

Integrated technology acceptance model (TAM) of sports team smartphone application (STSA) in the stimulus organism response (SOR) framework

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Abstract

Background: To date, Sports Team Smartphone Application (STSA) provides quick information, score, result, and highlights for fans. Also, STSA is a useful marketing tool for professional sports teams in research and practice. Therefore, the purpose of this study is (a) to examine the relationship between information credibility, Technology Acceptance Model (TAM), Intention to Revisit Apps (IRA), and Actual Sport Behavior (ASB) and (b) to apply an integrated Stimulus Organism Response (SOR) framework for the STSA. **Method:** The sample consisted of 315 participants from four Korean professional baseball teams. **Results:** The result supported multiple hypotheses. First, information credibility's accuracy and attractiveness significantly influence trustworthiness, perceived ease of use (PEOU), and perceived usefulness (PU). Trustworthiness and attractiveness of information have a positive influence on customers' IRAs. The PEOU influences PU, which affects IRA and ASB. Lastly, IRA significantly influences ASB. This study highlighted the purchasing behavior of sports fans through sports teams' apps. It also provided evidence that sports teams' apps can be beneficial tools to ensure the usefulness of information and IRA. Finally, the data provide evidence that the SOR theory applies to an STSA environment in a sports context. These results suggest that the SOR theory can be used to examine online studies and smartphone apps. **Conclusions:** Through this study's findings, each sports team's marketers will recognize that sports apps are useful resources to provide information and can be used as mutual communication to attract fans to the teams' apps and games more frequently. Consequently, to maximize sports fans' revisiting of team apps, each team needs to provide accurate, attractive, and useful information. Also, teams must update and monitor their apps constantly for effective management.

Keywords: Sports team smartphone application, information credibility, technology acceptance model, stimulus organism response, perceived ease of use.

Introduction

Although mobile technology adoption is slowing, the number of new mobile users from Asia-Pacific, the Middle East, and Africa is increasing. Putzer and Park (2010) emphasized that smartphone popularity is spreading because of wireless connections and mobile functionality (e.g., access to e-mail, Internet, applications: Apps, and telecommunication). Franko (2011) defined a smartphone as "a cellular telephone with an integrated computer that is capable of performing a broad array of tasks, including running various downloadable apps that typically are not associated with a cellular phone (p. 2042)."

Apps provide a diverse population of users access to the Internet that is analogous to traditional web browsers. Thus, apps are considered independent software programs digitized to smartphones (e.g., Android and iPhone) that can symbolize personal interests (Franko & Tirrell, 2012). In addition, Dickinson et al. (2014) noted that mobile app installation is a principal feature of smartphones that has implications for mass markets. This study has prompted the development of competitive smartphones that offer a wide variety of mobile apps to a growing market, which have considerable implications for new market movement (Kim et al., 2011).

Franko and Tirrell (2012) stressed that smartphones' assorted capabilities (e.g., store reference information, save critical data, perform complex calculations, access Internet-based content, and present video/audio media) appeal to consumers for various functions (e.g., social, professional, and inexpensive apps). Furthermore, smartphone apps have been thoroughly researched in various fields, such as health and tourism (Dickinson et al., 2014), because they offer various media information and play an essential role in the experience of smartphone users if they are conveniently accessible.

Specifically, people use smartphone apps in the sports industry to access sports news, scores, and schedules. In addition, sports apps provide unprecedented access to sports organizations for fans, regardless of geographic location, through new communication technology in the sports world. Also, sports fans can

continuously obtain information on their favorite sports team, interact with other fans, and watch sports games (i.e., live streaming) by using apps.

Professional sports teams such as the Miami Heat, Los Angeles Dodgers, and Dallas Cowboys have developed official apps that allow fans to receive various information. For example, the official LA Dodgers app provides news and photo coverage of the Dodgers from the LA News Group staff, including the LA Daily News, via itunes.apple.com. Also, the Google Play app offers team resources (e.g., Dodgers scores, real-time stats, historical trends, team power rankings, individual player rankings, and grades) via play.google.com. In this regard, sports teams need to access and maintain apps that store essential information; while simultaneously encouraging sports fans to appreciate their experience.

Although sports teams provide information that focuses on enhancing the fans' attention, there is a lack of research on the importance of sports teams' information in apps. Online sports information is a crucial marketing factor (e.g., Fio et al., 2009; Hur et al., 2012); however, most research has focused on general sports information on websites. Many studies have emphasized the importance of information, but consumers seek source credibility on the Web (e.g., Flanagin & Metzger, 2007; Rieh & Danielson, 2007). For example, Johnson et al. (2007) suggested that people (a) have different expectations about the credibility of information and (b) use credibility to judge online resources. According to Flanagin and Metzger, credibility is not a perception variable; it can be defined as an objective measure of the quality of information and information sources. Thus, credibility is determined by the individual who receives the information (Freeman & Spyridakis, 2004). In particular, various academic fields (communications, consumer behaviors, health sciences, information disciplines, marketing, psychology, sociology, and sports) suggest credibility is fundamentally crucial for the field's perception (Wathen & Burkell, 2002).

In the online context, despite the importance of information source credibility (e.g., Eastin, 2001; Hillgoss & Rieh, 2008; Westerman et al., 2012), few studies have been conducted to account for the credibility of information sources in the field of sports (e.g., Sadri, 2014). Since smartphone apps provide unparalleled access to information worldwide, researchers should examine sports team smartphone apps (STSA) that provide quick information, scores, results, and highlights for fans. Today, STSA is a useful marketing tool for professional sports teams in research and practice. Therefore, the purpose of this study is (a) to examine the relationship between information credibility, the technology acceptance model (TAM), intention to revisit apps (IRA), and actual sports behavior (ASB); and (b) to apply an integrated stimulus organism response (SOR) framework to the STSA.

Theoretical Background

Stimulus organism response framework

Mehrabian and Russell (1974) proposed the SOR paradigm to account for environmental factors that influence an individual's cognitive and affective behaviors. The SOR model has been used to research people's responses to stimuli in the online environment. For example, Kim and Lennon (2013) examined a relationship between reputation and website quality (stimuli), perceived risk and emotion (organism), and purchase intention (response). They found evidence that the online environment factors, such as reputation and website quality, positively influenced perceived risk, emotion, and purchase intention.

SOR models focus mainly on the related variables and between variables (Thang & Tan, 2003). A SOR framework consists of three spheres: stimulus, organism, and response (Vieira, 2013). First, stimulus (S) is an independent variable (e.g., atmospherics and information). Sherman et al. (1997) noted that "stimulus can be conceptualized as those external factors associated with a pending decision in the consumer decision-making context" (p. 5). Second, the organism is a mediator variable (e.g., consciousness and emotion) between stimulus and response in consumer behavior. Third, the response is a dependent variable that includes psychological reactions (outcome or final action), such as the consumer's attitude and behavior.

Therefore, our conceptualization extends to the sports consumer's perception of the STSA. More specifically, the stimulus indicates the information credibility of STSA; the organism refers to perceived ease of use (PEOU) and perceived usefulness (PU) in the TAM, and the response represents sports fans' behaviors in the STSA.

Information credibility

One field of interest for researchers has been information areas and their importance to web consumers. Wathen and Burkell (2002) suggested that "information can be passed on to others, it can be used to make decisions, and it can affect attitudes and behaviors" (p. 134). Online information becomes a persuasive source to direct consumer choices on choosing products, evaluating services, and finalizing purchases. The social information processing theory (SIPT) proposes that people use such information when they encounter situations where they need to judge a person or other channels. Therefore, SIPT is useful for examining how consumers assess information or make decisions. For instance, Westerman et al. (2012) suggested that SIPT worked with online channels to provide more information. The authors examined how system-generated cues available in social media impacted the perceptions of a source's credibility. The results showed that social media networks, such as Twitter information, impacted customers' perceived source credibility.

Smartphone apps allow users to directly access information on the Web, such as news, health, or relative sports information. However, even though STSA allows people to receive and interact with information more efficiently, the credibility of such information is uncertain because of sources. O'Keefe (2002) defines source credibility as "judgments made by a perceiver concerning the believability of a communicator" p. 181. Usually, individuals determine a source's credibility through simultaneous multidimensional assessments (Fogg et al., 2002).

Credibility is multifaceted. Perceived information quality focuses on accuracy, reliability, believability, fairness, objectivity, attractiveness, and trust. However, trust shares commonality with the notion of willingness depending on the information's credibility (Lucassen & Schraagen, 2011). Also, the credibility of a source or message can be interpreted as consumer judgment, which includes objective and quality judgments of information and subjective attitudes regarding the source's trustworthiness, expertise, and attractiveness (Freeman & Spyridakis, 2004).

Empirical evidence has indicated that trustworthiness is vital in evaluating credibility, web buying behavior, and developing a marketing relationship (Hilligoss & Rieh, 2008; Yoon, 2002). Kim et al. (2008) argued that information quality comprises the consumer's perception concerning the accuracy of the information and its effect on consumer trust. For example, website credibility significantly influences trust (Cugelman et al., 2009), and since trust assessments are heuristic, the accuracy of information significantly affects truth assessments (Lucassen & Schraagen, 2011).

Another source of trustworthiness is attractiveness (Bzdok et al., 2010). A critical component to trust is attractiveness (Bzdok et al., 2010), with individuals associating "looking good" and "being good" with "being credible" and, therefore, trustworthy (Fogg et al., 2002). Thus, credibility (e.g., accuracy, attractiveness, familiarity, information quality) can positively influence trust and trustworthiness in an online environment (Lucassen & Schraagen, 2011).

Integrated TAM in STSA

Online research adopting the technology acceptance model (TAM) can influence the individual's perceived ease of use (PEOU) and perceived usefulness (PU). Lin and Lu (2000) demonstrated that information quality, response time, and system accessibility significantly influence PEOU and PU beliefs. Also, information received from social backgrounds can influence people's attitudes and cognitive behaviors. Thus, a person's social influence can impact PEOU and PU (López-Nicolás et al., 2008). Other factors, such as web quality or information quality (e.g., accuracy and reliability), significantly influences PEOU and PU (Ahn et al., 2007). Regarding smartphone use, Youm and Yu (2013) examined motivation factors such as convenience, information pursuit, leisure time use, and monetary reward with PEOU and PU. The authors found evidence that all motivation factors significantly affected PU, but information pursuit negatively influenced PEOU.

Yang et al. (2005) suggested that five key dimensions could guide service quality perception with web portals. The authors validated that the quality of information, ease of navigation, adequacy of information, interactive communication, and technical adequacy significantly impacted service quality. In addition, higher satisfaction levels can lead to seeking out certain information. Hong (2006) found credibility factors such as trust/expertise and depth significantly affected whether people revisited a website with health-related information. Some studies have argued that web credibility significantly influences intention (Cugelman et al., 2009), but in terms of the impact of intention on the web portal in sports, perceived enjoyment and trustworthiness impacted the sports web portals the most (Hur et al., 2012).

Regarding using individual intention and smartphones for TAM, Kim (2008) discovered that PEOU significantly influenced smartphone users' PU and behavioral intention if accounting for perceived cost-saving and the company's willingness to fund if moderated by job relevance and experience. In another study concerning TAM, Lin and Lu (2000) examined TAM and found that PU significantly influences attitude and intention to reuse a website. In addition, previous research demonstrated that PU significantly impacts consumers' online revisiting intention (e.g., Castañeda et al., 2007; Chun et al., 2012; Kim, 2008; López-Nicolás et al., 2008).

Smartphone apps user behavior intentions

Theories to explain behavior routinely focus on the intention of the individual. For example, the theory of planned behavior (TPB) argues that intention is an antecedent of behavior that can predict behavior and control (Ajzen, 1991); while the theory of reasoned action (TRA) is an especially well-researched intention model that has proven successful in predicting and explaining behavior across a wide variety of domains" (Davis et al., 1989, p. 983).

In this regard, TRA significantly influences the performance of a specified (or actual) behavior. However, TAM behavior is determined by personal attitude toward the system and PU. TRA and TAM research has shown that behavior intention is an antecedent variable of usage behavior (e.g., Ahn et al., 2007; Lin & Lu, 2000; Venkatesh & Davis, 2000).

Castañeda et al. (2007) examined a web acceptance model (WAM) and found a causal relationship between PEOU, PU, website perception, and future intention. Castañeda and colleagues also found that positive

perceptions of websites significantly influence future intention on the Web. Web-based research further found that online user intention and attitude significantly influence behaviors (e.g., Ahn et al., 2007; Lin & Lu, 2000; Venkatesh & Davis, 2000). Furthermore, smartphone app users' intentions can influence their behaviors (e.g., Kim & Han, 2014). Thus, the users' intention can lead to making decisions and actions, such as becoming fans of specific sports teams. This intention can also contribute to fans' loyalty to specific sports teams by providing information about game schedules or results and suggesting using the team's apps. If this continues, the fans will become consumers who will take action, such as purchasing the sports team's goods (e.g., Kim & Han, 2014).

Research questions and hypotheses

This research seeks to answer questions regarding the use of STSA:

- RQ1: To what extent do accuracy and attractiveness of information credibility influence trustworthiness?
H1a and H1b: Accuracy and attractiveness of information credibility on the STSA will positively influence trustworthiness.
- RQ2: How do accuracy, trustworthiness, and attractiveness affect PEOU?
H2a (i.e., accuracy), H2b (i.e., trustworthiness), and H2c (i.e., attractiveness): Information credibility of STSA will positively influence PEOU.
- RQ3: How do accuracy, trustworthiness, and attractiveness affect PU?
H3a (i.e., accuracy), H3b (i.e., trustworthiness), and H3c (i.e., attractiveness): Information credibility of STSA will positively influence PU.
- RQ4: How do accuracy, trustworthiness, and attractiveness in STSA affect IRA?
H4a (i.e., accuracy), H4b (i.e., trustworthiness), and H4c (i.e., attractiveness): Information credibility of STSA will positively influence IRA.
- RQ5: To what extent does PEOU influence PU, IRA, and ASB?
H5a, H5b, and H5c: PEOU of STSA will positively influence PU, IRA, and ASB.
- RQ6: To what extent does PU influence IRA and ASB?
H6a and H6b: PU of STSA will positively influence IRA and ASB.
- RQ7: To what extent does IRA influence ASB?
H7: IRA of STSA will positively influence ASB.

Method

Sample

A convenience sampling method was used to survey 360 professional baseball spectators using a sports team app in four stadiums. Of the 357 respondents participating in the survey, 42 surveys were incomplete, leaving 315 surveys in the final sample. Samples consisted of 51.4% male ($n = 162$) and 48.6% female ($n = 153$). The respondents ranged from 19–50 years ($M = 21$). In terms of age, 82.5% ($n = 260$) were 20–29 years old, 15.9% ($n = 50$) and 1.6% ($n = 5$) were older than 40. In terms of smartphone hours by the user per day, the results were: 13.0% ($n = 41$) under 1 hour per day, 17.8% ($n = 56$) between 1-2 hours, 21.9% ($n = 69$) between 2-3 hours, 16.2% ($n = 51$) between 3-4 hours, and 31.1% ($n = 98$) for 4+ hours. In terms of sports team smartphone application hours, 71.7% ($n = 226$) reported under 1 hour, 19.4% ($n = 61$) between 1-2 hours, and 8.9% ($n = 28$) between 2-3 hours.

Measurement scale

Information credibility of sports team application

Fogg et al. (2003) examined several websites (e.g., e-commerce, health, sport, travel) regarding 18 types of credibility. The scale items were developed and modified from the websites' credibility, such as information focus, usefulness, accuracy, and readability. Much research has suggested that credibility measurement covers multiple dimensions. Also, Eastin (2001) examined the accuracy, believability, and factualness of information credibility from the literature (Johnson & Kaye, 1998). Specifically, accuracy (e.g., Flanagan & Metzger, 2000), trustworthiness (e.g., Hur et al., 2012), and attractiveness (e.g., Hur et al., 2012) were developed and modified from items in existing scales. In addition, we referred to a credibility and information quality web scale because credibility is a key feature of the quality of the information (Hilligoss & Rieh, 2008).

TAM

PEOU and PU measured the TAM. Each dimension was measured with four items from Hur et al.'s (2012) sports website's acceptance model measurement scale. In addition, the integrated model of smartphone TAM was modified for this survey by adding the words STSA (e.g., Chun et al., 2012; Kim, 2008).

IRA and ASB

IRA was measured with three items derived from Yoo and Donthu's (2001) SITEQUAL of revisit intention scale and Castañeda et al.'s (2007) web acceptance model (WAM) scale. ASB was measured with three items derived from Trail, Fink, and Anderson's (2003) spectators' consumption behaviors. See Table 1 for all questions, means, standard deviations, skewness, and kurtosis for all measurements.

Table 1. Cronbach's α , Mean, Standard Deviation, Skewness, and Kurtosis

Items (Cronbach's α)	M	SD	SK	KU	λ	CR
Accuracy ($\alpha = .88$)	3.85	.78	-.19	-.53	-	.91
ACC1. This information is accurate	3.81	.90	-.10	-.98	.80	
ACC2. This information is correct	3.95	.83	-.30	-.69	.90	
ACC3. This information is free of error	3.80	.89	-.20	-.80	.83	
Trustworthiness ($\alpha = .86$)	3.70	.67	-.10	-.06	-	.91
TRU1. This information is believable	3.66	.72	-.05	-.28	.82	
TRU2. This information is trustworthy	3.87	.77	-.24	-.37	.93	
TRU3. This information is credible	3.56	.79	-.07	-.24	.69	
Attractiveness ($\alpha = .91$)	3.90	.74	.10	-1.20	-	.94
ATT1. This information is attractive	3.86	.75	.23	-1.18	.84	
ATT2. This information is pleasant	3.88	.80	.11	-1.17	.92	
ATT3. This information is favorable	3.95	.86	-.11	-1.18	.87	
Perceived Ease of Use ($\alpha = .82$)	3.74	.69	-.26	-.37	-	.86
PEOU1. My favorite STSA is the ease of use	3.87	.92	-.75	.61	.69	
PEOU2. Learning to operate my favorite STSA is easy	3.72	.87	-.24	-.32	.75	
PEOU3. My interaction with the STSA is clear and understandable	3.55	.83	.22	-.59	.79	
PEOU 4. It is easy to interact with my favorite STSA	3.82	.83	-.39	-.30	.68	
Perceived Usefulness ($\alpha = .75$)	3.90	.64	-.23	-.09	-	.80
PU1. The STSA is useful for searching sport-related information	4.26	.74	-.88	.96	.60	
PU2. The STSA provides schedules of teams	3.75	1.00	-.51	-.32	.50	
PU3. The STSA enables my effectiveness to search for sports information	4.13	.82	-1.0	1.35	.70	
PU4. The STSA provides the results of games	3.44	1.04	-.08	-.72	.56	
Intentions to Revisit Application ($\alpha = .94$)	4.03	.70	-.35	-.09	-	.97
IRA1. I intend to continue visiting the STSA in the future	3.98	.77	-.39	-.22	.90	
IRA2. I am likely to revisit this STSA in the near future	4.05	.73	-.47	.10	.95	
IRA3. I am encouraged to revisit this STSA in the near future	4.07	.72	-.56	.66	.90	
Actual Sport Behaviors ($\alpha = .80$)	3.84	.68	-.32	.61	-	.87
ASB1. I am more likely to attend future games	3.78	.78	-.20	-.17	.67	
ASB2. I am more likely to support the (team name)	3.90	.78	-.61	.76	.85	
ASB3. I am more likely to recommend the future game to other people	3.83	.85	-.53	.39	.78	

Note. M = Mean; SD = Stand Deviation; SK = Skewness; KU = Kurtosis; λ = Factor Loading; CR = Composite Reliability

Results

Reliability and validity test for the measurement model

To verify the measurement model structure, a confirmatory factor analysis (CFA) was conducted to examine the psychometric properties of the measures. The CFA, factor loading, composite reliability, and Cronbach's alpha results indicated that the seven dimensions met the criteria. The factor loading ranged between .50 (PU 2) and .95 (IRA 2). All loading of items on the measurement model was statistically significant ($p < .001$). To examine the construct reliability of the measurement model, we measured CR. The CR values of greater than .70 (accuracy = .91; trustworthiness = .91; attractiveness = .94; PEOU = .86; PU = .80; IRA = .97 and ASB = .87) are considered good overall construct reliability.

The results showed that Cronbach's alpha was greater than .70 for each dimension, which represents high levels of internal consistency and reliability (accuracy = .88; trustworthiness = .86; attractiveness = .91; PEOU = .82; PU = .75; IRA = .94 and ASB = .80). In addition, the measurement model yielded an acceptable model fit ($\chi^2 = 502.06$; $df = 209$; $\chi^2/df = 2.40$; RMSEA = .07; SRMR = .05; CFI = .93; IFI = .93; TLI = .92).

Correlation analysis for discriminant validity

To examine discriminant validity, we tested a correlation analysis among all dimensions. The correlations ranged from .25 to .56, and all factors were significantly correlated with each other, as shown in Table 2. The estimated correlations among all dimensions were not excessively high (e.g., $< .85$; Kline, 2005). The average variance extracted (AVE) values of greater than .50 (accuracy = .78; trustworthiness = .76; attractiveness = .84; PEOU = .60; PU = .51; IRA = .91 and ASB = .69) are shown in Table 2. Also, a reasonably appropriate level of factor correlations among all factors value and the squared correlation between those two constructs was less than the AVEs value for each construct.

Table 2. AVEs, correlations, and squared correlations among the constructs

Dimension	1	2	3	4	5	6	7
1. Accuracy	.78 ^a	.12	.06	.10	.10	.09	.08
2. Trustworthiness	.34**	.76 ^a	.13	.08	.12	.20	.09
3. Attractiveness	.25**	.37**	.84 ^a	.13	.09	.17	.11
4. PEOU	.31**	.29**	.37**	.60 ^a	.21	.15	.13
5. PU	.32**	.35**	.30**	.46**	.51 ^a	.26	.21
6. IRA	.29**	.45**	.41**	.38**	.51**	.91 ^a	.31
7. ASB	.28**	.30**	.33**	.36**	.46**	.56**	.69 ^a

Note. ^a Average Variance is Extracted; the AVE line represents the correlation among the constructs; the AVE line represents squared correlations among the constructs.

** $p < .01$

Structural equation model (SEM) for hypothesis tests

After the CFA, structural equation modeling (SEM) was conducted to test the hypothesized relationships among the accuracy, trustworthiness, and attractiveness of sports team application information, perceived ease of use/usefulness, revisit of application intentions, and actual behavior. The results showed a good model fit ($\chi^2 = 522.62$; $df = 213$; $\chi^2/df = 2.45$; $p < .001$).

RQ1:

The results for research question one supported hypotheses 1a and 1b, accuracy ($\beta = .32, p < .001$) and attractiveness ($\beta = .36, p < .01$) significantly influenced trustworthiness.

RQ2:

The results for research question two supported hypotheses 2a and 2c, accuracy ($\beta = .25, p < .001$) and attractiveness ($\beta = .32, p < .001$) significantly influenced PEOU. However, hypothesis 2b was not supported as trustworthiness ($\beta = .10, p > .05$) did not significantly influence PEOU.

RQ3:

The results for research question three supported hypotheses 3a and 3b, accuracy ($\beta = .22, p < .01$) and trustworthiness ($\beta = .23, p < .01$) significantly influenced PU. However, hypothesis 3c was not supported as attractiveness ($\beta = .07, p > .05$) did not significantly influence PU.

RQ4:

The results for research question four supported hypotheses 4b and 4c, trustworthiness ($\beta = .21, p < .001$) and attractiveness ($\beta = .18, p < .01$) significantly influence IRA. However, hypothesis 4a was not supported as accuracy ($\beta = .04, p > .05$) did not significantly influence IRA.

RQ5:

The results for research question five supported hypothesis 5a, PEOU significantly influenced PU ($\beta = .39, p < .001$). However, hypotheses 5b and 5c were not supported as IRA ($\beta = .01, p > .05$) and ASB ($\beta = .08, p > .05$) were not influenced by PEOU.

RQ6:

The results for research question six supported hypotheses 6a and 6b, PU significantly influenced IRA ($\beta = .49, p < .001$) and ASB ($\beta = .25, p < .05$).

RQ7:

The results for research question seven supported hypothesis 7, IRA significantly influenced ASB ($\beta = .41, p < .01$). The SEM tested 17 hypotheses, 12 hypotheses were supported, and five were rejected. See Table 3 for path coefficients and hypothesis test results.

Table 3. Path coefficients and statistical significance for the result of hypothesis tests

Hypothesis	β	SE	t	Confirmed
H1a. Accuracy → Trustworthiness	.32***	.05	5.30	Confirmed
H1b. Attractiveness → Trustworthiness	.36***	.06	6.06	Confirmed
H2a. Accuracy → PEOU	.25***	.06	3.71	Confirmed
H2b. Trustworthiness → PEOU	.10	.08	1.44	Rejected
H2c. Attractiveness → PEOU	.32***	.07	4.65	Confirmed
H3a. Accuracy → PU	.22**	.04	3.00	Confirmed
H3b. Trustworthiness → PU	.23**	.06	3.11	Confirmed
H3c. Attractiveness → PU	.07	.05	.93	Rejected
H4a. Accuracy → IRA	.04	.06	.64	Rejected

H4b. Trustworthiness → IRA	.21***	.08	3.30	Confirmed
H4c. Attractiveness → IRA	.18**	.06	3.01	Confirmed
H5a. PEOU → PU	.39***	.06	4.58	Confirmed
H5b. PEOU → IRA	.01	.08	.15	Rejected
H5c. PEOU → ASB	.08	.08	1.12	Rejected
H6a. PU → IRA	.49***	.15	5.04	Confirmed
H6b. PU → ASB	.25*	.15	2.42	Confirmed
H7. IRA → ASB	.41***	.08	5.12	Confirmed

Note. β = Standardized Path Coefficient; t = Critical Ratio

*** $p < .001$, ** $p < .05$

Discussion

The first research question tested information credibility, STSA, and behavioral intention; many of these hypotheses were supported. First, we found that accuracy-attractiveness of information credibility are antecedent factors of trustworthiness. This result supports previous research (e.g., Lucassen & Schraagen, 2011; Yoon, 2002), which supports STSA. Likewise, Sadri (2014) noted that smartphones are a conduit for continuous connection to the Internet's online sports information sources throughout the day. Thus, providing accurate and attractive information may benefit professional sports teams.

Research questions two and three results partially supported that accuracy and attractiveness of information credibility (H2a & H2c) significantly influence PEOU, and accuracy and trustworthiness of information credibility (H3a & H3b) affect PU. These results are consistent with previous online studies that found that web quality or information quality (e.g., accuracy and reliability) significantly influences PEOU and PU (e.g., Ahn et al., 2007; Venkatesh, 2000). Although previous studies emphasized the importance of information credibility and TAM, little research has been conducted to test the relationships between the two variables on the Web. This study proved that information credibility significantly influences PEOU and PU in STSA.

For research question four, data indicated that trustworthiness and attractiveness of information (H4b & H4c) significantly influenced customers' IRA, but the accuracy of information (H4a) failed to show any significant influence. These findings are consistent with previous research that website credibility significantly influences trust (e.g., Cugelman et al., 2009). More specifically, these results strongly support Hur et al.'s (2012) findings that perceived enjoyment in web portal sites significantly influences customers' intentions. Sports information online is also an important predictable factor in understanding sports fans' information-seeking behavior and purchasing behavior. Therefore, each sports team should develop and manage its unique content materials, including the team's distinctive characteristics, including the distinctive attractiveness of information (e.g., being pleasant and favorable) and trustworthiness of information to boost their customers' intention to revisit the site through smartphone apps.

The results for research questions five and six indicated that PEOU significantly influenced PU (H5a) but failed to significantly influence IRA (H5b) and ASB (H5c). However, when considering PU's effects on PEOU in the online STSA environment, the results indicate PU's effects on PEOU contrast to IRA and ASB (H6a & H6b). These findings are congruent with TAM research, indicating that PU significantly impacts consumers' online revisiting intention (e.g., Castañeda et al., 2007; Lin & Liu, 2000). Although STSA does not significantly impact customers' revisit intentions and ASB, sports fans' PEOU is an important predictable variable influencing PU. Accordingly, IRA and ASB will increase if: (a) the database is designed for effective information searches and (b) if the information is deemed useful through the smartphone app. Thus, it is expected that sports fans who use apps will watch games more frequently (e.g., Castañeda et al., 2007; Lin & Liu, 2000).

For research question seven, IRA significantly influences ASB (H7). These study findings support the research regarding intention and behavior (e.g., Castañeda et al., 2007; Kim et al., 2014). For example, Kim (2008) found that behavior intention using a smartphone significantly influenced the actual use of a smartphone in the TAM. This result indicated that fans who have high STSA would come to watch the games more frequently (Kim et al., 2014). As such, each sports team should recognize that STSA is a useful tool to provide information and can be used as a marketing tool to provide quality service and information. The sports marketing team can attract app users to revisit and watch more games by investing in resources and management.

Conclusion

This study highlighted the purchasing behavior of sports fans through sports teams' apps. It also provided evidence that sports teams' apps can be beneficial tools to ensure the usefulness of information and IRA. There is an avenue for teams to use apps as marketing tools to increase attendance at games potentially. Likewise, this research broadens the understanding of SOR theory. The data provides evidence that the SOR

theory applies to an STSA environment in a sports context. These results suggest that the SOR theory can be used to examine online studies and smartphone apps.

This research also will be a foundation to test relationships between the credibility of information and TAM in online apps. Previous online research emphasizes the credibility of information and TAM, but little research demonstrates the relationship between the two variables. Therefore, future online research can use this study's verified model to examine the relationships between the credibility of information, PEOU, and PU. For example, this study can be implemented in various research areas regarding sports smartphone apps (e.g., ESPN apps), e-learning, e-retailing, and e-shopping to examine the relationship between the credibility of information and TAM.

Additionally, based on previous online research, STSA can apply to TAM. According to this study, PU influences customers' revisiting of apps and sports behavior. However, PEOU does not positively influence these areas. Thus, this study provides a foundational theory of online and smartphone app research to understand the importance of perceived usefulness in TAM. Based on these study findings, researchers can create an integrated usefulness model. For example, this study demonstrates how useful information in smartphone apps can be applied to sports fans' intentions and purchasing behavior.

Lastly, this study's results can be used as a marketing tool for sports teams because they show that sports fans who perceive smartphone apps as attractive and trustworthy engage in sports behaviors. Thus, based on these results, sports teams' marketers can recognize that if the effectiveness of information on their teams' websites and SNS is reliable, fans' intention to revisit the site can increase. Therefore, through this study's findings, each sports team's marketers will recognize that sports apps are useful resources to provide information and can be used as mutual communication to attract fans to the teams' apps and games more frequently. Consequently, to maximize sports fans' revisiting of team apps, each team needs to provide accurate, attractive, and useful information. Also, teams must update and monitor their apps constantly for effective management.

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