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Academics' intention to adopt online technologies for public engagement

Abstract

Purpose – The need for universities to connect with local communities and to make research relevant to the public has been highlighted over recent years through the debate about public engagement. At the same time, the Internet and its applications have made it possible for universities and academics to engage with the public in an easier and more effective way. The objective of this study is to examine the factors that motivate academics to engage with the public online.

Design/methodology/approach – The Decomposed Theory of Planned Behaviour and Uses and Gratifications Theory were used as a basis for the study's research model. An online survey was conducted and 250 valid responses were used for the data analysis (Structural Equation Modelling).

Findings – The results indicate that although academics seem to use online technologies for public engagement, this use takes the form of a one-way communication as the most influential factors of attitude when it comes to engaging with the public are image and information seeking rather than networking.

Originality/value – While there are some studies about the use of online technologies for teaching or for networking purposes within academia, little is known about academics' intentions to engage with the public online. The study attempts to fill this gap and help universities understand their staff's motivation and needs, which could be useful when it comes to launching successful public engagement campaigns.

Keywords: IT adoption, Public engagement, Decomposed Theory of Planned Behaviour, Uses and Gratifications Theory, academia

Article Type: Research paper

Introduction

Online technologies are “a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information” (Blurton, 1999). When it comes to engagement, while online technologies are mainly used by companies to reach out to their customers (Okazaki et al., 2015) and facilitate open-ended knowledge management activities in the workplace (Cao et al., 2016), during recent years, universities and individual academics have also started using them (e.g. social media, blogs, Wikis and Massive Open Online Courses (MOOCs) etc.) for public engagement. Evidence shows that the reason why academics use them for engaging with the public is that they constitute easy to use and effective tools for two-way dialogue in research (Chikoore et al., 2016; Wilson et al., 2014). Blogs, for example, have the potential to change academics into ‘public intellectuals’ (Baert and Booth, 2012; Nackerud and Scaletta, 2008) and enable “*a more dialogical style of intervention*”, as academics can now reach publics without mediating actors such as newspapers, radio and television. In contrast to the conventional media, through which only few high-profile academics were connected, blogs dilute institutionalised hierarchy and give the opportunity to any academic to engage with the public (Baert and Booth, 2012; Bastow et al., 2014: 231). At the same time, this direct relationship with the public enables academics to assess who their public is and therefore tailor their engagement approaches accordingly (Baert and Booth, 2012). Wikis may present a similar opportunity, as academics can deduce a great deal about public understanding of a scientific topic by considering how Wikipedia articles are structured, when they were created and edited, and who the users that wrote the articles were (Thornton, 2012). MOOCs on the other hand, work as platforms for universities which want to broadcast video and TV content to very large audiences and stimulate interactions (Bastow et al., 2014). Social networks such as ResearchGate may primarily facilitate

interactions with academic peers, but also offer an opportunity to engage with other online users (Thelwall and Kousha, 2017). Finally, even less complicated online tools, such as websites, can become strong competitive weapons for building online brands and promoting a desirable image to universities' stakeholders (Hayes et al., 2009; Opoku et al., 2008).

From the above it is evident that online technologies can transform the way academics engage with the public. However, research so far has focused either exclusively on their attitudes towards public engagement in general (Davies, 2013a; Hoffman, 2016; Poliakoff and Webb, 2007; Watermeyer, 2011), or on their intentions to participate in SNS (Social Networking Sites) for connecting with their peers (Gruzd et al., 2012; Lupton, 2014). A recent study has found that when it comes to engaging with their peers, academics are motivated to use SNS by their need to expand their professional network and create their academic image online, while they use other online technologies mainly for making new acquaintances and seeking information about academic matters (Dermentzi et al., 2016). As the motives for engaging with the public differ from the motives for networking inside academia, it is important to test whether there are also differences in the reasons why academics decide to use online technologies for such tasks. Although the reasons for engaging with the public may seem obvious, the literature about public engagement shows that there is ambiguity regarding its definition (Jolibert and Wesselink, 2012; Petersen and Bowman, 2012) and academics often feel puzzled about what type of activities they are expected to perform (Davies, 2013a; Watermeyer, 2011). What is more, using online technologies for public engagement is not required officially by universities yet, so academics engage in such activities on their own initiative and it is interesting to find out what drives them to do so.

The current study aims to fill the above gap and examine the factors that motivate academics to use online technologies in order to engage with the public. In doing so, it contributes

to the literature by adding knowledge to the public engagement scholarship and IT adoption research area. Also, it helps universities understand their staff's motivation and needs, which could be useful when it comes to launching successful public engagement campaigns.

The next section presents the literature review, where the challenges that academics may face regarding online public engagement are discussed and then hypotheses based on the IT adoption literature are formed. The section that follows presents the methodology of the study, which is followed by the section with the results. The discussion of the results comes next and the paper concludes with practical/theoretical implications of the study, limitations, and suggestions for future research.

Literature review

Online academic engagement with the public

The National Co-ordinating Centre for Public Engagement (NCCPE) in the UK suggests that “*Everyone is a member of the public*” (NCCPE, 2015). What NCCPE wants to highlight by giving such a general definition is that the public is not a specific group of people, but it consists of many different groups of stakeholders that may have different reasons to engage with academia. For instance, these may involve practitioners/businesses that might be interested in research results that could be utilised in the development of products and services, or individuals who may be interested in research related to their personal interests, hobbies, health and well-being. Thus, academia has to take into consideration the needs of the different groups when planning and implementing public engagement strategies. According to the NCCPE, public engagement is the term that “*describes the myriad of ways in which the activity and benefits of higher education and research can be shared with the public. Engagement is by definition a two-way process, involving interaction and listening, with the goal of generating mutual benefit*” (NCCPE, 2015). Based on

this definition, we understand that various online tools can be used to achieve this two-way communication process.

Regardless of the type of online tool used in public engagement, research has shown that there are many challenges and concerns that should be addressed either at the institutional or the individual level. At the institutional level, views of online tools as ephemeral need to be mitigated (Richardson, 2013) and any online engagement activities should be aligned with the organisation's brand image and social principles (Fotopoulou and Couldry, 2015; Hayes et al., 2009). Also, universities need to create online engagement policies that will guarantee privacy and standards of conduct (Hayes et al., 2009; Timm and Duven, 2008). Such policies help institutions to utilise their employees' voice online fully (in the case of higher education these are mainly academics) and at the same time they are necessary to make sure that organisational principles are followed and an organisation's reputation is not at stake due to its employees' poor communicating decisions (Miles and Mangold, 2014). In addition, universities may have to overcome issues related to the digital divide as there are citizens that do not have access to the Internet and do not know how to use it (Daun-Barnett and Das, 2013; Richardson, 2013). Economic (i.e. education and occupation), cultural (i.e. gender and age), social (i.e. social isolation and social capital), and personal (i.e. individual health and well-being) factors can affect skills related to IT, self-efficacy and online participation, and although digital skills training is important, there are still some inequalities that have to be addressed separately (Helsper and Eynon, 2013). This is of relatively higher importance for research projects that are of interest to stakeholders who may not have access to the Internet, the researcher and the research findings. From their perspective, access issues limit their knowledge pool and potentially the opportunity to be heard. From the researchers' point of view,

engagement can never be as effective as one may have envisioned as the main beneficiaries cannot be reached and other communication channels need to be sought.

At an individual level, academics may find using new technologies emotionally challenging, either because they are unfamiliar with them (Bennett, 2014), or due to potential criticism they may receive by being exposed to a broad audience (Sucharov and Sasley, 2014; Wade and Sharp, 2013; Watermeyer, 2011). The time commitment online engagement requires is another important challenge for academics (Wade and Sharp, 2013), especially when online engagement activities are not recognised as factors that contribute to career promotion (Barrett et al., 2014) and they have to focus on more essential tasks, such as networking inside academia. Academics feel that although they are expected to play different roles as intellectual leaders, they are often excluded from contributing toward the leadership and management of the university, their expertise is not fully exploited and their priorities do not match the priorities of their institutions (Macfarlane, 2011). This attitude towards public engagement is so common that academics who sustain a long term relationship with the public and emerge as public intellectuals can be grouped into the following two categories: one that includes senior academics that use their professional status to develop a public image (integrated intellectuals) and a second that includes academics who try to engage with the public while they support a different mind-set that opposes the professionalised academy (non-conformist academics) (Dallyn et al., 2015). Finally, issues of responsibility and an ethical imperative for accuracy and honesty also emerge, as the online environment facilitates the quick and direct exchange of uncontrolled messages (Bowen, 2013; Sucharov and Sasley, 2014).

IT adoption at an individual level

Various theoretical models that stem from social psychology have been used to study IT adoption from the perspective of the individual user. The Theory of Reasoned Action (TRA) is one of the first theories developed in the area and postulates that behavioural intention that results in actual behaviour is mainly influenced by attitude toward behaviour and subjective norms (i.e. influence from others regarding the acceptance decision) (Fishbein and Ajzen, 1975). Based on the TRA, Davis et al. (1989) developed the Technology Acceptance Model (TAM), which focuses on the behaviour related to the use of computing technologies. The main differences between the two models is that TAM does not include the ‘social norms’ variable of TRA and puts more emphasis on how useful (i.e. Perceived Usefulness) and easy to use (i.e. Perceived Ease of Use) a prospective user finds the technology (Bradley, 2012). Another social-psychological model based on TRA, which is often used in the Information Systems discipline, is the Theory of Planned Behaviour (TPB) (Ajzen, 1991). The difference between TPB and TRA is that TPB adds the Perceived Behavioural Control as a motivational factor of humans’ intentions (Al-Lozi and Papazafeiropoulou, 2012).

Considering that the above models (i.e. TRA, TAM and TPB) are similar to each other, it is not surprising that scholars have tried to determine which of them is more successful in predicting behavioural intention. However, different studies report different results so it is not easy to reach a conclusion. For example, Taylor and Todd (1995) found that TPB predicted intention slightly better than TAM, while the study of Yousafzai et al. (2010) suggested that TAM is better than TRA and TPB in terms of explaining variance in actual behaviour and model fit. Mathieson (1991), on the other hand, has found that both TAM and TPB predicted intention to use IT quite well. The differences among the above studies may be explained by the strengths and weaknesses that each model has. TAM is a general model that can be applied to many different contexts and it

is easy to use, but due to this characteristic it cannot provide much detail about intention (Mathieson, 1991; Yousafzai et al., 2010). In addition, TAM has been developed for studying voluntary use of IT and may not be appropriate for situations where IT adoption is compulsory (Bradley, 2012). TPB, on the other hand, provides more information for explaining behaviour and is more likely to identify context specific factors (Mathieson, 1991; Yousafzai et al., 2010), but even in this case the model's main constructs may have to be decomposed and extended in order to fully capture IT acceptance and adoption in different contexts and situations (Bradley, 2012).

A less commonly used theory in the area of IT adoption is Uses and Gratifications Theory, which is considered more appropriate for understanding the uses of new media by individuals (Foregger, 2008). The theory sheds light on how individuals use communication tools among other resources in order to meet their needs and accomplish their goals. It is based on five basic assumptions: a) the audience is conceived of as active, b) the audience takes a great deal of initiative in linking “*need gratification*” and media choice, c) media compete with other sources of need satisfaction, d) as far as methodology is concerned, many of the goals related to mass media use can be derived from data provided by the audience itself, and e) judging the cultural significance of mass communication should be avoided while audience orientations are separately explored (Katz et al., 1973).

Although it is not considered atheoretical in nature (due to its basic assumptions), as an approach it lacks a single universal theory and therefore it does not provide a list with the needs that may be gratified by using mass media (Blumler, 1979). The paradigm has been used to explain Internet usage, but it does not belong to the IT adoption theories, as it basically comes from the communications research field and the expectations regarding the outcomes of media usage themselves cannot predict media behaviour effectively (Larose et al., 2001; Song et al., 2004).

However, there are studies that have used it as a theoretical framework that can explain adoption of the Internet and its applications. More specifically, Papacharissi and Rubin (2000) found five motivations for using the Internet according to U&G namely, ‘interpersonal utility’, ‘pass time’, ‘information seeking’, ‘convenience’ and ‘entertainment’. These findings have been replicated to some extent by a more recent study about uses and gratifications of internet-based communication tools (i.e. SNS, Instant Messaging, e-mail), which found the following main gratifications: ‘relationship maintenance’, ‘information seeking’, ‘amusement’ and ‘style’ (Ku et al., 2013). When it comes to SNS specifically, motives like ‘belonging’, ‘hedonism’, ‘self-esteem’ and ‘reciprocity’ have emerged as potential gratifications (Pai and Arnott, 2013), while an earlier study that examined gratifications of Facebook at the time that it first became popular around the globe found motivations like ‘pass time’, ‘connection’, ‘sexual attraction’, ‘utilities and upkeep’, ‘maintain old ties’, ‘accumulation’, ‘social comparison’, ‘channel use’ and ‘networking’ (Foregger, 2008). It is evident that as time passes by and SNS and other online technologies evolve, the various uses and gratifications of them may change, although some basic factors like networking, remain the same.

Conceptual framework

As discussed above, the literature so far has focused exclusively on the factors that may discourage academics from using online technologies for public engagement, but it has not drawn any conclusions about the factors that strengthen academics’ intentions to engage with the public online. However, discussing potential barriers that academics may face if they decide to adopt online technologies for public engagement is not enough; universities and relevant stakeholders (e.g. funding councils) need to know how they can motivate academics to use new media to interact with the public. In order to fill this gap, the current paper proposes a conceptual framework based

on two prominent theories in the area of IT adoption: the Decomposed Theory of Planned Behaviour (Taylor and Todd, 1995) and Uses and Gratifications Theory (Katz et al., 1973). Both theories have been used extensively to explain online behaviour in various contexts, such as internet purchasing (George, 2004), use of online news services (Chen and Corkindale, 2008), participation in digital piracy (Phau et al., 2014), and web site “stickiness” (Chiang and Hsiao, 2015). The Decomposed Theory of Planned Behaviour extends the Theory of Planned Behaviour proposed by Ajzen (1991) by further analysing its three main variables (i.e. attitude towards behaviour, social norms, and perceived behavioural control) into the dimensions that comprise them. In order to find potential factors that may affect academics’ intention to use online technologies for public engagement, we used Uses and Gratifications Theory, which is suitable for examining the use of new media by individuals (Foregger, 2008).

More specifically, needs that can be gratified by using online technologies, such as the need for self-promotion, image and seeking information, are expected to have a positive influence on academics’ attitudes (Flanagin and Metzger, 2001; Mewburn and Thomson, 2013; Papacharissi and Rubin, 2000; Ridings and Gefen, 2004). As far as image is concerned, it has been found that the enhancement of users’ ‘status’ among their peers that is due to their participation in social networking sites (SNS) can influence their attitude towards using them in a way that they perceive the use of SNS as a more enjoyable activity (Li, 2011). Recent studies have also found that academics already use social media not only to create online professional identities, but also for promoting their expertise and engaging in impression management (Mewburn and Thomson, 2013; Veletsianos, 2012). It is therefore expected that academics will take into consideration the capabilities that online technologies offer for self-promotion and promoting one’s image, while engaging with the public, too. Online technologies are also usually seen as information resources

(D'Ambra and Wilson, 2004), while social networking sites specifically have been found to support the development of information capital (Wu et al., 2016). Academics already use online technologies to get updates on new developments in their research areas (Lupton, 2014). Thus, it is highly likely they will be interested in using them to obtain information about the public's views and expectations from science. It is important to note that our work considers a high-level of engagement and not the different types of strategies and approaches one may adopt to target different stakeholder groups. For example, considering the public audience for science bloggers, Luzón (2013) suggests that this is a stratified and heterogeneous one, including the interested public, members of the public with some training in science, and scientists both inside and outside the particular research area.

As public engagement is about two-way interactions with the public, it is expected that academics' need to maintain and expand their network of practitioners and members of the public will positively affect their attitude towards using online technologies (Foregger, 2008; Kim et al., 2011; Ridings and Gefen, 2004). Online technologies facilitate networking as they offer many options for communication, and social media usage especially has been associated with the need to keep in touch with old friends and find new ones with similar interests (Foregger, 2008; Kim et al., 2011; Ku et al., 2013). The opportunities for interactivity and social approval that social networking sites offer can be perceived as a form of online engagement (Smith and Gallicano, 2015). Academics use social networking sites to manage their professional networks (Gruzd et al., 2012; Lupton, 2014) and it is therefore expected that they may follow similar practices in the case of engaging with the public.

H1: Academics' need for a) self- promotion, b) maintaining a positive image, c) seeking information, d) maintaining old contacts, and e) creating new contacts positively affects their attitude towards using online technologies for public engagement.

According to the Decomposed TPB, one of the main factors that affect social norms is peer influence (Taylor and Todd, 1995). It has been shown that the need for public engagement is greatly promoted by universities and the departmental culture can have an important effect on academics' views about the need to engage with external stakeholders (Kalar and Antoncic, 2015). In such a working environment that nurtures the notion of public engagement, peer influence can be an important part of academic social norms, with academics being expected to influence each other regarding the use of online technologies for public engagement. Similarly, external influence can positively affect the social norms of academics when it comes to public engagement, as the need to engage with the public is not stressed only by individuals inside academia, but also by accreditation or funding bodies (Cooper et al., 2014). External influence has been defined as any non-personal source of information (e.g. mass media, experts etc.) that could influence an individual's behaviour (Hsu and Chiu, 2004) and it is thought to be influential on social norms in IT-related contexts (Bhattacharjee, 2000). Mass media do indeed seem to be influential in the case of public engagement, as it has been found that academics who have developed active relationships with journalists and media organisations are more willing to engage with the public (Petersen et al., 2009).

H2: a) Peer influence and b) external influence positively affect the social norms of academics regarding their use of online technologies.

Factors related to issues that may arise while using online technologies (i.e. privacy and limited IT skills/knowledge) are expected to influence the perceived behavioural control of

academics in using online technologies for public engagement. More specifically, self-efficacy, which in our context represents the users' beliefs about their capabilities to use online technologies, is expected to have a positive effect on academics' perceived behavioural control, based on Decomposed TPB (Taylor and Todd, 1995). Privacy control (i.e. perceived control over the data a user shares online), on the other hand, can alleviate academics' concerns about overexposure online (Lupton, 2014; Sucharov and Sasley, 2014; Wade and Sharp, 2013).

H3: a) Privacy control in online environments and b) self-efficacy related to the use of online technologies positively affect the perceived behavioural control of academics.

Finally, based on the main tenets of the Decomposed Theory of Planned Behaviour, it is expected that attitude, social norms and perceived behavioural control will positively affect academics' intentions to use online technologies for public engagement (Taylor and Todd, 1995). Ajzen (1991) has defined the attitude towards a behaviour as “*the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question*”, while ‘subjective’ or social norms are “*the perceived social pressure to perform or not to perform the behaviour*”. Perceived behavioural control, on the other hand, refers to “*the perceived ease or difficulty of performing the behaviour and it is assumed to reflect past experience as well as anticipated impediments and obstacles*” (Ajzen, 1991). Attitude and perceived behavioural control have been found to be positively related to intention to use online technologies or participate in online communities (Ajjan and Hartshorne, 2008; Lin, 2006; Lu et al., 2009), while social norms have a positive impact on intention to use SNS or web applications that facilitate online communication in general (Liao et al., 2007; Lu et al., 2009; Peslak et al., 2011).

H4: a) Attitude, b) social norms, and c) perceived behavioural control of academics related to using online technologies for public engagement positively affect intention to use online technologies for this purpose.

Figure 1 summarises the above hypotheses and presents the research model of the study. The right section of the model (H4 a-c) reflects the main premises of the Decomposed Theory of Planned Behaviour, while the left one (H1-3) reflects the decomposition of TPB's main variables based on the Uses and Gratifications Theory and TPB.

[Figure 1 HERE]

Methodology

Due to the context of our study, which focuses on online technologies and practical issues, such as reaching academics around the world, an online questionnaire was deemed appropriate as a data collection tool. For the online survey, a multistage sampling technique, where clusters are selected and a sample is randomly drawn from these clusters, was used (Fink, 2003, p. 15). The authors collected 3,000 random email addresses of academics by looking for staff public contact details on the websites of universities. At the same time, the link to the online survey was distributed on social networking sites in order to encourage academics that already use online technologies for public engagement to participate in the study. The valid sample after discarding incomplete responses and outliers was 250 responses.

Table 1 presents the sample's profile, which consists mainly of academics that are based in Europe (72.8%) and conduct research either in the disciplines of social sciences (57.6%) or in STEM (20.4%). Such uneven distribution of coverage of scholarship among disciplines has also been recently reported in a study examining ResearchGate, with the arts and humanities, health professions, and decision sciences poorly represented (Thelwall and Kousha, 2017). A high

percentage of the respondents (75.6%) stated that they already use online technologies for public engagement; however, an equally high percentage (85.2%) answered that less than 25% of their time spent on the Internet is dedicated to public engagement. The distribution among genders, posts, age groups and academic experience was satisfactory.

[Table 1 HERE]

Reliability and validity analysis

The main analysis of the data was conducted by following a Structural Equation Modelling (SEM) technique using AMOS 22.0. Table 2 includes the items that were used in the study and were adapted from previous studies. The data screening for normality issues showed that one item of Attitude (Attitude 2) had a kurtosis value of 3.880, which is higher than the recommended threshold of 2.58 (Tabachnick and Fidell, 2012, p. 201), and therefore it was removed from the analysis. During the EFA, the authors had to remove items 2 and 4 from the 'Old Contacts' construct, item 3 from 'Information Seeking', and item 2 from 'New Contacts', as they did not load on their expected factor. All the remaining items loaded on each distinct factor (Table 2) and explained 77.07% of the total variance, while KMO had the value of 0.918.

[Table 2 HERE]

The reliability of the scales was also tested and the Cronbach's alphas of all scales ranged between 0.793 and 0.967. In addition, all the constructs had Composite Reliabilities (CR) above the recommended value of 0.70 and the Average Variance Extracted exceeded the threshold of 0.50 (Hair et al., 2014). Therefore, reliability and convergent validity have been established (Table 3). Furthermore, the square root of AVE is greater than inter-construct correlations for every construct; thus, there was discriminant validity among them (Table 4). As far as the model fit of the measurement model was concerned, all the indices ($\chi^2/df=1.581$, CFI = 0.951, SRMR = 0.045, RMSEA=0.048) met the required thresholds proposed by Hair et al. (2014). Two errors of Self-

Promotion (i.e. error terms of Self-Promotion 1 and Self-Promotion 2) were covaried as suggested by Kenny (2011) to achieve this model fit.

[Table 3 and Table 4 HERE]

Results

Independent sample t-tests were also performed to find potential differences in the means of the four main constructs of the model between users and non-users. It was found that academics that already use online technologies for public engagement rated their intentions to continue using Online Technologies for this reason higher ($M = 4.08$, $SD = 0.71$) than the rest ($M = 3.11$, $SD = 1.00$), $t(80.37) = 7.01$, $p < 0.001$. Similarly, differences were observed between users and non-users in terms of attitude towards using Online Technologies for public engagement (users: $M = 3.99$, $SD = 0.65$, non-users: $M = 3.62$, $SD = 0.61$, $t(248) = 3.90$, $p < 0.001$), Social Norms (users: $M = 4.52$, $SD = 1.48$, non-users: $M = 3.72$, $SD = 1.47$, $t(248) = 3.68$, $p < 0.001$), and Perceived Behavioural Control (users: $M = 5.45$, $SD = 0.90$, non-users: $M = 4.74$, $SD = 1.12$, $t(248) = 4.97$, $p < 0.001$).

Figure 2 shows the results that were obtained after testing the full hybrid model ($\chi^2/df = 1.643$, $CFI = 0.944$, $SRMR = 0.071$, $RMSEA = 0.051$).

[Figure 2 HERE]

Image ($\beta = 0.330$, $p < 0.001$) and Information Seeking ($\beta = 0.246$, $p < 0.05$) had a significant and positive effect on Attitude and therefore H1b and H1c were supported. The effect of Creating New Contacts on Attitude ($\beta = 0.206$, $p = 0.083$) was positive; however, it was significant only at the 0.1 level so H1e was rejected. H1d and H1a were also rejected as the effects of Maintaining Old Contacts and Self Promotion were not significant. As far as the determinants of Social Norms were concerned, only Peer Influence ($\beta = 0.626$, $p < 0.001$) had a significant and positive effect on

Social Norms and therefore H2a was accepted while H2b was rejected. Similarly, of the two hypothesised antecedents of Perceived Behavioural Control, only Self-Efficacy ($\beta = 0.754$, $p < 0.001$) had a significant positive effect on it and therefore H3b was supported, whereas H3a was rejected. Finally, all the three hypotheses that related to the main part of the Decomposed Theory of Planned Behaviour (H4a, H4b and H4c) were supported as Attitude ($\beta = 0.473$, $p < 0.001$), Social Norms ($\beta = 0.144$, $p < 0.01$) and Perceived Behavioural Control ($\beta = 0.237$, $p < 0.001$) had significant and positive effects on Intention.

Discussion

The aim of the study was to examine the factors that motivate academics to use online technologies for public engagement. The hypotheses relating to the main part of the Decomposed Theory of Planned Behaviour were fully supported based on the results of the analysis, while the other three hypotheses were partially supported.

One of the most interesting findings in this survey is that academics' attitude towards using online technologies for public engagement is mainly affected by their need to maintain a professional image and secondly by their interest in finding information about the views/needs of the public. Networking factors, namely Creating New Contacts and Maintaining Old Contacts, did not have any significant effect on Attitude, although Social Networking Sites were among the most popular online tools that academics use for public engagement. This probably reflects the way that many academics see public engagement and how they engage with the public online. Although, as discussed in the literature review section, public engagement is about two-way communication between the public and academia (NCCPE, 2015), finding that networking factors do not play a role in academics' decisions to adopt online technologies for engagement implies that for the majority of them public engagement is one-way ephemeral communication with the public. They

seem to recognise the need for research to be open to the broader public and, thus, they are interested in creating an online public image, but they do not seem to invest in creating long-lasting linkages with society, at least via online technologies. A similar finding comes from a study about the use of Twitter by non-profit organisations (NPOs), according to which NPOs perceive Twitter as a one-way communication tool instead of a platform that can facilitate two-way communications (Gálvez-Rodríguez et al., 2016). Thus, this limited view of how online technologies can be utilised within the public engagement process may not be prevalent only within academia, but may also affect other organisations.

This absence of long-lasting relationships with the public may be a result of the confusion that prevails in academia regarding the meaning of the public engagement concept and the various definitions that exist (Davies, 2013b; Jolibert and Wesselink, 2012; Rowe and Frewer, 2005; Watermeyer, 2011), which do not explicitly specify the nature and depth of the relationship that academics are expected to develop with actors outside academia. It may also reflect other factors, such as the lack of time or perceptions of limited return on investment (Brass and Rowe, 2009; Lupton, 2014; Watermeyer, 2011). In either case, it may be beneficial for academics and academic institutions to explore the opportunities that online technologies offer for creating more substantial relationships with external organisations and the public, instead of simply disseminating research findings online, a practice that belongs to movements of the past, such as Public Understanding of Science (Bastow et al., 2014; McNeil, 2013). For instance, they may utilise online technologies for engaging the public at the early stages of the research process, a practice that is known as ‘upstream engagement’ and can give the researchers valuable feedback while they are developing controversial or disruptive technologies (Rogers-Hayden and Pidgeon, 2008; Watermeyer, 2012). Online technologies can also facilitate more contemporary paradigms, like Citizen Science or

Science 2.0, which aim to open science to the public by encouraging its participation in various stages of research (e.g. research design, data collection, dissemination of findings etc.) (Bastow et al., 2014; Haywood and Besley, 2014; Jolibert and Wesselink, 2012). For the above to take place, research designs and methodologies may need to be reviewed in order to make them more open and inclusive to external participation. With engagement built into a research project, the chances of its impact may be compared more easily, given that stakeholders are involved in all stages of the project from its outset, whereas typically this only happens after the project is over. Such a shift in how scholarship is undertaken and how research projects are operationalised may require new benchmarks and metrics (e.g. metrics to measure the intellectual ownership of the work produced).

Developing more meaningful relations with the public online can have other benefits, too. As discussed in the introduction, online technologies can empower academics by making it possible for them to communicate directly with the public and emerge as public intellectuals (Baert and Booth, 2012). Academics with a strong online presence can be more popular among the public, which in turn may lead to a favourable stance of the public towards their research, not because of the contribution their research makes, but because of effective communication practices. This is a view that was shared among academics more widely, as, according to our findings, Image was one of the influential factors of Attitude towards online engagement intentions. If someone's online image and reach affects how their scholarship is perceived not only among the public, but potentially also among their academic peers, it may affect how the significance of their findings is perceived and in turn how their work is accepted in the future. Such an eventuality could have significant repercussions for academic scholarship.

Self-promotion, on the other hand, did not have any significant effect on Attitude, reinforcing the finding that academics do not use online tools for self-promotion (Stewart, 2015). Comparing the two findings suggests that academics are interested in maintaining a successful, professional image and that they think that having an online presence can be useful towards this end, but they are not willing to promote themselves actively through online technologies. The reason is that extensive self-promotion can be considered as annoying by other people (Lupton, 2014) and it has the counter-productive result of being perceived as vain.

As far as Social Norms are concerned, Peer Influence had a strong positive effect on them, while the effect of External Influence (e.g. mass media) was insignificant. It is true that the call for public engagement comes mainly from within academia (e.g. in the form of peer pressure) rather than the mass media (Bastow et al., 2014; Hoffman, 2016), and this is probably the reason why academics do not consider the influence of external actors important in their decisions to engage with the public online. Also, academics tend to work independently and often prioritise their own agendas (Aarrevaara et al., 2015), so even if universities receive some kind of external influence at the institutional level for supporting public engagement, this influence may be diluted before it reaches the individual level. Future research could shed more light on how this process works internally, which could in turn help inform internal communication strategies. In particular, it could examine how personal values and perceptions of public engagement influence intentions to engage online with the public.

When it comes to Perceived Behavioural Control, Self-efficacy appears to be the most important determinant. The important effect of Self-efficacy is not a surprise as the factor has also been found to be quite influential in similar settings, like online learning communities (Liou et al., 2016). The insignificant effect that Privacy Control had on the Perceived Behavioural Control of

academics could be explained by the limited interactions that academics seem to intend to have with the public. As they are mainly interested in maintaining an image and finding information online rather than having online interactions with the public, the privacy issues that may arise from their use of online technologies are expected to be of relatively minor significance. This view is supported by a recent study that has found a positive relationship between communicating/sharing information online and concerns about privacy control (Xu et al., 2013).

The positive effects that Attitude, Social Norms and Perceived Behavioural Control had on academics' intention to engage with the public online are in line with the expectations of the Theory of Planned Behaviour (Ajzen, 2002; Taylor and Todd, 1995). According to Gruzdt et al., (2012). Academics' concerns about their control over using online technologies, such as social media, are mainly related to the potential loss of the 'personal/professional boundary' and control of the content posted online. The importance of having control over one's use of social media is also stressed in the study of Lupton (2014), where academics have stated that among their concerns is the idea of "social media use becoming an obligation" and the "commercialisation of the content/copyright issues". In the same study the positive relationship between attitude towards social media and social media use is presented, as the majority of the respondents, who are academics that already use social media in their academic practice, has expressed a positive attitude towards using social media (Lupton, 2014).

Conclusions

The study has shed light on a number of factors that motivate academics to engage with the public online. The findings show that the need of academics to maintain a professional image online is the most important factor that affects academics' attitude towards using online technologies for public engagement, followed by the need to seek information about the

views/needs of the public. Social norms are affected only by peer influence, while perceived behavioural control is affected only by the self-efficacy of academics in using online technologies for engagement. Attitude has the strongest effect on intention to use online technologies for public engagement, followed by perceived behavioural control and social norms.

This study contributes to the growing body of literature studying why academics use online technologies as part of their practice. The study's findings are also useful for public engagement scholarship as they reflect the views that academics hold on public engagement, which are not necessarily in line with their institutions' expectations or what the literature has suggested so far. For instance, the absence of motivation on the part of the academics to create online linkages with the public is not consistent with the concept of public engagement, which is mainly about creating social networks that include both academics and members of the public. This finding could trigger further research on the topic, as scholars may want to explore whether this reluctance on behalf of academics reflects a more general reluctance towards building stronger relationships with the public, or whether this is entirely due to their perceptions of online technologies. In the latter case, it would be interesting to explore the reasons why academics may have formed such perceptions and how these could potentially change.

Also, as noted in the Introduction, studies in the area are scarce and most of them follow a qualitative methodology. Although qualitative studies are extremely useful for exploring new phenomena (in this case the use of social media by academics), they focus on the experiences of few people, making it hard to draw conclusions about the broader population under examination. In this study, using an established theoretical framework was quite helpful in determining specific factors that affect academics' behavioural intention more broadly. The study has included both academics that use online technologies for engagement and those who do not, and thus its findings

reflect the views of a broader pool of online users rather than just the views of heavy users of online technologies, who already use them for engagement, and who are usually presented in the studies in this research area.

The joint use of the Decomposed TPB and the Uses and Gratification Theory has enabled us to develop a theoretical model that can explain intention to engage with the public online. Instead of developing separate typologies of motives, which is one of the main criticisms of U&G Theory (Ruggiero, 2000), our study tried to understand the interplay among these motives and link them directly to the attitude towards using online technologies for public engagement. The findings of the joint model suggest that some of the usual motives for using mass communication media, like maintaining interpersonal interconnectivity, may not be particularly influential after all. Thus, our study is in line with the views of the scholars that challenge the assumption of the active audience with media behaviour that is directed by specific goals (Ruggiero, 2000). Having said that, it is important to note that we have contextualised the model according to the given setting and it would be interesting to see if similar results are derived from research in related contexts. The joint model presented in this study could potentially be extended and adapted in future studies to examine online engagement in similar settings (e.g. politicians engaging with citizens online).

From a practical perspective, the findings of the study can be used at an individual level, as academics could use them as 'benchmark' values to help them understand where they stand on online public engagement compared to other academics. Universities may also be interested in the findings of the study, when it comes to formulating strategies for supporting academics. Given that academics are the ones that conduct research and potentially create impact, they can become ideal ambassadors of their institution's engagement efforts with the public. Universities' strategies will need to consider not just how to support academics at an individual level (e.g. making time

available for public engagement, weighting public engagement when it comes to staff promotions) but also how it would become possible to magnify the reach and impact on their aggregate online engagement efforts. For example, universities could compile directories of engaged academics, follow them online and when they post share their content among University social media followers. This could both bring more prominence to the content but also encourage online users to follow the academics directly. Considering that self-efficacy has been found to play an important role in academics' perceived behavioural control, providing training and support on how to use online technologies could be helpful. Universities may also want to intensify their online public engagement campaigns within their faculties, as social norms have some effect on behavioural intention.

Finally, the findings of the study could inform the public engagement agendas of third-party organisations, like research councils, or governments. As these actors are interested in promoting research dissemination and public engagement, they may find the study's findings useful in understanding how they can motivate academics to engage with the public online. For example, they may want to organise training seminars on using online technologies, or provide funding to universities to organise such workshops, in order to make sure that all academics have the necessary skills for online public engagement. In addition, research councils/governmental organisations could further promote the idea of engaging with the public online by acknowledging the importance of online public engagement (e.g. by including online public engagement activities in the funding criteria) and linking online public engagement with a desirable academic image. Funding applications could ask not just for evidence of online engagement but expect tangible evidence of its success.

The generalisability of the findings may be limited due to the fact that the majority of respondents come from the social sciences and from universities based in Europe. Therefore, drawing conclusions for academics that do not fall into one of the above areas should be done with caution. Similar challenges were faced when considering other attributes of our sample. Future studies with bigger and better balanced sub-groups could explore differences among them, adopting appropriate statistical techniques. For instance, it would be of interest not just to explore geographical differences at the continent level but potentially also at the national level, as an indirect proxy of the engagement attitude held in such national communities. Also, our study has not differentiated between users and non-users of online technologies for engagement although based on the independent t-tests there are some differences in the means between the two groups. The fact that the survey in this study is cross-sectional could also be a limitation. As online trends change quite quickly, the study can only give insights into how behavioural intention is currently formed; future studies may find different results. The cross-sectional nature of the survey is also a reason why the findings can provide only indications for the relationships among the dependent and independent variables rather than making strong causal inferences.

For practical reasons this study has examined only some of the interactions that take place online as part of the public engagement process. Future studies could focus on the stance that universities as organisations hold towards using online technologies for engaging with the public and examine how their relevant strategies are formed and to what extent universities use online technologies as part of their public engagement activities.

Future research might also explore how factors related to the working environment of academics, such as work engagement or job satisfaction, affect their decisions to engage with the public online. The relatively low R-squared of the public engagement model shows that almost

half of the variance of the model remains unexplained. Adding factors from a different research area (e.g. organisation studies or work psychology) may provide a better explanation of the phenomenon of online public engagement.

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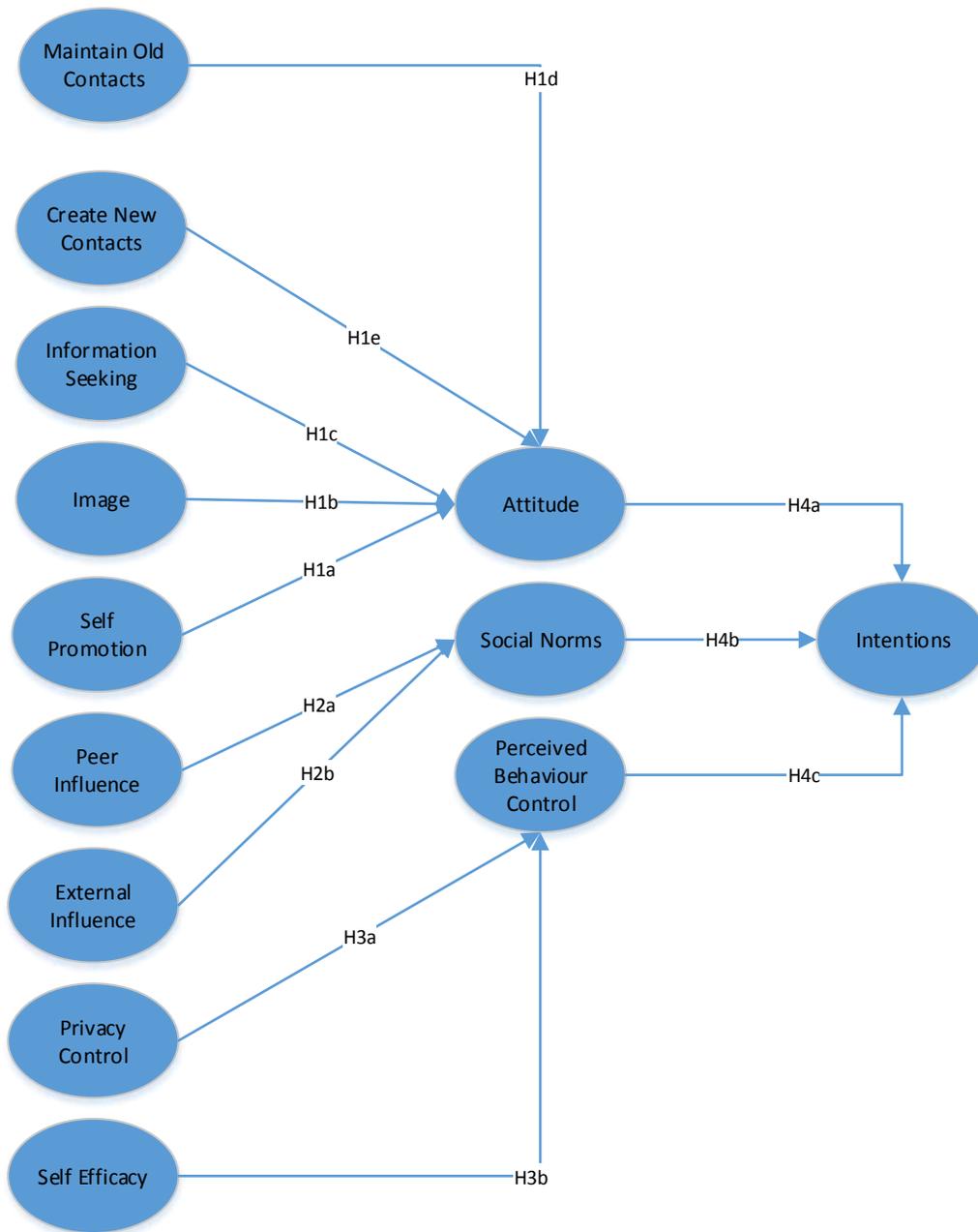


Figure 1. Research model

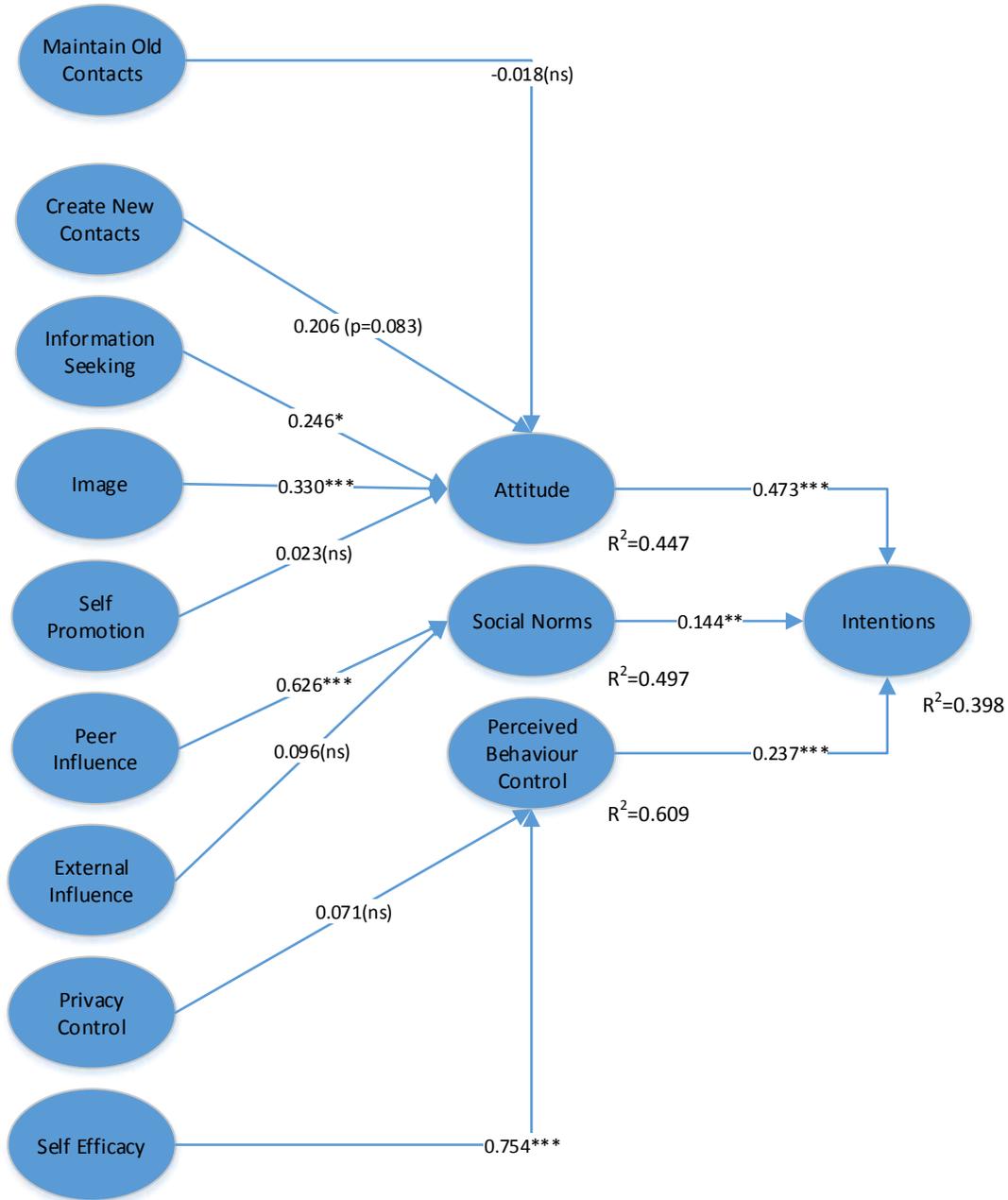


Figure 2. Results (**p < 0.01, ***p < 0.001, *p < 0.05, ns = non-significant).

Table 1. Sample's demographics.

Characteristic	Frequency	%	Characteristic	Frequency	%
Gender			Age		
Male	138	55.2	18-24	3	1.2
Female	112	44.8	25-34	48	19.2
Total	250	100.0%	35-44	97	38.8
Current Post			45-54	54	21.6
PhD Student	23	9.2	55-64	39	15.6
Post-Doc/ Research Associate	16	6.4	65 or over	9	3.6
Lecturer	77	30.8	Total	250	100.0 %
Senior Lecturer/Assistant Professor	68	27.2	Continent		
Reader/Associate Prof./ Professor	66	26.4	Europe	182	72.8
Total	250	100.0%	America	31	12.4
Academic Experience			Asia	20	8.0
1-5	39	15.6	Australia/Oceania	17	6.8
6-10	52	20.8			
11-20	99	39.6	Total	250	100.0 %
21-30	40	16.0	Use of Online Technologies for public engagement		
31 and over	20	8.0	Yes	189	75.6
Total	250	100%	No	61	24.4
Discipline Group			Total	250	100.0 %
STEM	51	20.4	Time per day spent on Internet		
Humanities	20	8.0	Less than 10 minutes	12	4.8
Social Sciences	144	57.6	10-30 minutes	18	7.2
Multidisciplinary/Other	35	14.0	31-60 minutes	22	8.8
Total	250	100.0%	1-2 hours	35	14.0
% of time on Internet work-related			2-3 hours	34	13.6
0-25%	33	13.2	More than 3 hours	129	51.6
26-50%	89	35.6	No response	-	-
51-75%	84	33.6	Total	250	100.0 %
76-100%	44	17.6	% of time on Internet for public engagement		
No response	-	-	0-25%	213	85.2
Total	250	100.0%	26-50%	34	13.6
% of time on Internet for personal use			51-75%	2	0.8
0-25%	105	42.0	76-100%	1	0.4
26-50%	99	39.6	No response	-	-
51-75%	27	10.8	Total	250	100
76-100%	19	7.6			
No response	-	-			

Total	250	100%		
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Table 2. Items and EFA loadings.

Construct	Items		EFA Loadings	Source
Intention	I1	I plan to use online technologies in the future in order to engage with practitioners/the public.	0.944	(Ajzen, 2002)
	I2	I intend to use online technologies in the future in order to engage with practitioners/the public	0.953	
	I3	I expect to use online technologies in the future in order to engage with practitioners/the public	0.919	
Attitude	A1	When it comes to engaging with practitioners/the public, using online technologies will be... ..good	0.701	(Peslak et al., 2011)
	A2	...useful	Removed	
	A3	...worthwhile	0.941	
	A4	...helpful	0.905	
	A5	...valuable	0.935	
Subj. Norms	SN1	Academics who influence my behaviour will encourage me to use online technologies to engage with practitioners/the public.	0.721	(Taylor and Todd, 1995)
	SN2	Academics who are important to me will encourage me to use online technologies to engage with practitioners/the public.	1.036	
PBC	PBC1	I will be able to use online technologies in order to engage with practitioners/the public.	0.662	(Taylor and Todd 1995)
	PBC2	I will be in control when it comes to using online technologies in order to engage with practitioners/the public.	0.518	
	PBC3	I have the resources, the knowledge and the ability to use online technologies in order to engage with practitioners/the public.	0.616	

Privacy Control	PC1	I believe I will have control over who could access my information collected by online service providers.	0.920	(Xu et al., 2013)
	PC2	I believe I will have control over what information will be released by online service providers.	0.957	
	PC3	I believe I will have control over how my information will be used by online service providers.	0.946	
	PC4	I believe I will have control over information provided to online services.	0.878	
Old Contacts	OC1	To keep in contact with practitioners and members of the public from the past.	0.765	(Foregger, 2008)
	OC2	To contact distant practitioners and members of the public.	Removed	
	OC3	To track down practitioners and members of the public from the past.	0.802	
	OC4	To see where practitioners and members of the public are at now.	Removed	
	OC5	To maintain connections with practitioners and members of the public from the past.	0.760	
New Contacts	NC1	To meet new practitioners and members of the public.	0.838	(Kim et al., 2011)
	NC2	To find practitioners and members of the public like me.	Removed	
	NC3	To talk to practitioners and members of the public with the same interests.	0.573	
	NC4	To hang out with practitioners and members of the public I enjoy talking to.	0.592	
Info Seek	ISK1	To learn about unknown things relevant to my academic research.	0.808	(Kim et al. 2011)
	ISK2	To do research.	0.747	
	ISK3	To learn about useful things about practice and public interests.	Removed	
	ISK4	To get new academic ideas.	0.586	

Image	IMG1	Using online technologies to engage with the public will improve my image among practitioners and members of the public.	0.751	(Moore and Benbasat, 1991)
	IMG2	Because of my use of online technologies, practitioners and members of the public will see me as a more valuable academic.	0.741	
	IMG3	Academics in my organisation/field who use online technologies have more prestige among practitioners and members of the public than those who do not.	0.917	
	IMG4	Academics in my organisation/field who use online technologies have a high profile among practitioners and members of the public.	0.856	
	IMG5	Having an online presence is a status symbol in the practice/public communities.	0.835	
Peer Influence	PI1	My friends in academia think that I should use online technologies for public engagement.	0.634	(Taylor and Todd 1995)
	PI2	My colleagues think that I should use online technologies for public engagement.	0.657	
External Influence	EI1	I have seen in news reports that using online technologies is a good way to engage with practitioners and members of the public.	0.781	(Hsu and Chiu, 2004)
	EI2	The popular press depicts a positive sentiment for using online technologies for public engagement.	0.839	
	EI3	Expert opinions depict a positive sentiment for using online technologies for public engagement.	0.807	
	EI4	Mass media reports are encouraging me to use online technologies for public engagement.	0.746	

Self-Efficacy	SE1	The level of my capability in using online technologies to successfully engage with the public is very high.	0.936	(Lin and Huang, 2008)
	SE2	The level of my understanding about what to do in using online technologies is very high.	0.890	
	SE3	The level of my confidence in using online technologies is very high.	0.892	
	SE4	In general, the level of my skill in using online technologies for engaging with the public is very high.	0.942	
Self-Promotion	SP1	Talk proudly about my experience or education.	0.643	(Bolino and Turnley, 1999)
	SP2	Make people aware of my talents or qualifications.	0.837	
	SP3	Let practitioners and the public know that I am valuable to my field.	0.940	
	SP4	Let practitioners and the public know that I have a reputation for being competent in a particular area.	0.907	
	SP5	Make practitioners and the public aware of my accomplishments.	0.838	

Table 3. Reliability and statistics.

Construct	Reliability			Statistics	
	C.R.	AVE	Cronbach α	Mean	Standard deviation
Intention	0.967	0.907	0.967	3.84	0.92
Attitude	0.939	0.795	0.938	3.90	0.72
Subj. Norms	0.921	0.853	0.921	4.33	1.58
PBC	0.831	0.623	0.829	5.28	1.16
Privacy Control	0.960	0.856	0.959	3.86	1.65
Old Contacts	0.852	0.659	0.848	3.67	0.89
New Contacts	0.827	0.614	0.818	3.48	0.94
Info Seek	0.793	0.564	0.793	3.79	0.89
Image	0.931	0.729	0.930	4.54	1.41
Peer Influence	0.901	0.819	0.900	4.26	1.44
External Influence	0.884	0.656	0.882	4.52	1.39
Self-Efficacy	0.960	0.857	0.960	4.89	1.44
Self-Promotion	0.919	0.696	0.922	2.95	1.00

Table 4. Construct correlation matrix (square root of AVE on diagonal)

	PC	A	I	SN	PBC	OC	NC	IS	Img	SP	PI	EI	SE
PC	0.925												
A	0.285	0.891											
I	0.240	0.593	0.953										
SN	0.371	0.466	0.448	0.924									
PBC	0.322	0.377	0.463	0.497	0.790								
OC	0.158	0.415	0.418	0.434	0.302	0.812							
NC	0.292	0.536	0.545	0.496	0.388	0.745	0.784						
IS	0.174	0.575	0.490	0.476	0.440	0.586	0.694	0.751					
Img	0.300	0.580	0.469	0.562	0.406	0.403	0.529	0.581	0.854				
SP	0.224	0.334	0.354	0.368	0.318	0.398	0.421	0.353	0.451	0.834			
PI	0.358	0.372	0.353	0.697	0.355	0.326	0.365	0.352	0.587	0.385	0.905		
EI	0.325	0.451	0.370	0.568	0.422	0.454	0.427	0.483	0.648	0.401	0.796	0.810	
SE	0.336	0.325	0.387	0.319	0.775	0.360	0.417	0.374	0.296	0.206	0.172	0.281	0.926