The effect of Consumer’s Socio-Economic stratum on Complexity Expectations of New Technological Products

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Abstract

The adoption of new technological products is a salient issue in current marketing activities. As low-income consumers from emerging economies are increasingly targeted by technology, it becomes necessary to understand the effect of socioeconomic stratum on the way technology is adopted. We contribute to this topic by proposing and testing a scheme of the way socioeconomic stratum influence product complexity expectations, a construct that has been found to be an important determinant of technology adoption (e.g., Wood & Moreau, 2006). Using regression analysis and structural equation modeling we show that socioeconomic stratum influence complexity expectations through consumer’s knowledge, Self-esteem and subjective beliefs of capabilities.
1. Introduction

As technology (cell phones, internet) is being quickly spread to subsistence markets, it is of salient importance for marketers to understand the particularities of the psychological mechanisms that underly technology adoption in these segments. One way to approach the problem is to explore the way in which socio economic level affects known patterns of behavior. Knowing these effects allows marketing strategies to go beyond the obvious income barriers and to incorporate insights about the behavior of subsistence consumers. Such knowledge truly adds to the long term success of technology adoption with consideration for the consumer well being. Under this framework, this research mainly contributes to the understanding of the cognitive barriers that subsistence consumers face before being ready to adopt new technologies. In addition, we contribute, albeit to a lesser extent, to knowledge in the adoption process of technology, by outlining the particularities and contingencies that technology companies may face when targeting subsistence segments. (see Venkatesh, Davis and Morris, 2007, for a recent review of the new directions of research on technology adoption).

Our work focuses on getting insights into the mechanisms that underly the effect of socio economic level on the cognitive structures that precede technology adoption. Specifically, we focus on a relevant construct known as expectations of complexity, which has been found to be a determinant precedent of adoption (Rogers, 1996). It is rather obvious to expect that subsistence consumers face more barriers than other segments when adopting and using new technologies. However, there is little knowledge regarding the detailed
mechanisms, psychological and sociological, that shape the negative effect of a low socio
economic context. We argue that we need that knowledge in order to help businesses in the
development of correct strategies that are directed to the real causes of subsistence
consumers barriers to new markets. With this goal in mind, we aim at setting a general
framework that provides an overall map of the main relationships that intervene in the
effect of socio economic level on complexity expectations of new technology.

The paper is organized in the following way. We first conducted a literature review aimed
at identifying psychological variables that are both influenced by socio economic level and
determinants of complexity expectations. From this exploration we extracted some
relationships and then we went further and developed four hypotheses that were necessary
in order to complete a general conceptual scheme of the effect of socio economic stratum
on complexity expectations, specifying the connections among the mediating variables that
operationalize such effect. Once the conceptual model was established, we performed a
quasi experimental procedure to test it. We analyze the results in two steps. First, we sought
empirical evidence of the pairwise relationships. Then, based on those results and the
theoretical arguments, we rebuilt the conceptual map of relationships and tested it through
structural equation modeling. Results show that our scheme is an adequate representation of
the general effect of socio economic level on expectations of complexity, providing insights
on the mechanisms that produce the effect. Finally, implications are analyzed for
marketing, cultural perspectives and policy making.
2. **Complexity expectations and socio economic stratum**

Different approaches have been taken to explain how new technologies are adopted. One of the most widely used framework focuses on the adopters’ characteristics, according to the chronological adoption of a new product. This way, a consumer might be classified as early, average or late adopter (Dickerson and Gentry, 1983; Rogers, 1962). This widespread approach is very useful for marketing purposes to the extent the researcher is able to find particular market segments that should be targeted at different moments throughout the product development. This view, however, says nothing about the internal process a given consumer performs in order to adopt a new product, regardless of the relative moment of adoption in comparison with other consumers. There is research on technology adoption that focuses on the adoption processes, looking in particular for behavioral or judgmental variables that are related to it (e.g., Bruner and Kumar; 2005; Davis et al 1989). Under this framework, it has been found that the early experience with a product affects definite adoption (Shih and Venkatesh, 2004). As part of the early experience with a product, complexity expectations have been found to be a determinant of the adoption and diffusion of new products and technologies (e.g. Rogers, 1996; Thompson, Hamilton and Rust, 2005; Wood and Moreau, 2006). Complexity expectations are consumers’ ex-ante predictions about ease of use, learning time, and learning difficulty of new products (Wood and Moreau, 2006). The positive or negative confirmation of these expectations (i.e., the technology is less or more complex than expected) provides a point of reference that influences the evaluation of the innovation during its early use, which in turn exerts an effect on final adoption.
Even though the effect of complexity expectations on the adoption process has been the object of different studies (e.g., Shih and Venkatesh, 2004, Wood and Moreau 2006), little research has examined the variables that shape such expectations (Moreau, Lehmann and Markman 2001). For instance, there are no studies that address how complexity expectations differ among consumers depending on their market and personal context. In this work, we contribute to the understanding of complexity expectations by linking it with a contextual variable such as socioeconomic stratum of consumers.

It has been established that consumer’s market context serves as frame for the development of her cognitions, emotions and intentions (Hill and Gaines, 2007), revealing a connection between her sense of self and the ability to consume (McCraen, 1986; Zukin and Maguire, 2004). Within a general notion of market context, one of the variables that shape individual differences is socioeconomic stratum (Boardman and Robert, 2000; Wheatley, Chiu and Stevens, 1980). Consumer’s socioeconomic stratum contribute to shape beliefs, attitudes and behaviors (Lewis, 1959; Hill and Stephens, 1997; Jones and Lou, 1999) and it has been widely accepted that there is a relation between consumption behavior and consumer’s social class (Coleman, 1983; Levy 1966; Schaninger, 1981). Considering this frame, our research aims to determine whether a contextual variable like socioeconomic status influences complexity expectations. More specifically, we hypothesize that the socioeconomic conditions that surround the consumer, determine certain judgments and types of knowledge, which in turn produce a cognitive response that shapes the expected complexity of new technological products. In order to operationalize this notion, we
reviewed the literature using a two step strategy: We first looked for some potential determinants of consumer’s complexity expectations, and then we determined whether consumer’s socioeconomic status may exert an effect on those determinants. In the following sections, we provide details on what the literature contains regarding these relationships, and then we go further proposing a number of hypotheses that complete the scheme.

3. Determinants of complexity expectations:

The notion of complexity expectations can be generally understood as a construct whose constituents are related to subjective beliefs and cognitions regarding the relationship of a person with an object. In this sense, we selected from the literature a set of variables that capture such beliefs and cognitions and therefore may constitute determinants of the complexity expectation construct. These are: knowledge of domains (Moreau, Lehmann and Markman, 2001), previous categorization (Moreau, Markman and Lehmann, 2001) subjective beliefs of capabilities (Beloff, 1992), and Self-esteem (Twenge and Campbell, 2002).

Complexity expectations and knowledge: The cognitive side of expectations is related with consumer’s knowledge. Bettman and Park (1980) stressed the role of previous knowledge in the formation of expectations, pointing out that consumers place new information in a context based on their past and present events. Such mapping process contributes to form expectations about a new product. Other researchers emphasize such view stating that
complexity expectations are constructed using the consumer’s relevant prior knowledge (Oliver and Winter, 1987; Wood and Moreau, 2006). Note that this type of knowledge is a collection of previous experiences without a specified classification structure.

The role of knowledge can also be understood according to some kind of classification. Previous research has established that consumer’s prior knowledge about related product categories may be classified according to the domain to which the information belongs: it could be related whether to the primary domain, when the basic category is directly associated to the new product or to the supplementary domain, when a superordinate category is recalled. This process facilitates product learning (Gregan-Paxton and John, 1997), by allowing the consumer to transfer extant knowledge from familiar to novel domains (Yamauchi and Markman, 2000). Furthermore, it has also been argued that marketers may facilitate categorization–based transfer of knowledge by giving consumers a plausible category label. The activation of such category would then influence behavior by eliciting previously formed preferences that apply to the new product. By the same mechanism, the primed category may also modify consumer’s expectations of product features (Moreau, Markman and Lehmann, 2001).

In the present research we test the robustness of these findings by treating expectations of complexity as one of the subjective judgments that is affected by consumer previous knowledge of categories, either primary or supplementary. In this sense we hypothesize that complexity expectations are reduced due to the improved accessibility to knowledge related to either type of category.
**Complexity expectations and Self-assessed capabilities:** There is no explicit account in the literature, to our knowledge, of a connection between the subjective beliefs of own capabilities and the construct of complexity expectations. However, we suggest that such relation exists and has a key role in the determination in the construction of the expected complexity of a product. We base this hypothesis on the idea that the subjective concept of own capacity generates a general sense of difficulty/easiness for any task a person faces. Such relationship is coherent with the well established notion that perceived self efficacy is a determinant regulator of cognitive processes (e.g., Bandura, 1989; Gist and Mitchell, 1992). This general judgment of difficulty/easiness can be conceptualized, in a very specific expression, as the expectations of complexity. This means that the consumer uses her sense of general efficacy to confront the product and the task ahead. As a result of this match, a complexity expectation judgment is issued. This way, two consumers with identical knowledge of a product should display differences in their expectations of complexity due to different subjective capabilities.

Summarizing, we have put together from the literature a set of cognitive and behavioral variables that may constitute significant determinants of expectations of complexity. These are domains of knowledge, related categories and self assessed capabilities. These variables are expected to be the ones that channel the effect of socio economic stratum on complexity expectations. Thus, in the following section we explore the evidence regarding the relationship of these variables with socio economic aspects.
4. Effects of socio economic stratum

In this section we discuss the effects of socio economic stratum on the different variables and psychological constructs that we previously identified as determinants of complexity expectations. However, we must note that socio economic stratum is the reflection of more specific socio economic variables, such as income, education and place of residence among others. In this research we do not discriminate the effects of these variables separately. Instead, we measure them and then calculate an individual overall socio economic stratum. The focus of our conceptualization and analysis is the effect of this aggregated variable, which can be understood as the aggregate effect of the actual causal agents (i.e., Income, education, etc.)

*Socio economic stratum (SES) - Knowledge of domains and categories:* The widespread characterization of low-income consumers as uneducated and limitedly experienced in important areas of social interactions have made them seem unprofitable and unattractive for marketers. This causes a kind of exclusion from marketing activities (Alwitt and Donley, 1996; Bauman, 1998; Boyce, 2000; Hamilton and Catterrall, 2005). Such isolation affects the formation of knowledge about products. Thus, even though researchers have not explicitly established a direct relationship between socioeconomic status and knowledge of technology domains, some have found that prior knowledge about products is formed through exposure to external sources of information (Gregan-Paxton and Roedder, 1997). This means that socio economic level becomes a proxy for low exposure to the types of marketing promotions that serve to educate consumers in the capabilities and functions
of new technologies. Therefore, we suggest that marketing exclusion constitutes a learning obstacle for low-income consumers. This naturally decreases their knowledge on both technology domains and product categories.

**Socio economic stratum (SES) - Self-assessed capabilities:** The relationship between socioeconomic stratum and subjective capabilities is treated from different perspectives in the literature. For instance, Alwitt and Donley (1996) describe some societies where low SES people are expected to underperform on intellectual tasks. Furthermore, some studies have found that there exists a stereotypical view of poverty, in the sense that some believe poverty is actually caused by lack of capabilities (Becker, 1997). Some authors (e.g., Croizet & Claire, 1998; Rist 1970) argue that such conceptions about low SES groups can be strong enough to produce a stereotype that is somehow adopted by the poor. This leads low SES groups to underperform in different tasks even in the absence of a discriminating treatment (Crocker & Major, 1989; Steele, 1997). Complementary, such stereotype is believed to influence the subjective estimates of intelligence (Beloff, 1992). This way, we expect that SES and Self assessed capabilities are positively correlated.

**Socio economic stratum (SES) - Self-esteem – Self assessed capabilities:** As it was explained above, it has been established that SES affects subjective capabilities through the formation of certain negative beliefs about intelligence. However, there is an additional component of that relationship that is more affectively laden due to the mediation of Self-esteem. Consumer self esteem is an important determinant of behavior that has been found to be related to socio economic stratum. It could be defined as “the overall affective
evaluation of one’s own worth, value or importance” (Blascovic and Tomaka, 1991). Twenge and Campbell (2002) found a small but statistically significant positive relationship between Self-esteem and SES, emphasizing that income, education and occupation were the most salient aspects of SES that drive the effect on Self-esteem. Subsequently, Self-esteem would affect Self assessed capabilities in the following way:

Self-esteem is an overall Self-evaluation (Boardman and Robert, 2000) composed by different dimensions including an “academic” facet (Marsh, 1986, 1990). It has been established that such overall evaluation of the Self is some kind of aggregation of the single dimension assessments. However, if the evaluation of one of the dimensions is not firmly established and supported by clear evidence, then the directionality of the evaluations may be reversed. This means that the overall evaluation would be the driver of the weakly developed dimension evaluation (Rosenberg, Schooler, Schoenbach and Rosenberg, 1995). Given that low SES people have little evidence and experience regarding their capabilities, as well as clear biases, such evaluation is weakly supported. We hypothesize that this is indeed the case and therefore, that a consumer with a low Self-esteem will likely have low Self-assessed capabilities.

5. Summary of relationships and hypotheses.

We have so far explained the relationships that are likely to play a role in the overall effect of socioeconomic stratum on expectations of complexity. Initially, socio economic stratum influences these variables, and through them expectations of complexity is then affected. These variables are: Consumer self esteem, consumer knowledge of product domains,
consumer knowledge of related categories and Self assessed capabilities. Since not all these relationships are well established in the literature we developed specific hypotheses to complement the structural conceptualization.

H1: Information about product categories, primary or supplementary reduces complexity expectations of the new product.

H2: There is an inverse relationship of consumer’s Self-assessed capabilities and expectations of complexity.

H3: Consumer’s Self-esteem positively influences Self-assessed capabilities.

H4: Socio economic stratum positively influences knowledge of technology.

Figure 1 summarizes the complete scheme. The dotted lines denote our hypotheses and solid lines denote the relationships extracted from the literature. Variables represented by squares are observable and variables represented by ovals are non observable constructs.
6. Test of the conceptual scheme

In order to test the scheme and to provide empirical support for it, we performed a quasi experimental procedure. The basic idea was to expose a group of participants from different social levels to a new technological product and ask them to perform some task with it. As we shall explain, we did a pre test in order to select the most appropriate product. Then, at different stages of the experiment, we collected the necessary data to evaluate all variables in the model.

Choice of innovation stimulus: The product selection was based on two requirements: (1) it should be a product unavailable in the local market, and therefore the participant should not
have used it, nor even know specifically how to use it. (2) It should be a product that the consumer may be able to classify in his primary or supplementary domain of knowledge. We ran a pre test with 180 participants from different socio economic strata in Bogota, Colombia. We basically showed participants some information about products and then we asked them to say what they thought the product was and whether they knew it. In order to test the second requirement we developed two treatments for each product. In one treatment the participant was given a picture of the product and a description of some secondary functions of it. In the second treatment we added to that information the main function of the product. If the second requirement was fulfilled, participants in the first treatment should describe the product using a supplementary (or superordinate) category, whereas participants in the second treatment should describe the product using the primary category. The product that produced the best results was an e-book. The primary category mostly used by participants was indeed “digital book reader” (31%); and the most frequent supplementary category was PDA (personal digital assistant) (46%). These results provided us in addition, with the categories that we should use as the primary and supplementary base domains in the subsequent main procedure.

Method
The procedure followed in the quasi experiment was performed one participant at a time, in a closed office with the experimenters. It consisted of four phases, chronologically ordered in the following way: First we identified respondent’s socioeconomic stratum (SES); then we applied a series of instruments in order to measure the mediating variables, namely, participants’ Self-esteem, Self-assessed capabilities and knowledge of technology domains.
Up to that point all participants went through the same procedure. In the third phase we performed a category knowledge manipulation. Note that product categories were pretested during the choice selection phase, and two (e-book reader and PDA) were used in the main study to assess generalizability across new types of technology. Participants were told that the product was either a PDA or an e-book. This should not affect complexity expectations. Finally, respondents were asked to respond the expectations of complexity questionnaire and afterwards to complete a task with the product. Before leaving, participants were paid a flat fee of 6, 9 or 14 USD accordingly to the socio economic stratum.

**Measurement instruments.**

*Socio economic stratum (SES):* Participants filled out a set of demographic questions in order to establish their socioeconomic stratum. We used the assumptions and procedure of Hollingshead and Redlich (1967), according to which, socioeconomic status is determined by: “(1) the existence of a class status structure in the community, (2) that class status positions are determined mainly by a few commonly accepted symbolic characteristics and (3) that characteristics symbolic of class status may be scaled and combined by the use of statistical procedures so that a researcher can reliably and meaningfully stratify the population” This way, following their procedure the demographic variables used to determine SES were: residential stratum, monthly income, educational scale and parents’ educational scale.
**Self-esteem:** We used a standard method for assessing the individual Self esteem that conveniently suited our research procedure. This was the Coopersmith Self-Esteem Inventory (1967). It consists of a group of 25 questions that evaluates participants’ attitudes towards themselves in four areas: (1) social self-peers, (2) home-parents, (3) school / work (4) general-self.

**Beliefs of Capabilities:** To assess participant’s belief of capabilities, we adapted the methodology used by Rammstedt and Rammsayer (2002), which asks subjects to assess their score in the seven aspects of intelligence based on Thurstone’s primary mental abilities (verbal comprehension, verbal fluency, arithmetic ability, memory, perceptual speed, inductive reasoning and spatial visualization), and in the types of intelligence proposed by Gardner (1983) (linguistic, logical-mathematical, spatial, musical, body-kinesthetic, interpersonal and intrapersonal intelligence). Since this instrument was too long for our purposes, the adaptation we conducted was the following: Some weeks before the experiment we applied the test to 64 people different than those of the main experiment. We performed a factor analysis to determine which of the 14 original items of the test should be included. We selected surrogated items following the procedure used by Hair et al (1998): We took the items with a factor loading of 0.7 or above in each of the factors of the rotated solution and we used those items as the constituents of the reduced version of the test. These are the items finally included in the adapted Self-assessed capabilities test: verbal fluency, arithmetic ability, interpersonal intelligence, linguistic intelligence and spatial intelligence. The test presented a short description of each item and asked subjects to assess their subjective level in each item using a seven point scale.
Knowledge of technology domains: Participants’ knowledge was measured using a questionnaire that included 6 different true/false statements. We used a separated questionnaire for each category domain: digital book reader (primary) and PDA (supplementary). Then, participants answered whether the statements were true or false or whether they didn’t know the answer (an option used to avoid guessing) (Johar, Jedidi and Jacobi, 1997; Moreau, Lehmann and Markman 2001). The sum of the correct answers provided the measure of knowledge.

Complexity expectations: Following Wood and Moreau (2006) and Rogers (1996) procedure, participants indicated on three seven point scales how difficult to use they expected the product to be, how long it would take to learn to use it, and how much of a challenge its use would be.

Sample
The sample consisted of 266 participants from Bogota, Colombia, representing most socio economic strata of the city. We hired a trained recruiter, experienced with several marketing research companies, to find the people in the different neighborhoods and bring them to the university campus in small groups.

7. Results
Descriptive information: The sample had a mean age of 39 years old, with a SD of 16 years ranging between 19 and 84 years. 50.8% were male and 49.2% women. Since SES was a
composite measure of four items, we obtained a continuous variable ranging from 1 to 4. We obtained information for all SES levels. Table 1 displays descriptive statistics for the main variables.

Table 1. Descriptive statistics of main variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Socioeconomic Status (SES)</td>
<td>266</td>
<td>.67</td>
<td>4.00</td>
<td>2.11</td>
<td>.85</td>
</tr>
<tr>
<td>2. Self-esteem</td>
<td>266</td>
<td>24.00</td>
<td>100.00</td>
<td>79.98</td>
<td>12.43</td>
</tr>
<tr>
<td>4. Knowledge of domains</td>
<td>266</td>
<td>.00</td>
<td>10.00</td>
<td>3.61</td>
<td>2.82</td>
</tr>
<tr>
<td>6. Expectations of complexity</td>
<td>266</td>
<td>1.00</td>
<td>7.00</td>
<td>3.91</td>
<td>1.26</td>
</tr>
<tr>
<td>3. Capabilities (belief)</td>
<td>266</td>
<td>1.20</td>
<td>6.60</td>
<td>5.10</td>
<td>1.07</td>
</tr>
</tbody>
</table>

We analyzed the information in two steps: In the first one we took the individual relationships among the different variables in order to seek empirical support for each of the relationships explained previously. However, this analysis is not sufficient to test the whole conceptual model. The reason is that several variables (knowledge, Self esteem and subjective capabilities are both dependent and independent. Therefore, step two of the analysis builds on the results of step one by constructing a structural equation model of the whole system of relationships in order to validate its behavior as a system. Such structural model is hence supported by the theoretical argumentations and the empirical results of the regression analyses.

*Individual relationships:* We first performed multiple linear regressions to assess the effects of socio economic stratum on the different intermediate variables. Table 2 summarizes the results.
We found that SES exerts a highly positive significant effect on Self esteem, capabilities beliefs and knowledge. That supports H4 (positive effect of SES on knowledge) and confirms and replicates the results already documented in the literature. In addition, Self esteem display a significant positive effect on capabilities belief, providing suport for H3. Note that we also included in the analysis the effect of age, which we found to be a significant determinant of subjective capabilities and knowledge. This means that younger people know more about technology, which is not surprinsing, and also that younger people tend to show high subjective capabilities. This may influence complexity expectations and should be taken into account in the subsequent analyses. In summary, regressions provided support for the expected effects of SES on knowledge, Self esteem and subjective capabilities. In addition, the relationship between Self esteem and subjective capabilities was also supported.

We moved forward to analyse the effect of knowledge and subjective capabilities on expectations of complexity. This analysis was performed using two procedures. In the first
one we performed a multiple linear regression including knowledge of domains and subjective capabilities as regressors of expectation of complexity. We also included age, due to the effect found in the previous analyses. In the second analysis, we separately tested the effect of the category priming manipulation on complexity expectations using Anova. Table 3 summarizes the results of the regression analysis.

Table 3. Linear regression of knowledge and subjective capabilities on expectations of complexity

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Capabilities (belief)</th>
<th>Knowledge of domains</th>
<th>Age</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectations of complexity</td>
<td>-.55**</td>
<td>-.25**</td>
<td>-.03</td>
<td>.47</td>
</tr>
</tbody>
</table>

** p < .01.

The regression analysis revealed a significant negative effect of knowledge and subjective capabilities on expectations of complexity. These results provide support for H2 and replicate the effect of knowledge according to the literature. Age displayed no effect on expectations of complexity. In addition, as we expected the category information manipulation had no effect on expectations of complexity (t= 0,5, p = 0,6).

**Structural model:** The analyses performed in the previous section provided initial empirical support for most of the relationship described as the basis of our conceptualization of the effect of socio economic stratum on expectations of complexity. However, the structure of the model renders the regression analysis insufficient to draw insightful enough
conclusions. The main feature of our scheme is the dual role of some variables (knowledge, self esteem and subjective capabilities), so that they work both as dependent and independent (see figure 1). In addition, several of our variables are non observable constructs. These characteristics lead to the use of structural equation modeling as a highly appropriate technique (Hair, Black, Babin, Anderson and Taham, 2006) to evaluate and test the complete model as a whole. The input of regression analyses then became a source of empirical support for the conceptual scheme depicted in figure 1 that helps to transform the conceptual map into a testable path diagram. The final path diagram produced with Amos software 16.0 is shown in figure 2.
Figure 2. Path diagram of the effect of Socio economic stratum on expectations of complexity.
This path diagram produced a Goodness of Fit Index (GIF) of 0.87 with a comparative fit index (CFI) of 0.93. The root mean square error of approximation (RMSEA) was 0.08 and the Chi-square was 316, significant at the 0.01 level with 115 degrees of freedom. In addition, the squared multiple correlation of expectations of complexity was 0.7, meaning that the model captured 70% of this construct’s variance. Given the characteristics of the model complexity (16 observed variables and 37 estimated parameters) and sample size (266), the model shows an adequate fit, following Hair et al., (2006); Carmines and McIver (1981) and Browne and Cudeck (1993) criteria for model adequacy assessment. Thus, we can state that we successfully produced a conceptual scheme that captures a significant extent of the effect of SES on complexity expectations. Appendix 2 contains correlations of measurement variables and appendix 2 contains information on regression coefficients of both measurement and structural models. Finally, we must note that the model is appropriate but not excellent. Goodness of fit is a little below of a desirable 0.9 and RMSEA is right on the threshold. This is probably due to the fact that some variance of expectations of complexity (30%) remains unexplained and the complexity of the psychological constructs we used. Further research can address these questions using the baseline we are providing in this work.

8. Discussion

We were able to define a conceptual model that adequately captures the main mechanism by which expectations of complexity are reduced as the socio economic level of people increases. More specifically, we showed that there are three salient variables through which
this occurs, namely, knowledge of technology domains, self esteem and subjective beliefs of own capacities.

**Marketing implications**: These results contribute to the understanding of the particular barriers that subsistence consumers face when they start to participate in new markets, in particular those that involve technological developments. Moreover, this research remarks the fact that the barriers faced by subsistence consumers go beyond the purchasing power issues, entering deeper psychological aspects. Our work emphasizes the notion that socio economic level is a contextual variable that exerts significant effects on a wide range of psychological constructs that are determinants of observable consumer behaviors. Understanding these effects is useful for social and behavioral scientists and marketing practitioners. In this sense, our results provide insights that can be applied to innovative market segmentation strategies, as well as to develop better framed marketing communications of technological products, aimed at acting against the negative psychological influence of a low socio economic context. For instance, there could be market segments based on different degrees of consumer knowledge of technological categories and based on that, three or four communication strategies could be developed, varying their degree of educational content. Similar approaches may be taken for self esteem based or capabilities based segmentation strategies. Based on our results, the bottom line of any strategy targeted to subsistence consumers is that explicit tactics should be implemented in order to reduce complexity expectations, and this may me accomplished by incorporating knowledge, self esteem and subjective capabilities as the key strategic objects of interventions.
Note that our research not only confirms the influence of knowledge of domains on the technology adoption process (Gregan-Paxton and John, 1997; Moreau, Markman and Lehmann, 2001; Gragan-Paxton, 1999; Yamauchi and Markman, 2000), but also provides evidence on the relation between consumer knowledge of domains and economic status. From the marketing perspective, finding this two way link makes salient the consequences of what some researches (e.g, Alwitt and Donley, 1996; Also, Hamilton and Catterall, 2005; Boyce, 2000) have called the exclusion of the low income from some marketing strategies. Such exclusion creates psychological barriers that need time and properly conceptualized actions to be overcame.

**Effects of culture:** This research complements studies of cultural differences as a barrier to technology adoption. It has been suggested that cultural differences can act as a barrier to technology adoption (Pohjola, 2003; Erumban and de Jong, 2006). At the same time, different authors state that the low-income consumer has created a culture based on her lack of resources (Hill, 2002, Hill and Gaines, 2007; Hamilton and Catterall, 2005). Our research complements these arguments by providing an account of the way socio economic stratum constitutes a contextual variable that shapes the cultural characteristics of people. According to our results, this seems to structurally influence the behavior of individuals. Furthermore, our results also complements knowledge on what Croizet and Claire (1998) called the stereotype threat of the low-income consumer, adding details on the characteristic of such stereotype regarding self esteem effects and subjective capabilities effects on behavior.
Policy. Finally, we would like to comment on policy making implications of our research. Technology diffusion is usually considered as a desirable goal in order to increase living standards. Different multilateral organizations are working to reduce what they have called the “Digital Divide” of the low-income population. There are different studies (e.g., Fife and Pereira 2002; Erumban and de Jong, 2006) that explore macro economic factors that determine the characteristics of countries’ adoption rates. They also suggest that socio cultural factors are salient determinants of such adoption rates. Notwithstanding, the details of how these socio economic factors operate are not clearly understood, let alone incorporated in policies. We believe that behaviorally driven research can inform policy makers about important issues that should be part of policy implementation in order to maximaze its results. Our research leads us to argue that capabilities beliefs and knowledge are part of the socio cultural factors that influences technology adoption. This provides two specific directions towards which policies can be focused. In this sense, programs that promote the construction of better self perception as well as inclusion in the diffusion of knowledge should help to increase aggregated technology adoption rates and help people to be more functional in a technological society.

References


## Appendix 1

Correlation of measurement variables

| Correlation Coefficient | 2. Self-esteem | 4. Knowledge of domains | 1.1 Educational scale | 1.2 Residential stratum | 1.3 Monthly income | 1.4 Parents' educational scale | 3.1 Verbal fluency | 3.2 Arithmetic ability | 3.3 Interpersonal intelligence | 3.4 Linguistic ability | 3.5 Spatial intelligence | 6.1 Task difficulty | 6.2 Task learning time | 6.3 Task challenge | 6.4 Product difficulty | 6.5 Product learning time |
|-------------------------|----------------|------------------------|----------------------|------------------------|-------------------|-----------------------------|------------------|------------------------|-----------------------------|----------------------|------------------------|-------------------|-----------------------|-------------------|----------------------|
|                         |                |                        |                      |                        |                   |                             |                  |                        |                             |                      |                        |                   |                       |                   |                      |
| 2. Self-esteem          | .389*          |                        |                      |                        |                   |                             |                  |                        |                             |                      |                        |                   |                       |                   |                      |
| 4. Knowledge of domains | .695*          | .523**                 |                      |                        |                   |                             |                  |                        |                             |                      |                        |                   |                       |                   |                      |
| 1.1 Educational scale   | .695*          | .523**                 | .622**               | .752**                 |                   |                             |                  |                        |                             |                      |                        |                   |                       |                   |                      |
| 1.2 Residential stratum | .616*          | .506**                 | .657**               | .841**                 | .791**            |                             |                  |                        |                             |                      |                        |                   |                       |                   |                      |
| 1.3 Monthly income      | .606*          | .444**                 | .681**               | .744**                 | .799**            |                             |                  |                        |                             |                      |                        |                   |                       |                   |                      |
| 1.4 Parents' educational scale | .606*         | .444**                 | .681**               | .744**                 | .799**            |                             |                  |                        |                             |                      |                        |                   |                       |                   |                      |
| 3.1 Verbal fluency      | .588*          | .485**                 | .535**               | .697**                 | .799**            | .515**                      |                  | .543**                 |                             |                      |                        |                   |                       |                   |                      |
| 3.2 Arithmetic ability  | .603*          | .507**                 | .602**               | .626**                 | .517**            | .557**                      | .486**          |                       |                             |                      |                        |                   |                       |                   |                      |
| 3.3 Interpersonal intelligence | .417*         | .241**                 | .298**               | .295**                 | .260**            | .180**                      | .173**          |                       |                             |                      |                        |                   |                       |                   |                      |
| 3.4 Linguistic ability  | .601*          | .444**                 | .550**               | .555**                 | .560**            | .476**                      | .407**          | .436**                 | .381**                      |                      |                        |                   |                       |                   |                      |
| 3.5 Spatial intelligence | .574*          | .397**                 | .536**               | .651**                 | .560**            | .475**                      | .485**          | .460**                 | .321**                      | .487**               |                        |                   |                       |                   |                      |
| 6.1 Task difficulty     | .538*          | .388**                 | .585**               | .696**                 | .822**            | .815**                      | .441**          | .444**                 | .416**                      | .497**               | .495**                 |                   |                       |                   |                      |
| 6.2 Task learning time  | .402*          | .387**                 | .433**               | .513**                 | .430**            | .578**                      | .460**          | .469**                 | .325**                      | .453**               | .437**                 | .245**          |                       |                   |                      |
| 6.3 Task challenge      | .445*          | .321**                 | .484**               | .492**                 | .370**            | .430**                      | .399**          | .375**                 | .286**                      | .407**               | .381**                 | .300**          |                       |                   |                      |
| 6.4 Product difficulty  | .526*          | .334**                 | .513**               | .458**                 | .426**            | .465**                      | .378**          | .425**                 | .157**                      | .406**               | .389**                 | .642**          | .572**                | .438**          |
| 6.5 Product learning time | .586*         | .467**                 | .625**               | .542**                 | .459**            | .575**                      | .496**          | .511**                 | .230**                      | .454**               | .488**                 | .707**          | .447**                | .592**          |
| 6.6 Product challenge   | .478*          | .398**                 | .538**               | .557**                 | .415**            | .544**                      | .418**          | .385**                 | .174**                      | .346**               | .311**                 | .541**          | .730**                | .401**          | .516**          |

*p < 0.01

*p < 0.05
Appendix 2

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<th>Measurement Model</th>
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= Loading value fixed at 1.000 for estimation purposes
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Goodness of Fit \( \chi^2 = 319.5, \text{df} = 115, p = .000; \text{GFI} = .87; \text{CFI} = .92; \text{RMSEA} = .082 \)