	46.4 [a]
Educational Level	$\chi 2$ (0.05)	High educated (College degree and higher: 50%)	Medium-high educated (High school and higher: 77%)	Medium-low educated (High school and some college: 69%)	Less educated (High school or less: 69%)

Note: Age means with the same superscripts are not significantly different; age means with different superscripts are significantly different at $p < 0.05$.

Table 8. Predicted Segment Membership

Actual Groups	Number of Cases	Laggards	Pioneers	Explorers	Skeptics
Laggards	176	***172*** ***97.7%***	1 0.6%	0 0.0%	3 1.7%
Pioneers	137	1 0.7%	***134*** ***97.8%***	0 0.0%	2 1.5%
Explorers	66	0 0.0%	0 0.0%	***65*** ***98.5%***	1 1.5%
Skeptics	122	0 0.0%	2 1.6%	3 2.5%	***117*** ***95.9%***

97.4% of original grouped cases correctly classified.
Source: Authors' own.

appear in the Chilean sample. Therefore H2 is also partially supported.

A discriminant analysis using a step-wise procedure was conducted for predictive purposes. The prediction accuracy (*i.e.* hit ratio) is shown in the diagonal of Table 8. For Segment 1 it is 97.7%, for Segment 2 it is 97.8%, for Segment 3 it is 98.5%, and for Segment 4 it is 95.9%, thus achieving an overall of 97.4% for the correctly predicted cases. Given the four segments in this research, by chance alone one would expect a classification accuracy of 1/4 or 25%. The improvement on chance is more than 70%, thus indicating that the discriminant functions are accurate in predicting segment membership.

Discussion

The importance of having a psychographic tool to assess TR instead of demographic variables alone is highlighted

when a demographic homogeneous population is under analysis. Below is a discussion of the possible explanations for Chileans' TR scores.

Wealth is probably the first explanatory variable one may think of that could explain why Chileans score somewhat lower in their TR. Although this may be true, there is evidence that at a certain point in time, culture replaces wealth as a predictor variable (De Mooij, 2011). The mean scores achieved by Chileans in the four TR dimensions may be the reflection of national cultural values. Following the findings of Srite and Karahanna (2006), who performed a study that identifies espoused national cultural values of low masculinity and high uncertainty avoidance as an important set of individual difference moderators in technology acceptance, we explored the potential impact of some of the cultural dimensions proposed by Hofstede (2014): uncertainty avoidance, individualism-collectivism, masculinity-femininity, and power distance.

According to Hofstede (2014) Chile scores one of the highest levels of uncertainty avoidance (Chile = 86). This cultural dimension refers to anxiety, need for security, dependence on experts and a great need for the application of information (Hofstede, 1980, 1991). High uncertainty avoidance cultures need explanations and perhaps scientific proof, while low uncertainty avoidance societies, such as the US, are more interested in results. Buying a brand new product/service, especially the more costly and sophisticated ones, may increase levels of anxiety in those individuals belonging to high uncertainty avoidance countries such as Chile. There is also evidence that in high uncertainty avoidance cultures (*i.e.* Chile) people adopt innovations at a lower speed than in cultures of low uncertainty avoidance (De Mooij, 2011). The cultural environment in Chile is much less conducive to adopting new technologies than those characterised by lower levels of uncertainty avoidance. At the same time, to cope with their uncertainty avoidance, late adopters tend to imitate as they try to benefit from the experience accumulated by early adopters (Sundqvist Lauri & Kaisu, 2005). Therefore, the high level achieved by Chileans in Insecurity in the TR index should not be surprising.

The low level of Innovativeness shown by Chileans should not come as a surprise either. Independently adopting a new technology is not a typical characteristic of collectivistic societies (De Mooij, 2011) such as Chile, which scores very low (Chile = 23). From the national cultural dimensions perspective these results are consistent with those reported by Lynn and Gelb (1996) who developed an index of national innovativeness based on ownership of several technological devices. This index was found to be significantly correlated with individualism and low uncertainty avoidance; the explanation being that emphasis placed on achievement, success, and ambition would be related to innovativeness (Steenkamp, Ter Hofstede & Wedel, 1999).

The national cultural dimension of masculinity/femininity may also explain some of the results obtained for this Chilean sample. Hofstede (2014) reports a score of 28 points for Chile, meaning that it is a feminine society. De Mooij (2011) asserts that in feminine cultures people are less interested in technology than in the masculine cultures.

The last of the four typical cultural dimensions proposed by Hofstede (2014) is power distance. Hofstede (2001) noted that cultures scoring low in power distance are expected to have more of a need for technology. Thus, Chileans, by scoring high in power distance (63) tend to be less techno-ready than people from other countries scoring lower in the same cultural dimension.

Previous studies have also found strong evidence that attitudes towards time, shape attitudes towards significant activities. Gonzalez and Zimbardo (1985, p. 21) posit that, "*there is no more powerful, pervasive influence on how individuals think and cultures interact than our different perspectives on time*". Bergadaa (1990) linked the time orientation construct with behaviour by suggesting that a consumer's attitude toward the past, present, or future relatively encourages more active or reactive responses to various types of products consumed. In this regard, Settle, Alreck and Glaheen (1978) found that future oriented individuals, such as Americans, saw themselves as opinion leaders, more flexible and innovative, more ambitious, involved, adventurous, and mobile than their past and present oriented counterparts. Future oriented individuals are regarded as "voluntaristics", because they claim to undertake any action necessary to be able to have control of their own future (Bergadaa, 1990).

In turn, Chile, as the majority of other Latin American nations, is considered to be present oriented (Gentry, Tansuhaj & Ko, 1993). Present-oriented individuals seek to simplify their lives and rely more on others. This fact explains why Chileans embrace and use new technology at a lower rate than individuals from future oriented societies. They also tend to have an external locus of control; that is, they react to external events, and do not themselves plan any changes (Bergadaa, 1990). They are completely engaged in the here and now (Settle *et al*. 1978) and follow the 'sensation' reality of immediacy and concreteness (Morello, 1989) as their concern is primarily revolved around improving their current situation. Thus, they express a lack of concern with either the past or the future (Brodowsky & Anderson, 2000). Therefore, taking into consideration the cultural perspective, it was justifiable that there were lower scores achieved by Chileans in

the TR. All in all, it seems that results for Chile are clearly reflecting its national cultural values.

Conclusions and Recommendations

This study is one of the first in applying TR to a Spanish speaking country. It is therefore quite interesting that the four dimensions of TR emerge as expected, thus adding external validity to the scale.

One of this study's conclusions is that demographic variables still matter when explaining peoples' willingness to adopt new technology. Particularly, among demographic variables, age is the most consistent predictor for the intention to embrace and use new technology based products and services. Therefore, these results confirm those reported by Meuter *et al*. (2003), who posited that age is the most consistent demographic predictor for the usage of self-service technology by consumers. The results that females and less educated people are less willing to adopt technology may indicate that they prefer to deal with companies based on an interpersonal way of communication rather than a technology based one such as on-line tools.

This study also reveals that demographic variables and attitude toward technology complement each other as predictors of the intention to embrace and use technology based products and services. At the same time, there is evidence that attitude gets more importance than demographics when the potential adoption of a new technology may carry some potential risk of being affected, either economically or physically. For products and services that tend to contribute to a better quality of life without putting at risk some resources, consumers' intentions can be better predicted by demographics alone.

In Chile, where a feminine collectivistic culture of high uncertainty avoidance and power distance prevails, it is expected that adoption of new technology devices would take longer than in masculine individualistic countries of low uncertainty avoidance and low power distance. Chileans, on average, tend to be more cautious until all the facts about a novel technological product/service are well known. At the same time, their needs for conformity and interpersonal communications lead to a fast diffusion, mainly by word-of-mouth, after opinion leaders have lead the way.

These results support an additional argument in favour of culture as a meaningful way of explaining differences in intention and behaviour. Although technology is constantly affecting our lives, it seems that it has an enhancing quality rather than overriding the impact of culture. Therefore, multinational companies should not be dazzled by the misleading idea that the degree of adoption and use of technologies in one country can be used as an indication of a similar pattern across cultures. The temptation may, of course, exist, especially when there are significant economic resources are involved. However, companies should be ready to develop appropriate marketing strategies for both the offline and the online interfaces in order to deal with customers from different cultures.

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