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Tech Readiness Optimism: Examining Its Significance in the Behavioral Intent to Use SSTs

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ABSTRACT

Extant research indicates a significant relationship between the optimism (OPT) of consumer technology readiness (TR) and the behavioral intent to adopt self-service technology (SST). Independent determinant regressions of the basic Technology Acceptance Model (TAM) indicate that tech optimism (OPT) combines with the consumer trait of age (AG) and the situational factors of wait time (WT) and crowding (CR) to explain 33% of the variance of the behavioral intention (BI) to adopt or use SST. When regressed independently with behavioral intention, tech optimism (OPT) (alone) explains over 20% of BI’s variance (Martin, 2012). This study further examines optimism (OPT) in an effort to identify substitute variables for OPT that do not require methodological identification and assessment, and/or to consider OPT’s practical identification, assessment, and application in the use environment. While analyses indicate a significant relationship for optimism with age, gender, and income, the relationships are relatively weak; no demographic or psychographic customer trait variables are adequate substitutes for OPT in the model. Practical techniques of assessing optimism in retail self-scanning applications are considered and suggested to minimize methodological assessment.

INTRODUCTION

Figure 1 illustrates the original suggested model (with respective standardized βetas) for behavioral intent to use SST from extant research (Martin, 2012). The adjusted R-squared indicates that 33% of the variance of BI is explained by this model. While this is only half of the BI variance explained by basic TAM, this model has the advantage of being partially (over 40%) based upon determinants (age; wait time; crowding) that are readily (i.e., visually) discerned in the application environment. Unfortunately over 50% of the variance is explained by the tech readiness facet of optimism (OPT), which is a variable that must be attained through surveying. This issue is reiterated by Massey, Khatri, and Montoya-Weiss (2007): “Observable characteristics such as demographics are generally useful in characterizing market segments, but they do not explain distinctly unobservable differences such as underlying beliefs, attitudes, and motivations”. The purpose of this study is to further examine and understand optimism’s potential determinants and relationships, to identify substitute or alternative variables for OPT that do not require methodological identification and assessment, and/or to consider OPT’s practical identification, assessment, and application in the marketplace.
Table 1
Reduced Generalizable Model for Behavioral Intent to use SST

(Martin, 2012)

<table>
<thead>
<tr>
<th>Behavioural Intent (BI)</th>
<th>Age (AG)</th>
<th>Wait Time (WT)</th>
<th>Crowding (CR)</th>
<th>Optimism (OPT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.163</td>
<td>-0.203</td>
<td>-0.203</td>
<td>0.418</td>
</tr>
</tbody>
</table>

Note 1: \( \beta \) values for \( n=303 \) linear regressions are indicated
Note 2: Dashed lines indicate lack of confirmation in multiple logistic regressions (MLRs)
Note 3: R-squared = 0.341; adj. R-squared = 0.332
Note 4: All assumptions for linear regression were met
Note 3: Split samples (\( n=150, n=153 \)) were used in exploratory regressions for confirmation.

LITERATURE

Tech-based Psychographic Traits

While many psychographic determinants for technology adoption exist, perhaps the most prevalent surround the tech anxiety (TA) or tech readiness (TR) (Parasuraman, 2000) that the consumer experiences. Technology acceptance (TA) was introduced by Meuter, Ostrom, Bitner, and Roundtree in 2003 and is subtly distinguished from technology readiness (TR). Technology acceptance is based on the concept of computer anxiety and focuses on the state of mind of the user regarding anxiety, self confidence, and venturesomeness. TR is broader than TA in that it extends its concept beyond computers to include technological tools in general (Meuter et al., 2003). TR was developed to understand consumer use of (new) technology and captures the “readiness” to embrace or adopt (new) technology; it focuses on multiple facets of user readiness and tech inclination (Meuter et al., 2003).
Technology Readiness (TR)
TR was introduced by Parasuraman in 2000 and is rooted in the technology paradox work of Mick and Fournier (1998). It is formulated from four consumer psychographic facets -- two positive facets in optimism and innovativeness and two negative facets in discomfort and insecurity (Parasuraman, 2000). Using 28 original items, Parasuraman revamped and expanded his technology readiness scale into a 36-item scale known as the Technology Readiness Index (TRI). Technology readiness is a prevalent and recognized psychographic theory and construct in technology adoption and TAM-based research (Lin et al., 2007; Lin & Hsieh, 2007; Lin & Hsieh, 2006; Massey, Khatri, & Montoya-Weiss, 2007; Walczuch, Lemmink & Streukens, 2007). In 2006 Lin and Hsieh (2006) applied Parasuraman’s technology readiness to multiple SSTs and industries and determined that, while tech readiness influences quality and behavioral intent, it does not have a significant relationship with satisfaction. In 2007 Lin and Hsieh again found a significant positive relationship between tech readiness and behavioral intent. In another 2007 study, Lin et al. applied tech readiness to basic TAM in “TRAM” (Technology Readiness Acceptance Model), confirmed the basic TAM relationships, and determined that tech readiness has a positive significant relationship with both perceived usefulness and perceived ease-of-use. In a pervasive study of TR’s four facets with TAM, Walczuch et al. (2007) confirmed perceived ease-of-use’s significant positive relationship with perceived usefulness and found that innovativeness has a significant positive relationship with perceived ease-of-use, that optimism has significant positive relationships with perceived usefulness, and that discomfort has significant negative relationships with perceived usefulness and perceived ease-of-use. However, while Walczuch et al.’s study supports the discriminating ability of the four facets, Liljander, Gillberg, Gummerus, & van Riel’s (2006) study on kiosk check-in yielded mixed results at the (TR) facet-level. They found that tech readiness’ overall impact on customer attitudes and responses toward SSTs was significantly positive but was not a determinant of adoption behavior. Discomfort and insecurity did not form individual dimensions that could be tested, and all of optimism’s and innovativeness’ relationships were only partially or weakly supported.

Optimism
Parasuraman (2000) defines optimism as “a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives” (as cited in Tsikriktsis, 2004). Optimism is a psychographic facet that is based upon the basic positive belief that self-service technology is relatively convenient, easy, desirable, and usable. However, its nature is such that unless it has a strong correlation and/or relationship with a readily discerned determinant, it requires surveying the consumer to identify and assess it (Massey, Khatri, and Montoya-Weiss, 2007).

Optimism’s original data for this study was attained through four Likert scale items that were selected from Parasuraman’s original technology readiness index (TRI):

1. *Technology gives people more control over their daily lives.*
2. *Products and services that use the newest technologies are much more convenient to use.*
3. *You find new technologies to be mentally stimulating.*
4. *Technology gives you more freedom of mobility.*
In 2001, Parasuraman and Colby identified a typology of technology readiness in the U.S. population: explorers; pioneers; skeptics; paranoids; laggards. This belief-based typology was mapped with the four facets of TR in Rose and Fogarty’s article “Technology Readiness and Segmentation Profile of Mature Consumers (2010). Their mapping reflects optimism as high (H) in explorers, pioneers, and paranoids, moderately high (MH) in skeptics, and low (L) in laggards. Innovativeness was moderately high in explorers and pioneers but low in the other types. However, while younger mature respondents had some correlation with explorer types, the study primarily reiterates the lack of clear relationship between demographics and TR types; every category of age, gender, income, and education had a reasonably even distribution of TR typologies: “…the findings from this study support the claim that the mature consumer market is heterogeneous. Thus, even within the restricted age range of a mature consumer population, the trends apparent in the general population can also be observed here” (Rose & Fogarty, 2010).

METHODS

The methods of this study are an exploratory extension of the analyses that suggested the original model (Martin, 2012; Figure 1). Correlations and regressions are performed on tech-based optimism (OPT) with consumer demographics, situational traits, technology readiness facets, and TAM base variables in an attempt to better explain OPT’s nature and behavior. Analyses were performed using a full sample of n=303 from the original study’s data. Regressions are performed that examine OPT’s relationship with age (AG), gender (GN), income (IN); education (ED), ethnicity (ET)), wait time (WT), crowding (CR), tech discomfort (DIS), tech innovativeness (INN), and tech insecurity (INS) to ascertain if other model configurations can more easily offer comparable predictability. As with the original study and samples, all linear regression assumptions were met. Because no significant model improvements precipitated from the full (n=303) sample regressions, no split-sample confirmations were necessary for confirmation of the full Likert-scaled regressions.

RESULTS

Correlations

In performing both Pearson’s and Kendall’s Tau-B correlations, optimism has no strong (i.e., > 0.700) correlations with any variables. The only TAM external determinant that correlate moderately (β=0.501 @ 0.000 sig.; 0.374 @ 0.000 sig. (respectively)) with optimism is (tech) innovativeness, which is the other positive facet of technology readiness. In correlations with TAM’s internal constructs, optimism unsurprisingly (given previous regression results) indicates moderate Pearson’s and Kendall’s Tau-B correlations with perceived usefulness (PU; β=0.492 @ 0.000 sig.; β=0.355 @ .000 sig. (respectively)), perceived ease-of-use (PEOU; β=0.457 @ 0.000 sig.; β=0.341 @ 0.000 (respectively)), and behavioral intent (BI; β=0.469 @ 0.000 sig.; 0.356 @ 0.000 sig. (respectively)).

Demographic and Situational Factor Regressions

Linearly regressing optimism with age, gender, income, education, and ethnicity demographics indicates a significant but weak relationship with age and income. Age shows a standardized βeta of -0.184 @ 0.006 sig. while income’s βeta is 0.157 @ 0.026 sig. Unfortunately R-squared
statistics indicate that this demographic pair only explains approximately 2% of optimism’s total variance. Optimism shows no significant relationships with the situational traits of wait time and crowding in linear regressions.

**Technology Readiness Regressions**

Linear regressions are performed on optimism with the other three facets of technology readiness (TR). While insecurity (INS) revealed a weak significant relationship with optimism ($\beta=-0.183$ @ 0.000 sig.), the strongest relationship for OPT is with innovativeness (INN). INN receives a standardized $\beta$ of 0.488 @ 0.000 sig. and when regressed with INS accounts for approximately 28% of OPT’s variance. When regressed independently of INS, innovativeness alone results in a standardized $\beta$ of 0.501 @ 0.000 sig. and explains approximately 25% of OPT’s variance. This seems logical given the aforementioned correlations between the two and their shared positive tech readiness facet nature.

**Tech Innovativeness Regressed with Demographics and Situational Factors**

In an attempt to better understand optimism indirectly through innovativeness, regressions were performed on INN with age, gender, income, education, and ethnicity. Age, gender, and income collectively show significant relationships with innovativeness ($\beta=-0.359$ @ 0.000 sig.; $\beta=-0.216$ @ 0.000 sig.; $\beta=0.243$ @ 0.000 sig.; respectively), and collectively explain approximately 17% of its variance. While all three demographics have significant relationships, age is clearly the strongest predictor/determinant. INN shows no significant relationship with wait time or crowding in regression.

**Optimism Regressed with Key Variables**

Linear regressions of optimism with age, gender, income, and innovativeness predictably result in approximately 27% of its variance explained; the vast majority of this was due to INN ($\beta=0.543$ @ 0.000 sig.). While innovativeness clearly has a relationship with optimism in tech readiness, it does not provide an easily discerned variable in lieu of OPT. INN is as difficult to assess as is OPT; the key is to find and strengthen the model with new visually assessed variables (if possible). I.e., if a variable must be surveyed to gain assessment (i.e., innovativeness), then it is more advantageous to merely survey the initial/direct variable (optimism).

**Visual Variables as Substitutions for Optimism**

Based upon Optimism’s direct significant (although weak) relationship with age, gender and income and its indirect relationship with income and age, a regression is conducted on behavioral intent with age, income, gender, wait time and crowding. Unfortunately the relationship between optimism and these other variables is too weak to provide a reasonable substitution in the model; income is deemed insignificant and while gender is significant ($\beta=0.108$ @ 0.043 sig.), it merely adds one percentage point in the explanation of BI’s variance (i.e., omitting optimism results in a net loss of 15% of variance explanation for behavioral intention).
CONCLUSIONS, IMPLICATIONS, LIMITATIONS, & FUTURE RESEARCH

Conclusions
The exploratory regressions focusing upon tech optimism (OPT) as a dependent variable lend little insight into its nature. Wait time and crowding have no significant relationship with optimism, and significant demographics, individually and/or in combination, explain only 5% of optimism’s total variance. OPT does seem to have a moderately strong relationship with the innovativeness facet (INN) of tech readiness; INN explains approximately ¼ of OPT’s variance and shows moderately strong correlations. Unfortunately, regressing INN as a dependent variable provides little insight into its determinants. While this confirms these two positive tech readiness facets as unique variables, neither can be ascertained easily; both variables require surveying methods to identify and assess their presence in the SST consumer. Unless further research reveals strong determinants and/or relationships for optimism and/or behavioral intention, the suggested prediction model for BI must recognize and include OPT as a key determinant; without its inclusion the amount of BI variance explained by the model is reduced from approximately 33% to less than 20%. The situational traits of wait time (WT) and crowding (CR) show no significant direct relationships with optimism. Similarly, despite (tech) innovativeness’ explaining one-fourth of optimism’s variance, its inclusion as a compliment or substitute for OPT did not strengthen the original model.

Implications
Tech optimism is a unique and significant yet difficult trait to identify or assess in retail self-scanning application environments; it is impossible to identify or quantify without the use of scaled (Likert) surveys. Despite this inconvenience, it is nevertheless possible to include it in consumer characterization and in SST related decisions. It is possible for optimism to be well captured and utilized via the process of retail store account (membership) applications and card issuance. The four question items for optimism could easily be included in applications that would then allow retailers to have a code or score for optimism that is in their database and/or notated in or on the card. This could allow consumer optimism to be readily identified for SST related management. This information could be practically utilized in several ways. First, SST design & customization considerations could include knowledge of the mix or profile of the optimism of the target market or customer base. SSTs could also be designed so that these optimism codes or designations are read by the scanner and provide a different software-based configuration for the self-checking consumer. Second, the training, staff support, and instructions for the SST could be tailored to the optimism profile of current shoppers. This could be ascertained through a card swipe as they enter the store. Third, the optimism profile of the customer base could be used to consider and place SSTs for basic product information, promotions, and how-to and/or do-it-yourself instructions in the store. Third, capacity decisions regarding the purchase of SSTs and/or the offloading of traditional check-out customers to SST self-scanning could be improved by knowledge of the optimism profile of the customer base.

Limitations
The key limitations for this model are basically the same as for the original research. First, while met regression assumptions indicate that these and the original findings and study are
generalizable to other SST technologies and/or industries, no split samples or logit-based confirmation analyses were used in this optimism study. It is possible, (although unlikely) that logit-based confirmations would yield different results and conclusions regarding optimism. Second, the practical identification, assessment, and application of optimism is only suggested for self-scanning technology in a retail hardware setting; additional considerations are warranted that are tailored for applications in other SST technologies and industries.

**Future Research**
The significant amount of BI variance explained by tech optimism (over 20%) warrants further understanding of consumer tech readiness in general and of optimism in specific. While no key demographics or situational variables have been shown to have a strong determinant relationship, it is logical that age, education, gender, income, and/or ethnicity could have a significant impact upon, or correlation with, tech readiness based beliefs. Additional TR and optimism focused research is warranted with larger samples, different SST technologies, different SST industries, and/or with different situational variables.

**REFERENCES**


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**ABOUT THE AUTHOR**

Dr. Jon M. Martin is currently an Assistant Professor of Health Administration for Pfeiffer University in North Carolina. He received his M.M. from the Kellogg School at Northwestern University with concentrations in Marketing, Operations, and Quantitative Methods and his Ph.D. from Capella University with a focus on services marketing. Jon’s dissertation and field is in self-service technology (SST), and his 2014-2015 research will focus upon applying SST research to telemedicine models and MOOCs in health care and education.