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A mindful product acceptance model

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A Mindful Product Acceptance Model

Abstract

We posit, develop and test a new Mindful Product Acceptance Model that includes the independent variable constructs of perceived ease of use, perceived usefulness, mindful judgement constructs (taste and environmental concerns), trust and perceived safety. Concerns about the environment are addressed in the bottled water context because of its ubiquitous use and increasing sales. This increasing bottled water use raises the question about why people drink bottled water versus tap water and provides a venue for testing how mindfulness influences the decision process. This study contributes to the literature by providing a new application of TAM that includes the "mindful" judgement construct as well as the context of applying TAM to a non-traditional technology. This research found that increasing mindfulness of environmental concerns in our community limits bottled water consumption. The statistically significant findings of this research suggest that companies can benefit from examining their manufacturing and recycling processes.

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1. Introduction

The increasing use of bottled water despite environmental concerns provides a venue for positing, testing, and developing a model that examines how mindfulness about environmental concerns relate to an individual's decision making. Using bottled water as the context study addresses how environment awareness relates to bottled water users' perceptions and allows development of a Mindful Product Acceptance Model (MPAM), which is likely to have an application to numerous other products and services related decisions. While carbonated drink giants, such as Coke, Pepsi, and Dr Pepper, have faced declining sales, bottled water from these same and other companies, such as Nestle Pure Life, Poland, Dasani, and Aquafina, have had growing sales (Trefis Team, 2015). Bottled water sales volume in the U.S. increased from 8.76 billion gallons in 2010 to 10.87 billion gallons in 2014, while carbonated drink sales volume decreased from 13.78 billion gallons in 2010 to 12.75 billion gallons in 2014 (Trefis Team, 2015). The rising use of bottled water occurs even in countries that supply high-quality tap water (Doria, 2006). This phenomenon suggests the need to determine how to improve municipal tap water utilization.

In prior research, scholars have proposed factors that explain why people use bottled water. For example, Hu et al. (2011) confirmed the relationship between consumers' perceptions of the quality of local tap water and bottled water use. Saylor et al. (2011) investigated the perceived risks and perceived safety of tap water and bottled water use, respectively, to reveal drinking water choices. Doria (2006) concluded that the concerns about health and risk are the most common factors explaining bottled water use. In these studies, scholars concentrated on fragmented factors to explain bottled water consumption. These prior studies' results indicate the need for a complete view of the main factors affecting the use of bottled water. The objectives of this study are to draw together factors in the literature to build an integrated theoretical MPAM in general and to determine crucial factors that affect bottled water use in particular. Although MPAM is developed and applied within the context of a specific product in this study, the model can be used to provide insight into issues about how mindfulness of environmental concerns is relevant to other products.

The theoretical foundation guiding our proposed framework is comprised of the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the Theory of Planned Behavior (Ajzen, 1985) and the Technology Acceptance Model (TAM) (Davis, 1989). Key factors driving behavioral intentions are attitude, behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), and perceived behavioral control (Ajzen, 1985). The constructs in the proposed model are an extension of TAM and include perceived ease of use and perceived usefulness (Davis, 1989). Since its introduction almost three decades ago, TAM has become one of the most popular models used to explain behavioral intention in general and technology system acceptance in particular (Marangunić & Granić, 2015). However, a search of the literature shows that TAM has never been applied to explain the acceptance of a non-traditional technology system. Moreover, TAM constructs, such as perceived ease of use and perceived usefulness, only examine the user's preferences with behavioral intention. We introduce "mindful" judgment related constructs, which reflect the influence of feeling and social judgements on decision-making. This study attempts to explore, extend and validate the application of a "mindful judgement" TAM to explain the acceptance of bottled water, a type of non-traditional technology systems.

The increasing use of bottled water raises environmental concerns about unnecessarily growing landfills and wasting energy and resources in the manufacturing process. Less than a third of used plastic bottles are collected for recycling in the U.S. (Neufeld et al., 2016). In other words, more than two-thirds of used plastic bottles are either landfilled or not collected at all. After ending up in landfills, plastic bottled water made of recyclable polyethylene terephthalate (PET) still takes centuries to decompose (Schriever, 2013). Plastic water bottles also increase garbage patches in the world's oceans. The overwhelming amount of plastic bottles affects the lives of hundreds of marine species since they mistake plastic waste for their food source (Henn, 2016).

The potentially inverse relationship of environmental public concerns with actual bottled water use has an important practical application if supported by this study. Indeed, this study reinforces the need for environmental education to reduce the unnecessary consumption of bottled water, because these environmental concerns do, in fact, negatively affect bottled water use, as shown in this research. Thus, companies in the bottle water supply chain will also be negatively affected and need to acknowledge the relationship between environmental concerns and bottled water consumption. In this way, these companies will bear more responsibility in the manufacturing and recycling process.

2. Literature Review

The literature provides insights into the reasons for drinking bottled water such as better taste or more convenience (Gleick, 2004). Some studies propose factors to explain why people use bottled water such as perceived risks of local water supply, perceived safety of bottled water, and health concerns (Doria, 2006; Hu et al., 2011; Saylor et al., 2011). Doria (2006) found that consumers perceived bottled water as a healthier product. However, a portion of bottled water literature indicates the drawbacks of using bottled water. A study in Cleveland indicated that some bottled water does not meet the state required fluoride level, while 100% of tap water samples pass the test (Lalumandier & Ayers, 2000). Featherstone (1999) indicated that fluoridated drinking water reduces tooth decay via topical mechanisms. Bottled water contamination could be leached from bottle materials such as glass or plastic (Reimann, Birke, & Filzmoser, 2010). The quality of tap water and new bottled water can be similar in developed countries, but one study found that the bacteria growth in opened or used bottled water increased dramatically faster than a similar sample of tap water (Raj, 2005). Another study indicates that neither municipal tap water nor bottled water is always free from bacteria. In fact, bacterium contamination was found in both tap water samples and 20-L bottles of mineral water samples (Da Silva et al., 2008). The argument about the pros and cons of each alternative attracts much media attention and public discourse, and has generated numerous published scientific studies (Doria, 2006). In this study, we do not judge or compare the use of tap water and bottled water but rather investigate the factors affecting the use of bottled water.

Several conceptual models have been built to explain behavioral intentions, such as the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the Theory of Planned Behavior (Ajzen, 1985), and TAM (Davis, 1989). Currently, to the extent of our knowledge, none of these models have been applied to investigate the antecedents of bottled water use. This study attempts to explore the use of TAM constructs as key drivers of bottled water use. TAM was originally developed to explain the importance of perceived usefulness and perceived ease of use in order to determine individuals' behavioral intention of using an information system (Davis, 1989). The model was extended by adding a number of constructs, such as subjective norm, image, job relevance, experience, and voluntariness, and was called TAM 2 (Venkatesh & Davis, 2000). Venkatesh and Bala (2008) proposed the TAM 3 model in which experience plays a more important role in moderating the relationships among existing constructs. For more than the last two decades, TAM 1, 2, 3, and its extended versions have been widely used to explain behavioral intention. The original and extended TAM models have been used to investigate many types of usage, such as e-commerce, email and telecom related devices (King & He, 2006), and web-enhanced instruction (Landry et al. 2006). Nevertheless, all of them are information system related types of usage. No studies have been done on the use of non-IT related systems. Bottled water is obviously not considered a traditional technology system. Our research is the first attempting to extend the use of TAM to a non-IT system.

In the highly cited Weber et al.' (2009) study, the authors emphasized the importance of "Mindful" judgement and decision making process. McAvoy and Butler (2009) showed how such mindful judgment transfers to other venues and proposed a conceptual model to show the effect of mindless and mindful behaviors on IS adoptions in the context of employees of a U.S. manufacturer in Ireland. In addition, Mu and Butler (2009) developed a proxy to assess organizational mindfulness and applied the proxy to evaluate the role of mindful related factors on the deployment of IT innovations at an organizational level. This research helps bridge a gap suggested by this mindfulness research because the traditional TAM model addresses only the user's psychological process and interpretation such as how he or she feels and how social judgments influence the decision. While our study is not the first to include trust and perceived safety with other TAM constructs, it is the first research that includes "mindful" judgement related constructs, which are taste and environmental concerns in the research context of this study. In general, we believe that the proposed Mindful Product Acceptance Model is a valuable extension of the TAM model that includes perceived trust, perceived safety (risks) and "mindful" judgement constructs.

For the purpose of this paper, the original TAM (Davis, 1989) is more relevant because we develop the model based on the two main constructs of perceived usefulness and perceived ease of use. We propose that the original TAM constructs fit and provide insights into consumers' behavioral intent to use bottled water. TAM also suggests that the individuals' beliefs about an information system positively relate to the future use of the system. In our research context, we also add trust, perceived safety, taste, and environmental concerns as influential driving factors.

3. Hypothesis and Research Methodology

3.1. Trust, Perceived Safety and TAM constructs

Trust is an important element required for all human interactions. In a relationship between two entities, trust represents "one entity's confidence, belief and expectation that another entity will act or intend to act beneficially" (Xiu & Liu, 2005). Except one item, all survey items contextualized from a validated survey (Bratanova et al., 2013) were used to measure consumers' trust in bottled water companies. The perception of trust in any relationship will elevate the perception of security (Simpson, 2007). Generally, people feel unsafe or insecure in unpredictable situations. Trust plays a crucial role in reducing consumer perception of the risk of vulnerability (Pavlou, 2003). In other words, people will feel safer about any particular product or transaction if they trust their partners or providers. In the literature, many studies mentioned the relationship among trust, perceived risks, and behavioral intention (e.g., Egea & González, 2011; Kim et al., 2008; Pavlou, 2003). This study attempts to find the antecedents of bottled water use. We assume people decide to drink bottled water because of its safety rather than its risks. Thus, we use perceived safety instead of perceived risks in the proposed model. We use three contextualized survey questions from a validated study (Saylor et al., 2011) to measure the degree of a consumer's perceived safety toward bottled water quality. We hypothesize that the more trust people develop in bottled water companies, the more likely they will feel safe using the product**.**

Hypothesis 1a. Trust will have a direct positive effect on the perceived safety of bottled water use.

Many studies successfully integrated trust with TAM (e.g., Gefen & Straub, 2003; Kim, 2012; Pavlou, 2003). In these studies, trust did play a role as one of the determinants of the perceived usefulness and ease of use. According to Davis (1989), perceived usefulness is the extent to which using a technology system would increase job performance, while perceived ease of use is the degree to which people can use a system without difficulty. One out of four survey questions that evaluated the ease of use perception toward bottled water use was contextualized from a previously validated study (Saylor et al., 2011). In this study context, the usefulness of bottled water is considered convenience, time efficiency, or simple water intake tracking, while ease of use is considered expediency, access to drinkable water anytime and anywhere. If people trust bottled water companies, they will develop an expectation of usefulness and ease of use of bottled water. Kim (2012) confirmed the positive relationship between trust and the perceived usefulness. If people don't trust the company, they will not develop their intentions to use its products (Wu et al., 2016). Thus, consumers will not develop their usefulness perception without trust. Similarly, Pavlou (2003) argued that, if consumers' trust is low, they will spend more time and effort examining and understanding the product. Again, without trust, people will stop using the product, and ease of use never becomes a consideration. Thus, when the consumer trusts the company, they will be open to developing their perceived usefulness and ease of use of the product.

Hypothesis 1b. Trust will have a direct positive effect on the perceived usefulness of bottled water use.

Hypothesis 1c. Trust will have a direct positive effect on perceived ease of use of bottled water use.

Some studies integrated perceived risks, security, or safety with TAM constructs (e.g., Faqih, 2013; Martins et al., 2014). In this research context, perceived safety measures consumers' concerns about their health and their fear of unsafe tap water. With the same reasoning that explains the relationship between trust and the two TAM constructs, we expect that as people feel safer about bottled water, the more likely they will be to build their perceived ease of use and usefulness about the product.

Hypothesis 2a. Perceived safety will have a direct positive effect on Perceived Usefulness.

Hypothesis 2b. Perceived safety will have a direct positive effect on Perceived Ease of Use.

TAM proposes that consumers' perceived ease of use and usefulness positively affects behavioral intention (Davis, 1989). Similar to technology systems, bottled water also benefits individuals in daily life, by saving time and providing access to an immediate drinking source anytime and anywhere bottled water is available. Thus, despite the high cost, consumers are still willing to pay more for the convenience and reliability (Gleick, 2004). The more a person perceives the usefulness and ease of use of bottled water, the more actual use will be. In this study, actual use represents how often a person use bottled water, while future use indicates the likelihood that a person will use bottled water in future. Davis (1989) suggested that the attitudes toward the "intention to use" affect future usage behavior. Thus, we hypothesize that the use of bottle water at present will be positively related to the future use.

Hypothesis 3. Perceived usefulness will have a direct positive effect on actual use.

Hypothesis 4. Perceived ease of use will have a direct positive effect on actual use.

Hypothesis 5. Actual use will have a direct positive effect on future use of bottled water.

3.2. Taste

Municipal tap water is more strictly regulated than bottled water (Daigneau, 2012). Under the Safe Drinking Water Act, the Environmental Protection Agency (EPA) requires utilities to test tap water quality at least once a week (Daigneau, 2012). However, no national standard is established for taste or odor compounds in the U.S. (Burlingame, 2007). Minerals, such as calcium, sodium, bicarbonate, sulfate and chloride, as well as inorganic chemicals, power of hydrogen (pH), and water treatment methods are main factors that affect the taste of water (Burlingame, 2007). The taste of tap water varies by community since treatment plants employ different methods according to a water source. For example, the surface water, including lakes, rivers, streams, requires more complex treatment than tap water (CDC).

In the literature, taste is one of the crucial determinants of preference in regards to restaurant choice (Duarte Alonso, 2013). Taste should be considered an important factor of bottled water use since bottled water obviously belongs to the food and drink category. Some may argue that taste should be a part of perceived usefulness and not considered as an independent construct. However, Raghunathan et al. (2006) found that people still prefer to eat tasty food even though they also perceived it as unhealthy. Thus, even if people do not perceive any usefulness of using bottled water, taste still can be an independent driving factor in choosing the product.

Hypothesis 6. Taste will have a direct positive effect on bottled water use.

3.3. Environmental Concerns

Product sustainability can be a reason for customers to switch to another product or activate purchase decision-making (Galbreth & Ghosh, 2013). When deciding to buy a product, individual consumers not only consider its price but also its environmental friendliness (Siskos & Capros, 2015). The rapidly increasing consumption of bottled water ignites already growing public environmental concerns.

About three-thirds of plastic packaging, including water and soda bottles, are not recycled, out of which about 32% is mismanaged, illegally dumped near or in the ocean (Neufeld et al., 2016). About 8 million metric tons of plastic get into the ocean every year, seriously endangering the lives of marine animals (Jambeck et al. 2015). Cózar et al. (2014) estimated about that only 1% of floating plastic debris in the ocean have been located, while 99 percent is consumed by marine animals, frozen in Artic ice, or has broken and sunk to the bottom of the sea. Moreover, the entire bottled water production process (i.e. manufacture, clean, and label the bottles, and process, and cool the water) wastes energy and resources (Gleick & Cooley, 2009). The energy cost of producing one liter of bottled water is about 2000 times more than the amount of energy cost to produce the similar amount of tap water (Gleick & Cooley, 2009). Therefore, consumers who acknowledge the negative impact of bottled water on the environment will use less bottled water. If such a finding is confirmed it shows that providing information that increases knowledge about environment concerns results in more mindful decision making about how products impact the environment.

Hypothesis 7. Environmental concerns will have a direct negative effect on bottled water use.

4. Sample and Data Collection

Natural mineral water, spring water, and purified water are the three major types of bottled water (Ferrier, 2001). This study concentrates on explaining behavioral intentions in using bottled water in general. Thus, we did not differentiate bottled water in different types, sizes, or brand names when we surveyed our participants. The survey was approved by the Internal Review Board (IRB) before distribution to participants. We used the 7-point Likert scale to measure the degree of agreement of respondents (1 = strongly disagree, 7 = strongly agree). Qualtrics Survey Software was used to develop and distribute the survey.

The survey questions that measured the extent to which consumer's trust and perceived safety and perceived ease of use were partially contextualized from survey items of previously validated studies (Bratanova et al., 2013; Saylor et al., 2011). These construct items were modified within our research context to maintain their validity and reliability. Instruments addressed in Davis, F. D. (1989) and Venkatesh and Davis (2000) were adapted to create items in perceived safety, perceived usefulness, actual use, and future use. New survey items were created to measure other constructs including, taste, and environmental concerns. The questionnaire was tailored to match the research context. To ensure the content validity, a group of information technology and decision science scholars was asked to validate variables of each construct. Survey items were modified according to the scholars' feedback. Finally, we asked 33 Ph.D. candidates in the college of business to do a pilot study. According to comments from this pilot study, we modified and completed the survey. The revised survey was again approved by IRB before distributing it to college students.

For bottled water consumption, the use of a college student sample is appropriate because students represent an important market for bottled water, and results of the survey show that nearly 100% of the students have purchased bottled water in the recent past. The online survey was sent to 1217 students from a college of arts and sciences at the public University in North Texas. In a three-week period, 793 responses were collected. After eliminating incomplete or invalid responses, 565 useable responses were chosen for the final sample.

We addressed the non-response bias by comparing 90% of the early response to 10% of the late response from the sample (Karahanna, Straub, & Chervany, 1999). The independent t-test indicated no significant difference between the two groups. We analyzed the dataset by using Partial Least Squares Structural Equation Modeling (PLS-SEM) using the Smart PLS 3.0 software package. PLS-SEM has been increasingly used in social science research (Hair, Hult, Ringle, & Sarstedt, 2014). PLS-SEM is a statistical technique using an ordinary least square regression-based method that produces coefficients for the path relationships among latent constructs (Hair, Hult, Ringle, & Sarstedt, 2014; Hair, Black, Babin, & Anderson, 2010).

5. Results

5.1. Reliability and Validity

The scale reliability was investigated using Cronbach's alpha (Cronbach, 1951). All of Cronbach's Alpha values are greater than the minimum threshold of 0.7 (Hair, Hult, Ringle, & Sarstedt, 2014; Reynold & Santos, 1999). Additionally, the composite reliability (CR) (Werts, Linn, & Jöreskog, 1974) was also used to assess the reliability of latent constructs. The CR values of all constructs are between 0.838 and 0.944, greater than the suggested value of 0.8 (Nunnally & Bernstein, 1994). Thus, we concluded reliability was supported.

Convergent validity of item indicators was verified by the results of component factor analysis. All rotated factor loading, except P Safety-3 and Future Use-2, and cross-loading items in the pattern matrix, exceed the accepted thresholds of 0.7 and the cutoff value of 0.4, respectively (Hair et al. 2014). Although the indicator P Safety-3 (0.603) and Future Use-2 (-.538) falls below the common thresholds of 0.7, their cross loadings are higher than cutoff value of 0.4, and the inclusion of these indicators kept the composite reliability and Cronbach's alpha above the threshold value of 0.8 and 0.7. Moreover, since the variable items of Perceived safety and Future use constructs are exploratory in nature, the inclusion of these indicators necessary to enhance content validity is acceptable (Hair et al. 2014). At the individual construct level, Convergent validity was supported because the average variance extracted (AVE) values of reflective latent constructs are greater than the minimum threshold of .5 (Fornell & Larker, 1981). Discriminant validity was verified through the analysis of cross-loading values (Gefen & Straub, 2005) and Fornell & Larker criterion (1981), in which the square root of the AVE of each construct should be higher than the highest correlation between latent constructs.

5.2. Structural Model

After validating the reliability and validity of the outer theoretical model, we investigated the individual path coefficient among constructs of the inner model by using PLS-SEM (Gefen, Straub, & Boudreau, 2000). We utilized the bootstrap standard error, with the recommended 5,000 bootstrap samples (Hair et al., 2014), to compute the Student's t-test and p-value of path estimates. The results indicate that all hypotheses are significantly supported at the 0.001 level. The proposed model explains 41% and 50% of the variance in actual use and future use constructs, respectively.

5.3. Secondary analysis of bottled water actual use

A secondary analysis is necessary to provide insight into the role of factors affecting bottled water use between high and low degree of actual use (Scott et al., 2016). The high bottled water actual use subgroup contains 202 observations, while the low subgroup contains 213 observations. We utilized the PLS polar extremes method, proposed by George and Prybutok (2015) to analyze the difference of path coefficients and variances between the two dataset. For the high subgroup, all regression weights are statistically significant, except the path coefficients between Trust and Perceived Usefulness, Trust and Perceived Ease of Use, Perceived Usefulness and Actual Use, and Taste and Actual Use. For the low subgroup, all paths are statistically significant, except Perceived Ease of Use and Actual Use, and Taste and Actual Use. We applied Olkin and Finn's (1995) estimation of R2 standard error to compare the statistical difference of R2 between the two models.

6. Discussion

All relationships within the model are significant at the 0.001 level. The model has a good fit because it explains 41% and 50% of the variance in actual use and future use of bottled water, respectively. Hypotheses 1a, 1b and 1c are supported (coefficient values are 0.43, 0.32 and 0.31, with t statistics of 9.90, 7.41, and 7.31, respectively). When people trust bottled water companies, they will inflate their perception of safety, usefulness, and ease of use about the product. The results also support hypothesis 2a and 2b (coefficient value is 0.21 and 0.25, and t statistics are 4.45 and 6.08, respectively). These findings support the contentation that perceived safety is an important factor that is positively correlated with the perceived ease of use and usefulness of bottled water. Thus, consumer trust and perceived safety significantly affect perceived usefulness and perceived ease of use.

Hypothesis 3 and 4 are supported (coefficient values are 0.33 and 0.17 with t statistics of 7.95 and 3.98, respectively) and affirm the use of TAM variables in the model to predict the behavioral intentions on bottled water. This use of TAM confirms its application in this non-traditional technology system. Hypothesis 6, which addresses the relationship between taste and bottled water use, is also confirmed (coefficient value is 0.20 with t statistic is 5.17). The results support the claim that people choose to drink bottled water because the taste is better than tap water taste. Hypothesis 7 is also supported by the data (coefficient value is -0.20 with t statistic is 5.40). Thus, hypotheses 3, 4, 6, and 7 indicate perceived usefulness, perceived ease of use, taste, and environmental concerns are important factors affecting bottled water use. Our findings support Wansink's (2006) study, which indicated that people change their consumption behavior if they make decisions with mindfulness. According to Wansink's results, obesity could be the results of consuming food with little awareness about the appropriate amount of caloric intake. Using similar rationale and the support of our results, if a user perceives that using bottled water negatively affects the environment, such as increasing the landfill space, wasting energy, and increasing harmful trash, then it is likely they will use less bottled water. The coefficient value of 0.71 and the t-statistic of 30.85 significantly support hypothesis 5, indicating a strong relationship between actual use and future use of bottled water. If bottled water is currently used, the user is more likely to use it in future. Thus, the current use of bottled water affects future use.

To explain the increasing consumption of bottled water, this study confirms that taste is one important factor explaining why people drink bottled water, or, in other words, why they do not like tap water. Thus, improving the taste of municipal drinking water is a crucial potential step to improve utilization of tap water and decrease unnecessary consumption of bottled water. Although the American Water Works Association (AWWA) Taste and Order Committee addressed many difficulties in setting a national standard for taste and odor compound of tap water (Burlingame, 2007), moving toward standardization of the taste and odor compound for each specific regional municipal drinking water system is still possible. Using the available methods to assess public sensitivity proposed by AWWA (Burlingame, 2007), each community water system supplier can move toward a standard for taste and odor, depending on the origin of the water and water treatment methods.

The secondary analysis of high and low degrees of bottled water use provides insights into consumers' behavior. These results indicate that perceived usefulness for the high subgroup has more influence on actual use than the low subgroup, while the role of perceived ease of use is significantly greater for the low subgroup. The results also show that the negative path coefficient between environmental concerns and actual use in the low subgroup is significantly greater than in high subgroup. In other words, acknowledging the negative impact of bottled water on the environment reduces bottled water use. Hypothesis 7 is again supported. This finding provides evidence for the importance of environmental education to increase public awareness about the unnecessary consumption of bottled water use. Indeed, the polar extremes approach enhances the applications of PLS-SEM in social sciences research (George & Prybutok, 2015).

This study contributes to the literature by confirming the appropriateness of using TAM to explain the use of a non-traditional technology system and also contributes to the literature on the inter-relationship among trust, perceived safety, perceived usefulness, perceived ease of use, and behavioral intentions. The study also provides business-related contributions for bottled water companies, because customers are concerned about the environment. If a bottled water company provided an innovative way to improve the recycling process for its plastic or glass bottles and had a good marketing campaign to inform consumers about their innovation, the company could gain a competitive advantage and attract more environmentally-concerned customers. In addition, if the company implemented manufacturing and distribution processes requiring lesser energy than its competitors, this could boost sales. Moreover, the motivation for these bottled water companies also indirectly improves the quality of the environment by reducing energy waste and landfill space.

7. Limitation and Future Research

The use of a sample that includes only undergraduate students limits the generalization of the study. However, a student sample is the appropriate context because students represent a key demographic in the bottled water market and an important segment of future users. Regarding potential areas of future research, extending the sample to other populations would show the ability to generalize the MPAM. Furthermore, another opportunity for future work is to extend the survey to a location where people do not have access to good quality tap water. In these areas, the relationship among perceived safety, trust, and the two TAM constructs may be stronger. Although the development of MPAM within the context of a specific product may appear to limit the generalization of the study, developing this model is an important step in gaining the ability to judge how mindfulness about environmental concerns relates to decisions. Another opportunity for future research is to apply MPAM to other environmentally friendly products as well as services.

The R-square of the proposed model for bottled water actual use is 41%. Although this indicates that MPAM is a good model to explain the use of bottled water, some possible factors that may influence consumer behaviors are still not included such as price, cleanliness, or impact of group inference (Boonme et al., 2016). Some users argue that fountain water is publicly available or close to the restroom door and, thus, potentially less clean. In addition, bottled water is much more expensive than tap water in the majority of the world, except locations suffering severe drought or geologically low rainfall levels, and the high cost could prevent people from purchasing. Some consumers may decide to use bottled water because of the feedback from their families or friends.

Other important and related areas for future research include how to encourage new behavior and the effectiveness of public awareness campaigns, for example, what about using a filter and washing and storing a reusable container. Finally, all of this research is predicated on establishing and maintain a safe public water supply which has recently been challenged in the press because of some notable failures.

8. Conclusion

Using bottled water as the context study developed a new Mindful Product Acceptance Model. While developed in relations to a specific product we believe that future application will support the relevance of this model to numerous other product and service related decisions. The continuously increasing sales of bottled water corresponding with the decline in the sales of carbonated drinks bring into question the factors driving bottled water use around the world. The proposed and tested MPAM confirms the four crucial driving factors of bottled water use, including perceived usefulness, perceived ease of use, taste, and environmental concerns. The results show that perceived usefulness and perceived ease of use positively relate to trust in bottled water companies and perceived safety of the bottled water use. Also, people drink more bottled water because of the superior taste while, in contrast, environmental concerns reduce bottled water consumption. The more people think bottled water is harmful to the environment, the less bottled water they consume. This finding contributes a practical application for the bottled water industry, in particular, and the beverage industry, in general. Consistent with previous studies (e.g., Bratanova et al., 2013; Chircu et al., 2000), this research provides evidence that trusted companies have the ability to enhance perceived safety and increase the use of the product by increasing usefulness and ease of use perception.

The results of this study motivate companies in the bottled water or any other drink supply chain to invest more in sustainable technology, reduce manufacturing energy, recycle bottled waste, and improve the environmental friendliness of the manufacturing processes. In the literature, TAM constructs have been widely applied but never to explain the use of a non-traditional technology system. The results of this study empirically demonstrate that TAM constructs are appropriate for use with not only a technology but also a non-traditional technology system. With this new application of the TAM constructs and the extension to develop the new MPAM, this work has the potential to apply MPAM to a variety of new products and services. In addition, the finding that mindfulness about environmental concerns can influence decisions has implications for extensions to other models as well as relevance to how future products and services are developed, manufactured, marketed, and sold.

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Appendix

Table 1: Survey Instrument

	Trust	Contextualized from
Trust-1	The bottled water manufacturers produce high quality bottled water	Bratanova et al 2013
Trust-2	Bottled water manufacturers have the consumers' interests at heart	Bratanova et al 2013
Trust-3	Bottled water manufacturers use first class, modern techniques for the purification of water	Bratanova et al 2013
Trust-4	I trust that the authorities will address any possible problems with bottled water	Bratanova et al 2013
Trust-5	Bottle water is free of harmful contaminants and bacterial infections	Developed for MPAM
	Perceived Safety	
P Safety-1	Drinking bottled water from a natural spring is safer than drinking tap water	Saylor et al. 2011
P Safety-2	Drinking bottled water purified from municipal tap water is still safer than drinking directly from tap water	Saylor et al. 2011
P Safety-3	I am concerned about health risks from tap water	Saylor et al. 2011
	Perceived Ease of use	
P EOU1	I can drink bottled water when I am traveling on holiday or at work	Contextualized for MPAM based upon TAM
P EOU2	I can drink bottled water when driving	Contextualized for MPAM based upon TAM
P EOU3	I can drink bottle water when working out at the gym or running outdoor	Contextualized for MPAM based upon TAM
P EOU4	Bottled water is convenient because I can always have it with me	Saylor et al. 2011
	Perceived Usefulness	
P Usefulness-1	Grabbing a bottled water is faster and more convenient than filling a glass with tap water	Contextualized for MPAM based upon TAM
P Usefulness-2	Bottle water helps you easily track your intake water because bottle's label clearly indicates the volume of water	Contextualized for MPAM based upon TAM
P Usefulness-3	Drinking bottled water saves me time	Contextualized for MPAM based upon TAM

	Taste	
TAS1	Bottled water tastes better than tap water	Developed for MPAM
TAS2	I don’t like the taste of tap water	Developed for MPAM
TAS3	Tap water tastes funny	Developed for MPAM
TAS4	Tap water smells bad	Developed for MPAM
	Environmental concerns	
Env Concerns-1	Using bottles for water will increase trash that is harmful to the environment	Developed for MPAM
Env Concerns-2	It wastes energy and resources to make bottles for water	Developed for MPAM
Env Concerns-3	Used empty bottles will occupy too much landfill space	Developed for MPAM
Env Concerns-4	Transporting bottled water or keep them cold will waste unnecessary energy	Developed for MPAM
	Actual use	
Actual Use-1	I frequently drink bottled water at home	Developed for MPAM
Actual Use-2	I frequently drink bottled water at work	Developed for MPAM
Actual Use-3	Bottled water is my major source of drinking water	Developed for MPAM
	Future use	
Future Use-1	I will continue to use bottled water in future	Developed for MPAM
Future Use-2	I will continue to prefer bottled water	Developed for MPAM
Future Use-3	I will continue to purchase bottled water	Developed for MPAM

Table 2: CFA of Bottled Water Acceptance Constructs with Actual Use

	Perceived Ease of Use	Environ-mental Concerns	Taste	Trust	Perceived Usefulness	Perceived Safety	Actual Use
P EOU1	**.783**	.062	-.024	.045	-.026	.013	.035
P EOU2	**.910**	.028	-.007	-.005	.011	.004	-.017
P EOU3	**.928**	-.054	.002	-.065	.016	.017	.026
P EOU4	**.711**	-.030	-.070	.025	-.156	-.020	.100
Env Concerns-1	.098	**.832**	.113	.000	-.033	.134	-.040
Env Concerns-2	-.004	**.891**	-.034	.028	-.028	-.058	-.048
Env Concerns-3	-.034	**.903**	.026	-.014	-.060	.023	-.008
Env Concerns-4	-.047	**.771**	-.105	-.019	.142	-.101	.067
Taste-1	.179	-.074	**-.616**	.249	-.119	-.001	-.027
Taste-2	.029	.012	**-.896**	.045	-.056	.003	-.016
Taste-3	.021	-.010	**-.924**	.026	-.077	.000	-.048
Taste-4	-.022	.020	**-.797**	-.099	.079	.071	.068
Trust-1	.151	-.060	-.054	**.665**	.028	.071	.091
Trust-2	-.019	-.108	-.030	**.753**	.118	.086	.134
Trust-3	.023	-.029	-.058	**.835**	.055	.046	.017
Trust-4	-.032	.025	.067	**.805**	-.092	.019	-.001
Trust-5	-.034	.078	-.005	**.819**	-.077	-.045	-.053
P Usefulness-1	.019	-.039	-.052	-.036	**-.861**	.011	.025
P Usefulness-2	.135	.014	.009	-.012	**-.730**	.094	-.006
P Usefulness-3	.002	.001	-.079	.117	**-.722**	-.049	.223
P Safety-1	-.016	-.006	.006	.101	-.065	**.793**	.044
P Safety-2	.125	-.030	.062	.123	-.010	**.811**	-.099
P Safety-3	-.082	.045	-.307	-.146	.011	**.603**	.151
Actual Use-1	-.029	-.039	.015	.026	-.167	.005	**.812**
Actual Use-2	.116	.024	.043	.040	.093	-.005	**.872**
Actual Use-3	.017	-.049	-.047	.033	-.116	.025	**.811**

Table 3: CFA of Bottled Water Actual and Future Use

	Actual Use	Future Use
Actual Use-1	**.831**	-.005
Actual Use-2	**.688**	-.061
Actual Use-3	**.977**	.045
Future Use-1	-.093	**-.995**
Future Use-2	.367	**-.538**
Future Use-3	.096	**-.850**

Table 4: Verification of relative Measurement model

	Actual Use	Perceived Ease of Use	Environ-mental Concerns	Future Use	Perceived Safety	Trust	Taste	Perceived Usefulness
Cronbachs Alpha	0.873	0.902	0.875	0.912	0.718	0.873	0.880	0.835
Composite Reliability	0.922	0.931	0.915	0.944	0.838	0.907	0.917	0.901
AVE	0.798	0.773	0.729	0.849	0.638	0.662	0.736	0.752
Actual Use	**0.893***							
Perceived Ease of Use	0.480	**0.879**						
Environmental Concerns	-0.283	-0.102	**0.854**					
Future Use	0.707	0.630	-0.424	**0.922**				
Perceived Safety	0.342	0.379	-0.095	0.452	**0.798**			
Trust	0.422	0.411	-0.254	0.521	0.426	**0.814**		
Taste	0.435	0.402	-0.096	0.524	0.489	0.291	**0.858**	
Perceived Usefulness	0.561	0.635	-0.156	0.660	0.344	0.412	0.453	**0.867**

* The diagonal values are square root of AVE

Table 5: Secondary Analysis of High and Low Bottled Water Actual Use

	Path Coefficie-nt	SE	Sam-ple Size	Path Coefficie-nt	SE	Sam-ple Size	Differenc e	t-value	p-valu e
	High Bottled Water Use			Low Bottled Water Use			Difference in models		
Trust → Perceived Usefulness	0.097	0.088	202	0.278***	0.079	213	-0.181	-22.10	0.00
Trust → Perceived Ease of Use	0.136	0.076		0.321***	0.066		-0.185	-26.61	0.00
Trust → Perceived Safety	0.331***	0.083		0.419***	0.075		-0.089	-11.48	0.00
Perceived Safety → Perceived Usefulness	0.229**	0.080		0.22**	0.076		0.009	1.20	0.23
Perceived Safety → Perceived Ease of Use	0.157*	0.070		0.319***	0.065		-0.162	-24.33	0.00
Perceived Usefulness → Actual Use	0.012	0.079		0.250**	0.080		-0.239	-30.57	0.00
Perceived Ease of Use → Actual Use	0.270**	0.087		0.093	0.074		0.177	22.27	0.00
Taste → Actual Use	0.159	0.085		0.130	0.068		0.028	3.75	0.00
Environmental Concerns → Actual Use	-0.167*	0.073		-0.220**	0.066		0.053	7.76	0.00
Actual Use → Future Use	0.426***	0.061		0.522***	0.054		-0.096	-17.03	0.00
	R^2	SE		R^2	SE				
Actual Use	0.149	0.044		0.212	0.048		-0.063	-13.92	0.00
Future Use	0.173	0.046		0.266	0.050		-0.093	-19.69	0.00

Path Coefficient significant at the * 0.05 level, ** 0.01 level, *** 0.001 level

Figure 1: Mindful Product Acceptance Model

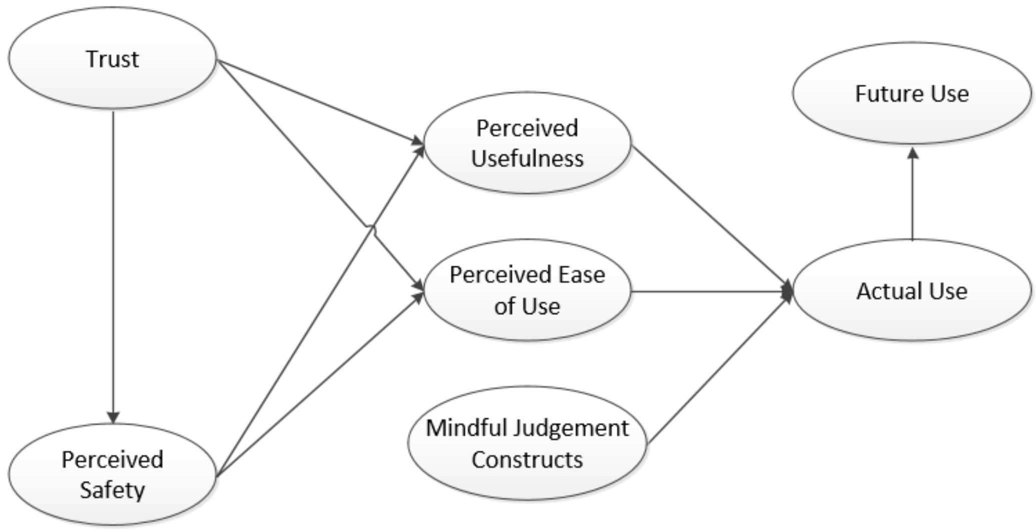
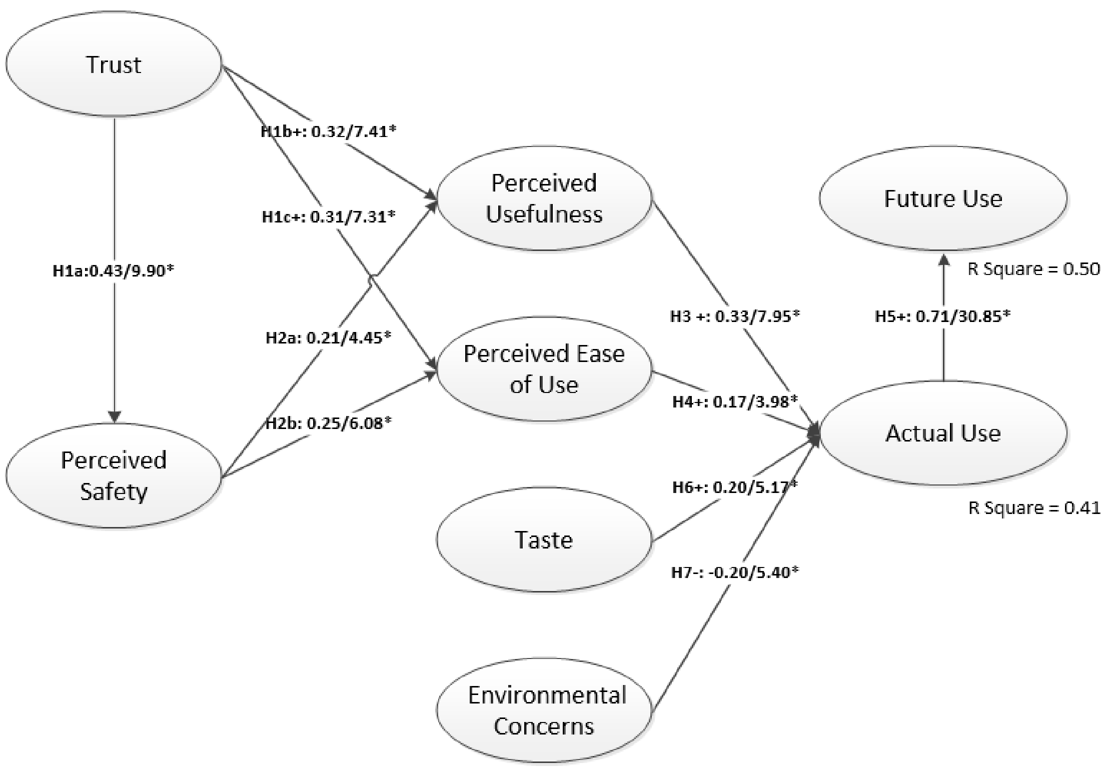


Figure 2: Structural Equation Modeling: Path Analysis



*Path Significant at p < 0.001

A Mindful Product Acceptance Model

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A Mindful Product Acceptance Model

Abstract

We posit, develop and test a new Mindful Product Acceptance Model that includes the independent variable constructs of perceived ease of use, perceived usefulness, mindful judgement constructs (taste and environmental concerns), trust and perceived safety. Concerns about the environment are addressed in the bottled water context because of its ubiquitous use and increasing sales. This increasing bottled water use raises the question about why people drink bottled water versus tap water and provides a venue for testing how mindfulness influences the decision process. This study contributes to the literature by providing a new application of TAM that includes the "mindful" judgement construct as well as the context of applying TAM to a non-traditional technology. This research found that increasing mindfulness of environmental concerns in our community limits bottled water consumption. The statistically significant findings of this research suggest that companies can benefit from examining their manufacturing and recycling processes.

Keywords: TAM; Environmental Concerns; PLS; Structural Equation Modeling; Mindful Product Acceptance Model.

1. Introduction

The increasing use of bottled water despite environmental concerns provides a venue for positing, testing, and developing a model that examines how mindfulness about environmental concerns relate to an individual's decision making. Using bottled water as the context study addresses how environment awareness relates to bottled water users' perceptions and allows development of a Mindful Product Acceptance Model (MPAM), which is likely to have an application to numerous other products and services related decisions. While carbonated drink giants, such as Coke, Pepsi, and Dr Pepper, have faced declining sales, bottled water from these same and other companies, such as Nestle Pure Life, Poland, Dasani, and Aquafina, have had growing sales (Trefis Team, 2015). Bottled water sales volume in the U.S. increased from 8.76 billion gallons in 2010 to 10.87 billion gallons in 2014, while carbonated drink sales volume decreased from 13.78 billion gallons in 2010 to 12.75 billion gallons in 2014 (Trefis Team, 2015). The rising use of bottled water occurs even in countries that supply high-quality tap water (Doria, 2006). This phenomenon suggests the need to determine how to improve municipal tap water utilization.

In prior research, scholars have proposed factors that explain why people use bottled water. For example, Hu et al. (2011) confirmed the relationship between consumers' perceptions of the quality of local tap water and bottled water use. Saylor et al. (2011) investigated the perceived risks and perceived safety of tap water and bottled water use, respectively, to reveal drinking water choices. Doria (2006) concluded that the concerns about health and risk are the most common factors explaining bottled water use. In these studies, scholars concentrated on fragmented factors to explain bottled water consumption. These prior studies' results indicate the need for a complete view of the main factors affecting the use of bottled water. The objectives of this study are to draw together factors in the literature to build an integrated theoretical MPAM in general and to determine crucial factors that affect bottled water use in particular. Although MPAM is developed and applied within the context of a specific product in this study, the model can be used to provide insight into issues about how mindfulness of environmental concerns is relevant to other products.

The theoretical foundation guiding our proposed framework is comprised of the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the Theory of Planned Behavior (Ajzen, 1985) and the Technology Acceptance Model (TAM) (Davis, 1989). Key factors driving behavioral intentions are attitude, behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), and perceived behavioral control (Ajzen, 1985). The constructs in the proposed model are an extension of TAM and include perceived ease of use and perceived usefulness (Davis, 1989). Since its introduction almost three decades ago, TAM has become one of the most popular models used to explain behavioral intention in general and technology system acceptance in particular (Marangunić & Granić, 2015). However, a search of the literature shows that TAM has never been applied to explain the acceptance of a non-traditional technology system. Moreover, TAM constructs, such as perceived ease of use and perceived usefulness, only examine the user's preferences with behavioral intention. We introduce "mindful" judgment related constructs, which reflect the influence of feeling and social judgements on decision-making. This study attempts to explore, extend and validate the application of a "mindful judgement" TAM to explain the acceptance of bottled water, a type of non-traditional technology systems.

The increasing use of bottled water raises environmental concerns about unnecessarily growing landfills and wasting energy and resources in the manufacturing process. Less than a third of used plastic bottles are collected for recycling in the U.S. (Neufeld et al., 2016). In other words, more than two-thirds of used plastic bottles are either landfilled or not collected at all. After ending up in landfills, plastic bottled water made of recyclable polyethylene terephthalate (PET) still takes centuries to decompose (Schriever, 2013). Plastic water bottles also increase garbage patches in the world's oceans. The overwhelming amount of plastic bottles affects the lives of hundreds of marine species since they mistake plastic waste for their food source (Henn, 2016).

The potentially inverse relationship of environmental public concerns with actual bottled water use has an important practical application if supported by this study. Indeed, this study reinforces the need for environmental education to reduce the unnecessary consumption of bottled water, because these environmental concerns do, in fact, negatively affect bottled water use, as shown in this research. Thus, companies in the bottle water supply chain will also be negatively affected and need to acknowledge the relationship between environmental concerns and bottled water consumption. In this way, these companies will bear more responsibility in the manufacturing and recycling process.

2. Literature Review

The literature provides insights into the reasons for drinking bottled water such as better taste or more convenience (Gleick, 2004). Some studies propose factors to explain why people use bottled water such as perceived risks of local water supply, perceived safety of bottled water, and health concerns (Doria, 2006; Hu et al., 2011; Saylor et al., 2011). Doria (2006) found that consumers perceived bottled water as a healthier product. However, a portion of bottled water literature indicates the drawbacks of using bottled water. A study in Cleveland indicated that some bottled water does not meet the state required fluoride level, while 100% of tap water samples pass the test (Lalumandier & Ayers, 2000). Featherstone (1999) indicated that fluoridated drinking water reduces tooth decay via topical mechanisms. Bottled water contamination could be leached from bottle materials such as glass or plastic (Reimann, Birke, & Filzmoser, 2010). The quality of tap water and new bottled water can be similar in developed countries, but one study found that the bacteria growth in opened or used bottled water increased dramatically faster than a similar sample of tap water (Raj, 2005). Another study indicates that neither municipal tap water nor bottled water is always free from bacteria. In fact, bacterium contamination was found in both tap water samples and 20-L bottles of mineral water samples (Da Silva et al., 2008). The argument about the pros and cons of each alternative attracts much media attention and public discourse, and has generated numerous published scientific studies (Doria, 2006). In this study, we do not judge or compare the use of tap water and bottled water but rather investigate the factors affecting the use of bottled water.

Several conceptual models have been built to explain behavioral intentions, such as the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the Theory of Planned Behavior (Ajzen, 1985), and TAM (Davis, 1989). Currently, to the extent of our knowledge, none of these models have been applied to investigate the antecedents of bottled water use. This study attempts to explore the use of TAM constructs as key drivers of bottled water use. TAM was originally developed to explain the importance of perceived usefulness and perceived ease of use in order to determine individuals' behavioral intention of using an information system (Davis, 1989). The model was extended by adding a number of constructs, such as subjective norm, image, job relevance, experience, and voluntariness, and was called TAM 2 (Venkatesh & Davis, 2000). Venkatesh and Bala (2008) proposed the TAM 3 model in which experience plays a more important role in moderating the relationships among existing constructs. For more than the last two decades, TAM 1, 2, 3, and its extended versions have been widely used to explain behavioral intention. The original and extended TAM models have been used to investigate many types of usage, such as e-commerce, email and telecom related devices (King & He, 2006), and web-enhanced instruction (Landry et al. 2006). Nevertheless, all of them are information system related types of usage. No studies have been done on the use of non-IT related systems. Bottled water is obviously not considered a traditional technology system. Our research is the first attempting to extend the use of TAM to a non-IT system.

In the highly cited Weber et al.' (2009) study, the authors emphasized the importance of "Mindful" judgement and decision making process. McAvoy and Butler (2009) showed how such mindful judgment transfers to other venues and proposed a conceptual model to show the effect of mindless and mindful behaviors on IS adoptions in the context of employees of a U.S. manufacturer in Ireland. In addition, Mu and Butler (2009) developed a proxy to assess organizational mindfulness and applied the proxy to evaluate the role of mindful related factors on the deployment of IT innovations at an organizational level. This research helps bridge a gap suggested by this mindfulness research because the traditional TAM model addresses only the user's psychological process and interpretation such as how he or she feels and how social judgments influence the decision. While our study is not the first to include trust and perceived safety with other TAM constructs, it is the first research that includes "mindful" judgement related constructs, which are taste and environmental concerns in the research context of this study. In general, we believe that the proposed Mindful Product Acceptance Model is a valuable extension of the TAM model that includes perceived trust, perceived safety (risks) and "mindful" judgement constructs.

For the purpose of this paper, the original TAM (Davis, 1989) is more relevant because we develop the model based on the two main constructs of perceived usefulness and perceived ease of use. We propose that the original TAM constructs fit and provide insights into consumers' behavioral intent to use bottled water. TAM also suggests that the individuals' beliefs about an information system positively relate to the future use of the system. In our research context, we also add trust, perceived safety, taste, and environmental concerns as influential driving factors.

3. Hypothesis and Research Methodology

3.1. Trust, Perceived Safety and TAM constructs

Trust is an important element required for all human interactions. In a relationship between two entities, trust represents "one entity's confidence, belief and expectation that another entity will act or intend to act beneficially" (Xiu & Liu, 2005). Except one item, all survey items contextualized from a validated survey (Bratanova et al., 2013) were used to measure consumers' trust in bottled water companies. The perception of trust in any relationship will elevate the perception of security (Simpson, 2007). Generally, people feel unsafe or insecure in unpredictable situations. Trust plays a crucial role in reducing consumer perception of the risk of vulnerability (Pavlou, 2003). In other words, people will feel safer about any particular product or transaction if they trust their partners or providers. In the literature, many studies mentioned the relationship among trust, perceived risks, and behavioral intention (e.g., Egea & González, 2011; Kim et al., 2008; Pavlou, 2003). This study attempts to find the antecedents of bottled water use. We assume people decide to drink bottled water because of its safety rather than its risks. Thus, we use perceived safety instead of perceived risks in the proposed model. We use three contextualized survey questions from a validated study (Saylor et al., 2011) to measure the degree of a consumer's perceived safety toward bottled water quality. We hypothesize that the more trust people develop in bottled water companies, the more likely they will feel safe using the product**.**

Hypothesis 1a. Trust will have a direct positive effect on the perceived safety of bottled water use.

Many studies successfully integrated trust with TAM (e.g., Gefen & Straub, 2003; Kim, 2012; Pavlou, 2003). In these studies, trust did play a role as one of the determinants of the perceived usefulness and ease of use. According to Davis (1989), perceived usefulness is the extent to which using a technology system would increase job performance, while perceived ease of use is the degree to which people can use a system without difficulty. One out of four survey questions that evaluated the ease of use perception toward bottled water use was contextualized from a previously validated study (Saylor et al., 2011). In this study context, the usefulness of bottled water is considered convenience, time efficiency, or simple water intake tracking, while ease of use is considered expediency, access to drinkable water anytime and anywhere. If people trust bottled water companies, they will develop an expectation of usefulness and ease of use of bottled water. Kim (2012) confirmed the positive relationship between trust and the perceived usefulness. If people don't trust the company, they will not develop their intentions to use its products (Wu et al., 2016). Thus, consumers will not develop their usefulness perception without trust. Similarly, Pavlou (2003) argued that, if consumers' trust is low, they will spend more time and effort examining and understanding the product. Again, without trust, people will stop using the product, and ease of use never becomes a consideration. Thus, when the consumer trusts the company, they will be open to developing their perceived usefulness and ease of use of the product.

Hypothesis 1b. Trust will have a direct positive effect on the perceived usefulness of bottled water use.

Hypothesis 1c. Trust will have a direct positive effect on perceived ease of use of bottled water use.

Some studies integrated perceived risks, security, or safety with TAM constructs (e.g., Faqih, 2013; Martins et al., 2014). In this research context, perceived safety measures consumers' concerns about their health and their fear of unsafe tap water. With the same reasoning that explains the relationship between trust and the two TAM constructs, we expect that as people feel safer about bottled water, the more likely they will be to build their perceived ease of use and usefulness about the product.

Hypothesis 2a. Perceived safety will have a direct positive effect on Perceived Usefulness.

Hypothesis 2b. Perceived safety will have a direct positive effect on Perceived Ease of Use.

TAM proposes that consumers' perceived ease of use and usefulness positively affects behavioral intention (Davis, 1989). Similar to technology systems, bottled water also benefits individuals in daily life, by saving time and providing access to an immediate drinking source anytime and anywhere bottled water is available. Thus, despite the high cost, consumers are still willing to pay more for the convenience and reliability (Gleick, 2004). The more a person perceives the usefulness and ease of use of bottled water, the more actual use will be. In this study, actual use represents how often a person use bottled water, while future use indicates the likelihood that a person will use bottled water in future. Davis (1989) suggested that the attitudes toward the "intention to use" affect future usage behavior. Thus, we hypothesize that the use of bottle water at present will be positively related to the future use.

Hypothesis 3. Perceived usefulness will have a direct positive effect on actual use.

Hypothesis 4. Perceived ease of use will have a direct positive effect on actual use.

Hypothesis 5. Actual use will have a direct positive effect on future use of bottled water.

3.2. Taste

Municipal tap water is more strictly regulated than bottled water (Daigneau, 2012). Under the Safe Drinking Water Act, the Environmental Protection Agency (EPA) requires utilities to test tap water quality at least once a week (Daigneau, 2012). However, no national standard is established for taste or odor compounds in the U.S. (Burlingame, 2007). Minerals, such as calcium, sodium, bicarbonate, sulfate and chloride, as well as inorganic chemicals, power of hydrogen (pH), and water treatment methods are main factors that affect the taste of water (Burlingame, 2007). The taste of tap water varies by community since treatment plants employ different methods according to a water source. For example, the surface water, including lakes, rivers, streams, requires more complex treatment than tap water (CDC).

In the literature, taste is one of the crucial determinants of preference in regards to restaurant choice (Duarte Alonso, 2013). Taste should be considered an important factor of bottled water use since bottled water obviously belongs to the food and drink category. Some may argue that taste should be a part of perceived usefulness and not considered as an independent construct. However, Raghunathan et al. (2006) found that people still prefer to eat tasty food even though they also perceived it as unhealthy. Thus, even if people do not perceive any usefulness of using bottled water, taste still can be an independent driving factor in choosing the product.

Hypothesis 6. Taste will have a direct positive effect on bottled water use.

3.3. Environmental Concerns

Product sustainability can be a reason for customers to switch to another product or activate purchase decision-making (Galbreth & Ghosh, 2013). When deciding to buy a product, individual consumers not only consider its price but also its environmental friendliness (Siskos & Capros, 2015). The rapidly increasing consumption of bottled water ignites already growing public environmental concerns.

About three-thirds of plastic packaging, including water and soda bottles, are not recycled, out of which about 32% is mismanaged, illegally dumped near or in the ocean (Neufeld et al., 2016). About 8 million metric tons of plastic get into the ocean every year, seriously endangering the lives of marine animals (Jambeck et al. 2015). Cózar et al. (2014) estimated about that only 1% of floating plastic debris in the ocean have been located, while 99 percent is consumed by marine animals, frozen in Artic ice, or has broken and sunk to the bottom of the sea. Moreover, the entire bottled water production process (i.e. manufacture, clean, and label the bottles, and process, and cool the water) wastes energy and resources (Gleick & Cooley, 2009). The energy cost of producing one liter of bottled water is about 2000 times more than the amount of energy cost to produce the similar amount of tap water (Gleick & Cooley, 2009). Therefore, consumers who acknowledge the negative impact of bottled water on the environment will use less bottled water. If such a finding is confirmed it shows that providing information that increases knowledge about environment concerns results in more mindful decision making about how products impact the environment.

Hypothesis 7. Environmental concerns will have a direct negative effect on bottled water use.

4. Sample and Data Collection

Natural mineral water, spring water, and purified water are the three major types of bottled water (Ferrier, 2001). This study concentrates on explaining behavioral intentions in using bottled water in general. Thus, we did not differentiate bottled water in different types, sizes, or brand names when we surveyed our participants. The survey was approved by the Internal Review Board (IRB) before distribution to participants. We used the 7-point Likert scale to measure the degree of agreement of respondents (1 = strongly disagree, 7 = strongly agree). Qualtrics Survey Software was used to develop and distribute the survey.

The survey questions that measured the extent to which consumer's trust and perceived safety and perceived ease of use were partially contextualized from survey items of previously validated studies (Bratanova et al., 2013; Saylor et al., 2011). These construct items were modified within our research context to maintain their validity and reliability. Instruments addressed in Davis, F. D. (1989) and Venkatesh and Davis (2000) were adapted to create items in perceived safety, perceived usefulness, actual use, and future use. New survey items were created to measure other constructs including, taste, and environmental concerns. The questionnaire was tailored to match the research context. To ensure the content validity, a group of information technology and decision science scholars was asked to validate variables of each construct. Survey items were modified according to the scholars' feedback. Finally, we asked 33 Ph.D. candidates in the college of business to do a pilot study. According to comments from this pilot study, we modified and completed the survey. The revised survey was again approved by IRB before distributing it to college students.

For bottled water consumption, the use of a college student sample is appropriate because students represent an important market for bottled water, and results of the survey show that nearly 100% of the students have purchased bottled water in the recent past. The online survey was sent to 1217 students from a college of arts and sciences at the public University in North Texas. In a three-week period, 793 responses were collected. After eliminating incomplete or invalid responses, 565 useable responses were chosen for the final sample.

We addressed the non-response bias by comparing 90% of the early response to 10% of the late response from the sample (Karahanna, Straub, & Chervany, 1999). The independent t-test indicated no significant difference between the two groups. We analyzed the dataset by using Partial Least Squares Structural Equation Modeling (PLS-SEM) using the Smart PLS 3.0 software package. PLS-SEM has been increasingly used in social science research (Hair, Hult, Ringle, & Sarstedt, 2014). PLS-SEM is a statistical technique using an ordinary least square regression-based method that produces coefficients for the path relationships among latent constructs (Hair, Hult, Ringle, & Sarstedt, 2014; Hair, Black, Babin, & Anderson, 2010).

5. Results

5.1. Reliability and Validity

The scale reliability was investigated using Cronbach's alpha (Cronbach, 1951). All of Cronbach's Alpha values are greater than the minimum threshold of 0.7 (Hair, Hult, Ringle, & Sarstedt, 2014; Reynold & Santos, 1999). Additionally, the composite reliability (CR) (Werts, Linn, & Jöreskog, 1974) was also used to assess the reliability of latent constructs. The CR values of all constructs are between 0.838 and 0.944, greater than the suggested value of 0.8 (Nunnally & Bernstein, 1994). Thus, we concluded reliability was supported.

Convergent validity of item indicators was verified by the results of component factor analysis. All rotated factor loading, except P Safety-3 and Future Use-2, and cross-loading items in the pattern matrix, exceed the accepted thresholds of 0.7 and the cutoff value of 0.4, respectively (Hair et al. 2014). Although the indicator P Safety-3 (0.603) and Future Use-2 (-.538) falls below the common thresholds of 0.7, their cross loadings are higher than cutoff value of 0.4, and the inclusion of these indicators kept the composite reliability and Cronbach's alpha above the threshold value of 0.8 and 0.7. Moreover, since the variable items of Perceived safety and Future use constructs are exploratory in nature, the inclusion of these indicators necessary to enhance content validity is acceptable (Hair et al. 2014). At the individual construct level, Convergent validity was supported because the average variance extracted (AVE) values of reflective latent constructs are greater than the minimum threshold of .5 (Fornell & Larker, 1981). Discriminant validity was verified through the analysis of cross-loading values (Gefen & Straub, 2005) and Fornell & Larker criterion (1981), in which the square root of the AVE of each construct should be higher than the highest correlation between latent constructs.

5.2. Structural Model

After validating the reliability and validity of the outer theoretical model, we investigated the individual path coefficient among constructs of the inner model by using PLS-SEM (Gefen, Straub, & Boudreau, 2000). We utilized the bootstrap standard error, with the recommended 5,000 bootstrap samples (Hair et al., 2014), to compute the Student's t-test and p-value of path estimates. The results indicate that all hypotheses are significantly supported at the 0.001 level. The proposed model explains 41% and 50% of the variance in actual use and future use constructs, respectively.

5.3. Secondary analysis of bottled water actual use

A secondary analysis is necessary to provide insight into the role of factors affecting bottled water use between high and low degree of actual use (Scott et al., 2016). The high bottled water actual use subgroup contains 202 observations, while the low subgroup contains 213 observations. We utilized the PLS polar extremes method, proposed by George and Prybutok (2015) to analyze the difference of path coefficients and variances between the two dataset. For the high subgroup, all regression weights are statistically significant, except the path coefficients between Trust and Perceived Usefulness, Trust and Perceived Ease of Use, Perceived Usefulness and Actual Use, and Taste and Actual Use. For the low subgroup, all paths are statistically significant, except Perceived Ease of Use and Actual Use, and Taste and Actual Use. We applied Olkin and Finn's (1995) estimation of R2 standard error to compare the statistical difference of R2 between the two models.

6. Discussion

All relationships within the model are significant at the 0.001 level. The model has a good fit because it explains 41% and 50% of the variance in actual use and future use of bottled water, respectively. Hypotheses 1a, 1b and 1c are supported (coefficient values are 0.43, 0.32 and 0.31, with t statistics of 9.90, 7.41, and 7.31, respectively). When people trust bottled water companies, they will inflate their perception of safety, usefulness, and ease of use about the product. The results also support hypothesis 2a and 2b (coefficient value is 0.21 and 0.25, and t statistics are 4.45 and 6.08, respectively). These findings support the contentation that perceived safety is an important factor that is positively correlated with the perceived ease of use and usefulness of bottled water. Thus, consumer trust and perceived safety significantly affect perceived usefulness and perceived ease of use.

Hypothesis 3 and 4 are supported (coefficient values are 0.33 and 0.17 with t statistics of 7.95 and 3.98, respectively) and affirm the use of TAM variables in the model to predict the behavioral intentions on bottled water. This use of TAM confirms its application in this non-traditional technology system. Hypothesis 6, which addresses the relationship between taste and bottled water use, is also confirmed (coefficient value is 0.20 with t statistic is 5.17). The results support the claim that people choose to drink bottled water because the taste is better than tap water taste. Hypothesis 7 is also supported by the data (coefficient value is -0.20 with t statistic is 5.40). Thus, hypotheses 3, 4, 6, and 7 indicate perceived usefulness, perceived ease of use, taste, and environmental concerns are important factors affecting bottled water use. Our findings support Wansink's (2006) study, which indicated that people change their consumption behavior if they make decisions with mindfulness. According to Wansink's results, obesity could be the results of consuming food with little awareness about the appropriate amount of caloric intake. Using similar rationale and the support of our results, if a user perceives that using bottled water negatively affects the environment, such as increasing the landfill space, wasting energy, and increasing harmful trash, then it is likely they will use less bottled water. The coefficient value of 0.71 and the t-statistic of 30.85 significantly support hypothesis 5, indicating a strong relationship between actual use and future use of bottled water. If bottled water is currently used, the user is more likely to use it in future. Thus, the current use of bottled water affects future use.

To explain the increasing consumption of bottled water, this study confirms that taste is one important factor explaining why people drink bottled water, or, in other words, why they do not like tap water. Thus, improving the taste of municipal drinking water is a crucial potential step to improve utilization of tap water and decrease unnecessary consumption of bottled water. Although the American Water Works Association (AWWA) Taste and Order Committee addressed many difficulties in setting a national standard for taste and odor compound of tap water (Burlingame, 2007), moving toward standardization of the taste and odor compound for each specific regional municipal drinking water system is still possible. Using the available methods to assess public sensitivity proposed by AWWA (Burlingame, 2007), each community water system supplier can move toward a standard for taste and odor, depending on the origin of the water and water treatment methods.

The secondary analysis of high and low degrees of bottled water use provides insights into consumers' behavior. These results indicate that perceived usefulness for the high subgroup has more influence on actual use than the low subgroup, while the role of perceived ease of use is significantly greater for the low subgroup. The results also show that the negative path coefficient between environmental concerns and actual use in the low subgroup is significantly greater than in high subgroup. In other words, acknowledging the negative impact of bottled water on the environment reduces bottled water use. Hypothesis 7 is again supported. This finding provides evidence for the importance of environmental education to increase public awareness about the unnecessary consumption of bottled water use. Indeed, the polar extremes approach enhances the applications of PLS-SEM in social sciences research (George & Prybutok, 2015).

This study contributes to the literature by confirming the appropriateness of using TAM to explain the use of a non-traditional technology system and also contributes to the literature on the inter-relationship among trust, perceived safety, perceived usefulness, perceived ease of use, and behavioral intentions. The study also provides business-related contributions for bottled water companies, because customers are concerned about the environment. If a bottled water company provided an innovative way to improve the recycling process for its plastic or glass bottles and had a good marketing campaign to inform consumers about their innovation, the company could gain a competitive advantage and attract more environmentally-concerned customers. In addition, if the company implemented manufacturing and distribution processes requiring lesser energy than its competitors, this could boost sales. Moreover, the motivation for these bottled water companies also indirectly improves the quality of the environment by reducing energy waste and landfill space.

7. Limitation and Future Research

The use of a sample that includes only undergraduate students limits the generalization of the study. However, a student sample is the appropriate context because students represent a key demographic in the bottled water market and an important segment of future users. Regarding potential areas of future research, extending the sample to other populations would show the ability to generalize the MPAM. Furthermore, another opportunity for future work is to extend the survey to a location where people do not have access to good quality tap water. In these areas, the relationship among perceived safety, trust, and the two TAM constructs may be stronger. Although the development of MPAM within the context of a specific product may appear to limit the generalization of the study, developing this model is an important step in gaining the ability to judge how mindfulness about environmental concerns relates to decisions. Another opportunity for future research is to apply MPAM to other environmentally friendly products as well as services.

The R-square of the proposed model for bottled water actual use is 41%. Although this indicates that MPAM is a good model to explain the use of bottled water, some possible factors that may influence consumer behaviors are still not included such as price, cleanliness, or impact of group inference (Boonme et al., 2016). Some users argue that fountain water is publicly available or close to the restroom door and, thus, potentially less clean. In addition, bottled water is much more expensive than tap water in the majority of the world, except locations suffering severe drought or geologically low rainfall levels, and the high cost could prevent people from purchasing. Some consumers may decide to use bottled water because of the feedback from their families or friends.

Other important and related areas for future research include how to encourage new behavior and the effectiveness of public awareness campaigns, for example, what about using a filter and washing and storing a reusable container. Finally, all of this research is predicated on establishing and maintain a safe public water supply which has recently been challenged in the press because of some notable failures.

8. Conclusion

Using bottled water as the context study developed a new Mindful Product Acceptance Model. While developed in relations to a specific product we believe that future application will support the relevance of this model to numerous other product and service related decisions. The continuously increasing sales of bottled water corresponding with the decline in the sales of carbonated drinks bring into question the factors driving bottled water use around the world. The proposed and tested MPAM confirms the four crucial driving factors of bottled water use, including perceived usefulness, perceived ease of use, taste, and environmental concerns. The results show that perceived usefulness and perceived ease of use positively relate to trust in bottled water companies and perceived safety of the bottled water use. Also, people drink more bottled water because of the superior taste while, in contrast, environmental concerns reduce bottled water consumption. The more people think bottled water is harmful to the environment, the less bottled water they consume. This finding contributes a practical application for the bottled water industry, in particular, and the beverage industry, in general. Consistent with previous studies (e.g., Bratanova et al., 2013; Chircu et al., 2000), this research provides evidence that trusted companies have the ability to enhance perceived safety and increase the use of the product by increasing usefulness and ease of use perception.

The results of this study motivate companies in the bottled water or any other drink supply chain to invest more in sustainable technology, reduce manufacturing energy, recycle bottled waste, and improve the environmental friendliness of the manufacturing processes. In the literature, TAM constructs have been widely applied but never to explain the use of a non-traditional technology system. The results of this study empirically demonstrate that TAM constructs are appropriate for use with not only a technology but also a non-traditional technology system. With this new application of the TAM constructs and the extension to develop the new MPAM, this work has the potential to apply MPAM to a variety of new products and services. In addition, the finding that mindfulness about environmental concerns can influence decisions has implications for extensions to other models as well as relevance to how future products and services are developed, manufactured, marketed, and sold.

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Appendix

Table 1: Survey Instrument

	Trust	Contextualized from
Trust-1	The bottled water manufacturers produce high quality bottled water	Bratanova et al 2013
Trust-2	Bottled water manufacturers have the consumers' interests at heart	Bratanova et al 2013
Trust-3	Bottled water manufacturers use first class, modern techniques for the purification of water	Bratanova et al 2013
Trust-4	I trust that the authorities will address any possible problems with bottled water	Bratanova et al 2013
Trust-5	Bottle water is free of harmful contaminants and bacterial infections	Developed for MPAM
	Perceived Safety	
P Safety-1	Drinking bottled water from a natural spring is safer than drinking tap water	Saylor et al. 2011
P Safety-2	Drinking bottled water purified from municipal tap water is still safer than drinking directly from tap water	Saylor et al. 2011
P Safety-3	I am concerned about health risks from tap water	Saylor et al. 2011
	Perceived Ease of use	
P EOU1	I can drink bottled water when I am traveling on holiday or at work	Contextualized for MPAM based upon TAM
P EOU2	I can drink bottled water when driving	Contextualized for MPAM based upon TAM
P EOU3	I can drink bottle water when working out at the gym or running outdoor	Contextualized for MPAM based upon TAM
P EOU4	Bottled water is convenient because I can always have it with me	Saylor et al. 2011
	Perceived Usefulness	
P Usefulness-1	Grabbing a bottled water is faster and more convenient than filling a glass with tap water	Contextualized for MPAM based upon TAM
P Usefulness-2	Bottle water helps you easily track your intake water because bottle's label clearly indicates the volume of water	Contextualized for MPAM based upon TAM
P Usefulness-3	Drinking bottled water saves me time	Contextualized for MPAM based upon TAM

	Taste	
TAS1	Bottled water tastes better than tap water	Developed for MPAM
TAS2	I don’t like the taste of tap water	Developed for MPAM
TAS3	Tap water tastes funny	Developed for MPAM
TAS4	Tap water smells bad	Developed for MPAM
	Environmental concerns	
Env Concerns-1	Using bottles for water will increase trash that is harmful to the environment	Developed for MPAM
Env Concerns-2	It wastes energy and resources to make bottles for water	Developed for MPAM
Env Concerns-3	Used empty bottles will occupy too much landfill space	Developed for MPAM
Env Concerns-4	Transporting bottled water or keep them cold will waste unnecessary energy	Developed for MPAM
	Actual use	
Actual Use-1	I frequently drink bottled water at home	Developed for MPAM
Actual Use-2	I frequently drink bottled water at work	Developed for MPAM
Actual Use-3	Bottled water is my major source of drinking water	Developed for MPAM
	Future use	
Future Use-1	I will continue to use bottled water in future	Developed for MPAM
Future Use-2	I will continue to prefer bottled water	Developed for MPAM
Future Use-3	I will continue to purchase bottled water	Developed for MPAM

Table 2: CFA of Bottled Water Acceptance Constructs with Actual Use

	Perceived Ease of Use	**Environ-mental Concerns**	**Taste**	**Trust**	**Perceived Usefulness**	**Perceived Safety**	**Actual Use**
P EOU1	**.783**	.062	-.024	.045	-.026	.013	.035
P EOU2	**.910**	.028	-.007	-.005	.011	.004	-.017
P EOU3	**.928**	-.054	.002	-.065	.016	.017	.026
P EOU4	**.711**	-.030	-.070	.025	-.156	-.020	.100
Env Concerns-1	.098	**.832**	.113	.000	-.033	.134	-.040
Env Concerns-2	-.004	**.891**	-.034	.028	-.028	-.058	-.048
Env Concerns-3	-.034	**.903**	.026	-.014	-.060	.023	-.008
Env Concerns-4	-.047	**.771**	-.105	-.019	.142	-.101	.067
Taste-1	.179	-.074	**-.616**	.249	-.119	-.001	-.027
Taste-2	.029	.012	**-.896**	.045	-.056	.003	-.016
Taste-3	.021	-.010	**-.924**	.026	-.077	.000	-.048
Taste-4	-.022	.020	**-.797**	-.099	.079	.071	.068
Trust-1	.151	-.060	-.054	**.665**	.028	.071	.091
Trust-2	-.019	-.108	-.030	**.753**	.118	.086	.134
Trust-3	.023	-.029	-.058	**.835**	.055	.046	.017
Trust-4	-.032	.025	.067	**.805**	-.092	.019	-.001
Trust-5	-.034	.078	-.005	**.819**	-.077	-.045	-.053
P Usefulness-1	.019	-.039	-.052	-.036	**-.861**	.011	.025
P Usefulness-2	.135	.014	.009	-.012	**-.730**	.094	-.006
P Usefulness-3	.002	.001	-.079	.117	**-.722**	-.049	.223
P Safety-1	-.016	-.006	.006	.101	-.065	**.793**	.044
P Safety-2	.125	-.030	.062	.123	-.010	**.811**	-.099
P Safety-3	-.082	.045	-.307	-.146	.011	**.603**	.151
Actual Use-1	-.029	-.039	.015	.026	-.167	.005	**.812**
Actual Use-2	.116	.024	.043	.040	.093	-.005	**.872**
Actual Use-3	.017	-.049	-.047	.033	-.116	.025	**.811**

Table 3: CFA of Bottled Water Actual and Future Use

	Actual Use	**Future Use**
Actual Use-1	**.831**	-.005
Actual Use-2	**.688**	-.061
Actual Use-3	**.977**	.045
Future Use-1	-.093	**-.995**
Future Use-2	.367	**-.538**
Future Use-3	.096	**-.850**

Table 4: Verification of relative Measurement model

	Actual Use	Perceived Ease of Use	Environ-mental Concerns	Future Use	Perceived Safety	Trust	Taste	Perceived Usefulness
Cronbachs Alpha	0.873	0.902	0.875	0.912	0.718	0.873	0.880	0.835
Composite Reliability	0.922	0.931	0.915	0.944	0.838	0.907	0.917	0.901
AVE	0.798	0.773	0.729	0.849	0.638	0.662	0.736	0.752
Actual Use	**0.893***							
Perceived Ease of Use	0.480	**0.879**						
Environmental Concerns	-0.283	-0.102	**0.854**					
Future Use	0.707	0.630	-0.424	**0.922**				
Perceived Safety	0.342	0.379	-0.095	0.452	**0.798**			
Trust	0.422	0.411	-0.254	0.521	0.426	**0.814**		
Taste	0.435	0.402	-0.096	0.524	0.489	0.291	**0.858**	
Perceived Usefulness	0.561	0.635	-0.156	0.660	0.344	0.412	0.453	**0.867**

* The diagonal values are square root of AVE

Table 5: Secondary Analysis of High and Low Bottled Water Actual Use

	High Bottled Water Use: Path Coefficie-nt	High Bottled Water Use: SE	Sam-ple Size	Low Bottled Water Use: Path Coefficie-nt	Low Bottled Water Use: SE	Sam-ple Size	Difference in models: Differenc e	Difference in models: t-value	Difference in models: p-valu e
Trust → Perceived Usefulness	0.097	0.088	202	0.278***	0.079	213	-0.181	-22.10	0.00
Trust → Perceived Ease of Use	0.136	0.076		0.321***	0.066		-0.185	-26.61	0.00
Trust → Perceived Safety	0.331***	0.083		0.419***	0.075		-0.089	-11.48	0.00
Perceived Safety → Perceived Usefulness	0.229**	0.080		0.22**	0.076		0.009	1.20	0.23
Perceived Safety → Perceived Ease of Use	0.157*	0.070		0.319***	0.065		-0.162	-24.33	0.00
Perceived Usefulness → Actual Use	0.012	0.079		0.250**	0.080		-0.239	-30.57	0.00
Perceived Ease of Use → Actual Use	0.270**	0.087		0.093	0.074		0.177	22.27	0.00
Taste → Actual Use	0.159	0.085		0.130	0.068		0.028	3.75	0.00
Environmental Concerns → Actual Use	-0.167*	0.073		-0.220**	0.066		0.053	7.76	0.00
Actual Use → Future Use	0.426***	0.061		0.522***	0.054		-0.096	-17.03	0.00
	R^2	SE		R^2	SE				
Actual Use	0.149	0.044		0.212	0.048		-0.063	-13.92	0.00
Future Use	0.173	0.046		0.266	0.050		-0.093	-19.69	0.00

Path Coefficient significant at the * 0.05 level, ** 0.01 level, *** 0.001 level

Figure 1: Mindful Product Acceptance Model

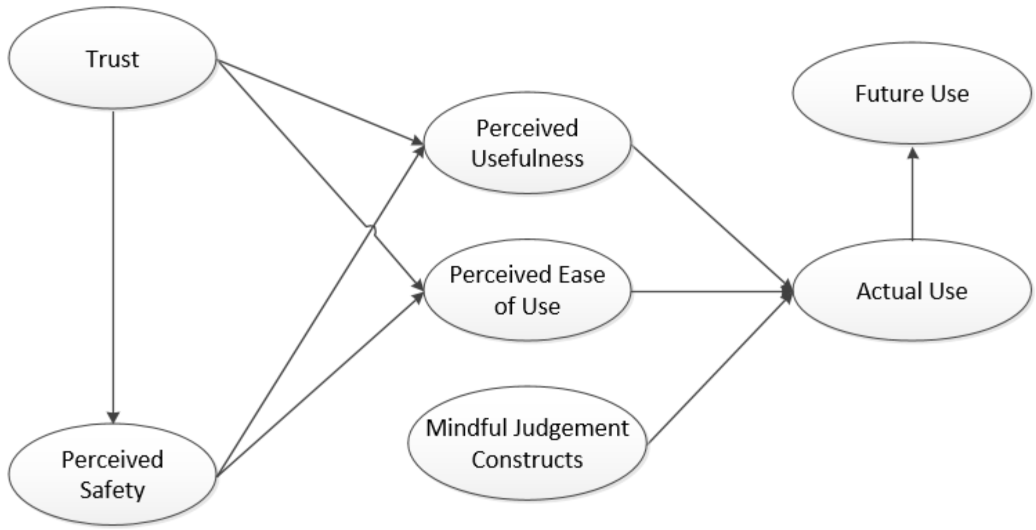
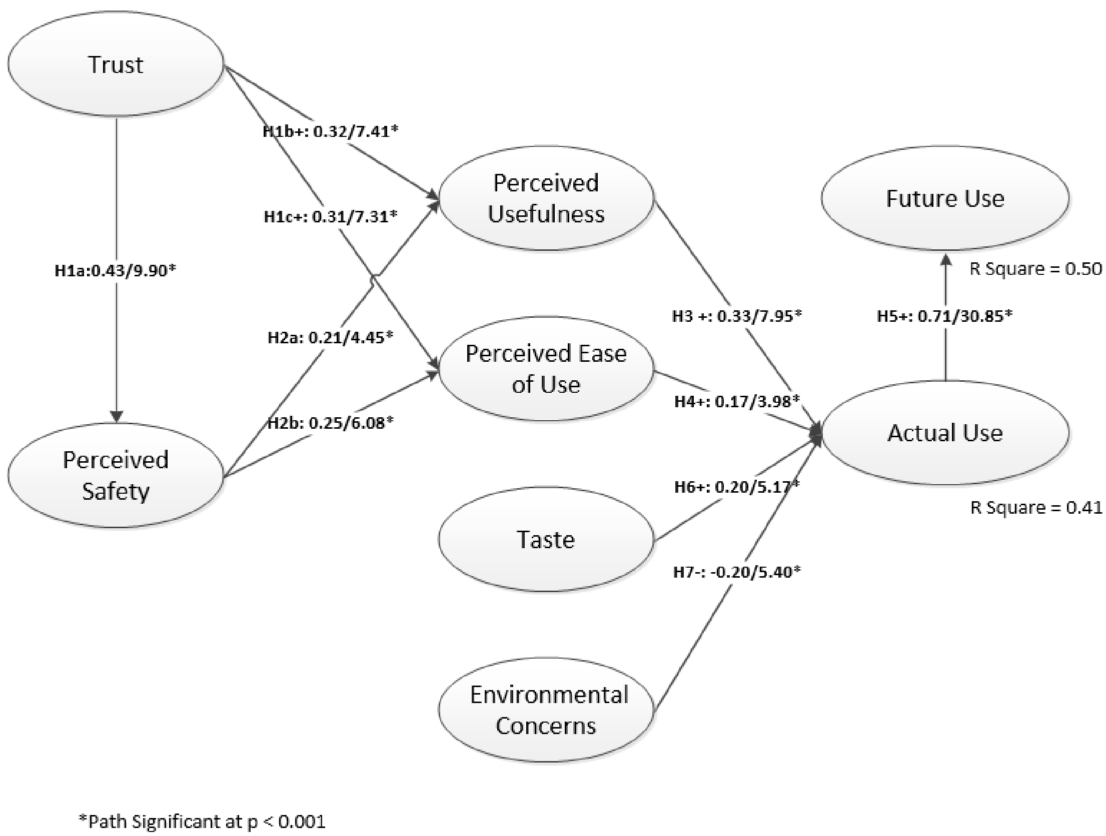


Figure 2: Structural Equation Modeling: Path Analysis



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A Mindful Product Acceptance Model

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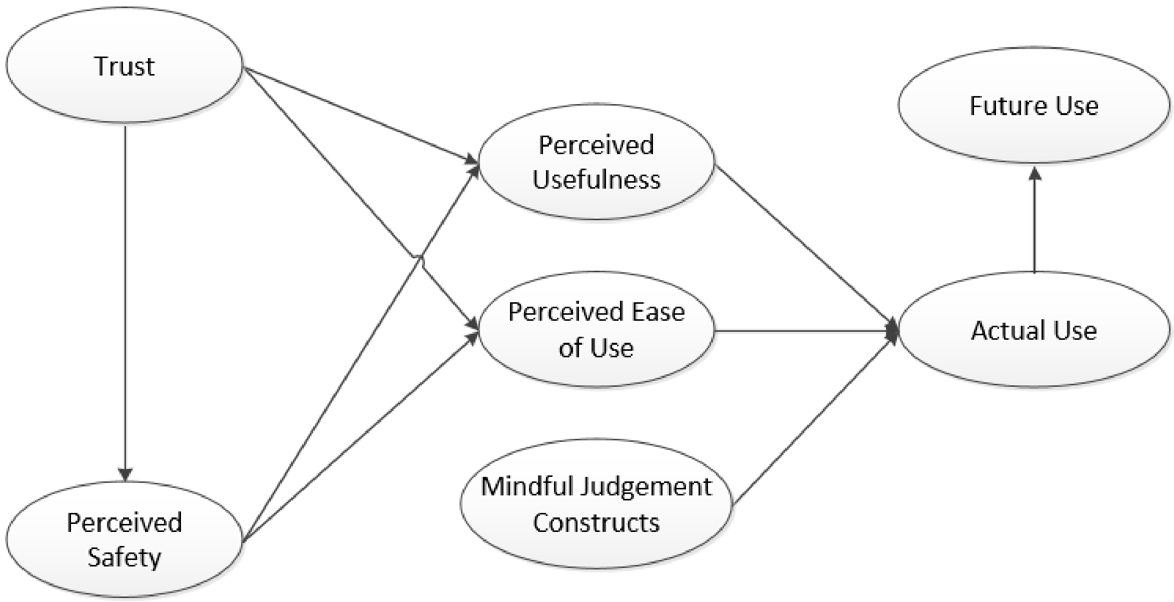

Figure 2: Structural Equation Modeling: Path Analysis