Subjective Norm, Self-Efficacy, and Policy Acceptance for Open Communication Science: An Empirical Analysis

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Given the opportunities that open communication science (OCS) affords, this study examines communication scholars' attitudes toward OCS and the factors influencing their acceptance. A survey of the Chinese Association for History of Journalism and Communication (CAHJC) was conducted (N = 351). Overall, respondents perceive OCS as positive and useful, but their behavioral intention varies by gender and publishing experiences. Males and those with publishing experiences in English demonstrate a higher level of subjective norm and self-efficacy, which function as antecedents of perceived usefulness and perceived ease of use, respectively. The results of structural equation modeling confirm that the extended technology acceptance model (TAM) can well predict communication scholars' participation in OCS. Practical implications for promoting and adopting OCS in developing countries are discussed.

Keywords: technology acceptance model (TAM), open science policy, China, communication studies, communication scholars

Open science encompasses a range of practices aimed at enhancing the transparency of scientific processes and increasing the accessibility of research results (Spellman, Gilbert, & Corker, 2018). This includes concepts like preregistration, open data, open materials, open methodology, preprints, open peer review, and open research processes. Additionally, it encompasses broader ideas like open scholarship, which collectively contribute to the field of open science. Like many disciplines in the social sciences, communication studies are in the midst of a debate about openness (Bowman, Rinke, Lee, Nabi, & de Vreese, 2022). Questionable research and publication practices in communication science, such as undisclosed flexibilities, reproducibility problems, and publication/replication bias (Vermeulen & Hartmann, 2015), have spurred calls for open communication science (OCS), aiming to increase the reproducibility, replicability, and generalizability of findings (Dienlin et al., 2021).

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To date, many papers have clarified the concept, history, philosophy, benefits, and concerns about OCS (Bowman & Keene, 2018; Dienlin et al., 2021; Lewis, 2020) and provided recommendations for researchers to implement open science practices (Atteveldt, Strycharz, Trilling, & Welbers, 2019; Konijn, van de Schoot, Winter, & Ferguson, 2015; McEwan, Carpenter, & Westerman, 2018). It is believed that open science practices can increase replicability and foster public trust (Munafò et al., 2017), improve the reliability and robustness of communication scholarship, and ensure that communication research remains relevant in the public sphere (Dienlin et al., 2021). Additionally, a key argument in the literature is that open science contributes to making science more democratic, equitable, and inclusive (de Oliveira et al., 2021). This aspect of open science is crucial as it promotes a wider and more diverse participation in scientific inquiry, ensuring that the benefits of research are accessible to a broader spectrum of society and that diverse perspectives are incorporated into the scientific process.

While perspectives on OCS are noted in position papers and editorials, thus indicating its great value and promising future, the progress of open science in communication is slower than that in the other fields of social sciences. A recent survey of International Communication Association (ICA) members ($N =$ 330) reported broad familiarity with and support for OCS but less OCS practices, such as sharing data, materials, and methodologies openly (Bowman et al., 2022). To our knowledge, this is the only quantitative study that investigated how communication scholars see open scholarship. The study of OCS, especially for developing countries, is less investigated. Besides, no empirical research so far has studied why communication scholars are willing or reluctant to adopt OCS. Whereas previous research from other disciplines identified specific problems and concerns related to open science, such as barriers to data sharing (Houtkoop et al., 2018), increased costs of data management, the emergence of "data cemeteries," a culture of distrust (Abele-Brehm, Gollwitzer, Steinberg, & Schonbrodt, 2019), forms of privacy protection, and misuse of shared data (Joly, Dalpe, So, & Birko, 2015), we lack macro insight into how the larger community understands, feels about, and engages with OCS. Our study aims to bridge this gap by investigating the factors that facilitate or inhibit the broader acceptance of OCS, thus addressing a critical aspect that has not been extensively explored in existing literature.

Currently, China lacks an official national policy dedicated to open science, indicating a preliminary stage in its journey toward embracing and incorporating open science principles. Despite the absence of formalized directives, there is a noticeable drive within the Chinese academic and research communities to comprehend and adopt open science practices. This is evident in the increasing engagement of Chinese scholars in open science research and advocacy, notably in the qualitative studies conducted by Xu and Zhang (2022). Their research sheds light on the unique challenges of OSC in China, such as limited awareness of open sharing, unclear data-sharing boundaries, deficiencies in data management standards, and insufficient incentives for open science practices. Particularly, Xu and Zhang (2022) highlighted issues faced by qualitative researchers, including the complexities in data verification, replication, and reuse. This evolving landscape in China forms a crucial context for our study, emphasizing the importance of examining the current attitudes and practices in OSC amid this transition. Against this backdrop, and considering China's substantial academic output, our study employs a specialized questionnaire to investigate the factors influencing Chinese communication scholars' intentions and practices related to OSC, thereby contributing to a deeper understanding of OSC's role in the evolving Chinese academic environment.

Investigating the acceptance of OCS is a critical issue of scholarly communication for several reasons: (a) Open science is one of today's most vigorous debates in academia and understanding how scholars perceive it is an essential part of communication within the research community. (b) OCS has the potential to revolutionize the paradigm of communication studies by enhancing transparency and replicability, promoting collaborative research, accelerating knowledge dissemination, democratizing research access, and facilitating interdisciplinary research. Understanding the factors that motivate scholars to adopt OCS is crucial to ensuring that these revolutionary benefits are fully realized. (c) Investigating OCS in developing countries like China is crucial, as it offers insights into the unique motivations, barriers, and effects of adopting OCS practices in these contexts. This focus not only contributes to a more nuanced global understanding of OCS but also addresses a significant gap in the current research landscape, where most OCS studies are predominantly centered on experiences from the Global North.

To gain a full understanding of what drives communication scholars to participate in OCS, this study proposes to integrate subjective norm and self-efficacy with the technology acceptance model (TAM) to explain communication scholars' intentions and behavior in relation to OCS. This research is based on the authors' previous interviews on how communication scholars perceive OCS (Zhang, Gong, Hou, Firdaus, & Xu, 2022). Its research findings were then combined with the theoretical framework of an extended TAM to develop a structured questionnaire.

Theoretical Framework

Technology Acceptance Model

TAM, proposed by Davis (1989), is a foundational framework in understanding the acceptance of information technology. At its core, TAM includes five variables: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude (A), Behavioral Intention (BI), and actual Behavior (B). PU and PEOU are the model's primary predictors: PU refers to the degree to which a person believes that using a particular system would enhance their job performance, while PEOU indicates the degree to which a person believes that using the system will be free of effort. These two factors are theorized to influence an individual's attitude toward using the technology, which in turn impacts their behavioral intention and behavior. TAM posits that the easier a technology is to use, the more useful it can be perceived to be, thereby positively influencing attitudes and intentions toward its usage. This model has been widely applied in various contexts to understand and predict user acceptance and engagement with new technologies.

Compared with other existing acceptance models, such as the theory of reasoned action (TRA) and the theory of planned behavior (TPB), TAM has many advantages. TRA predicts individuals' behavior intention among many alternative choices based purely on a person's attitude toward the behavior and subjective norms (Fishbein & Ajzen, 1975). TPB measures an individual's physical action based on cognitive processing but not cognitive acceptance (Ajzen, 1991). In contrast, TAM employs a broader set of predictors than TRA and TPB. It not only focuses on perceived usefulness and perceived ease of use but also considers potential external variables that impact individuals' perceptions that, in turn, influence behavioral intention. It is an ideal framework for investigating and evaluating acceptance and can be applied to measure

nonphysical action and cognitive acceptance (Rafique, Almagrabi, Shamim, Anwar, & Bashir, 2020; Scherer, Siddiq, & Tondeur, 2019).

Most TAM researchers have focused on its extrinsic perspective, which encompasses factors like perceived usefulness and ease of use—essentially, the practical benefits and ease associated with the technology (Igbaria, Parasuraman, & Baroudi, 1996). Only recently have they taken account of the significance of cognitive aspects, such as emotions, symbolism, and desires, in understanding attitudes and human behavior (Sánchez & Hueros, 2010). Consequently, investigators call for incorporating intrinsic factors or other theories in studies that could enhance TAM (Yang & Yoo, 2004; Zhang, Zhao, & Tan, 2008). Many studies have verified the influence of intrinsic factors by incorporating external variables into the original TAM. For example, Choi and Chung (2013) developed an extended TAM, incorporating subjective norms and perceived social capital for predicting social networking sites' acceptance and usage. Teo, Lee, and Chai (2008) examined preservice teachers' attitudes toward computers by extending TAM with the subjective norm and facilitating conditions acting as external variables. As suggested by previous literature (Scherer et al., 2019), we measured three external factors: subjective norm, self-efficacy, and facilitating conditions to increase the predictivity of the model and the generalizability of the findings.

Conceptualizing Extended TAM to Open Communication Science

Many communication scholars have heard about OCS, but few have incorporated it into their research routines (Bowman et al., 2022). A study tracing the adoption and effects of OCS found that among 10,517 papers across 26 journals from 2010 to 2020, only 5.1% of papers used or mentioned OCS (Markowitz, Song, & Taylor, 2021). With the advancement of the OCS movement, how scholars perceive and accept the OCS policy, for example, preregistration and data sharing, has become an urgent and challenging question. However, few theoretical models have been used to study the antecedents that induce scholars to adopt the guidelines provided by OCS.

Besides studying technology acceptance, TAM is now widely applied in other fields, including studying policy acceptance. Pierce (2014) first added age, ethnicity, and family to TAM and proposed an expanded model to analyze and evaluate the acceptance of new policy implementation. Li, Qiu, and Fu (2021) expanded the application of TAM to study the relationship between how policies are perceived and how enterprises behave in response to innovation policies in the era of Industry 4.0.

Since OCS is similar to the abovementioned policy acceptance and implementation, this study applies extended TAM as a theoretical framework for OCS acceptance. After OCS was put on the agenda, specific guidelines for how to adopt OCS practices were put forward (Atteveldt et al., 2019; Bowman & Keene, 2018). Though as difficult as it is to write a good policy, it is much more challenging to get the policy adopted widely (Gilbert & Taylor, 1999). When communication scholars consider the possibility of adopting OCS, this consideration may involve an internal cognitive process. For instance, is OCS useful to their research or career? If so, is it easy to learn how to apply OCS techniques? Extended TAM provides an excellent framework for studying this decision-making process, which includes stages of perceived ease of use, perceived usefulness, attitude toward use, and behavioral intention. It helps enhance our understanding of the motivators governing behavioral intention that can be targeted to promote OCS.

Hypotheses and Research Models

Perceived Usefulness and Perceived Ease of Use

Perceived usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance," while perceived ease of use (PEOU) refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). PU and PEOU aim to assess whether users can operate a technology effectively and efficiently, representing cognitive responses to using a technology (Holden & Rada, 2011). According to TAM (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989), PU has a direct impact on the intention to use, while PEOU influences the intention to use indirectly through attitude, and PEOU can positively impact PU. Attitude toward use is "his or her personal evaluation regarding the usage of the system" (Lee & Lehto, 2013, p. 194). Applying this definition to the context of OCS, "attitude" can be comprehensively described as the scholars' subjective and evaluative response to the use of OCS in their professional activities. It encompasses their personal beliefs, feelings, and predispositions toward engaging with OCS practices. Šumak, Heričko, Pušnik, and Polančič (2011) highlighted that the PEOU is a factor that directly affects individuals' attitude, when users perceive a system as user-friendly and easy to navigate, their overall attitude toward using the system becomes more favorable. Therefore, we hypothesize:

H1:   *Communication scholars' perceived usefulness of OCS positively influences their attitude toward OCS.*

H2:   *Communication scholars' perceived usefulness of OCS positively influences their intention to adopt OCS in their future research.*

H3:   *Communication scholars' perceived ease of use of OCS positively influences their perceived usefulness of OCS.*

H4:   *Communication scholars' perceived ease of use positively influences their attitude toward OCS.*

Attitude, Behavioral Intention, and Behavior

Outcome variables include behavioral intention and actual behavior. The former refers to an individual's intention to use a piece of technology (Alfadda & Mahdi, 2021), while the latter is an individual's use of technology (Scherer et al., 2019). When a technology is perceived as being easy to use and useful, individuals will have a more positive attitude toward using the technology and be more likely to accept, adopt, and use that technology (Davis, 1989; Holden & Rada, 2011). Therefore, we hypothesize:

H5:   *Communication scholars' attitudes toward OCS positively influence their behavioral intention.*

H6:   *Communication scholars' behavioral intention positively influences their actual behavior.*

The Mediating Role of Perceived Usefulness and Attitude

Based on the design of TAM proposed by Davis (1989), the direct and indirect relationships between PU, PEOU, attitude, and behavioral intention have been widely supported by many researchers (King & He, 2006; Marangunić & Granić, 2015). In particular, two mediators have been identified in previous literature: perceived usefulness and attitude. As suggested by TAM (Davis, 1989), PEOU influences PU (H3), PU influences attitude (H1), and PEOU might indirectly influence attitude through PU. As for the mediating role of attitude, the TAM literature exemplifies how the effect of PU on behavior intention is only partially mediated by attitude (Davis & Venkatesh, 1996). Notably, while users' attitudes were thought to play a significant mediating role (Davis, 1989), recent research suggests otherwise, stating that the attitude construct might be a weak or nonsignificant mediator of behavioral intentions (Rafique et al., 2020). In order to test the mediators in the extended TAM, we ask:

RQ1:   *Does communication scholars' perceived usefulness of OCS mediate the effect of perceived ease of use on their attitude toward OCS?*

RQ2:   *Does communication scholars' attitude toward OCS mediate the effect of perceived usefulness on their behavioral intention?*

Subjective Norm

Subjective norm (SN) refers to the social pressure exerted by family and friends to engage in a particular behavior (Agudo-Peregrina, Hernández-García, & Pascual-Miguel, 2014). In this study, "subjective norm" is specifically applied to communication scholars. It denotes the extent to which these scholars perceive expectations from significant or referent individuals in their professional sphere, such as colleagues or mentors, to engage in OCS practices. Venkatesh and Davis (2000) showed that subjective norm had moderate, significant effects on perceived usefulness. They argued that when a coworker thought that the system was useful, a person tended to agree. Individuals who perceive that others expect that they should use the system will have a high score on the intention to use the system, even when they may personally not feel positive about the system (Teo, 2009). Calisir, Gumussoy, and Bayram (2009) found such an effect that subjective norm positively affected perceived usefulness in using enterprise resource planning systems. Therefore, we hypothesize:

H7:   *Subjective norm positively influences communication scholars' perceived usefulness of OCS.*

Self-Efficacy

Self-efficacy (S) is individuals' judgment of their capability to use a technology, and it has served as a determinant of perceived ease of use in previous tests of TAM (Venkatesh, 2000; Venkatesh & Davis, 1996). Indeed, Hong, Thong, Wong, and Tam (2002) found that users' computer self-efficacy influenced their perceived ease of use of digital libraries. More recently, researchers exploring the implications of user self-efficacy with technology as an external factor of TAM have found that when users demonstrate low

levels of self-efficacy with a technology, they are less likely to adopt it (Hanif, Jamal, & Imran, 2018). Therefore, we hypothesize:

H8:   *Self-efficacy positively influences communication scholars' perceived ease of use of OCS.*

Facilitating Conditions

Facilitating conditions refer to the actual organizational and technical infrastructure available to support the use of a technology or system (Venkatesh, Morris, Davis, & Davis, 2003). It influences a person's perception of how easy or difficult it is to use an information technology to perform a task (Teo, 2010). For example, in the context of applying OCS, facilitating conditions are believed to include the availability of training and the provision of support. This variable has been tested in several technology acceptance studies and found to have a significant effect on perceived ease of use (Taylor & Todd, 1995; Venkatesh, 2000). Thus, we hypothesize:

H9:   *Facilitating conditions positively influence communication scholars' perceived ease of use of OCS.*

Figure 1 shows the research design and the relationship between different variables. The nine hypotheses are also marked.
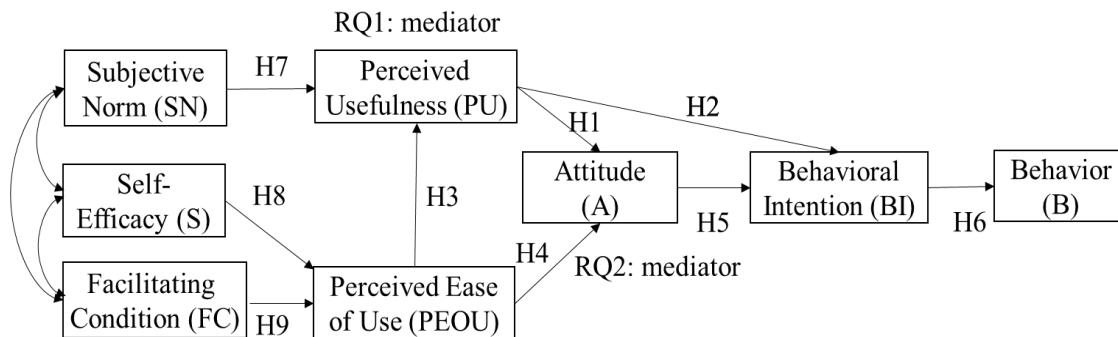

Figure 1. Proposed TAM of scholars' policy acceptance of OCS.

Demographic Features

The integration of TAM can be influenced by gender. Researchers have found that gender has an impact on technology acceptance and use. For example, Teo and Lim (1996) found that females tended to view PCs as being less easy to use than their male peers. González-Gómez, Guardiola, Martín Rodríguez, and Montero Alonso (2012) found that female students assigned more importance to teaching methods, planning, and fostering active participation in the learning process than their male peers. Therefore, gender was considered in our survey.

Our research includes title and subfield affiliation, informed by prior surveys in open science. Abele-Brehm et al. (2019) demonstrated that attitudes toward open science varied significantly across different occupational groups, underscoring the relevance of occupational data in this context. Bowman et al. (2022) asked participants to report demographic information using survey items from the ICA's standard profile information, which includes gender, nation, career progression, and ICA subfield affiliations. While they did not explicitly analyze the relationship between subfield affiliation and attitudes toward OCS, we believe collecting information on subfield affiliation allows for a more comprehensive description of our sample. Hence, we also measure respondents' title/career progression and subfield affiliation/research field.

Two additional variables are respondents' publishing history and their experiences of studying abroad. As our respondents are Chinese communication scholars, they publish mainly in Chinese and English journals whose data requirements vary, especially about open science policy. For example, many English journals, such as the *Journal of Communication, Journal of Media Psychology,* and *Communication Methods and Measures,* have already supported the preregistration of research plans and uploading data to share online. In contrast, few Chinese journals in the communication field ask authors to share their data and use online databases to store and share data. Therefore, we assume that publishing history may affect our respondents' attitude and behavioral attention toward OCS, and we separately documented their publishing history in Chinese and English peer-reviewed journals. In the same vein, scholars with experience of studying or visiting abroad may receive different academic training in writing and submitting journal articles, so the experience of studying abroad was also considered.

Methods

Study Context and Sample

China is among the countries whose communication research is becoming more international with the rapid development of 5G and the social media boom. Many Chinese scholars are actively involved in studying and advocating open science (Xu & Zhang, 2020; Zhang et al., 2022). However, as OCS is a relatively new academic practice, studies are conducted mainly in Western developed countries, whereas little is known about Asian countries (Cheah et al., 2015; Zhang et al., 2022). Therefore, understanding communication scholars' acceptance of OCS is crucial within the context of developing countries. Considering the large number of papers published by Chinese scholars and the feasibility of sampling, we developed a Chinese questionnaire to investigate OCS acceptance.

WeChat is China's largest social media platform and is more frequently used than e-mail in workplaces. Once the "invitation approval" feature is enabled, nonmembers can only be invited into the group when approved by the initiator. This verification mechanism can ensure the authenticity of identity. Our survey was delivered in two official WeChat groups ($N = 871$) of the Chinese Association for History of Journalism and Communication (CAHJC), the sole national academic association for journalism and communication studies. Respondents were also encouraged to distribute the questionnaire to their colleagues or PhD students. Two filtering questions were set to ensure that respondents were conducting

research in the communication field with PhD degrees or were PhD candidates. The survey was distributed on May 17, 2022, and made available for four weeks.

Respondents

We received a total of 412 valid responses to the questionnaire. As the survey was intended to be completed in a single session, we removed times faster than the lower 5% (≤ 361.3, *n* = 20) and slower than the upper 90% (≥ 1431.0, *n* = 41) from further analysis, following Bowman et al. (2022). This step resulted in the removal of 61 responses, resulting in a final sample of *N* = 351 respondents, with an adjusted average completion time of *M* = 757.0 (*SD* = 248.7).

Among 351 respondents, 192 (54.7%) identified as "women," and 199 (56.7%) had studied abroad. Ninety-two respondents (26.2%) reported "senior faculty" status, followed by 113 (36.2%) as "mid-career faculty, 52 (14.8%) as "junior faculty" and 94 (25.4%) as "postdoctoral and doctoral students." About publishing history, 185 (52.7%) had published more than five articles in the journals of the Chinese Social Science Citation Index (CSSCI), 145 (41.3%) had published one to five articles, and only 21 (6%) had published no articles. However, the result for the publishing record of the Social Science Citation Index (SSCI) journals is the opposite, with 237 (67.8%) having never published articles, only 86 (24.5%) having published one to five articles, and 27 (7.7%) having published more than five articles. About subfield affiliations, all 25 ICA divisions and interest groups were represented in the data, with each individual being in only one division closest to their research interest. Two subfields were represented by at least 10% of the sample: Popular media and culture (*n* = 66, 18.8%) and communication and technology (*n* = 36, 10.3%). They were closely followed by journalism studies (*n* = 33, 9.4%), political communication (*n* = 31, 8.8%), and mass communication (*n* = 28, 8%). This distribution is similar to OCS surveys performed among ICA members (Bowman et al., 2022). Because of different response rates by subfield affiliation, comparisons were not made between affiliation groups, and this factor was also not taken into consideration in later modeling.

Measures

The first section of our structured questionnaire included 33 items that measured the following eight constructs. All items were rated on a 7-point Likert scale, with 1 representing "strongly disagree" and 7 representing "strongly agree." PU and PEOU were adapted from Davis (1989); subjective norm (SN) was adapted from Taylor and Todd (1995); self-efficacy (S) was adapted from Sánchez and Hueros (2010); facilitating conditions (FC) and attitude (A) were adapted from Venkatesh et al. (2003); OCS behavioral intention (BI) and behavior (B) were adapted from Harper and Kim (2018). The second section contained six questions that asked respondents to indicate their gender, title, research subfield, experience of studying abroad and publishing history of Chinese and English articles. A pilot test was conducted among 30 respondents through snowball sampling. Participants were asked to provide qualitative feedback on the questionnaire's clarity and relevance. Respondents indicated that the instruction and wording of items were clear and the items appeared to measure what the authors intended to measure, therefore confirming the face and content validity of the questionnaire (Churchill, 1979).

Results

OCS Acceptance Among Different Demographic Groups

To have an overview of how different types of communication scholars view OCS, we analyzed respondents' demographic variables. As Table 1 shows, Chinese communication scholars generally have a positive attitude ($M = 5.03$, $SD = 1.26$) toward OCS. They perceived OCS as positive and, overall, useful ($M = 4.59$, $SD = 1.37$) for enhancing their research. However, there is a sharp distinction between behavior intention ($M = 4.61$, $SD = 1.30$) and behavior ($M = 1.40$, $SD = .85$), given that OCS is fairly new in China and only in recent years that scholars have noticed it and they have not fully adopted. A notable gap exists between the high intentions of Chinese scholars to adopt OCS ($M = 4.61$, $SD = 1.30$) and their lower actual behaviors ($M = 1.40$, $SD = .85$). This discrepancy highlights the challenges in translating the willingness to engage with open science into practical application within the unique academic context of China.

Additionally, T-tests and ANOVA tests were performed to determine whether gender, experience abroad, title, and publishing history had any effect on the TAM variables. The results showed no significant differences between experience abroad, title, and CSSCI-listed journal publishing. However, there were significant differences in gender and SSCI-listed journal publishing. Specifically, men displayed a higher level of subjective norm ($t = -2.172$, $p < .05$), indicating they perceived a stronger social pressure to adopt OCS compared with women. Furthermore, men reported higher self-efficacy ($t = -3.566$, $p < .001$) and facilitating conditions ($t = -3.771$, $p < .001$), alongside more positive attitudes ($t = -3.586$, $p < .001$) and behavioral intentions ($t = -2.108$, $p < .05$) toward using OCS. These findings imply that men feel more confident in their ability to adopt OCS and perceive a more supportive environment, which in turn positively influences their attitude and intention to engage with OCS.

About the impact of publishing in SSCI-listed journals, those who had not published in such journals perceived OCS to be more useful ($t = 2.471$, $p < .05$) than their counterparts with SSCI publications. This difference suggests that less experienced researchers see greater utility in OCS, possibly as a way to enhance their research visibility and collaboration opportunities. However, this group also reported lower self-efficacy ($t = -2.445$, $p < .05$) and facilitating conditions ($t = -3.062$, $p < .01$), which translates to a lower engagement in behavior ($t = -2.548$, $p < .05$) compared with more experienced researchers. This could indicate that despite recognizing the potential benefits of OCS, less experienced researchers might feel less capable and supported in utilizing OCS effectively.

Table 1. The Mean Scores, Standard Deviation, Composite Reliabilities, AVE Values, and Pearson Correlations of the Constructs (N = 351).

	M	*SD*	α	CR	AVE	PU	PEOU	SN	S	FC	A	BI	B
Perceived Usefulness (PU)	4.59	1.37	.94	.95	.77	**.88**							
Perceived Ease of Use (PEOU)	4.25	1.14	.92	.92	.75	.40**	**.87**						
Subjective Norm (SN)	3.31	1.40	.95	.95	.84	.38**	.33**	**.91**					
Self-efficacy (S)	3.81	1.33	.91	.92	.73	.23**	.58**	.44**	**.85**				
Facilitating Conditions (FC)	3.39	1.37	.94	.94	.81	.17**	.47**	.49**	.72**	**.90**			
Attitude (A)	5.03	1.26	.96	.95	.81	.55**	.46**	.34**	.34**	.25**	**.90**		
Behavior Intention (BI)	4.61	1.30	.95	.96	.86	.50**	.42**	.42**	.34**	.33**	.69**	**.93**	
Behavior (B)	1.40	.85	.83	.85	.58	.12*	.14**	.25**	.23**	.29**	.11*	.21**	**.76**

Note. **p < .01, *p < .05. The square roots of the AVE values are in bold on the diagonal.

Measurement Model Assessment

Confirmatory factor analysis was conducted using IBM SPSS AMOS 24.0 to examine the reliability and validity of the measurement model. Each latent variable was defined by its observed variables. Five indices were used to assess how well the model fits the collected data. The desirable values for these indices are lower than 3 for χ2/*df*, greater than .90 for CFI and TLI, and less than .08 for RMSEA and SRMR (Hair, Black, Babin, Anderson, & Tatham, 2019). The results of confirmatory factor analysis produced the following fit indices: χ2/*df* = 1.86 (χ2 = 866.56; *df* = 467; *p* < .001), CFI = .97, TLI = .96, RMSEA = .05, and SRMR = .04. These values met the recommended values, suggesting that the measurement model fit the collected data well.

The composite reliabilities (CR) and average variance extracted (AVE) values of eight variables were computed using standardized loadings. The AVE values were used to assess the convergent and discriminant validity of the constructs. Table 1 shows the CR, AVE values, and Pearson correlations of the eight constructs. The CR ranged from .85 to .96, suggesting that the measurement items were reliable. The AVE values are all greater than.5, indicating adequate convergent validity (Hair et al., 2019). Discriminant validity was checked by comparing the square root of the AVE value for each construct with the correlations between this construct and all other constructs. The square root AVE values were greater than all of the interconstruct correlations, as shown in Table 1, supporting discriminant validity (Fornell & Larcker, 1981).

Hypothesis Testing

The results of structural equation modeling produced the following fit indices: χ2/*df* = 1.95 (χ2 = 939.88; *df* = 483; *p* < .001), CFI = .96, TLI = .96, RMSEA = .05, SRMR = .08. A detailed inspection of the results revealed that the path between facilitating conditions and perceived ease of use was nonsignificant (*p* > .05). Thus, this path was removed. A refined structural equation modeling was then conducted, which produced the following fit indices: χ2/*df* = 2.65 (χ2 = 720.46; *df* = 368; *p* < .001), CFI = .96, TLI = .96, RMSEA = .05, SRMR = .075 < .08. The results showed that the refined structural model (Figure 2) fit the collected data well. All examined paths are significantly positive, thereby supporting H1 through H8. Conversely, Hypothesis 9 was not supported, indicating that facilitating conditions do not have a significant impact on perceived ease of use. This finding suggests that although multiple factors positively affect the proposed TAM within the context of OCS, facilitating conditions do not play a pivotal role.
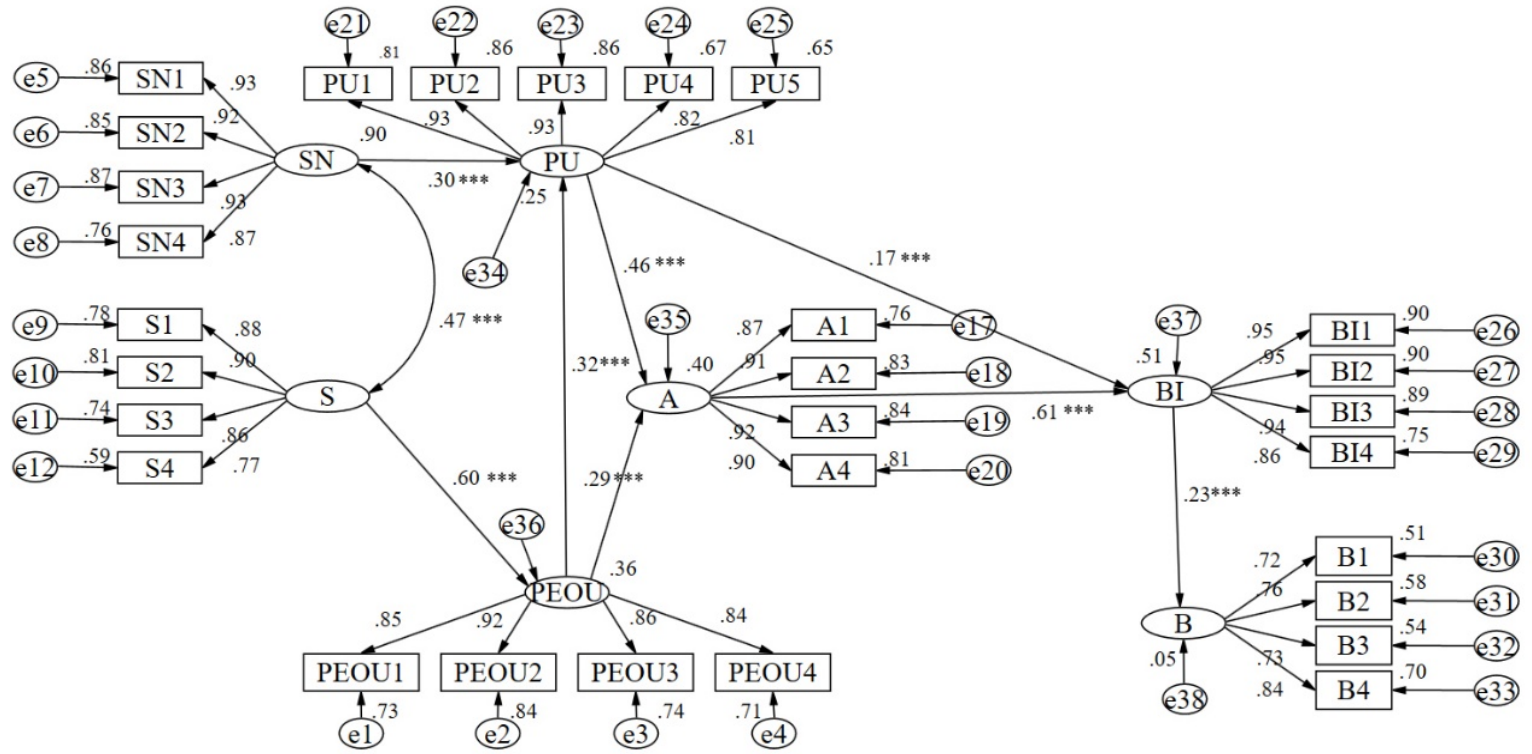
Figure 2. Standard regression weights for the final TAM. Note. ***p < .001.

According to Cohen (1988), standardized beta coefficients can be classified as weak (β ≤ .3), moderate (.3 < β ≤ .5), and strong (β > .5). Hence, perceived usefulness (β = .46, *p* < .001) was found to be a stronger predictor of communication scholars' attitudes than perceived ease of use (β = .29, *p* < .001), and perceived ease of use directly (β = .29, *p* < .001) and indirectly through perceived usefulness (β = .15 [= .32 × .46]) influenced individuals' attitudes toward the technology, which was consistent with Davis (1989). Similarly, perceived usefulness directly (β = .17, *p* < .001) and indirectly through attitude (β = .28 [= .46 × .61]) influenced scholars' behavioral intention. Communication scholars' attitudes toward OCS strongly and positively influenced their behavioral intention (β = .61, *p* < .001), while behavioral intention, in turn, weakly and positively predicted their behavior (β = .23, *p* < .001). For external variables, subjective norm was found to weakly (β = .30, *p* < .001) influence communication scholars' perceived usefulness, while subjective norm strongly and significantly influenced communication scholars' perceived ease of use (β = .60, *p* < .001). The impact of facilitating conditions was weak and insignificant (β = .11, n.s.) in the original structural model.

To investigate the mediation effects (RQ1 and RQ2), the bootstrap method with PROCESS (Model 4) developed by Hayes (2013) was used. Gender and SSCI-listed journal publishing were entered as control variables because they were found to be relevant, as demonstrated earlier. Under this analytical approach, indirect effects can be interpreted as statistically significant if the corresponding bias-corrected bootstrap confidence interval (CI) does not contain zero. The bootstrapped 95% CI method confirmed that the indirect effect of perceived ease of use on attitude through perceived usefulness was significant (effect = .20, SE = .04, CI [.13, .29]). Similarly, the indirect effect of perceived usefulness on behavioral intention through attitude was also significant (effect = .31, SE = .05, CI [.22, .40]).

Discussion

Factors Affecting OCS Acceptance

First, among core variables, communication scholars' perceived usefulness plays an important role in their intentions to adopt open science. Although not surprising, this finding provides additional support for the TAM literature and Davis et al.'s (1989) assertion that perceived usefulness is vital for predicting behavioral intention. The impact of perceived usefulness on attitude is stronger than that of perceived ease of use on attitude. Meanwhile, perceived usefulness directly and indirectly influences communication scholars' behavioral intention.

Consistent with previous findings on TAM (Davis, 1989; Holden & Rada, 2011), perceived usefulness is posited to elicit a positive attitude. This study corroborates these findings, as demonstrated by the scholars' favorable attitudes toward open science (*M* = 5.05, *SD* = 1.26). Notably, attitude is also the strongest predictor of communication scholars' behavioral intention.

Second, three external variables of TAM—namely, subjective norm, facilitating conditions, and self-efficacy—were also tested. Communication scholars' perceived usefulness of open science was directly impacted by subjective norm. Given the context of the study, our finding of the effect of subjective norm on perceived usefulness was not unexpected because Chinese communication scholars—who are

collectivistic individuals (Li, Vazsonyi, & Dou, 2018)—tended to go along with the norm, that is, the group trend (To & Tang, 2019). However, communication scholars' perceived ease of use is influenced by self-efficacy but not facilitating conditions. One possible explanation is that, as open science is still a fairly new concept in China's communication field and there is a lack of corresponding facilitating conditions, including organizational and technical infrastructure, Chinese communication scholars may consequently rely more on individual efforts rather than using external facilities. Therefore, Chinese communication scholars' self-efficacy can better predict their perceived ease of use than facilitating conditions.

Third, two mediators were found in TAM. The mediating effect of attitude on the relationship between perceived usefulness and behavioral intention and the mediating effect of perceived usefulness on the relationship between perceived ease of use and attitude were both significant. Attitude and perceived usefulness partially mediated the outcome variables, which is consistent with the original TAM (Davis, 1989).

Potential Barriers to OCS Adoption

Even though we found Chinese communication scholars have a positive attitude toward OCS and such attitude can well predict their behavior intention, the score of their actual behavior is low. This distinction between high behavioral intention ($M = 4.61$, $SD = 1.30$) and low actual behavior ($M = 1.40$, $SD = .85$) is striking. This discrepancy underscores a significant gap between the willingness to adopt open science practices in communication studies and the tangible implementation of such practices.

We believe the phenomenon can be attributed to several contextual factors unique to the academic environment in China. Although there is a growing awareness and interest in OCS principles among Chinese scholars, the field is relatively new in the region. The concept of open science, characterized by transparent and accessible communication of research findings, is still in its nascent stages of adoption (Xu & Zhang, 2020). Chinese scholars have only recently begun to recognize its value, leading to a high level of expressed interest and intention to engage with OCS practices (Zhang et al., 2022). However, actual adoption has been slower, reflecting a lag in translating these intentions into concrete actions.

Several barriers may also contribute to this gap. These include a lack of comprehensive infrastructure to support open science practices and limited access to platforms for sharing and collaborating openly, as suggested by the low score of facilitating conditions ($M = 3.39$, $SD = 1.37$). Meanwhile, China's prevailing academic culture may not fully embrace the openness and collaborative ethos of OCS. Additionally, concerns about intellectual property rights, data privacy, and the potential impact on academic evaluations and promotions might further inhibit scholars from fully integrating OCS into their research activities.

Practical Implications for OCS Adoption in Developing Countries

The unique characteristics of OSC in developing countries necessitate tailored suggestions for OSC adoption. The challenges faced in regions like Malaysia (Zhang et al., 2022), Thailand (Cheah et al., 2015), and Latin America (de Oliveira et al., 2021) include limited capacity for data sharing due to the high costs of data management and the scarcity of skills in data collection, validation, and standardization. These

constraints mean that the approach to OSC in these areas must be different from that in Western developed countries. Understanding these nuances is crucial for developing context-specific strategies that address the distinct challenges in these regions.

Given the crucial role of perceived usefulness in shaping scholars' behavioral intention toward OSC, universities and research institutes in developing countries should actively highlight OSC's practical benefits. By providing real-world examples and case studies, these institutions can showcase the tangible improvements OSC brings to research quality and community engagement.

In promoting perceived ease of use, it is vital that universities and research institutes address challenges in data management and the high costs of data software. These institutions should explore cost-effective, user-friendly OSC platforms. Simplifying the data-sharing process and offering basic data management training can significantly ease perceived barriers to OSC adoption. Additionally, journals and publishing industries should develop user-friendly tools for scholars to participate in OSC, including preregistration and data sharing.

Considering the role of self-efficacy, tailored training and workshops should be provided to bolster scholars' confidence and skills in OSC practices. Highlighting success stories from other developing countries where OSC has been effectively implemented, despite challenges, can serve as a powerful motivational tool. Our findings indicate that scholars who had published English articles found OSC useful through their own experiences of sharing and using data. Encouraging scholars to engage in initial data sharing can foster further OSC adoption.

Our research highlights that subjective norms significantly influence scholars' intentions to adopt OCS. This finding underscores the importance of a supportive academic culture in promoting OCS adoption. National organizations in developing countries, such as the CAHJC in China, are well positioned to spearhead this initiative by embedding open science principles into their journals and annual meetings. This approach, akin to that of the ICA, can serve as a model for fostering a conducive environment for OCS adoption, emphasizing high-quality publishing, transparency, and trust within the academic community.

Our study's insights into OCS adoption in developing countries are particularly relevant in light of current trends toward global research partnerships, the de-westernization of academic practices, and addressing inequalities in research production and funding. By integrating OCS principles, journals and academic institutions can contribute to more equitable knowledge production and dissemination. The adoption of OCS in developing regions can serve as a catalyst for redefining publication impact by prioritizing inclusivity and diversity in scholarly communications. This shift has the potential to influence global debates in communication studies by highlighting how localized adaptations of open science can contribute to global academic discourse and collaboration. Furthermore, our findings open new lines of research into how open science can be adapted and implemented in different socioeconomic contexts to mitigate the disparities in academic resources and opportunities. This perspective not only enriches the academic debate but also encourages a reevaluation of the metrics of success and impact in scholarly publications.

Limitations and Future Directions

This study is not without limitations. First, there may be sampling biases in our sample. We cannot guarantee that all members of the CAHJC are in the WeChat group, considering that some scholars choose not to join or quit the group chatting. Even though we tried to compensate for this fact by inviting participants to distribute the questionnaire to their coworkers or students, our sample is not perfectly representative, and the response rate of snowball sampling is difficult to calculate. However, compared with Bowman et al. (2022), who conducted a survey of 387 members of the ICA (51.2% from America) across 36 nations, we view our sample as particularly valuable for our study's focus. The homogeneity of our sample about nationality allows for an in-depth examination of the impact of OCS within the Chinese academic and cultural context. Future research could consider collecting data through a complete e-mail list or conducting the survey during the annual meeting with the help of the corresponding association. It could also test how varied scenarios and scholars influence respondents' intentions to adopt OCS.

Second, while our model partially elucidates the factors influencing the adoption of OCS, it does not fully account for the observed low levels of actual OCS behavior. The transition from behavioral intention to behavior may be affected by additional variables not captured within our current analytical framework. While this study sheds light on the relationship between identified factors and actual behavior, it opens the door for future research to explore in depth the mechanisms by which attitudes and intentions are transformed into concrete actions. Besides, the study observed varying impacts of different demographic variables on OCS adoption, indicating a complex interplay of factors that influence individuals' engagement with open science practices. However, the specific reasons why these demographic variables have differing effects on OCS adoption were not deeply explored. These limitations highlight the importance of future studies that could employ a more detailed methodological approach, including qualitative analyses or mixed-methods research, to unravel the intricate dynamics of OCS behaviors.

Conclusion

This study helps illuminate the factors that influence communication scholars' behavioral intention to participate in OCS. The study found a strong positive correlation between the scholars' attitudes and behavioral intention about OCS acceptance. In addition, by integrating self-efficacy and subjective norm as external variables, our proposed modification to the TAM framework is empirically validated. The results revealed that gender and publishing history of English articles are correlated with the TAM variables. However, it found no correlation between experience abroad, title, and publishing history of Chinese articles and TAM variables. Moreover, the study revealed the factors that impact those adoption decisions, illuminating several considerations for universities, research institutes, journals, publishing industries, and academic organizations. Specifically, universities or research institutions that desire scholars to apply OCS should feel compelled to develop ways to make the OCS easy to use and refine the overall process. In that way, communication scholars can be better informed of the value of OCS to their overall academic research and, therefore, establish reliable and robust claims about the communication process.

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