

Online public engagement in higher education: studying the
perspectives of academics and the public

by

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Abstract

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. While public engagement has been accepted as an idea by academia and justified by funding and assessment bodies, its effective implementation is still in its infancy for most universities around the world. 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 doctoral work is to study the use of online technologies by academics and the public in order to engage with each other, or in other words, online public engagement.

Three surveys were conducted as part of this thesis, each of them looking at a different perspective on the topic under examination. The first survey, which used the Decomposed Theory of Planned Behaviour and the Uses & Gratifications Theory, focused on the use of online technologies for academic engagement, taking into consideration both users and non-users of online technologies. The second survey used the same research framework as the first, but it focused on why academics may be interested in using online technologies for engaging with the public. The final survey, which used the extended Unified Theory of Acceptance and Use of Technology, focused on the public and more specifically on the factors that affect the public's intention to engage with academics via online technologies. Structural Equation Modelling was used in all the three cases for the data analysis.

Results suggest that although academics seem to use online technologies for both academic and public engagement, the latter use probably 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. Similarly, the public seems to have a rather passive role in the public engagement process as the most important factor of their intentions to engage with academia online is habit.

The thesis's theoretical implications stem not only from the fact that it contributes to the knowledge about public engagement, but also from testing two relatively new IT adoption theories, namely Decomposed TPB and UTAUT2, in a new context. As far as the practical implications are concerned, universities and funding bodies can use the results in order to plan and launch more effective public engagement campaigns, while providers of online platforms that are interested in attracting users from academia can form more direct marketing approaches.

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1. Introduction

1.1 Public Engagement in Academia

Public engagement has emerged as a popular notion in academia, now that the need for universities to satisfy their various stakeholders has become essential for their prosperity (McClung & Werner, 2008). Indicative of this trend is the fact that stakeholder engagement is among the requirements the accreditation bodies ask for from their members (Cooper, Parkes, & Blewitt, 2014). Although there are multiple terms that have been used interchangeably to refer to public engagement, such as ‘civic engagement’, ‘community engagement’, ‘community outreach’, ‘community-university partnership’ and ‘knowledge exchange’ (Hart & Northmore, 2011), the key objective is the same: research outcomes must be communicated not only to other academics, but also to non-academic people and organisations, and useable lessons must derive from them (Bastow, Dunleavy, & Tinkler, 2014).

Discrepancies can be found not only in the terms used, but also in the proposed benchmarks for evaluating the effectiveness of public engagement, making the need for scholarship on engagement more pressing. This need is not only about critically discussing the ambiguities of the meaning of public engagement, but also about promoting strategic thinking that will result in public engagement being deeply embedded in academic practice (Watermeyer, 2011). In addition, scholarship on engagement could address other important topics that are currently under-examined, such as the audit and evaluation of public perspectives on community-university engagement (Hart & Northmore, 2011). Considering the above, it would be useful for promoting both public engagement practice and relevant research to review the research conducted in the area so far and highlight any significant gaps that have to be addressed.

Although there are reflective papers about the emergence of engaged scholarship, like the one by Hoffman (2016), the absence of literature reviews that could cover the literature and pave the way for future studies in the area is evident. The current thesis provides a review of public engagement literature and then focuses on some of the research gaps found. More specifically, it explores the use of online technologies in the public engagement process, taking into consideration not only the perceptions of academics, but also the views of the public.

Public engagement as a term involves by definition another important key player apart from universities and academics, namely ‘the public’. The thesis adopts the approach of the National Co-ordinating Centre for Public Engagement (NCCPE) in defining the public, according to which “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 university stakeholders that may have different reasons to engage with academia (e.g. practitioners/businesses may be interested in research results that could be utilised in the development of products and services, individuals may be interested in research related to their personal interests, hobbies, health and well-being etc.). Thus, academia (i.e. both universities as organisations and academics as individuals) has to take into consideration the needs of the different groups when planning and implementing public engagement strategies.

So, what is public engagement? As is going to be discussed in the Literature Review section there are many different definitions of the term, since it has evolved over the years and included more and more activities. This thesis adopts again the definition given by NCCPE as a) it is up-to-date, b) it comes from an official organisation in the UK that specialises in public engagement, and c) it is not restrictive and can encompass all the activities that have been associated with different evolution phases of public engagement. Therefore, public engagement is defined as 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).

Figure 1 summarises the interactions that take place among the key players during the public engagement process. These include the attempts from the side of universities and academics for external impact and engagement with the public and the interest of the public to engage with academics or universities that is expressed through participation in dialogue about science or even in research projects. The diagram also includes the two-way interactions between universities and academics. Although these interactions are not considered as public engagement activities, they describe the internal engagement and communication processes that have to be present in universities in order for the public engagement process to be effective. This is due to the fact that universities have to engage with their employees and communicate their visions in order to launch effective public engagement strategies and at the same time academics have to feel engaged at least to some degree with their home institutions in order to implement these strategies. At the same time, these two-way interactions represent the engagement of academics with academia as a whole (i.e. other universities and academics in the discipline), which has creating internal impact (i.e. impact on science and academic community through research) as a goal.

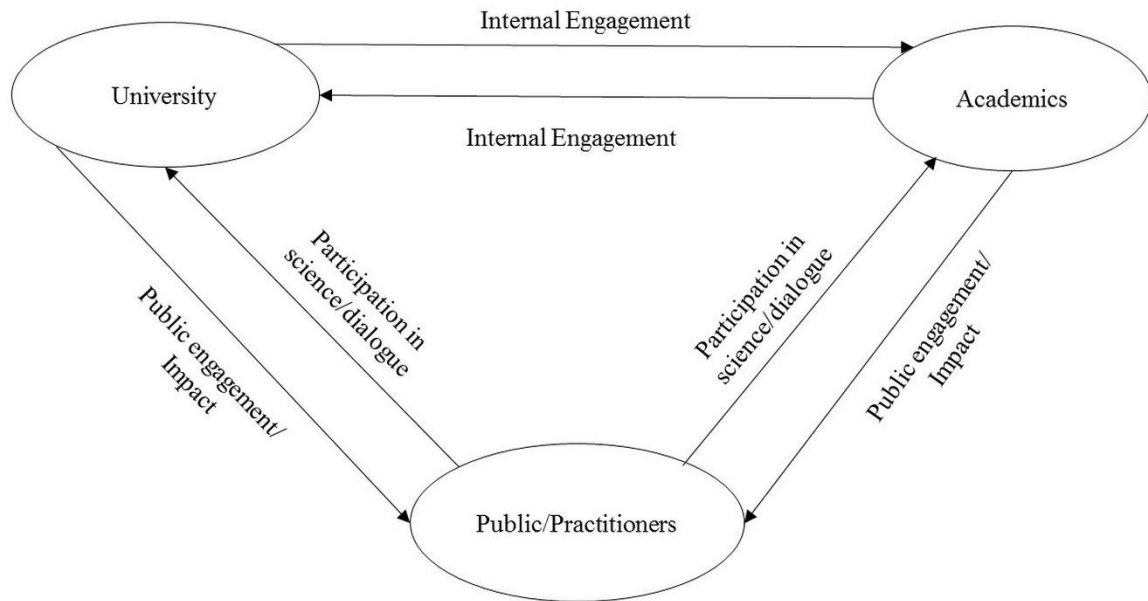


Figure 1. The process of Public Engagement: Interactions among key players (own illustration).

The thesis focuses on the aforementioned interactions when they take place in online settings, and more specifically on the intentions of each key player to use online technologies in order to engage with the other players in the public engagement process. Thus, the second part of the literature review section is dedicated to the IT adoption research area and explores potential factors that may affect such intentions. The following section explains in detail the research gaps and objectives addressed in the thesis.

1.2 Online Public Engagement: Research Gaps, Aims and Objectives

Online technologies (i.e. websites, blogs, forums, social networking sites, newsfeeds etc.) have long been established as communication and collaboration tools in academia. While some of them (e.g. websites, newsfeeds etc.) belong to the “Web 1.0” model (in which most of the users are consumers of information), nowadays the majority of them follow the “Web 2.0” paradigm that allows any user to create content and therefore, facilitates the exchange of ideas (Cormode & Krishnamurthy, 2008). In particular, when it comes to networking and information exchange Social Networking Sites (SNS) seem to prevail. SNS have been defined as “*web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system*” (Boyd & Ellison, 2007). Although many of them have not been created specifically for professional purposes, research has shown that scholars employ them as professional tools that can be used beyond instructional purposes (Veletsianos, 2012). SNS

use has been found to have a positive effect on job performance and to help employees balance their work-life realms (Moqbel, Nevo, & Kock, 2013). In addition, SNS can facilitate the creation of social capital in academia (Madhusudhan, 2012; Richter, 2011) and make Networked Participatory Scholarship, “*the practice of scholars’ use of participatory technologies and online social networks to share, reflect upon, critique, improve, validate, and further their scholarship*”, feasible (Veletsianos & Kimmons, 2012). Equally importantly, SNS can help both academics and institutions increase community outreach, their impact on society and their effectiveness in accomplishing their goals (Forkosh-Baruch & HersHKovitz, 2012; Veletsianos & Kimmons, 2013).

Due to the significant benefits that SNS can potentially offer in an academic context, scholars have begun to examine the use of SNS for academic purposes more systematically. However, so far research has focused exclusively on addressing “how” SNS can change academic practice and “what” the academics’ usage patterns are (Forkosh-Baruch & HersHKovitz, 2012; Madhusudhan, 2012; Van Noorden, 2014; Veletsianos, 2012; Veletsianos & Kimmons, 2012; 2013). This thesis builds on this emerging body of research, extending it by focusing on “why” scholars are willing to use online technologies and participate in SNS as part of their academic engagement activities. To the best of the author’s knowledge this is the first attempt to understand the motivating factors that drive academics to adopt online technologies (SNS and other technologies) for networking quantitatively. Previous studies have been of an exploratory nature so far, using qualitative approaches and focusing exclusively on SNS (Gruzd, Staves, & Wilk, 2012; Lupton, 2014). In addition, current research is based entirely upon the views of users of SNS, ignoring the vantage point of academics that do not use online technologies for professional purposes. This could limit the potential practical value of the findings as stakeholders such as SNS providers and universities are equally interested in knowing the factors that could motivate non-users to adopt such technologies, so that they can adopt appropriate strategies.

Based on the above, the first research objective of the thesis is to examine the use of online technologies for academic engagement, taking into consideration both users and non-users of online technologies. More specifically, the aim is

Aim 1: to study firstly, why academics are willing to use online technologies in order to engage with their peers and what the motivating factors are

and secondly,

Aim 2: whether there are any differences between academics using Social Networking Sites for engagement purposes and other technologies (OT, e.g. webpages, blogs, forums, portals etc.).

By separating SNS from other online technologies and studying them in parallel the research also provides insights as to how social networking applications are perceived compared to other more established technologies.

Online technologies are not used by academics exclusively for academic engagement. There is evidence that academics use them also for engaging with the public as they constitute easy to use and effective tools for two-way dialogue in research (Chikoore, Proberts, Fry, & Creaser, 2016; Wilson, Manners, & Duncan, 2014). Thus, the second research objective that is addressed in the second survey of the thesis is to explore the intentions of academics to use online technologies for public engagement, considering both future and continuance intentions. The aim of this survey is

Aim 3: to examine the factors that motivate academics to use online technologies in order to engage with the public.

Online technologies can be useful not only for academics, but also for practitioners and other members of the public who are interested in research and science and are looking for ways to communicate with the academic community (i.e. universities and academics). However, the factors that motivate the public to engage online with academia are still unknown, as research has focused exclusively on the academic perspective so far. This focus can be potentially justified by the increasing pressure on academics to engage with external stakeholders.

Considering that public engagement is a two-way process, though, examining the perspective of practitioners and the public is essential. It can help obtain a holistic view of the factors that affect the success of universities' and academics' attempts to engage with the public online. Such an understanding is of significant importance as a successful engagement process is a prerequisite for establishing quality relationships, in turn making an impact.

Thus, the third objective of the thesis is to study what motivates practitioners and other members of the public to use online technologies for engaging with the academic community and participating in the public research dialogue. This objective is addressed in the last survey of the thesis, which responds to the call for support of public engagement in the UK academic system (NC CPE, 2015) and can help academics and universities understand the public and its needs better. Its first aim is

Aim 4: to find out which factors affect the public's decision to adopt online technologies for engaging with academia

and secondly,

Aim 5: to consider whether there are differences in the public's intentions to engage with academia online related to the primary goal of this engagement (i.e. learning or information acquisition).

The overall goal of this thesis is to understand how online public engagement works by examining the main interactions that take place on the Internet as part of the public engagement process. More specifically, the thesis tries to understand a) what makes academics use online technologies in order to create internal impact (online engagement within academia) and what makes them use the same technologies for public engagement, and b) what makes the public use online technologies for interacting with academics and universities. Although online engagement that takes place within academia is not by definition a formal part of public engagement practice, as it was discussed above, it can affect the public engagement process indirectly (Figure 1). Thus, the examination of the motives behind online academic engagement can give us additional valuable information about these secondary interactions. More importantly, it can provide a basis for comparison (i.e. between academic and public engagement) that will allow the deduction of more thorough conclusions about how academics see online technologies in general and whether their motives for using them differ depending on the task (i.e. engagement within academia vs public engagement).

Online public engagement can be seen as the next step in the public engagement process. This is due to the fact that although many of the amphidromous interactions presented in Figure 1 take place in traditional settings, the Internet and its tools have provided opportunities to academia to engage with the public in a more effective way as they are open to everyone and allow quick and straightforward communication among the users (Hoffman, 2016; Richardson, 2013; Thornton, 2012). Thus, research about online public engagement can inform and facilitate research and practice about public engagement in general.

At the same time, the thesis provides valuable insights about IT adoption. As it is discussed in the second part of the literature review section, many theoretical models have been proposed over the years in order to explain the adoption of new technologies. However, a look at the findings of the relevant studies shows that research is inconclusive regarding which model is more successful in explaining the phenomenon and the influential factors change according to the context of the study. The thesis proposes a model for online public engagement. In doing

so it makes a contribution to the literature that has so far only seen models focusing on either work-related or consumer settings. It also provides useful information about the online behaviour of Internet users, such as whether they use online technologies for learning, information seeking or networking tasks in the context of engaging with academics. Although there are studies that aim to understand Internet use, most of them date at least ten years ago and therefore, new studies that take into consideration recent advances, like social media or Massive Online Open Courses, are also needed.

1.3 Structure of the Thesis

The thesis is comprised of seven chapters. The current chapter, Chapter 1, provides an introduction to the background of the study and outlines the research aims and objectives. Chapter 2 includes a literature review of the studies about public engagement and identifies potential research gaps. Then, it examines the literature about online engagement (both academic and public) and tries to shed light on how individuals use online technologies for communicating ideas, getting informed about key practices in their profession and collaborating. Finally, it provides an overview of the literature in the Information Technology (IT) adoption research area, taking into consideration the strengths and weaknesses of the most well-known theories, while it also discusses the most common factors of IT adoption. Chapter 3 presents the research models and hypotheses used to study the different perspectives addressed in the thesis. Chapter 4 explains the research philosophy that the thesis follows and then it provides details about the thesis's methodology. In Chapter 5 the findings of the data analysis are presented, indicating which of the formed hypotheses were supported and which were rejected. Chapter 6 provides a discussion about the findings of each of the three surveys and finally, Chapter 7 presents the conclusions of the thesis, along with its theoretical and practical implications, limitations and suggestions for future research.

2. Literature Review

This chapter presents the literature review of the PhD thesis. The first section aims to review the literature in the area of public engagement, clarify the concept, and highlight potential research gaps. Section 2.2 provides insight about how online technologies can be used for engaging with others and examines separately online academic engagement (i.e. engagement within academia), online public engagement from the perspective of academics, and online public engagement from the perspective of the public. Finally, Section 2.3 examines the literature about IT adoption, compares the existing theories in the field and discusses the most common factors of IT adoption.

2.1 Public Engagement Literature and Research Gaps

The current literature review follows the structure of a traditional review, aiming to identify gaps and promote future research. In this section the author outlines how the selected papers were identified and analysed (Jones & Gatrell, 2014). According to Macpherson and Jones (2010), a literature review, whether traditional or systematic, should include a) a choice of a field or sub-field that is mature enough to ensure that a literature review can be conducted, b) a clear definition of the field to justify the inclusion or exclusion of publications, c) a synthesis and evaluation of the knowledge accumulated in the field, d) consideration of the development of the field and a reference to its sub-categories, concepts or themes, e) analysis of the literature regarding contrasting methodologies, strengths and weaknesses of approaches followed, agreements and disagreements in the field and a discussion about the current state of the literature, f) justified and authoritative conclusions that highlight the research gaps and potential research questions in the area and, g) a clear statement about the theoretical, practical and/or research contribution of the review.

The current review focuses on the field of public engagement and includes all the relevant terms that can describe the openness of research to the general public. In order to identify relative papers, the author used Scopus and Web of Science. A combination of keywords was used for the search queries, such as: “public engagement”, “academia”, “engaged scholarship”, “scholars”, “research impact”, “academics”, “civic engagement”, “community engagement”, “public understanding of science” etc. Only relevant journal articles and book chapters were selected for the analysis (n=51). After reading the selected papers, the author identified recurrent themes, such as the vagueness of the definition, academics’ perceptions of public engagement and the evolution of the concept over the years, and they organised the review in the light of these themes.

As can be seen in Table 2, the majority of publications comes from the years 2011- 2014, which may be due to the intensification of the dialogue in academia over recent years about the need for public engagement. Especially in the UK, 2014 was the year when the Research Excellence Framework (REF) exercise took place and the need for creating impact through research was highlighted. It is also interesting that many different terms have been used to describe the development of relations between academics and universities' external stakeholders, although 'public engagement' is the term that clearly prevails among publications (Table 1). The majority of publications focuses on the academics' perceptions and attitudes towards public engagement, while only few publications examine the perspectives of the public and the university as an organisation (Table 2). There are also many papers that present case studies of research projects related to public engagement or discuss the concept of public engagement in general without focusing on a specific actor. Finally, there is a good distribution of methodologies used in the publications, with quantitative and qualitative methods being the most common approaches. The relatively high number of papers that are of a reflective nature (opinion articles) is another indication of the intensification of the public engagement debate in academia. There are also many conceptual papers, probably due to the ambiguity of the definition of public engagement and the various terms associated with it.

Table 1. Terms used in the literature to describe public engagement.

Term(s) used	Studies	References
Public Understanding of Science	4	Haywood & Besley (2014); McNeil (2013); Sjostrom, Sowka, Gollwitzer, Klimmt, & Rothmund, (2013); Wibeck (2014)
Science Communication/ Research Dissemination	9	Barrett, Notaras, & Smith (2014); Besley, Oh, & Nisbet (2013); Besley & Tanner (2011); Dudo (2013); Forkosh-Baruch & Hershkovitz (2012); Kurath & Gisler (2009); Palmer & Schibeci (2014); Sjostrom, Sowka, Gollwitzer, Klimmt, & Rothmund, (2013); Wade & Sharp (2013)
Public Engagement/ Community Engagement	30	Baert & Booth (2012); Besley, Oh, & Nisbet (2013); Brass & Rowe (2009); Chilvers (2013); Cormick and Hunter (2014); Ćulum, Turk, & Ledić (2015); Davies (2013a); Davies (2013b); Delgado, Lein Kjølborg, & Wickson (2011); Eames & Egmore (2011); Hart and Northmore (2011); Haywood & Besley (2014); Hoffman (2016); Neresini & Bucchi (2011); Palmer & Schibeci (2014); Petersen & Bowman (2012); Petersen, Anderson, Allan, & Wilkinson (2009); Poliakoff & Webb (2007); Richardson (2013); Rowe & Frewer (2005); Scanlon (2014); Thornton (2012); van Bekkum & Hilton (2014); Vargiu (2014); Ward, Howdle, & Hamer (2008); Watermeyer (2011); Watermeyer (2012); Welsh & Wynne (2013); Wibeck (2014); Dallyn, Marinetto, & Cederström (2015)
Linkages with external stakeholders	8	Bastow et al. (2014); Brundiers, Wiek, & Kay (2013); Jolibert and Wesselink (2012); Kalar & Antoncic (2015); Olmos-Peñuela, Benneworth, & Castro-Martínez (2015); Palmer (2014); Perkmann et al. (2015); Phillipson, Lowe, Proctor, & Ruto (2012)
Public Intellectuals	3	Baert & Booth (2012); Sucharov & Sasley (2014); Dallyn, Marinetto, & Cederström (2015)
Public dialogue on science	2	Chilvers (2013); Macnaghten & Chilvers (2014)
Upstream Engagement	6	Kurath & Gisler (2009); Macnaghten and Chilvers (2014); Petersen & Bowman (2012); Rogers-Hayden & Pidgeon (2007); Rogers-Hayden & Pidgeon (2008); Watermeyer (2012)
Public Participation/Citizen Science/ Science 2.0	6	Delgado, Lein Kjølborg, & Wickson (2011); Eames & Egmore (2011); Haywood & Besley (2014); Robinson et al. (2011); Rowe & Frewer (2005); van Bekkum & Hilton (2014)

Table 2. Publications about public engagement in the last decade

Perspective	Studies	References	
University	6	Brass & Rowe (2009); Brundiars, Wiek, & Kay (2013); Forkosh-Baruch & Hershkovitz (2012); Hart and Northmore (2011); Neresini & Bucchi (2011); Palmer (2014)	
Academics	20	Baert & Booth (2012); Barrett, Notaras, & Smith (2014); Bastow et al. (2014); Besley, Oh, & Nisbet (2013); Besley & Tanner (2011); Ćulum, Turk, & Ledić (2015); Dallyn, Marinetto, & Cederström, (2015); Davies (2013a); Davies (2013b); Dudo (2013); Hoffman (2016); Kalar & Antoncic (2015); Olmos-Peñuela, Benneworth, & Castro-Martínez (2015); Perkmann et al. (2015); Petersen et al. (2009); Poliakoff & Webb (2007); Scanlon (2014); Sucharov & Sasley (2014); Wade & Sharp (2013); Watermeyer (2011)	
Public/practitioners	6	Cormick and Hunter (2014); Rogers-Hayden & Pidgeon (2007); Rogers-Hayden & Pidgeon (2008); Sjostrom et al. (2013); Ward, Howdle, & Hamer (2008); Wibeck (2014)	
Other (e.g. research project, funding bodies, public engagement as a concept etc.)	19	Chilvers (2013); Delgado, Lein Kjørberg, & Wickson (2011); Eames & Egmos (2011); Haywood & Besley (2014); Jolibert & Wesselink (2012); Kurath & Gisler (2009); Macnaghten and Chilvers (2014); McNeil (2013); Palmer & Schibeci (2014); Petersen & Bowman (2012); Phillipson et al. (2012); Richardson (2013); Robinson et al. (2011); Rowe & Frewer (2005); Thornton (2012); van Bekkum & Hilton (2014); Vargiu (2014); Watermeyer (2012); Welsh & Wynne (2013)	
Year of publication	Studies	Type of study / Methodology	Studies
2005	1	Quantitative (e.g. surveys, analysis of secondary datasets)	12
2007	2		
2008	2	Qualitative (e.g. interviews, context analysis etc.)	11
2009	3		
2011	7		
2012	7	Opinion/position article	9
2013	11	Conceptual paper	9
2014	12	Mixed methods/case study	10
2015	5		
2016	1		

2.1.1 Defining public engagement

Despite its popularity, public engagement is surrounded by definitional ambiguity, since it has multiple meanings and applications in practice (Petersen & Bowman, 2012). For example, Jolibert and Wesselink (2012) have defined stakeholder engagement as the active involvement of various stakeholders (e.g. citizens, businesses, NGOs, policy makers, scientists, the media etc.) in one or more stages of the research process (e.g. research proposal/design, planning, coordination, execution, dissemination, follow-up), by bringing different kinds of input, such as financial or material assets, opinions, knowledge, sharing of facilities or exchange of personnel. According to them, there are two dimensions of communication between stakeholders and researchers, namely ‘directionality’ and ‘formality’. As far as directionality is concerned, the communication can be either one-way (e.g. through publications, databases,

newsletters, videos, brochures, guidelines, websites etc.) or two-way (e.g. workshops, meetings, conferences etc.). Depending on the formality, communication can be either formal, resulting in clearly stated and recorded commitments, or informal, targeting unofficial information exchange (Jolibert & Wesselink, 2012).

A more general interpretation of public engagement, on the other hand, suggests that engagement is not necessarily connected to research projects, but includes “*the full range of ways in which university staff connect and share with lay publics*” (Davies, 2013a). Examples are volunteering activities, participatory social research, public lectures, informal conversations about research, and university open days. Public engagement has also been considered as a compound notion that encompasses public communication, public consultation and public participation. Public communication refers to the information flow from the research group to the public and it is a one-way process. In public consultation, the public responds to the communication initiated by the research group by giving feedback to them. Finally, public participation occurs when there is some degree of dialogue established between researchers and the public, with information being exchanged between them (Rowe & Frewer, 2005). More recently, according to Bastow et al. (2014, p. 37) “*an impact created by an academic or researcher is an auditable or recordable occasion of influence*”. Public engagement is considered by many academics as an aspect of the broader discussion about impact, which stresses the need for academic knowledge to become “*relevant and accessible to the public*” (Watermeyer, 2011). While impact is seen as “*a statement of the value of academic work*”, public engagement is considered as the method to achieve it. The two notions are co-dependent and mutually informing. Initiatives like the Research Excellence Framework 2014 and the promotion of the impact agenda in general have justified the need for public engagement and intensified the discussion about it (Watermeyer, 2012).

The vagueness and multiplicity that public engagement has as a term appears to puzzle even academics that practice it. In a study about university engagement in the UK, the interpretation that respondents gave to engagement ranged from forms of public learning (e.g. life-long learning programs), knowledge transmission (e.g. public seminars, masterclasses, workshops etc.), university open days, engagement with the media (i.e. press, television and new media), communication with policy and government agencies and school outreach. The term had different meanings across disciplines too, with respondents from medicine viewing engagement as a core activity in conducting research or as a research methodology (Watermeyer, 2011). In a more recent study, one of the main topics of discussion in the focus groups was the definitional issues of public engagement, since the academics could not decide

about the boundaries of engagement and whether the term is limited to knowledge transfer or includes talking to the public about the work they do as researchers (Davies, 2013b).

Defining public engagement is not the only issue related to the topic. There are also other topics of tension, such as the purpose, the planning and the timing of public engagement, who the people that should be involved are and whether public engagement activities should be context embedded or general (Delgado, Lein Kjølberg, & Wickson, 2011). In addition, published literature has not converged on a set of universally-accepted indicators for public engagement. Hart and Northmore (2011) suggest that the evaluation of public engagement sometimes may have to be context driven due to the difficulty of capturing the outcomes of public engagement at the institutional level. This is in line with the idea of evaluating the impact of single actions, projects or programmes and thinking of the overall institutional public engagement policy as the sum of the above single activities (Vargiu, 2014). Focusing on the individual level (i.e. each academic separately), Bastow et al. (2014, p.53) evaluated the potential influence that research has on various stakeholders, by looking at the external outputs and external visibility of academics. More specifically, they assessed the external visibility of their sample by constructing an index comprised of six elements: total number of Google references, proportion of references in the external domain, number of research reports found, proportion of references in civil society domain, visibility in the gov.uk domain and visibility in the UK and international press (Bastow et al. 2014, p. 60). A similar approach has been followed by another study in the area that showed that not accounting for independent impact-related activities (i.e., “academic engagement and commercialisation outside the formal university channels and often not recorded by universities”) may result in systematic underestimation of the extent of public engagement efforts (Perkmann et al., 2015). Table 3 summarises the ways that public engagement has been conceptualised as a term so far in the literature. Public engagement is either seen as a process that involves many different groups of actors that interact in multiple ways (Ćulum, Turk, & Ledić, 2015; Davies, 2013a; Hoffman, 2016; Jolibert & Wesselink, 2012; Rowe & Frewer, 2005) or as a compound notion that incorporates other related terms such as public communication and research impact (Bastow et al., 2014; Watermeyer, 2011).

The number and the nature of public engagement activities (i.e. whether they are formal, like community based research, or more casual, such as blogging for community outreach) varies significantly. However, a university will rarely base its public engagement strategy solely on informal activities; either there will be a mixture of informal activities (e.g. engagement via social media, informal conversations about science) and formal processes (e.g. consultancy,

participatory social research) (Davies, 2013a; Hoffman, 2016), or all the attempts at engaging with the public will be formal (Bastow et al., 2014; Culum et al., 2015).

For some authors (Hoffman, 2016; Watermeyer, 2011) public engagement is simply the communication of academics with the public, implying that the public has a rather passive role in the process (one way communication). For others (Bastow et al., 2014; Culum et al., 2015; Davies, 2013a; Jolibert & Wesselink, 2012; Rowe & Frewer, 2005) it is an opportunity for academics to participate actively in their community (e.g. volunteering activities, community based research). The public may also hold an active role in the process by participating in research (e.g. participatory social research) or by participating in the dialogue about it (two-way communication).

Each of these activities is associated with a different movement in the literature and practice of public engagement (e.g. public understanding of science, science communication, public participation etc.). For example, one-way communication activities, such as making knowledge available to the public, giving interviews and public presentations (Hoffman, 2016; Watermeyer, 2011), are related to the public understanding of science and science communication movements, while activities that involve the active participation of the public, like community-based research and public dialogue about science (Culum et al., 2015; Rowe & Frewer, 2005), are associated with public engagement and public participation.

Table 3. Defining the concept of public engagement

Reference	Definition	Indicative activities	Directionality	Formality	Highlights
Jolibert and Wesselink (2012)	Active involvement of various stakeholders in one or more stages of the research process	Communication/collaboration with stakeholders (e.g. citizens, businesses, NGOs, policy makers, scientists, the media etc.)	Two	Mixed	Various stakeholders
Davies (2013a)	The full range of ways in which university staff connect and share with lay publics	Volunteering activities, participatory social research, public lecturers, informal conversations about research, and university open days	Two	Mixed	Multiple ways of engaging with the public
Rowe and Frewer (2005)	A compound notion that encompasses public communication, public consultation and public participation	Communication of science, consultation, dialogue about research	Two	Formal	Multiple ways of engaging with the public
Watermeyer (2011)	Aspect of the broader discussion about impact, which stresses the need for academic knowledge to become “relevant and accessible to the public”	Communication with the public	One	Mixed	Relationship with research impact
Bastow et al. (2014)	A multi-stage process that results in the creation of linkages between academics and stakeholders	Creating various forms of linkages with businesses, government and mass media	Two	Formal	Relationship with research impact
Hoffman (2016)	A complex phenomenon that eludes clear definition	Congressional testimony, assistance to government agencies, board service, public presentations, media interviews, K-12 education, blogging, editorial writing, social media, political activism	One	Mixed	Multiple ways of engaging with the public
Ćulum, Turk, & Ledić (2015)	Cooperation among academics and many stakeholders, such as public institutions, kindergartens, primary and secondary schools, museums, civil society organisations and civic initiatives, charities, local authorities and the media	Academic service-learning and student placements, community-based research, outreach activities, volunteering and pro bono work, service organised by an institution (university, faculty, department), political engagement	Two	Formal	Various stakeholders

2.1.2 Evolution of public engagement

Although attempts to move away from the view of the ‘ivory tower’ started a long time ago on the part of universities and academics, the trend regarding the degree of public involvement has changed over time. Three main trends or streams can be found in the literature: the dissemination stream, which includes ‘Science Communication’ and ‘Public Understanding of Science’ and discusses the one way communication that academics initiate with a view to informing the public about research developments; the deliberation stream, which includes ‘Public Engagement’, ‘Public Dialogue about science’ and ‘Upstream Engagement’ and focuses on the two-way communication between academics and the public; and the participation stream, which includes ‘Citizen Science’ and ‘Science 2.0’ and discusses the active participation of citizens in research projects (Figure 2). It should be noted that the above terms are not necessarily independent from each other; on the contrary, usually there is overlap among them – this is especially true for terms that belong to the same stream – and many times they are used interchangeably by scholars to describe the same idea.

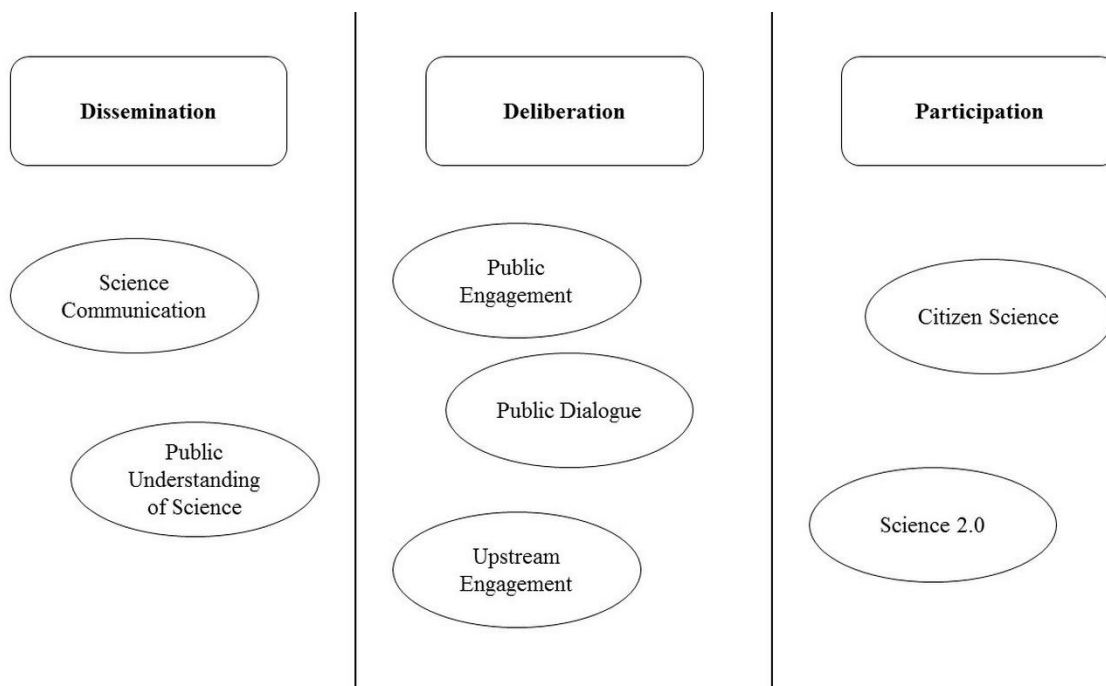


Figure 2. The three main streams of opening science to the public

Dissemination and Deliberation

Public understanding of science started in the late 1980s as a new research area and focus for policy in the UK and USA (McNeil, 2013). The movement aimed to foster public trust in

science and make the public aware of scientific issues. Scientists were considered experts with superior knowledge and their main responsibility was to present their research outcomes in a way that they would be easily understood by lay people (Bastow et al., 2014, p. 212). The idea was quite similar to the ‘science communication’ concept (also called ‘deficit model’), which presents the public as having difficulties in understanding scientists’ decisions (Palmer & Schibeci, 2014). That perception of the public had as a result that it treated citizens like passive ‘non-entities’ in research policies and dialogue and that all they had to do was to comply with the decisions taken by experts. The public was sometimes even seen as threatening or hostile towards innovation due to its perceived ignorance of scientific issues (Welsh & Wynne, 2013). The criticism that the above views received led to the emergence of a more democratic, two-way science communication among scientists, policy makers and publics (Chilvers, 2013). From 2000, ‘public engagement’ and ‘public dialogue’ have been the prevalent approaches, with the public being viewed as highly politicised (Welsh & Wynne, 2013) and having its own models for handling information, which scientists have to take into consideration and adapt accordingly (Bastow et al., 2014, p.212). Despite this development, the transition from public understanding of science to public engagement has not been smooth, as the former is still a major part of the overall attempt to reach the public and public engagement, as it works in practice and is just the crossroads of various trajectories (Davies, 2013b; Kurath & Gisler, 2009; McNeil, 2013). Palmer and Schibeci (2014) found that although the ‘public dialogue’ and ‘public engagement’ approaches are supported by research funding bodies, the model of ‘science communication’ continues to dominate.

In STEM disciplines (i.e. the physical sciences, medicine, technology, engineering and mathematics) another type of public engagement can be encountered, that of ‘upstream engagement’. According to a working definition upstream engagement is “*Dialogue and deliberation, that includes the publics and related interest groups, relevant science communities and policy makers, about potentially disruptive/controversial technologies at an early stage of the research and development process and in advance of significant applications, or widespread public knowledge, in a way that has the potential to influence the technology trajectories*” (Rogers-Hayden & Pidgeon, 2008). Upstream is often considered to be the opposite of ‘downstream dialogue’, which takes place too late in the research process to have any significant effect. It suggests that not only do citizens learn from science and academics, but also academics learn from citizens and this exchange of knowledge is equally important for both parties (Rogers-Hayden & Pidgeon, 2007). Some of the main reasons for academics to follow an upstream engagement approach are to drive and assist the exchange,

translation and commercialisation of expert knowledge and develop their own impact agenda (Watermeyer, 2012).

Participation

A more recent approach to public outreach is public participation in research, which has the potential to genuinely influence public perceptions and engagement in the research process (Haywood & Besley, 2014). The public can contribute at any stage of the research process, namely helping in research design or data collection, becoming partners in the research by providing facilities or materials, and giving feedback on the research findings or assisting with the wider dissemination of them (Jolibert & Wesselink, 2012; Phillipson, Lowe, Proctor, & Ruto, 2012). Citizen science is a common example of this participatory model. It refers to citizens' active contribution to science as co-producers of knowledge, by providing experimental data and facilities, recording observations, forming new questions and supporting the development of a new scientific culture (Bastow et al., 2014; Eames & Egmore, 2011; Sanz, Holocher-Ertl, Kieslinger, Sanz Garcia, & Silva, 2014). Science 2.0 also stresses the role of citizens and civil society as funders and 'agenda setters' in research. In addition, it encompasses digital technologies as tools for giving broad access to scientific data and articles (open science), enabling 'digital natives' to contribute as researchers and launching data-intensive science that is supported by large datasets and high performance computing. Among others, Science 2.0 is expected to have such benefits as increased transparency and openness in the international research system, a higher degree of responsiveness to societal needs, enhanced trustworthiness of science from the citizens' perspective and opportunities for SMEs and small organisations to innovate by utilising research outcomes (European Commission, 2014). For example, a community-based research project about sustainability has employed a web-based application in order to facilitate interactive knowledge sharing with the local community, while a similar project has used online kiosks to allow a large and diverse number of citizens to participate in dialogue about land-use, transportation planning and issues related to emissions and government spending (Robinson, Burch, Talwar, O'Shea, & Walsh, 2011).

The use of online technologies in the public engagement process is quite common and it can be described by the term 'online engagement'. Online or digital engagement has been defined as "*an organisation creating active and interested relationships with publics using Internet channels, such as product endorsements by prominent bloggers*" (Bowen, 2013). However, online engagement is not a strategy that is followed exclusively by commercial organisations;

universities have used online tools, such as instant messaging and platforms that supply digital content (e.g. YouTube, iTunes etc.), in order to engage with students, faculty, alumni and the public (Junco & Cole-Avent, 2008; Salas & Alexander, 2008). The rapid growth of social media, which makes possible short and prompt communication, has made online engagement a cost effective solution for sustaining linkages and achieving communication that resembles the usual contact in person (Bastow et al., 2014, p.111). Social media, such as Facebook and Twitter, have been used by public relation practitioners and student affairs staff for maximising communication and strengthening media relations (Eyrich, Padman, & Sweetser, 2008; Heiberger & Harper, 2008). Although there is a hint that academics may use tools like Twitter in order to enhance their reputation and respond to the call for wider public engagement (Knight & Kaye, 2016), it appears that in practice this use results mainly in creating intra-specialist networks rather than opening the road for public dialogue about research (Richardson, 2013). Non-profit organisations and academic institutions do not fully utilise the potential of social media either, as they have not exploited the options that such sites offer for cultivating relationships with their stakeholders (Forkosh-Baruch & Hershkovitz, 2012; Waters, Burnett, Lamm, & Lucas, 2009). Academic institutions especially are given the opportunity to create ‘online communities of practice’ that will provide informal learning environments for the general public, complement the official website of the institution and facilitate collaboration (Forkosh-Baruch & Hershkovitz, 2012). Of course, if the above are to be actualised and work effectively, sustained commitment and some kind of strategy has to be demonstrated by academic institutions (Palmer, 2014). The 3-M framework, which classifies the online communication of an organisation with the public into three categories, namely ‘Megaphone’ (i.e. organisation to public communication), ‘Magnet’ (i.e. public to organisation communication) and ‘Monitor’ (i.e. public to public interaction), can be used for planning and managing the online interactions of an organisation (Gallaughier & Ransbotham, 2010). Twitter, for instance, can be used by universities as ‘Megaphone’ for information dissemination to a wider audience, but if the institution aims at a more interactive presence on social media, directed Tweets and Retweets have to be used as a ‘Magnet’ to attract the public’s interest and engage with them (Palmer, 2014). However, having a plan for utilising social media is not enough for incorporating them effectively in a university’s engagement strategy, as the existence of public relations staff in organisation and the views that these people hold for the credibility of social media also affect the successful adoption of these tools (Curtis et al., 2010).

2.1.3 Different vantage points of public engagement

One of the reasons why public engagement is filled with such ambiguity is that it involves many different actors that may understand the term in their own way. Among these, the most important are universities (which launch public engagement initiatives), academics (who implement their institutions' strategy at the operational level), and the public/practitioners (who are the targets of such efforts). Studies in public engagement usually address only one perspective; however, if public engagement attempts are to succeed, the three different perspectives have to come to an alignment at least at some degree.

University

There are only a few studies that have examined public engagement from the organisational perspective (Brass & Rowe, 2009; Brundiers, Wiek, & Kay, 2013; Hart & Northmore, 2011; Neresini & Bucchi, 2011). This is probably due to the assumption that academics represent their institutions and therefore their attitudes and goals towards public engagement reflect universities' attitudes and goals. However, this assumption is problematic for three key reasons. Firstly, only senior academics are typically actively involved in developing the vision and strategy of the university in which they are based and in countries where universities are managed by a board of executives they are not the only actors involved in decision making (Kehm, 2015). Secondly, academics may end up working independently (Aarrevaara, Dobson, & Wikström, 2015), prioritising their own agendas, with their decisions and actions not necessarily driven by their institution's goals and mission. Thirdly, a lack of coordination can result in less optimal overall results compared to those that have been achieved by the sum of the joint efforts (Clarke, Drennan, Hyde, & Politis, 2015). Thus, examining the stance and actions related to the public engagement of a university as an organisation and taking into consideration the attitude and opinion of people that are responsible for organising, promoting and implementing the public engagement process (e.g. managers, PR, public engagement and knowledge transfer officers etc.) is also necessary.

Research so far that has focused on the university's perspective has shown that universities dedicate resources for public engagement activities. However, due to the lack of a public engagement culture, these activities are often not considered as essential to academic practice. This is also apparent from institutions' websites, which demonstrate a scientific-oriented identity rather than a public-oriented one (Neresini & Bucchi, 2011). Social media are not utilised effectively either, as they are usually used by universities as alternative official websites rather than interactive platforms (Forkosh-Baruch & Hershkovitz, 2012; Palmer, 2014). Performance indicators and standards (Hart & Northmore, 2011; Neresini & Bucchi,

2011) and specialised managers assigned to public engagement duties (Brundiers et al., 2013) have been suggested as a means of incorporating public engagement activities into universities' strategies. However, more research is needed before drawing any conclusions about how universities' public engagement efforts can become effective.

Academics

From the academics' perspective now, public engagement can be seen as rewarding, but challenging as well. In a relevant study, academics have listed various expected beneficial outcomes of public engagement, such as bringing change to society, empowering communities, correcting misunderstandings, exciting the public about science and enhancing research through participatory models of engagement. Many academics felt that public engagement can be beneficial for them too, as they get enjoyment and satisfaction from engaging with the public and raising awareness of their research (Davies, 2013a). It is interesting, though, that in a previous study, with data collection taking place in 2009, academics seemed to be uncertain about the value of public engagement and many of them wondered whether public engagement initiatives were driven by higher education bureaucracy instead of public consultation and public need (Watermeyer, 2011). This difference in academics' attitudes towards public engagement presented in the two studies could either mean that the academic community is divided over the need for public engagement or there has been a shift in academics' attitudes in recent years.

In either case, academics report a series of challenges and barriers that have to be overcome when it comes to engaging with the public. These include lack of information about the identity of the public(s), the threat of over-exposure that may result in personal attack or defamation (Watermeyer, 2011), lack of communication skills (Davies, 2013b) and the structure of contemporary research, which treats academic activities other than research as distracting and time consuming (Brass & Rowe, 2009; Davies, 2013b; Watermeyer, 2011). Moreover, 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, Marinetto, & Cederström, 2015).

The need for support by research councils through funding, along with the incorporation of public engagement in research and learning (Watermeyer, 2011) and provision of voluntary training on research communication (Ward, Howdle, & Hamer, 2008; Watermeyer, 2011) is also stressed by academics. Academics that conduct research in the area of science communication agree with the importance of training, suggesting that media training and training on communicating directly with the public would prove beneficial for all academics regardless of the discipline (Besley & Tanner, 2011).

A couple of studies have tried to shed light on the factors that affect academics' views about the media and their intentions to engage with them and the public in general. Previous experience with the media (either as readers or sources of news stories), availability for interviews, work experience and professional status and the degree of engagement with journalists, editors and media organisations are among them. It is interesting that although generally they are willing to engage with the media as news sources, they seem to be highly dissatisfied with newspapers' coverage of scientific issues, mainly due to the fact that papers try to create an interesting story by using certain language and images, showing negligence about key issues, and muddling facts with fiction (Petersen, Anderson, Allan, & Wilkinson, 2009). Demographic factors (e.g. age, gender etc.) do not seem to play an important role in predicting public engagement but scientists' attitude towards public engagement does. Also, the academic culture and the way the higher education system works in each country may affect the attitude of academics towards public engagement. It has been found that while in some countries (e.g. Ireland) public engagement activities are formally recognised by HE institutions, in others these activities are completely voluntary and performed at the request of university superiors (e.g. Germany) or even worse, they are seen as a potential threat to an academic career (e.g. Croatia) (Ćulum et al., 2015). Differences in academics' attitudes may also be observed based on the academic discipline or the orientation of the department. For instance, academics from natural sciences tend to perceive their departments as more 'entrepreneurial' compared to academics from social sciences. The orientation of a university department (whether it promotes a high or low entrepreneurial culture) may affect academics' intention to engage in entrepreneurial activities and departments that are perceived as highly entrepreneurially oriented tend to have fewer academics that see engagement in technology and knowledge transfer as harmful to academic practice (Kalar & Antoncic, 2015).

In addition, it has been found that academics that think managerial support is needed are more willing to engage with the public, but also less likely actually to do it, a finding that indicates that more research is needed about the effect that individual and organisational factors have on academics' attitude (Besley, Oh, & Nisbet, 2013). In a similar study, Poliakoff and Webb (2007), who used an extended version of the Theory of Planned Behaviour, found that the factors that predict scientists' intentions to engage with the public are attitude, perceived behavioural control and descriptive norms (i.e. "*whether scientists believe their colleagues participate*"). However, the most important factor turned out to be "*past behaviour*", with future intentions for public engagement depending on whether the scientist had engaged with the public in the past or not. This is also in line with the findings of another recent study that shows that academic identity and past experience are the main factors that determine which researchers are more willing to participate in public engagement activities (Olmos-Peñuela, Benneworth, & Castro-Martínez, 2015).

Part of the findings of the Poliakoff and Webb (2007) study have been confirmed by the study of Dudo (2013), who found that attitude and perceived behavioural control predicted public engagement intentions. The author also found that scientists' public engagement behaviour is affected by their media use and different media channels affect behaviour in different ways. The author suggests that future research should focus on the effect that scientists' online activities have on their public engagement behaviour, as the Internet and new media technologies can facilitate direct communication with the public, but over-exposure could have negative effects on public perceptions of scientists as well. Academics seem to hold a positive view towards online technologies, as they consider them as tools for extending their teaching and research activities, with some of them using online technologies for open collaboration with academics from other disciplines, and others using services like blogs not only for public engagement, but also for getting feedback from peers during the preparation of a publication (Scanlon, 2014).

Public/Practitioners

Equally important to the perspectives of universities and academics on public engagement are the perspectives of the public. However, the disparity of the public makes it hard to draw general conclusions about the topic. As Cormick and Hunter (2014) point out, different public groups can have different views about science and, therefore, successful engagement approaches are the ones that cover a broad spectrum of the public by including representatives from all the different groups. Differences in the views of the public can also be found depending on the discipline under examination. For example, the general public seems to have

a positive attitude towards social sciences and recognises the contribution of the discipline in public debate. The public sees social sciences as a source of expertise and references to research in the area of social sciences are considered to make news media look more credible and trustworthy (Sjostrom, Sowka, Gollwitzer, Klimmt, & Rothmund, 2013). Science and technology disciplines, on the other hand, are treated with more scepticism from the public. According to Macnaghten and Chilvers (2014), the purposes of science, trust, inclusion, speed and direction of innovation, and equity are the “*five spheres of public concern*” related to science and technology. In this case, the importance of public dialogue is emphasised as the public asks for more opportunities to be included in the governance process of science. Finally, although medicine triggers more interest from the public, with some of them participating in public engagement events for general learning purposes and others for acquiring information relevant to their own health, it is considered by the public to be disconnected from academic research (Ward et al., 2008).

2.1.4 Discussion

One of the main findings of this review is the different attitudes academics show towards public engagement. Differences have been observed between countries, disciplines and academic departments, which is indicative of the challenges faced when attempting to come up with an accepted definition or evaluation system for public engagement. Perhaps the most effective way to promote public engagement in academia is to make the notion relevant to each country’s HE system, to each discipline. In turn this would suggest that academics’ public engagement efforts could be judged based on benchmarks established especially for the country in which they are based or for the discipline they conduct research in. Such an approach may encourage academics to see public engagement as relevant to their work rather than an abstract, irrelevant notion.

Another interesting finding is that although there are many studies about the academic perspective of public engagement, there is a clear absence of papers that focus on the public’s perspective on the topic. Considering that public engagement is a two-way communication process and clearly cannot be successful unless both parties are equally interested in it, more research is necessary if our understanding of public engagement is to be more holistic. As discussed in the section about the barriers to and facilitators of public engagement, adopting a public focused approach and trying to respond to the needs of the audience can promote public engagement. This is important considering the plurality that characterises the public. According to Petersen and Bowman (2012), using the term ‘the public’ is a wrong approach, since it fails to recognise the diverse positions and opinions of the many publics, as far as

research and science are concerned. The public also differs in terms of scientific literacy, their ability to understand the complexities of science, social norms, ideologies, and values. These differences may affect public engagement with science and even pose barriers to its successful implementation (van Bekkum & Hilton, 2014; Wibeck, 2014).

Adopting a public focused approach, on the other hand, facilitates public engagement. This could provide positive feedback to people that engage with science, simplifying complex research reports into messages that consist of images and ICT-based visualisations and taking into consideration previous experiences in engaging with the public in order to discover different audiences' interpretations and understandings of scientific issues (Wibeck, 2014). A truly democratic relationship between science and society requires that citizens be able to challenge the views of scientists, policy makers and other influential stakeholders about science, its publics and its priorities (Petersen & Bowman, 2012). Another study suggests that the public perspective should be incorporated in the auditing and benchmarking frameworks about public engagement (Hart & Northmore, 2011). As for participatory research, it is suggested that the recruitment of participants should be purposeful and mutually beneficial, which includes the clarification of the roles that stakeholders can play, linking stakeholders' contributions with specific research goals or deliverables (Jolibert & Wesselink, 2012).

Another important finding of the review is that there are only few papers that examine public engagement from the vantage point of the universities as organisations. Considering that a public engagement strategy will affect the brand of the university and bring about changes inside the organisation, looking at university brand management literature may be useful in order to discover potential areas for future research in the public engagement field. What is more, branding as a strategy is related to the improvement of a university's image across different stakeholders (Dholakia & Acciardo, 2014), and it therefore facilitates public engagement. Universities use branding techniques in order to communicate their identity, position or competitive advantage, or to increase awareness and enhance their reputation (Chapleo, 2011). Such techniques could be potentially useful for raising the awareness of the public about the research conducted by a university and create a 'public engagement' brand for it. The brand is mainly constructed by the university and therefore can be more easily controlled than 'reputation', which is based on the university's history and the public's evaluation of experience and interactions with it (Chapleo, 2011; Yang, Alessandri, & Kinsey, 2008). Exploring the factors that influence the creation of a university brand can be beneficial for promoting the public role of the university.

A number of key points have been recognised in the literature as essential for any university's marketing or branding attempt to be successful. Leadership commitment is one of the most cited (Chapleo, 2010, 2013; De Meyer, 2012; Edmiston-Strasser, 2009; Masiki, 2011), since without support from the top any attempt is deemed to fail. It is equally important that faculty supports a university's strategic vision and shares the responsibilities of fulfilling the university's missions related to its internal and external stakeholders (Moorer, 2007). This can be achieved through effective formal and informal communication mechanisms and internal branding (Chapleo, 2013; Curtis et al., 2009; Edmiston-Strasser, 2009; Haytko, Burris, & Smith, 2008; Pinar, Trapp, Girard, & Boyt, 2011; Whisman, 2009). Faculty can play an additional important role: becoming strong brands themselves by fostering trusting and satisfying brand relationships with external organisations. Professor brands contribute to the overall brand image of the university and thus they are considered valuable organisational assets (Jillapalli & Jillapalli, 2014). Another valuable asset is the institution's website, which can be used for communicating a university's values and eventually for building an online brand (Chapleo, Carrillo Durán, & Castillo Díaz, 2011). Additionally, a university can utilise other online channels such as Facebook and Twitter, web search optimisation and e-marketing in general (Chapleo, 2013). Finally, organisational culture (Chapleo, 2010, 2013), effective planning (De Meyer, 2012; Haytko et al., 2008) and the institution's media policies (Brass & Rowe, 2009) influence the outcomes of a university's marketing efforts.

The close relationship between university branding and engagement with the public suggests that the good practices and key recommendations of the former could be used as a guide for the successful implementation of the latter. Future research could try to find out whether factors such as leadership commitment, internal communication mechanisms, and the utilisation of online channels, which were identified above, or additional factors, can affect universities' strategic goals regarding public engagement and eventually the success of universities' attempts at public engagement.

Finally, many studies focus on streams in public engagement like the public understanding of science or upstream engagement, which were popular in previous decades, but only a few discuss the latest trends in the area such as Science 2.0 and the use of online technologies, which is likely to become more significant going forward. To this end, more research is needed to clarify the challenges and concerns related to the use of online technologies for public engagement that have to be addressed either at an individual or institutional level.

2.2 Online Public Engagement

2.2.1 Engagement and collaboration within academia and the role of online technologies

While engagement among academics is usually informal and ad hoc, it can lead to a more formal type of interaction, namely a research collaboration. A research collaboration can take various forms depending on the institution, field, sector and country, and is typically measured through multi-author or multi-address papers (Katz & Martin, 1997). Its importance stems from the benefits that it provides to academics, as it is associated with high academic performance and productivity (Abbasi, Wigand, & Hossain, 2014; Ductor, 2014; Rostan & Ceravolo, 2015; Zutshi, McDonald, & Kalejs, 2012). A collaboration is usually initiated by the material, knowledge-based or social needs of academics, such as the need for infrastructure, research equipment and personnel (Melin, 2000; Rostan & Ceravolo, 2015). However, early career researchers may also be motivated to initiate interactions with their colleagues by needs for impression management and symbolic inclusion in networks (Pifer & Baker, 2013). PhD students, on the other hand, initiate professional relationships and interactions as they seek support, advice and guidance from more experienced students and academics (Baker & Pifer, 2011).

Although it has been suggested that online technologies facilitate the development of international collaborations, research results are inconclusive about the role of the Internet in the formation of academic networks (Wagner & Leydesdorff, 2005). In the past few years there has been a growing interest in the topic, resulting in a number of studies that mainly examine the use of social media in academia. This may be due to the characteristics that make them popular among academics. For example, Twitter, which enables quick and direct responses even among users that are not connected to each other, has been found to be an important source of support and professional socialisation for early career academics that use channels like #ECRchat to discuss topics relevant to the academic career and create a professional online image (Ferguson & Wheat, 2015). Twitter is also used by academics who want to share resources that contribute to academic discussions in their research field. However, contrary to what one may have expected, it is not used to a great extent for self-promotion (Stewart, 2015). Another study reported use of Twitter is being utilised as a conference backchannel that enables information sharing, building connections, and note-taking (Li & Greenhow, 2015). Academia.edu has been studied as a case study as well, since it is one of the few purely academic SNS. Academics have reported that the main reasons for using the site are getting in touch with other researchers, disseminating their research results

and getting informed about other researchers' activities. However, their actual use shows that they do not utilise the full capacity of the site to meet their goals, since most of them do not upload any documents and follow fewer than ten academics (Nández & Borrego, 2013). This may explain the absence of a strong relationship between altmetric (i.e. number of views, downloads and followers/followings on SNS) and bibliometric indicators at author level. According to a recent study, the correlations between them are poor and therefore altmetrics can be used only for evaluating the networking and social skills of researchers rather than being used as a proxy for research evaluation at author level (Ortega, 2015).

Despite the aforementioned benefits that SNS can offer to academic practice, academics face a number of barriers when they attempt to incorporate them in their daily work routine. Risks such as misinterpretation, misrepresentation, confrontation and intellectual property violation on SNS are evident according to the academics that use them (Ferguson & Wheat, 2015). In online groups that consist of many prominent researchers, the likelihood of an academic becoming active decreases, which may be an indication that academics think that the risk of losing reputation in such online groups is high (Matzat, 2009). Academics also point out the lack of institutional support as far as the use of SNS is concerned (Nández & Borrego, 2013), along with the general feeling that online engagement is illegitimate (Stewart, 2015) or superficial (Ferguson & Wheat, 2015). These different mind-sets regarding the academic use of SNS result in a type of "digital divide" that 'creates a sense of isolation from their peers in the minds of "digital scholars" that have not adopted technology for scholarly work (Costa, 2015). Finally, lack of time and online skills can also be obstacles for academics with regards to using SNS (Donelan, 2015).

2.2.2 Online public engagement: the academic perspective

Apart from social media, other online tools like blogs, Wikis and Massive Open Online Courses (MOOCs) are used for public engagement either by universities or individual academics. Blogs have the potential to change academics into 'public intellectuals' (Baert & Booth, 2012; Nackerud & Scaletta, 2008) and enable 'a more dialogical style of intervention' as academics can now reach publics without the usual mediators that can be found in newspapers, radio and television. That practically means that in contrast to the conventional media with which only the few privileged academics were connected, blogs dilute institutionalised hierarchy and give the opportunity to any academic to engage with the public (Baert & Booth, 2012; Bastow et al., 2014, p. 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 & Booth, 2012). Wikis may present a similar

opportunity as academics can deduce a lot 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, p. 103). 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, p. 228). Finally, even less complicated online tools, such as websites, can become strong competitive weapons for building online brand and promoting a desirable image to universities' stakeholders (Hayes, Ruschman, & Walker, 2009; Opoku, Hultman, & Saheli-Sangari, 2008).

Regardless of the type of online tool used in public engagement process, there are some challenges and concerns that have to be addressed either at an individual or institutional level. 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 & Sasley, 2014; Wade & Sharp, 2013). The time commitment online engagement requires is another important challenge for academics (Wade & Sharp, 2013), especially when online engagement activities are not recognised as factors that contribute to career promotion (Barrett, Notaras, & Smith, 2014). 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 & Sasley, 2014).

At an institutional level, views of online tools as ephemeral have to be mitigated (Richardson, 2013) and any online engagement activities have to align with organisation's brand image and social principles (Fotopoulou & Couldry, 2015; Hayes et al., 2009). In addition, universities need to create online engagement policies that will guarantee privacy and standards of conduct (Hayes et al., 2009; Timm & Duven, 2008). Such policies help institutions to fully utilise their employees' voice online (in the case of higher education these are mainly academics) and at the same time are necessary to make sure that organisational principles are followed and organisation's reputation is not at stake due to its employees' poor communicating decisions (Miles & Mangold, 2014).

Last but not least, universities that follow online engagement strategies 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 & 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 different 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 & Eynon, 2013).

2.2.3 Using online technologies for learning and information acquisition: the public's perspective of using online technologies

Online technologies have long been used by Communities of Practice (CoP) as platforms for communication and collaboration. According to Johnson (2001) Communities of Practice are “social arrangements in which individuals learn by participating in activities. They include the members, which consist of both experts and novices. In addition, communities of practice also include the artefacts, which are the products, technology, media, and processes that are created by its members. Constructivist techniques (e.g., collaboration, facilitation, and ill-structured problems) enable learning to take place in communities of practice”. Online CoP are based on the Internet and allow the communication and collaboration between the CoP members regardless of the geographical location or the time zone (Johnson, 2001). Although traditionally online CoP operate within organisational settings, open online CoP that are not constrained by an organisational context are also quite common (Hara, Shachaf, & Stoerger, 2009).

Online CoP have been considered to facilitate both information acquisition and informal learning depending on the degree of complexity they present. For some authors, Q&A sites are considered as online CoP, where the members' practice is answering questions by other users (Gazan, 2007; Pata, Santos, & Burchert, 2016; Rosenbaum & Shachaf, 2010). In their simplest form, Q&A sites can be used for tasks like seeking information for homework (Gazan, 2007), however, in many occasions advanced forms of participation, accompanied with high volume of members' interaction and collaborative problem solving, are also observed (Rosenbaum & Shachaf, 2010). In the case of professional Q&A sites, informal learning also takes place as the members have the opportunity to (Pata et al., 2016):

- learn from others by being collectively helped to solve problems;
- learn by observing how a problem was solved collectively (or by reading which possible solutions were suggested);
- discover new practices at work and share those with others;
- uptake new practices shared in the site;
- learn how to define a problem properly;
- learn how to raise the right questions.

Other popular Web 2.0 tools used for information acquisition, apart from Q&A sites, are the wikis. Although the content of such websites is provided by other online users, wikis have become more reliable and efficient over the years. In fact, it has been found that the quality of answers on the Wikipedia Reference Desk (a service that Wikipedia offers to its users and is similar to a library reference desk) is similar to the one of a library's reference service, as Wikipedia's users performed better or at the same level with librarians on most quality measures (i.e. accuracy, completeness, verifiability, responsiveness and assurance) (Shachaf, 2009). This may be due to the experience that Wikipedia's contributors accumulate over the time or the fact that answers on Wikipedia are results of collaborative group effort rather than the work of one librarian. Zhao and Bishop (2011) have proposed a conceptual model that explains better the main elements of Wikipedia and the dynamics among them. According to them, Wikipedia consists of:

- Individuals (i.e. people using and editing Wikipedia): individuals can be readers attracted by the content or if they are motivated, can be contributors that generate and edit content. As the community of Wikipedia grows, the users may become more motivated to generate content by affiliation, belonging and recognition of the community.
- Practice (i.e. the activities in which the users engage into and create the content on Wikipedia): generating content on Wikipedia may be the result either of an individual attempt (e.g. composing a single page) or of a coordinating project (e.g. many pages created by the community at large). These examples of 'practice' that promote individuals' interactions are the reason that Wikipedia is considered a Community of Practice by the authors.
- Content (i.e. the collection of articles and documents): it is the core element on Wikipedia as generating content is the purpose of the community. It also attracts newcomers, who become members of the community as they are interested in acquiring information. As mentioned above, the content is the outcome of both individual's and community's practice; although individuals may edit articles on their own, it is the community that controls the quality of the content through policies, coordination and differentiated roles.
- Interactions (i.e. interactions among the members): they facilitate individual's attachment to other members and to the community, creating the social character of the site.

- Community (i.e. the result of the aforementioned elements of Wikipedia): it is based on the social practice and the members' interactions and it has one shared goal that of creating content. As the community grows, a sense of belonging is developed among individuals that build identities and reputations by participating in community practices.
- Technology (i.e. the technology that supports the implementation of Wikipedia): it gives individuals access to the practice, the content and the community. The technology is used for archiving, organising documents, information retrieval and users' communication and interactions' online.

While Q&A and wikis cover various topics of interest and their members have a general interest towards gaining new knowledge, forums, blogs and Social Networking Sites (SNS) are used by practitioners and other individuals with specific interests in one topic or area of expertise to form specialised online communities. Such communities are not only based on established norms of participation and learning, but also on “unspoken standards of modesty and humility”, as members try to develop a status of an expert without being perceived by other members as being proud about their capabilities (Boven, 2014). In addition, these communities have more engaged members that share personal experiences besides answering other members' questions. For example, blogs have been used by professionals as platforms for reflection, debriefing and raising awareness in issues regarding their everyday practice (Hickson, 2012). At the same time, blogs facilitate professional learning since users act upon knowledge gained while reflecting and sharing working experiences with their colleagues (Byington, 2011).

Communities based on SNS also support professional development by providing a platform to their members for exchanging ideas (Dong, Cheema, Samarasekera, & Rajaratnam, 2015). However, as SNS are more popular than blogs and have a broader base of users, the communities based on them are not always job related. In fact, people seek for information and advice on a great variety of topics, such as health issues (i.e. searching for drug therapies, new treatment options, and emergent new alternative therapies) (Langhorne, Thomas, & Kolaczowski, 2013), personal issues (e.g. getting emotional support and advice on issues related to long distance romantic relationships) (He, Kraus, & Preece, 2013) and personal development (e.g. getting support for learning a foreign language or getting a university degree) (Arteaga Sánchez, Cortijo, & Javed, 2014; Razak, Saeed, & Ahmad, 2013).

Finally, some online communities are established by universities and academics that aim to promote online learning and spark interest in research and science. Massive Open Online Courses (MOOCs) are the most recent examples of such communities, as they combine e-learning with the social character of an online forum. These communities work in a similar way to other online CoP, as participants that have previously attended a course, help other members by acting voluntarily as mentors, while at the same time they have the opportunity to learn themselves (Nelimarkka & Vihavainen, 2015).

When the goal is just arousing curiosity about science and the target group consists of users of younger ages (i.e. adolescents and undergraduate students), even simpler platforms are usually used. For example, an application on Facebook, called Hot Dish has been used to engage young people (16-25 years old) in debate about socio-scientific issues and facilitate the development of their contemporary scientific literacy (Greenhow, Gibbins, & Menzer, 2015). Similarly, the ‘Genome Solver’ website has been used as a platform for discussion and collaboration among faculty, experts and undergraduate students in the area of biology. The same site has been used by faculty members for exchanging ideas about research and pedagogy (Rosenwald, Arora, Madupu, Roecklein-Canfield, & Russell, 2012).

Online communities like the above can promote research even among practitioners. An example is the online community called “Research to Reality” that has been created by a research institute and aims to promote cancer control research by a) engaging researchers and practitioners in an ongoing debate; b) building capacity for evidence-based program planning; c) facilitating collaborations and as a result enhancing research dissemination and implementation (Farrell, La Porta, Gallagher, Vinson, & Bernal, 2014).

Although from the above it is evident that the main goal for joining an online community is either learning or getting information, the particular factors that may facilitate or hinder participation are not that clear. Social factors are commonly cited in literature as facilitators of joining an online community. These may include the “sense of belonging” that eventually develops among the members of a community (Fasso, 2010; Greer & Deokar, 2013; He et al., 2013; Razak et al., 2013), the social influence of friends and colleagues (Arteaga Sánchez et al., 2014; Greer & Deokar, 2013) and the opportunities for networking, mentoring and social relations that online CoP usually offer (Arteaga Sánchez et al., 2014; Hoffmann, Desha, & Verrall, 2011). Usefulness is another factor that affects positively intention to participate in an online community, although it can mean different things depending on the main goal of the users. For instance, community health nurses and social workers may join online CoP because they find them useful in raising awareness of issues that face in their everyday practice

(Hickson, 2012; Valaitis, Akhtar-Danesh, Brooks, Binks, & Semogas, 2011), students may think they are useful for communicating, collaborating and exchanging ideas with their peers from the university (Arteaga Sánchez et al., 2014), and foreign language learners that they are useful in practicing their writing skills by interacting through messages with the instructors and the other learners (Razak et al., 2013). This does not necessarily mean that everyone considers online CoP useful. In some studies, adult learners have answered that they do not use SNS as part of their learning process because they think that they are “waste of time” and they do not have control over the quality of the answers posted online (Wang & Arfaa, 2013) and social workers have stated that they do not think that online forums are useful since they “hinder the establishment of relationships and trust” and therefore cannot replace the face-to-face meetings (Lev-On & Adler, 2013).

Other factors that affect intention to participate in online communities are facilitating conditions (like support services and system reliability) (Arteaga Sánchez et al., 2014; Greer & Deokar, 2013) and perceived ease of use (Arteaga Sánchez et al., 2014). In fact, it has been found that some of the barriers to participation are poor connectivity (e.g. disconnection of the Internet and slow networking access) (Razak et al., 2013) and access difficulties (e.g. difficulties with system functions, like logging in, and complexity of online environment and navigation) (Guldberg & Mackness, 2009; Hoffmann et al., 2011). Finally, in cases where practitioners use online technologies for reflection and sharing experiences (e.g. blogs) issues of client confidentiality and anonymity also arise (Hickson, 2012).

The factors affecting joining online communities are not necessarily the same with the factors affecting knowledge sharing on them. Knowledge self-efficacy (Cheung, Lee, & Lee, 2013; Tseng & Kuo, 2014) and satisfaction with the experience of sharing knowledge on an online environment (Cheung et al., 2013) have been found to have a positive effect on members' intention to share knowledge. Likewise, feelings of reciprocity and identification with the community promote knowledge sharing among members (Cheung et al., 2013; Chiu, Hsu, & Wang, 2006; Tseng & Kuo, 2014), although according to Chiu et al. (2006) these feelings increase only the quantity of knowledge being shared and not the quality. In the area of SNS, users' liking or sharing activity has been linked to their need to maintain relationships, while commenting on others' posts to the need to express oneself or to make new contacts (Huang, 2013).

It should be noted though that the effect that above factors may have on users' online activities may differ based on personal characteristics. Indeed, cultural differences have been observed in the sharing patterns of users. For example, Chinese users have been found to

share less information on online CoP compared to users in other countries (i.e. Russia and Brazil) due to modesty requirements and high degree of competitiveness among colleagues (Ardichvili, Maurer, Li, Wentling, & Stuedemann, 2006). The same was true when Chinese users were compared to users from western cultures; Chinese participants shared knowledge less frequently than their US peers as there were differences in language, thinking logic, and perceived credibility of voluntarily shared knowledge (Li, 2010).

2.3 Adoption of Information Technology

2.3.1 Main theoretical models in the field

Various theories have been proposed over time in order to explain IT adoption. These theories can be divided into two main groups: theories that examine IT adoption at the organisational level and the ones that examine this phenomenon at an individual level. A brief overview of the most well-known theories of each group is provided below.

The most common theories used to study IT adoption at the organisational level are Diffusion of Innovations (DOI) and the Technology- Organisation- Environment Framework (TOE). Diffusion of Innovations was originally proposed by (Rogers, 1962) and tries to explain the way, the reason for and the extent of diffusion of new ideas, technology and innovation process through an organisation, a society or a country. The original theory identified five main characteristics of innovations that affect their adoption, namely: relative advantage, compatibility, complexity, observability, and trialability. However, two additional constructs (i.e. image and voluntariness of use) were identified later as the theory evolved further (Moore & Benbasat, 1991). The TOE Framework, on the other hand, focuses on the internal and external environment of an organisation instead of the characteristics of the innovation, and tries to understand technological innovation as the outcome of the influence that three different contexts have on the firm: the technological context (i.e. existing technologies relevant to the firm that may be currently used or are available for use), the organisational context (i.e. firm's characteristics and resources, such as communication processes, firm's size, linking structures among employees etc.), and the environmental context (i.e. structure of the industry, existing service providers, competitors and regulatory environment) (Abu-Khadra & Ziadat, 2012, pp. 164–165).

Studies that focus on the organisational perspective of IT adoption and which use either DOI or TOE as theoretical framework utilise a variety of research methods, such as interviews, surveys or mixed methods (Table 4). However, when the TOE framework is used alone, qualitative methodology is usually preferred as the model is abstract by its nature and there

are no established scales for its variables in the literature. Probably this is another reason, along with the fact that it has not evolved further since its original development and it is considered to act only complementarily to other theories in explaining innovation adoption (Baker, 2012), that TOE is often combined with other theories, like DOI, in order to explain IT adoption.

Table 4. Studies about IT adoption in the last five years.

Reference	Context	Theory	Method
Aljukhadar, Senecal, & Nantel (2014)	Using websites for completing online tasks (individuals' perspective)	Task- Technology Fit	Survey
Borrero, Yousafzai, Javed, & Page (2014)	Intention to use SNS for expressive participation (individuals' perspective)	UTAUT	Survey
Chen & Chen (2011)	Travelers' usage intentions of in-vehicle GPS products (individuals' perspective)	TAM	Survey
Lancelot Miltgen, Popovič, & Oliveira (2013)	Acceptance of biometric identification techniques in a voluntary environment (individuals' perspective)	TAM, DOI, UTAUT	Survey
Lian & Yen (2014)	Online shopping intentions-differences based on age and gender (individuals' perspective)	UTAUT, innovation resistance theory	Survey
Lin (2012)	Intention to continue using Virtual Learning Systems (VLS) (individuals' perspective)	Task- Technology Fit	Survey
Lu & Yang (2014)	Intention to use a Social Networking Site (SNS) (individuals' perspective)	Task-Technology Fit	Survey
Mergel (2013)	Social media adoption by governments (organisational perspective)	DOI	Interviews
Mishra, Akman, & Mishra (2014)	Green Information Technology Acceptance (individuals' perspective)	Extended TRA	Survey

Oliveira, Thomas, & Espadanal (2014)	Cloud-computing adoption in the manufacturing and services sectors (organisational perspective)	DOI and TOE framework	Survey
Ortega Egea & Román González (2011)	Physicians' acceptance of electronic health care records (EHCR) systems (individuals' perspective)	TAM with trust and risk-related factors	Survey
Picoto, Belanger, & Palma-dos-Reis (2014)	Post-adoption of mobile business (organisational perspective)	TOE framework, DOI, Resource-Based theory	Mixed method: Interviews and a Survey
Slade, Williams, Dwivedi, & Piercy (2015)	Adoption of proximity mobile payment (MP) systems (individuals' perspective)	UTAUT2 with trust and risk-related factors	Survey
Workman (2014)	New media (i.e. social media and smart applications) adoption (individuals' perspective)	UTAUT	Survey

At an individual level now, various theoretical models that stem from social psychology have been used to study IT adoption (Table 4). 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 by others regarding the acceptance decision) (Fishbein & Ajzen, 1975). Based on the TRA, Davis, Bagozzi, and Warshaw (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 & 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, Foxall, and Pallister (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).

In order to address the problems that the general IT adoption models face in studying different contexts, some scholars have suggested alternative theories that focus on the task for which the IT is used rather than on the IT acceptance itself. One of the most popular theories of this kind is Task – Technology Fit (TTF) theory. TTF theory was proposed by Goodhue and Thompson (1995), according to whom, “Task-technology fit (TTF) is the degree to which a technology assists an individual in performing his or her portfolio of tasks. More specifically, TTF is the correspondence between task requirements, individual abilities, and the functionality of the technology”. TTF theory has been used in many studies about IT adoption, as it states that the TTF variable influences positively not only performance, but also technology use; however, it is most suited for studying the behavioural intention of individuals that have some experience with the technology and therefore are able to evaluate its fit to the task under examination (Furneaux, 2012). Another context specific theory in the area is Social Cognitive Theory, which was proposed by Bandura (1986) and is based on the premise that individual behaviour, personal factors and environmental factors interact with and influence each other. The theory highlights the important role that self-efficacy and outcome expectations (both personal factors) play in forming a behaviour and, more specifically, it shows how individual behaviour can alter depending on the individual's confidence in performing the behaviour and the desirability of the outcomes associated with it (Carillo, 2012). Studies in the IS discipline have confirmed that both self-efficacy and outcome expectations have a positive impact on intention to use a system for performing a specific task (Looney, Akbulut, & Poston, 2008; Lu & Hsiao, 2007).

The large number of competing theories in the discipline has motivated scholars to integrate some of them into one theoretical framework dedicated to the study of IS/IT adoption and diffusion. The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh et al. (2003) after reviewing and combining the following theories: TRA, TAM, the Motivational Model, TPB, a combined Theory of Planned Behaviour/Technology Acceptance Model (C-TPB-TAM), the Model of PC Utilisation, the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT). Although there is a large number of references to the original article that presented the UTAUT model, only a small proportion of these studies actually use the model and many authors have used external variables and additional theories with it (Williams, Rana, & Dwivedi, 2012). One common criticism of the model is that it leaves out important independent variables as the ones included in it are not necessarily universal or generic (Bagozzi, 2007). Thus, the ability of the model to explain IT adoption in different contexts remains to be seen. After all, as the authors who proposed UTAUT have suggested in one of their following articles, research in the area has reached its maturity and the next step would be to explore “boundary conditions” and “situational contingencies” related to IT adoption (Venkatesh, Davis, & Morris, 2007).

2.3.2 Most common factors that affect IT adoption at an individual level

From the above discussion it is evident that the factors that affect individuals’ decision to adopt a new technology can be classified into one of the following three groups: Behavioural Beliefs, Normative Beliefs, and Control Beliefs.

Behavioural beliefs

Behavioural or attitudinal beliefs focus on utilitarian (either personal or work-related use), hedonic (i.e. fun) or social (e.g. status, image) outcomes related to the use of the technology (Niehaves & Plattfaut, 2014). Perceived usefulness and performance expectancy are probably the most common utilitarian factors cited in IT adoption literature and can be found in well-known theories like TAM, Decomposed TPB and UTAUT. When it comes to hedonic outcomes, factors like perceived enjoyment and hedonic motivation are usually included as potential indicators of intention. Factors like image or social-technology fit are usually used to capture the potential social gains from technology use.

Whether intention is mainly affected by utilitarian, hedonic or social factors is determined by the context of the study. Wu and Lu (2013) have confirmed the important role that context plays in IT adoption, as their research has shown that when it comes to adoption of utilitarian systems, extrinsic motivators (e.g. perceived usefulness, image) are more influential than

intrinsic motivators (e.g. perceived enjoyment), while the opposite is true for hedonic systems. This finding agrees with the results of a previous study, according to which perceived enjoyment has a stronger predictive value than perceived usefulness in the case of adoption of pleasure- oriented information systems (van der Heijden, 2004).

A look at the studies in the area confirms that users focus on the practical gains when they adopt IT systems for utilitarian purposes. Perceived usefulness has been found to affect positively travellers' attitude toward usage of in-vehicle GPS products (Chen & Chen, 2011) and physicians' intention to use electronic health care records (Ortega Egea & Román González, 2011), while performance expectancy, which is a closely related concept, has been found to be the most important driver of intention to use the Internet for shopping (Lian & Yen, 2014) and adopt proximity mobile payment systems (Slade et al., 2015). Performance expectancy has also been associated with the use of smart phone applications, which are usually task-oriented, but not with the use of social media, which most of the times are used casually, for networking purposes (Workman, 2014).

Following the same logic, hedonic motivation (which also appears in some studies as perceived enjoyment) does not seem to play an important role in the adoption of utilitarian IT systems, such as mobile financial services (Yen & Wu, 2016) or proximity mobile payments (Slade et al., 2015). However, it may have an indirect effect on intention in some cases. For example, a recent study has found that perceived enjoyment affected positively both students' perceived usefulness and perceived ease of use of e-portfolios (Abdullah, Ward, & Ahmed, 2016), meaning that enjoyment is not a completely irrelevant factor of adoption, even in cases where the system is not designed for fun-related activities. For pleasure oriented IT systems, like social TV applications, enjoyment is clearly a predictor of intention to adopt the system (Krämer, Winter, Benninghoff, & Gallus, 2015), while the same is also true for systems that incorporate a hedonic element despite being utilitarian in essence. For instance, the intention to adopt gamification services, smart-watches or online platforms that analyse data gathered by wearable technologies (e.g. online fitness communities) can be influenced positively by the perceived enjoyment of the user (Hamari & Koivisto, 2015; Stragier, Vanden Abeele, Mechant, & De Marez, 2016; Wu, Wu, & Chang, 2016; Yang, Yu, Zo, & Choi, 2016).

Another common factor that affects positively the adoption of dual purposed (i.e. utilitarian and hedonic) IT is image (Wu & Lu, 2013). The need for feeling 'unique' and express oneself can be a driver for smartwatch adoption (Choi & Kim, 2016), while the sense of recognition from others that derives from using the technology can be influential in the case of online gamification services (Hamari & Koivisto, 2015). The reason for the latter is that online

services that facilitate social interactions can satisfy social needs and therefore users have expectations about the social outcomes of their technology use. This is something that has also been observed in simpler forms of online communities, like Social Networking Sites, where the “social-technology fit” (i.e. a fit between social and technology functions of the technology) can affect individuals’ intention to adopt the technology (Lu & Yang, 2014). But even in cases where the technology does not include a social element (e.g. smartwatch), the use of a popular piece of IT can be associated with social outcomes, such as status gains. Status and need for uniqueness operate as ‘symbolic drivers of personal self’ and can have a strong positive effect on self-identity, which in turn can influence positively intention to adopt the technology (Arbore, Soscia, & Bagozzi, 2014).

Normative beliefs

Normative beliefs include the influence that comes from friends, family members, colleagues and external sources like mass media (Niehaves & Plattfaut, 2014). Social influence (i.e. influence coming from people that are important to the user) has been found to be an important factor of individuals’ intention to either adopt or continue the use the technology in later stage (Sun & Jeyaraj, 2013). Sometimes it may also influence other factors than intention; for instance, in the case of gamification services it was found that it affects positively the attitude towards using the service (which in turn affected positively continued use), but its direct relationship with continued use was insignificant (Hamari & Koivisto, 2015). Although one explanation for this could be that the use of gamification services is voluntary and thus people are not affected by their social environment like they would do if the use of technology was in work-related settings, there are studies that have found a significant effect of social influence even in cases that the adoption of the technology is not required. Examples of such instances is the positive effect that social influence has in adoption of SNS for expressive participation in online social movements (Borrero et al., 2014) or online shopping (Lian & Yen, 2014).

So, if the voluntary nature of the IT use does not necessarily change the effect that social influence has on IT adoption, then what is the reason behind the aforementioned differences? One could speculate that the users’ experience with the technology can moderate the effect that social influence has, in a way it is more important for inexperienced users (as they may want to get a second opinion from their friends that have already used the technology). However, there is also some evidence that this is not the case. For example, in the case of online shopping, social influence was an important determinant of intention for both younger and older users (although one would expect that older users would be less familiar with the

use of the Internet) (Lian & Yen, 2014), while in the case of online participation in social movements the effect was significant for males with high levels of self-reporting technology readiness (Borrero et al., 2014).

Another dimension that may have to be taken into account is whether the adoption of IT itself is considered to have social desirable outcomes, as social influence has been found to be important not only in the case of online participation in social movements, but also in the adoption of green information technology, which shows environmental awareness on behalf of the user (Mishra et al., 2014). In these two cases, the adoption of IT may be a way for the users to express their social responsibility and thus individuals may be more prone to influence coming from the social environment. However, as discussed above social influence was also important in cases unrelated to social responsibility (e.g. online shopping), so probably there is a mixture of all the aforementioned factors (i.e. voluntariness, experience and social desirability) that determines how important the opinion of significant others is for IT adoption.

Another type of influence coming from the social environment is external influence. In contrast to social influence (or peer influence, which is another term used to describe influence coming from friends/family) external influence comes from any non-personal source of information, such as mass media, experts or other Internet users. For instance, the social support that users that participate in online communities receive from other members can influence positively users' intention to engage in social commerce (Hajli, 2014). Another instance of external influence is the one coming from mass media/the news or experts and usually affects individuals in work-related settings. One recent example, is a study about academics' intention to adopt e-learning systems, which found that external influence was the most important determinant of academics' subjective norms that influenced their intention to use such systems (Renda dos Santos & Okazaki, 2016). Similarly, the adoption of social media by civil servants has been found to be influenced by the passive observation and comparison of best practices either in public or private sector, along with the informal pressure that has arisen by the increasing use of social media by the citizens (Mergel, 2013).

Control Beliefs

Control beliefs include factors that reflect personal efficacy, any skills or knowledge required by the users, and the level of difficulty related to the use of the technology (Niehaves & Plattfaut, 2014). The most common factors found in IT adoption literature that fall in this

category are perceived ease of use/ effort expectancy, self-efficacy, facilitating conditions, trust and risk-related factors.

Perceived ease of use is defined as “the degree to which the prospective user expects the target system to be free of effort” (Davis et al., 1989). A similar notion (i.e. effort expectancy) was introduced in the UTAUT model by Venkatesh et al. (2003) years later to describe how easy it is to use the system under examination. Although these factors have been found to be influential of IT adoption in various settings, their effects are not always straightforward. Looking at the literature, it seems that users take into consideration the effort related to the use of the technology only when they have a choice about whether they are going to use the system or not. For example, perceived ease of use or effort expectancy have been influential factors in the cases of websites used to complete tasks online (Aljukhadar et al., 2014), social media and smart applications (Workman, 2014), and e-portfolios used by students (Abdullah et al., 2016), but not in the case of planned adoption of e-learning systems by faculty members (Renda dos Santos & Okazaki, 2016). Also, in some occasions, such as the adoption of smartwatch (Choi & Kim, 2016) or GPS by travellers (Chen & Chen, 2011) the effect of perceived ease of use is not direct, but mediated by perceived usefulness instead. This shows that although perceived ease of use may not be always an influential factor for adoption, it may still affect the degree to which users find the technology useful.

Users’ demographics may affect the perceived ease of use/ effort expectancy of the system. Venkatesh et al. (2003) found that effort expectancy was more influential for women and inexperienced users, a finding that has also been confirmed at some degree by a recent study that found that the effect of effort expectancy on intention to use SNS for expressive participation is only important for women and individuals with low levels of self-reported technology readiness (Borrero et al., 2014). Similarly, self-efficacy (i.e. how confident an individual feels to use the technology under examination) has also been found to affect positively perceived ease of use in the case of adoption of e-portfolios by students (Abdullah et al., 2016). Having said that, there are also studies in the area that show that the proposed moderating effects that demographics have according to the UTAUT do not necessarily stand in all cases. Workman (2014) found that age and gender differences in IT adoption may not be as important as they thought to be and Lian and Yen (2014) did not find any moderating effect of gender on the relationship between effort expectancy and intention to shop online. Thus, the influence of users’ demographics in IT adoption should not be taken for granted, but has to be examined in the specific context that is studied every time.

Facilitating conditions is another concept related to perceived ease of use/effort expectancy as it reflects the users' beliefs regarding the existence of an organisational and technical infrastructure that supports the adoption of the system. The relationship between facilitating conditions and effort expectancy is so close that according to the UTAUT model, the effect of facilitating conditions on intention is expected to be insignificant as it is captured by effort expectancy (Venkatesh et al., 2003). However, in practice there are many studies that have found that the two variables "move together". For example, in the study about social media and smart application usage significant and positive effects were found for both effort expectancy and facilitating conditions (Workman, 2014), while in the studies about online shopping (Lian & Yen, 2014), mobile payments (Slade et al., 2015) and e-learning systems (Renda dos Santos & Okazaki, 2016) the relative effects were both insignificant.

Finally, factors that are related to the risk that the use of IT entails can influence individuals' decisions to adopt a technology. Usually such factors play an important role when the users have to share sensitive or personal information while using the system. For instance, trust in provider and perceived risk have been found to be important determinants of individuals' intention to adopt proximity mobile payments (Slade et al., 2015). Perceived risk and trust are not important only when it comes to payments. They have been found to affect behavioural intention to adopt biometric identification techniques in a voluntary environment (Lancelot Miltgen et al., 2013), while trust has also been associated with the acceptance of Electronic Health Care Records by physicians (Ortega Egea & Román González, 2011). On the other hand, security and privacy factors did not have any significant effect on the intention to use websites for completing information tasks (i.e. finding a piece of information on a website) (Aljukhadar et al., 2014), reinforcing the hypothesis that risk-related factors affect IT adoption only when it comes to transactional online tasks or sensitive information exchange.

From the above discussion regarding the most common cited determinants of IT adoption, it is evident that each IT system is different and there is no theoretical model that fits any case of IT adoption. Research models have to be customised and take into consideration various parameters, such as the nature of the system (e.g. hedonic or utilitarian), the nature of the use (e.g. voluntary or compulsory), the nature of information that is handled with the system (e.g. sensitive or non - sensitive) and users' characteristics (e.g. IT experience, demographics etc.).

3. Research Models and Hypotheses

This chapter presents the research models that have been used in each of the three surveys of the thesis. Section 3.1 presents the main theories used to build the models (i.e. Decomposed TPB and UTAUT2). In Section 3.2, the hypotheses developed for Surveys 1 and 2 (online engagement within academia and academic perspective on online public engagement respectively) are presented. Finally, Section 3.3 presents the research model of Survey 3, which focuses on the public's perspective on online public engagement.

3.1 Theoretical Approach

In order to address the questions about the academic perspective of online public engagement, the study uses both the Decomposed Theory of Planned Behavior (Decomposed TPB) and the Uses and Gratifications Theory, proposing a conceptual model that aims to determine the factors that affect academics' intention to use online technologies in order to disseminate their research and engage with their colleagues and the public. On one hand, the Decomposed TPB has been found to provide a fuller understanding of behavioural intention in IT studies compared to other acceptance models (Taylor & Todd, 1995), while on the other Uses and Gratifications Theory is an appropriate theoretical framework for examining the uses of new media by individuals (Foregger, 2008; Papacharissi & Rubin, 2000). The joint use of the two theories provides a robust theoretical framework that captures the technologies under study holistically.

As far as the public perspective is concerned, the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) was used in the relevant study as a research framework. UTAUT2 aims to examine information technology acceptance and use in voluntary settings, like e-commerce (Venkatesh, Thong, & Xu, 2012). As the public's use of online technologies for engaging with academia is a voluntary task and completely unrelated with one's job performance (in contrast to the corresponding use of online technologies by academics, which could be considered as a part of extra role behaviour), UTAUT2 is considered as a more appropriate framework than the Decomposed TPB, which is mainly tested in organisational settings. Also, while academics as a professional group are homogenous (i.e. no significant differences in educational level and socio-cultural background), the public consists of people from various backgrounds, and therefore some demographic variables (e.g. educational level) also have to be considered. UTAUT2 incorporates such demographic variables as potential moderators in the model, in contrast to the Decomposed TPB, which examines only direct relationships. Table 5 summarises the theoretical frameworks used in order to address the

research objectives of each survey. Survey 1 acts as a “control” study as the same research model is tested in Survey 2 and the findings of the two surveys are compared in the Discussion section in order to draw conclusions about the reasons behind potential differences in academics’ motives in the two cases.

Table 5. Summary of the theories used in the thesis

Research Aims	Research Objectives/Questions	Survey	Research Framework
Examine the use of online technologies for academic engagement, taking into consideration both users and non-users of online technologies.	<ul style="list-style-type: none"> • Study why academics are willing to use online technologies in order to engage with their peers and what the motivating factors are • Examine whether there are any differences between academics using Social Networking Sites for engagement purposes and other technologies 	Survey 1	<ul style="list-style-type: none"> • The Decomposed Theory of Planned Behavior (Decomposed TPB) • the Uses and Gratifications Theory
Examine the use of online technologies by academics for public engagement, taking into consideration both users and non-users of online technologies.	<ul style="list-style-type: none"> • Examine the factors that motivate academics to use online technologies in order to engage with the public 	Survey 2	<ul style="list-style-type: none"> • The Decomposed Theory of Planned Behavior (Decomposed TPB) • the Uses and Gratifications Theory
Examine the public’s perspective in the online public engagement process, taking into consideration the different goals of the users (i.e. learning and information acquisition)	<ul style="list-style-type: none"> • Study what motivates practitioners and other members of the public to use online technologies for engaging with the academic community and participating in the public research dialogue • Examine whether there any differences between engaging with academia online for learning purposes or for information acquisition 	Survey 3	<ul style="list-style-type: none"> • Extended Unified Theory of Acceptance and Use of Technology (UTAUT2)

3.2 Development of Hypotheses for Surveys 1 and 2: Online Engagement: The Academics’ Perspective

The Decomposed TPB is an alternative version of the TPB model proposed by Ajzen (1991). According to the TPB model, human behaviour is affected by three factors: a) attitude towards behaviour, which can be either favourable or unfavourable and is formed by beliefs about the likely consequences or other attributes of the behaviour b) subjective or social norm, which is the perceived social pressure or in other words beliefs about the normative expectations of other people, and c) perceived behavioural control, which is “*the perceived*

ease or difficulty of performing the behaviour". These three factors lead to the development of behavioural intention (Ajzen, 2002). In the Decomposed TPB, the three factors are analysed further by taking apart the various dimensions that comprise them. Consequently, the Decomposed TPB provides a more holistic understanding of behavioural intentions, since the analysis of the factors renders the relationships among them clearer and easier to understand and interpret (Taylor & Todd, 1995).

While the Decomposed TPB is a suitable model for examining Information Technology (IT) usage (Taylor & Todd, 1995), it is not contextualised on new media, such as SNS. Hence, the Uses and Gratifications Theory, which is considered more appropriate for understanding the uses of new media by individuals (Foregger, 2008), has been adopted. 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, Blumler, & Gurevitch, 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, however 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, Mastro, & Eastin, 2001; Song, Larose, Eastin, & Lin, 2004). This is the reason that in the current thesis is used in conjunction with the Decomposed TPB.

In the area of IT adoption, Uses and Gratifications Theory has been used as a theoretical framework that can explain adoption of the Internet and its applications. More specifically, Papacharissi and Rubin (2000) found five motivations of using the Internet according to U&G namely, 'interpersonal utility', 'pass time', 'information seeking', 'convenience' and 'entertainment'. These findings have been replicated at 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, Chu, & Tseng, 2013).

When it comes to SNS specifically, motives like ‘belonging’, ‘hedonism’, ‘self-esteem’ and ‘reciprocity’ have emerged as potential gratifications (Pai & 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.

Based on the Decomposed TPB (Taylor & Todd, 1995) and Uses and Gratifications Theory (Katz et al., 1973), the first study proposes a research model that investigates how academics’ intention to use online technologies in order to engage with their peers is formed. The model is evaluated twice, once with data about academic use of SNS and once with data about other online technologies (OT). Subsequently, the same research model is used for the Survey 2 thus, the main hypotheses formed in Survey 1 are used in this case, too. The section that follows examines the various factors that may affect attitude towards behaviour, social norms, perceived behaviour control and lastly intention. The hypotheses presented below are proposed twice, once for SNS and once for other online technologies in the case of academic engagement and they are followed by the corresponding hypotheses for public engagement.

Self- promotion and Image: One of the needs related to the use of media, as proposed by the Uses and Gratifications Theory, is the need to gain insights into one’s personal identity (Flanagin & Metzger, 2001). Web sites are regularly used for implementing impression management strategies (i.e. strategies that aim to control information about a person, an object, an entity or idea) (Connolly-Ahern & Broadway, 2007). Participation in online communities has also been connected with self- interest motives, like seeking to enhance one’s reputation (Faraj & Johnson, 2010). In the academic context, blogs are often used as tools for sharing thoughts about academic work conditions and policies and even promoting one’s expertise by providing advice (Mewburn & Thomson, 2013), activities that eventually result in the creation of a virtual academic identity. Likewise, SNS have been found to be used by academics as tools for forming digital identities and engaging in impression management (Veletsianos, 2012). Many academics use social media in order to increase the visibility of their research and discuss their ideas with their colleagues (Lupton, 2014; Menendez, Angeli, & Menestrina, 2012). It is suggested that academics’ need for self-promotion, which is the manifestation of someone’s abilities or accomplishments in order to be seen as competent by others (Bolino & Turnley, 1999) and enhancement of professional

identity, affects their attitude towards using online technologies for engagement in a positive way.

H1.1: Academics' need for self-promotion positively affects their attitude towards using SNS/other online technologies for academic engagement.

H2.1: Academics' need for self-promotion positively affects their attitude towards using online technologies for public engagement.

H1.2: Academics' need to maintain a positive image positively affects their attitude towards using SNS/other online technologies for academic engagement.

H2.2: Academics' need to maintain a positive image positively affects their attitude towards using online technologies for public engagement.

Information Seeking: Knowledge management, including information exchange is a common motive for using online services. According to Papacharissi and Rubin (2000), information seeking is the most salient use of the Internet. This is especially true for virtual communities, with online users stating that the main reason they visit them is the opportunity to exchange information (Ridings & Gefen, 2004). A more recent study has found that information seeking is a motive for using SNS too, as users regard social relationships as useful sources for information (Kim, Sohn, & Choi, 2011). This is in agreement with other studies suggesting that information seeking is one of the four gratifications derived from using SNS (Ku et al., 2013). SNS are used for information dissemination in academia too (Lupton, 2014; Menendez et al., 2012). More specifically, many academics use SNS in order to keep in touch with new developments and events and provide access to new or unpublished articles in their research field (Lupton, 2014). Also, it is not uncommon for academics to use SNS like Academia.edu in order to provide personal and contact information (Menendez et al., 2012). Thus, SNS and online technologies in general can be used as sources for information within academic community.

H1.3: Academics' need to seek information positively affects their attitude towards using SNS/other online technologies for academic engagement.

H2.3: Academics' need to seek information positively affects their attitude towards using online technologies for public engagement.

Networking: Studies about the use of online communities have shown that many of the ways that people use to communicate during face-to-face interactions are replicated in online environments, with online members seeking social support or friendships by joining an online

community (Maloney-Krichmar & Preece, 2005; Ridings & Gefen, 2004). Not surprisingly, one of the main uses of SNS is networking in the form of maintaining old ties and creating new ones with peers that share the same interests (Foregger, 2008; Kim et al., 2011; Ku et al., 2013). Although one would expect that people use them mainly to connect with their friends, there is evidence that meeting new people may also be another motivation. A study about social networking sites has found that the perceived usefulness of a SNS is affected positively by both the number of friends that a user has on the site and the number of members of the SNS in general, indicating that users may be interested in socialising even with people they do not currently know (Lin & Lu, 2011). Despite the fact that maintaining old connections and creating new ones share a common theme (i.e. networking) the two concepts are usually examined separately in the literature. Foregger (2008) used the term 'Network' to describe the factor that emerged during EFA analysis and included items about making new friends, and the term 'Maintain Old Ties' to name the factor about keeping in touch with old friends. Similarly, in the study of Papacharissi and Rubin (2000) about uses and gratifications of Internet use, items related to meeting new people were grouped under the title 'Interpersonal Utility', while communicating with friends and family was part of a factor named 'Convenience'.

Academics also use SNS for connecting and establishing networks and sometimes they even use SNS as platforms for multi-disciplinary collaborations (Gruzd et al., 2012; Jung & Wei, 2011; Lupton, 2014). In addition, 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 & Gefen, 2004).

H1.4: Academics' need to maintain old contacts positively affects their attitude towards using SNS/other online technologies for academic engagement.

H2.4: Academics' need to maintain old contacts positively affects their attitude towards using online technologies for public engagement.

H1.5: Academics' need to create new contacts positively affects their attitude towards using SNS/other online technologies for academic engagement.

H2.5: Academics' need to create new contacts positively affects their attitude towards using online technologies for public engagement.

Peer and External Influence: As the Decomposed TPB suggests, social norms are affected by peer influence, which takes the form of encouragement or opposition towards using the IT in question (Taylor and Todd, 1995). Hsu and Chiu (2004) have added an additional factor, namely “external influence”, which is the influence from mass media, experts and any other non-personal information that could affect individuals’ considerations about performing the behaviour. Bhattacharjee (2000) agrees that external influence is an important determinant of social norms in IT-related contexts. Academics appear to take into consideration their colleagues’ opinions about SNS, even if these opinions come from academics outside their home organisation or from a different discipline (Gruzd et al., 2012).

When it comes to public engagement, it is true that it 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 & Antoncic, 2015). Similarly, external influence can positively affect the social norms of academics, as the need for engaging with the public is not stressed only by individuals inside academia, but also by accreditation or funding bodies (Cooper et al., 2014). Other external sources of influence are mass media, 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). Based on the above, the following hypotheses are put forward:

H1.6: Peer influence positively affects the social norms of academics regarding their use of SNS/other online technologies for academic engagement.

H2.6: Peer influence positively affects the social norms of academics regarding their use of online technologies for public engagement.

H1.7: External influence positively affects the social norms of academics regarding their use of SNS/other online technologies for academic engagement.

H2.7: External influence positively affects the social norms of academics regarding their use of online technologies for public engagement.

Privacy Control: Privacy control involves the ability of academics to control information about themselves and their research in online environments. For example, as far as SNS are concerned, privacy control could be influenced by the privacy policy of SNS, the awareness that information is being collected, the voluntary character of the information submission, and the openness of information usage by the SNS (Xu, Michael, & Chen, 2013). So far, privacy control has been associated with the alleviation of privacy concerns in SNS (Xu et al., 2013)

and Internet use (Dinev & Hart, 2003). In the case of academics, these concerns are about privacy in general, inability to control the content posted on social media and copyright issues (Gruzd et al. 2012; Lupton 2014). Ajzen (2002) has introduced the general notion of controllability as the second factor that, along with self-efficacy, comprises the perceived behavioural control in the TPB model. It is hypothesised that:

H1.8: Privacy control in SNS/other online environments positively affects the perceived behavioural control of academics when it comes to engaging with their peers.

H2.8: Privacy control in online environments positively affects the perceived behavioural control of academics, when it comes to engaging with the public.

Self- efficacy: In the context of online technologies, self-efficacy refers to users' beliefs about their capabilities of using online technologies. Lack of technological proficiency can be an important barrier to knowledge sharing in online communities (Ardichvili, 2008). The Decomposed TPB suggests that self-efficacy is one of the determinants of perceived behavioural control (Taylor & Todd, 1995). This notion is also supported by research in the e-commerce field that found that self-efficacy influences perceived behavioural control significantly (Hung, Ku, & Chang, 2003). Although academics are sufficiently technologically competent since they have to use the Internet in their academic practice (e.g. getting access to academic journals, submitting manuscripts through journals' online systems etc.), they may still feel that they have difficulties in managing personal and professional information when they use online tools like SNS (Gruzd et al. 2012). It is therefore expected that:

H1.9: Self-efficacy related to the use of SNS/other online technologies for academic engagement positively affects the perceived behavioural control of academics.

H2.9: Self-efficacy related to the use of online technologies for public engagement positively affects the perceived behavioural control of academics.

Attitude, Social Norms and Perceived Behavioural Control: TPB has been applied in many instances in the IT research area, showing that intention to adopt web technologies or e-services is affected positively by attitude and perceived behavioural control (Ajjan & Hartshorne, 2008; Hartshorne & Ajjan, 2009; Lu, Zhou, & Wang, 2009a; Shih, 2008). Social norms have also been positively associated with intention in cases of web applications that focus on communication and interaction among online users (Hartshorne & Ajjan, 2009; Liao, Chen, & Yen, 2007; Lu et al., 2009a). In addition, research on social networking has shown

that attitude toward social networking is positively associated with intention to use social networking (Peslak, Ceccucci, & Sendall, 2011). Similarly, social (or subjective) norms, which is the second factor that affects behavioural intention in TPB, is found to be positively correlated to intention in an SNS context (Peslak et al., 2011). Finally, perceived behavioural control has also been found to have a positive relationship with intention in a similar context, that of participating in virtual communities (Lin, 2006). Based on the above, the following hypotheses are formulated:

H1.10: Attitude of academics towards using SNS/online technologies for academic engagement positively affects intention to use SNS/other online technologies for this purpose.

H2.10: Attitude of academics towards using online technologies for public engagement positively affects intention to use online technologies for this purpose.

H1.11: Social norms of academics related to using SNS/online technologies for academic engagement positively affect intention to use SNS/other online technologies for this purpose.

H2.11: Social norms of academics related to using online technologies for public engagement positively affect intention to use online technologies for this purpose.

H1.12: Perceived behavioural control of academics related to using SNS/other online technologies for academic engagement positively affects intention to use SNS/other online technologies for this purpose.

H2.12: Perceived behavioural control of academics related to using online technologies for public engagement positively affects intention to use online technologies for this purpose.

Figure 3 summarises the hypotheses for both Survey 1 and Survey 2.

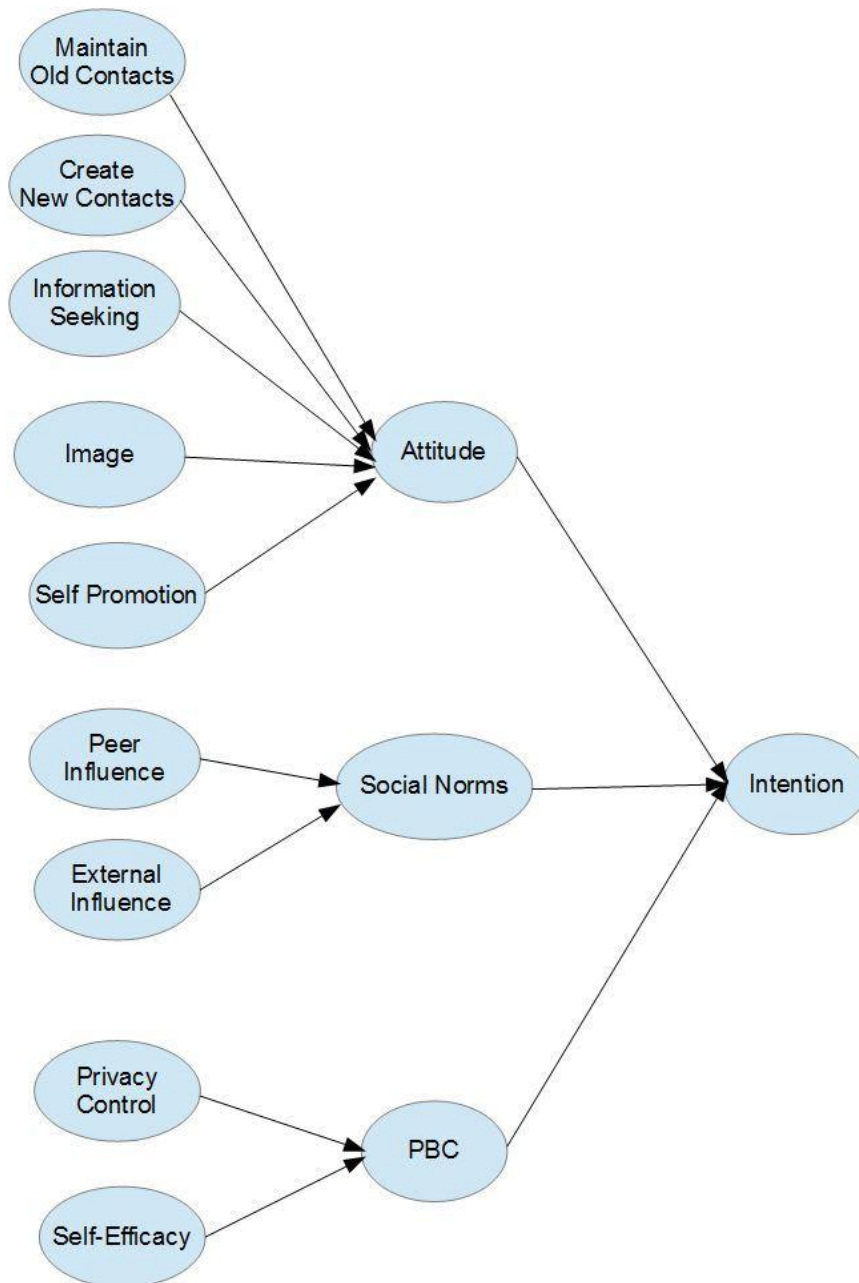


Figure 3. Research model used in Surveys 1 and 2

3.3 Development of Hypotheses for Survey 3: Public Engagement and Online Technologies: The Public's Perspective

The Extended Theory of Acceptance and Use of Technology (UTAUT2) is the subsequent model of UTAUT, which was proposed by Venkatesh et al. (2003) after reviewing and comparing the most prominent models in the user acceptance literature. The model examined the acceptance of Information Technologies (IT) in an organisational context, taking into account four constructs that affect behavioural intention, namely performance expectancy, effort expectancy, social influence, and facilitating conditions. In addition, it incorporated the following moderators that influence the relationships between constructs: gender, age, experience, and voluntariness of use. The model is considered to be quite successful when it comes to explaining users' intention to accept a new technology as it has explained up to 70 percent of the variance in intention.

UTAUT2 incorporates three additional constructs into the original UTAUT, namely hedonic motivation, price value and habit. It can be used for studying e-commerce settings and explain acceptance and use of technology in a consumer context. In such a context, factors like fun or pleasure may enhance the utilitarian value of a technology and affect usage intention too. The moderators found in UTAUT are used in the revised version too, apart from voluntariness of use, which is not relevant in the case of e-commerce as the use of such applications is always voluntary (Venkatesh et al., 2012).

Studies that have used either UTAUT or UTAUT2 have found that performance expectancy and social influence have positive effects on intention to use ICT in both voluntary and mandatory tasks. These variables affect behavioural intention not only in cases like mobile shopping (Yang, 2010) or mobile learning (Wang, Wu, & Wang, 2009), but also in organisational settings (Gupta, Dasgupta, & Gupta, 2008) or in tasks like filing tax returns (Schaupp, Carter, & McBride, 2010) and voting (Powell, Williams, Bock, Doellman, & Allen, 2012). The effect of effort expectancy, on the other hand, is not particularly clear as there are instances that have been found to be insignificant (Schaupp et al., 2010), or imposed directly on performance expectancy (Yang, 2010), indicating that its relation with intention is not always straightforward. Finally, while facilitating conditions have been found to have a positive effect on intention in many instances, like ICT adoption by government departments (Gupta et al., 2008), mobile shopping services adoption (Yang, 2010) and e-file adoption (Schaupp et al., 2010), there are also studies that have chosen to omit the variable from their research model as it did not fit their context or was considered to be too general. For example, m-learning is a relatively new application, so participants in a relevant study were considered

to lack the experience required to judge the facilitating conditions of adopting the technology (Wang et al., 2009). Also, in cases where security is a major concern, such as e-Voting or mobile wallets, other variables, such as trust or perceived security, were considered more important than facilitating conditions (Powell et al., 2012; Shin, 2009).

H3.1. Performance expectancy of online technologies has a positive effect on behavioural intention to use online technologies for engaging with the academic community.

H3.2. Effort expectancy has a positive effect on behavioural intention to use online technologies for engaging with the academic community.

H3.3. Social influence has a positive effect on behavioural intention to use online technologies for engaging with the academic community.

H3.4. Facilitating conditions have a positive effect on behavioural intention to use online technologies for engaging with the academic community.

The above discrepancies between the results/research models of ICT adoption studies and the original UTAUT model underline the need to take into consideration the context of each study (e.g. organisational, e-commerce, e-government). This need has led to the first extension of UTAUT, in a way that it can be used for e-commerce and explain acceptance and use of technology in a consumer context. In such a context, factors like fun or pleasure may enhance the utilitarian value of a technology and affect usage intention too. UTAUT2 incorporates three additional constructs into the original UTAUT, namely hedonic motivation, price value and habit. The moderators found in UTAUT are used in the revised version too, apart from voluntariness of use, which is not relevant in the case of e-commerce as the use of such applications is always voluntary (Venkatesh et al., 2012).

Hedonism or simply entertainment is one of the reasons why people use media according to Uses and Gratifications theory (Calder, Malthouse, & Schaedel, 2009). Not surprisingly, intention to use the World Wide Web has been positively associated with hedonic motivation (Moon & Kim, 2001). Similarly, people use Social Networking Sites for pleasure among other reasons, which may derive from exchanging information, interesting new facts or music or video clips (Kim et al., 2011; Lin & Lu, 2011; Pai & Arnott, 2013). Even the use of more utilitarian applications, like email, Instant Messaging, tax e-services or mobile shopping, is positively associated with hedonic motivation (Hsu & Chiu, 2004; Lu, Zhou, & Wang, 2009b; Papacharissi & Rubin, 2000; Yang, 2010), indicating that the perceived entertainment affects behavioural intention no matter the type of online technology.

As far as the effect of habit on internet usage is concerned, according to an older study in the UK, the use of Internet seems to lack purpose and mainly be driven by habit (Hills & Argyle, 2003). Habit seems to have a positive effect not only on intention to use the internet, but also on the perceived usefulness and trust attached to websites (Liao, Palvia, & Lin, 2006). It is considered as an important factor that explains IS usage (Limayem & Hirt, 2003) and in some cases it exerts a moderating effect on the relationship between intention to use IS and continuance behaviour (Limayem, Hirt, & Cheung, 2007).

H3.5. Hedonic motivation has a positive effect on behavioural intention to use online technologies for engaging with the academic community.

H3.6. Habit has a positive effect on behavioural intention to use online technologies for engaging with the academic community.

Moderating Effects

Originally, both UTAUT and UTAUT2 suggested that age and gender act as moderators in the model. However, when the use of the Internet is the topic under investigation the findings are inconclusive. Initially, studies suggested that demographics like gender, age, education and race play an important role in how people use the Internet (Howard, Rainie, & Jones, 2001; Wasserman & Richmond-Abbott, 2005; Weiser, 2000). For example, women seemed to use the Internet mainly for interpersonal communication and education assistance, and were more likely to use email than men, who used the Internet primarily for entertainment and to chat online more often than women (Wasserman & Richmond-Abbott, 2005; Weiser, 2000). More recent research has shown that these gender differences regarding the use of online technologies tend to disappear. Gender did not have any significant moderating effect on intention to use ICT in government organisations or mobile wallets (Gupta et al., 2008; Shin, 2009). Nevertheless, gender had a moderating role on the effect of social influence and self-management of learning on intention to use m-learning (Wang et al., 2009).

As far as age is concerned, its effect is mainly related to the effort expectancy of using online technologies and social influence. For instance, the moderating effect of age was significant between effort expectancy/ perceived ease of use and behavioural intention in the cases of e-Voting, m-learning and mobile wallets, in such a way that it was stronger for older people (Powell et al., 2012; Shin, 2009; Wang et al., 2009). Social influence, on the other hand, was more important for younger people in the case of mobile wallets (Shin, 2009), but more important for older people in the case of mobile learning (Wang et al., 2009). This is another

example as to why it is important to take context into consideration, as the effects of one variable on using the same technology may differ with the purpose of use.

Sometimes it is not clear whether it is age that influences the perceptions related to ICT use or education level that makes the differences. For instance, a study about the acceptance of Instant Messaging (IM) has found that the influence of perceived behavioural control on the actual use is stronger for high school students than for undergraduates and working professionals (Lu et al., 2009b). This could be attributed to the age, as adults may have more experience with IT than teenagers, but it could also be due to the higher education level that provides a person with more advanced ICT skills. It has been shown that the higher the educational level of an individual, the fewer problems he or she faces while using the Internet (Deursen, 2012) and the greater the range of activities he or she performs online (Hargittai, 2010; Hargittai & Hinnant, 2008). Differences in the intention to use ICT have also been observed based on the general socio-economic status of an individual (Hsieh, Rai, & Keil, 2008). From the above, it is evident that education, which has not been included in the UTAUT model so far, has an influence on behavioural intention, at least in the area of online technologies.

H3.7. Age, gender and education level moderate the effects of the above factors on behavioural intention.

Figure 4 presents the proposed research model. The hypotheses presented above are proposed twice, once for intention to engage online with academic community for learning purposes and once for information acquisition.

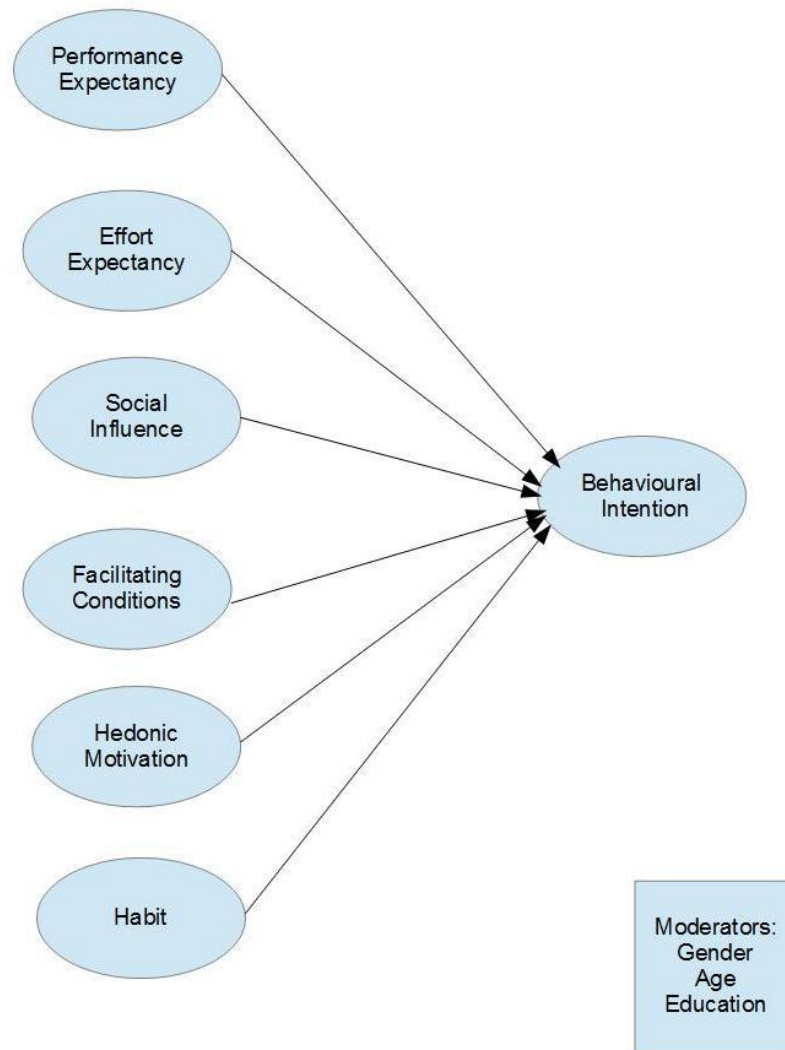


Figure 4. Research model used in Survey 3

4. Methodology

This chapter discusses the methodology followed in the thesis. Section 4.1 discusses the philosophical position that the researcher adopted, while Section 4.2 explains the multiple perspective design of the thesis. Section 4.3 presents the questionnaires design and sample of each of the three surveys. The data analysis technique used in the thesis is discussed in Section 4.4. The next section presents the reliability and validity analysis for the three surveys. Finally, common method bias and invariance tests required for the Survey 3 can be found in Sections 4.6 and 4.7, respectively.

4.1 Research Philosophy

According to Jonker and Pennink (2010, p. 25) every piece of research is based on the “research pyramid”, which consists of the following four levels:

- The research paradigm (or philosophy), which explains how the researcher views ‘reality’. This is the “basic approach” of a study.
- The research methodologies that are based on the research paradigm and represent a “way” to conduct the research
- The research methods, which are specific steps that have to be executed in a certain order
- The research techniques, which are specific practical tools for generating, collecting and analysing data

As far as the research philosophy is concerned, there are two main “schools of thought” namely, positivism and interpretivism. According to positivism, the world is “a collection of observable events and facts which can be measured” and therefore researchers try to apply research methods from natural sciences to the social sciences, while interpretivism dictates that researchers “emphasise the meanings made by people as they interpret their world” (Williamson, Burstein, & McKemish, 2002). More specifically, the two paradigms differ mainly in terms of ontology (i.e. the nature of reality and being), epistemology (i.e. the relationship between the “knower” -the research participant and the “would-be knower” -the researcher) and axiology (i.e. the role of the researcher’s values in the scientific process) (Ponterotto, 2005).

With regard to ontology, positivism suggests that the world is “*comprised of objectively given, immutable objects and structures*” that are independent of the researcher’s understanding of them. According to interpretivism, on the other hand, reality is subjectively

constructed and varies according to different languages and cultures as it is affected by socially transmitted concepts and norms (Goles & Hirschheim, 2000). Epistemologically, positivists believe that research participants and topics are independent of one another and the researcher can study them without bias when rigorous, standard procedures are followed (Ponterotto, 2005). The researcher focuses on testing theories and causal relationships and aims to produce generalisable results (Chen & Hirschheim, 2004). Interpretivists emphasise the context of the research and think that interactions between the researcher and the participants are important for understanding and explaining the experiences of the participants (Chen & Hirschheim, 2004; Ponterotto, 2005). As far as axiology is concerned, positivists claim that the researcher's personal values should not interfere during the research process, while interpretivists believe that these values cannot be set aside and, therefore, should be acknowledged and described by the researcher (Ponterotto, 2005). Table 6 presents an overview of the main implications that the two paradigms have on the research process.

Table 6. Key Research Implications of Positivism and Interpretivism (Holden & Lynch, 2004)

	Positivism	Interpretivism	
Independence	The observer is independent of what is being observed.	The observer interacts with subject being observed.	Interaction
Value-freedom	The choice of what to study, and how to study it, can be determined by objective criteria rather than by human beliefs and interests.	Inherent bias in the choice of what to study, and how to study it, as researchers are driven by their own interests, beliefs, skills, and values.	Value-laden
Causality	The aim of social science should be to identify causal explanations and fundamental laws that explain regularities in human social behaviour.	The aim of social science is to try to understand what is happening.	No Cause and Effect
Hypothetico-deductive	Science proceeds through a process of hypothesising fundamental laws and then deducing what kinds of observations will demonstrate the truth or falsity of these hypotheses.	Develop ideas through induction from evidence; mutual simultaneous shaping of factors.	No Hypothetico-deductive reasoning
Operationalisation	Concepts need to be operationalised in a way which enables facts to be measured quantitatively; static design – categories isolated before study.	Qualitative methods – small samples investigated in depth or over time; emerging design – categories identified during research process.	Operationalisation
Reductionism	Problems as a whole are better understood if they are reduced into the simplest possible elements.	Problems as a whole are better understood if the totality of the situation is looked at	No Reductionism
Generalisation	In order to be able to generalise about regularities in human and social behaviour it is necessary to select samples of sufficient size; aim of generalisations is to lead to prediction, explanation and understanding.	Everything is contextual; patterns identified – theories then developed for understanding.	Generalisation
Research Language	Formal, based on set definitions; impersonal voice; use of accepted quantitative words.	Informal, evolving decisions; personal voice; use of accepted qualitative words.	Research Language

The philosophical position adopted in the thesis is that of positivism. Although a study about the meaning that academics or practitioners attach to online public engagement will also be interesting, this thesis is about understanding what drives people within and outside academia to interact with each other online. The author, although an academic herself, does not let her own experiences or views on online public engagement interfere with the study of the phenomenon; the findings and the conclusions of the thesis are derived solely by the objective examination of the data. In that way, one of the main aims of the study (i.e. to have a general

understanding of how academics perceive online technologies for public engagement) can be achieved. By following positivism, not only are the research questions presented in the Introduction addressed in a way that suits the purposes of the thesis, but also a comparison with previous literature in the IT adoption field (which is largely based on positivism) is feasible.

4.2 Justification of the multiple vantage point design

When it comes to the philosophical stance towards academia and academic identity, literature suggests a different typology than the one used for classifying philosophical underpinnings of research. According to Stiles (2004) there are three theoretical bases of academic organisation and identity:

- a separatist perspective, which recognises the social world as a composition of largely autonomous actors (universities, firms, government organisations etc.) with well-defined boundaries and limited interaction. Domains of knowledge are strictly defined and there is a distinction between basic and applied knowledge. Academic life is seen as a ‘calling’ and not just an ordinary job. Academic identity is perceived as ‘cohesive and collegial’, aiming to promote common values, such as acquiring knowledge for its own sake, establishing theory based on experience, reason and ‘scientific universality’, and promoting freedom of expression.
- an integrationist perspective, which sees society as a composition of semi-autonomous actors with less distinct boundaries. Interaction among actors and exchange and diffusion between knowledge domains take place, resulting in ‘valid transdisciplinary and applied forms of knowledge’. Representative of this theoretical base are the concepts of Mode 2 and academic entrepreneurialism. The university is perceived as more contextually integrated and academic identity as more ‘fragmented and conflictual’ due to the limited support of traditional collegial values. Cultural (values are seen as an intrinsic part of the university), political (power conflicts exist as an integral part of the academic system), stakeholder (there is a need to balance the values and demands of the university’s stakeholders) and ‘garbage can’ (competing groups hinder any successful attempt to create a common organisational strategy) metaphors are used to describe the pluralistic nature of institutional strategies.
- a hegemonist perspective stresses the existence of actors with dominant power that pervades organisational boundaries. According to this perspective, knowledge “*represents the emergence of an ideological domain biased in favour of particular actors through a conflictual process*”. The university is absorbed by the social system

and therefore academic identity is seen as dependent and inferior. Organisation, managerial and postmodern writers adopt a hegemonist perspective by focusing on the role of particular actors or frameworks.

Table 7. Theoretical base of academic organisation and identity (Stiles, 2004)

Theoretical Base	Ontology	Epistemology	Academic organisation	Academic identity	Institutional strategies
Separatist	Autonomous actors Defined boundaries	Distinct domains Mode 1: Specialist, monodisciplinary, basic	Segregated Traditional	Independent Unitary/Rational Collegial values	Collegial
Integrationist	Semi-autonomous actors Semi-permeable Boundaries	Interacting domains Mode 2: Broad, transdisciplinary, basic and applied	Contextualized Traditional and entrepreneurial	Conflicting Disintegrated Fragmented values	Cultural Political Stakeholder Garbage can
Hegemonist	Dominant actors Permeable boundaries	Hegemonic domains Conflictual, socially biased	Socially subsumed Co-opted	Dependent Hegemonic Subsumed values	Managerial Radical Postmodern

With regard to academic ecosystem and identity, the thesis follows an ‘integrationist’ perspective (Table 7). It does not agree with the separatist view that universities operate isolated from the society and that research should be conducted for its own sake, or with the hegemonist view that the relationship between universities and actors in their environments is conflictual. The thesis adopts the stakeholder metaphor that prevails in public engagement literature and, thus, explores the phenomenon of using online technologies for engagement by taking into consideration the different perspectives of the main actors involved. It recognises the need for the university to respond to its stakeholders’ values and demands (which is the essence of public engagement after all) and highlights the importance of taking into consideration the views of both parties involved in the two-way interactions that take place in the public engagement process. Each of the surveys included in the thesis looks at the relationship between different stakeholders: Survey 1 focuses on interactions among academics and works as a ‘control’ study (as its results will be compared with the results of the survey about engagement with the public), Survey 2 examines the interactions of academics with the public, and Survey 3 looks at the perspective of the public and their interactions with the academic community.

4.3 Questionnaire Design and Sample

For the purposes of the thesis, online questionnaires were employed as the data collection tools. Online questionnaires offer many advantages, among which are: a) access to a broader pool of respondents that may be geographically distant from the researcher, b) anonymity and confidentiality are easily ensured, c) lower cost than paper-based questionnaires, d) respondents are more likely to give sincere answers that are not largely affected by social norms, and e) any bias that may come from the interactions between the researcher and the respondent is minimised (Matthews & Ross, 2010, p. 311). Online questionnaires were chosen mainly for two reasons: a) the population of Surveys 1 and 2 is academics around the world so it would not be possible to use paper-based questionnaires and b) the population of Survey 3 is UK Internet users, so using an online questionnaire was an easy way to exclude respondents that were out of the scope of the study. The decision to focus exclusively on Internet users was based on the premise that people that do not use the Internet in their everyday activities will not adopt online technologies just for engaging with the academic community. Most importantly, people that do not use the Internet in general will not be familiar with the various online technologies that exist and therefore they will not be able to relate to the questions of the survey.

Table 8. Commonly used probability and nonprobability sampling methods (adapted from (Fink, 2003))

Description	Advantages	Disadvantages
Probability Sample		
<p><i>Simple Random Sample</i></p> <p>Every unit has an equal chance of selection</p>	Relative simple technique	Members of a subgroup of interest may not be included in suitable proportions
<p><i>Stratified Random Sampling</i></p> <p>The population of the study is grouped based on distinctive characteristics or strata</p>	<p>Facilitates comparison analyses of subgroup (e.g. male vs female)</p> <p>The sample is more likely to be representative of the population as sampling variations are lower than for random sampling</p>	<p>Calculation of sample sizes for each group is required</p> <p>Implementation can be time consuming and costly</p>
<p><i>Systematic Sampling</i></p> <p>Every Xth unit on a list of eligible units is selected (e.g. every 5th or 10th, the exact number can be determined by dividing the size of the population by the desired sample size).</p>	<p>It is convenient as an existing list (e.g. list of names) is used as a sampling frame</p> <p>It is similar to random sampling if the first point is selected randomly</p>	The researcher has to watch for repeating patterns within the sampling frame (e.g. names starting with a certain letter, data arranged by month)
<p><i>Cluster/Multistage Sampling</i></p> <p>Natural groups and or clusters are sampled, with members of each selected group subsampled afterward</p>	It is convenient as existing units (e.g. schools, hospitals) are used	
Nonprobability Sample		
<p><i>Convenience Sampling</i></p> <p>Available group of individuals or units is used</p>	A practical method as it relies on available units (e.g. students in a school)	Sample is unlikely to be representative of the target population as it is opportunistic and voluntary
<p><i>Snowball Sampling</i></p> <p>Previously identified members identify other members of the population</p>	It can be useful when it is difficult or impractical to obtain a list of names for sampling	<p>Recommendations may produce a biased sample</p> <p>There is little or no control over who is named</p>
<p><i>Quota Sampling</i></p> <p>The population is divided into subgroups (e.g. men and women who are living alone, living with a partner etc.)</p> <p>A sample is selected based on the proportions of subgroups needed</p>	It can be practical if reliable data exist to describe proportions (e.g. percentage of men over a certain age living alone versus those living with partners)	Records must be up-to-date in order to get accurate proportions

to represent the proportions in the population		
Focus Groups Groups up to ten people serve as representatives of a population	It is useful in guiding survey development	The researcher has to ensure that the relatively small group is a valid reflection of the larger group that will be surveyed

As far as the sampling technique is concerned, random selection, which is the selection procedure that allows each member of a population to have an equal probability of being selected for the study (Marczyk, DeMatteo, & Festinger, 2005, p. 54), has been chosen as a way to ensure that the samples will be representative of each study's population. Compared to non-random sampling techniques (Table 8), which select participants based on how easy to reach they are (e.g. convenience and snowball sampling), random sampling is based on statistics and allows researchers to draw conclusions about the generalisability of their findings (VanderStoep & Johnston, 2009, p. 26). This is the reason why random sampling is the most popular choice for studies that follow the positivist paradigm.

For Surveys 1 and 2, a multistage sampling technique, where clusters are selected and a sample is randomly drawn from these clusters (Fink, 2003, p. 15), was used as it was impossible to compile an exhaustive list of all the academics around the world. Thus, the author accumulated 3,000 random emails of academics by looking for staff contact details on the websites of random universities. At the same time, the link to the online survey was distributed on social networking sites in order to ensure that both academics that already use online technologies for engagement and those who do not currently use them for this purpose will have the chance to participate in the study. Survey 3, which focuses on UK online users, has used a random sample provided by a commercial research company. All the three surveys follow the Newcastle University Code of Good Practice in Research. An introductory page was used in each questionnaire to inform participants about the purpose of the study, provide contact information in case they have queries about the nature of the project and explain to them how the confidentiality of their responses will be ensured. More details about the research design of each study are provided in the sub-sections that follow.

4.3.1 Survey 1

The online questionnaire that was used in Survey 1 was constructed by following the main premises of the two theories discussed (Ajzen, 2002; Francis et al., 2004). The measurements were based on a number of previously validated scales adapted from the literature (see

Appendix). In order to examine the differences in academics' intention to use SNS and to use online technologies, the participants were asked the questions twice, once in relation to engagement through SNS and once for engagement via online technologies (OT).

For the purposes of the study a purposeful sample that covers academics from different disciplines, career stages and countries was employed. In order to achieve this, two different sampling techniques were used: a) distribution of the link to the survey via social networking sites, by posting it on groups with an academic focus and using profiles on Twitter, Academia.edu etc. b) creation of a random sample of 3000 academics and email the link to the survey. Since there is no list of academics around the world, universities were chosen at random. After discarding the incomplete responses and outliers, 370 valid responses remained for the analysis. The author ran independent samples t-tests to check for differences between the responses from the email sample and the SNS sample and no significant differences were observed, indicating that sampling bias is not an issue in this survey.

The vast majority of the participants are SNS users and most of them are based in universities in Europe. Almost half of them conduct research in areas of the Social Sciences (Table 9). While 60% of the respondents stated that they use SNS in order to engage with their academic peers, only 37% stated the same for other online technologies. However, almost 65% of the respondents reported that at least half of the time they spend on using OT is for work-related purposes. The same was not true about SNS, where the percentage of respondents that stated that they use SNS for work-related reasons at least half of the time they are on SNS is just 31%. Overall the sample had a reasonable distribution of attributes and usage patterns among the demographics captured (Table 9).

Table 9. Sample Demographics of Survey 1

Characteristic	Frequency	%	Characteristic	Frequency	%
Gender			Age		
Male	202	54.6%	18-24	3	0.8%
Female	168	45.4%	25-34	106	28.6%
Total	370	100.0%	35-44	125	33.8%
Current Post			45-54	72	19.5%
PhD Student	65	17.5%	55-64	54	14.6%
Post-Doc/ Research Associate	30	8.1%	65 or over	10	2.7%
Lecturer	81	21.9%	Total	370	100.0%
Senior Lecturer/Assistant Professor	102	27.6%	Continent		
Reader/Associate Prof./ Professor	92	24.9%	Europe	282	76.1%
Total	370	100.0%	America	38	10.3%
Academic Experience			Asia	24	6.5%
1-5	57	15.5%	Australia/Oceania	25	6.8%
6-10	113	30.5%	Africa	1	0.3%
11-20	130	35.1%	Total	370	100.0%
21-30	45	12.1%	SNS User		
31 and over	25	6.8%	Yes	304	82.2%
Total	370	100%	No	66	17.8%
Discipline Group			Total	370	100.0%
STEM	91	24.6%	Time per day on SNS		
Humanities	36	9.7%	Less than 10 minutes	39	10.5%
Social Sciences	215	58.1%	10-30 minutes	98	26.5%
Multidisciplinary	28	7.6%	31-60 minutes	65	17.6%
Total	370	100.0%	1-2 hours	35	9.5%
% of time on SNS work-related			2-3 hours	26	7.0%
0-25%	115	31.1%	More than 3 hours	41	11.1%
26-50%	73	19.7%	No response	66	17.8%
51-75%	44	11.9%	Total	370	100.0%
76-100%	71	19.2%	SNS use for engagement		
No response	67	18.1%	Yes	222	60.0%
Total	370	100.0%	No	148	40.0%
% SNS contacts work-related			Total	370	100.0%
0-25%	89	24.1%	Time per day using OT		
26-50%	84	22.7%	Less than 10 minutes	14	3.8%
51-75%	57	15.4%	10-30 minutes	45	12.2%
76-100%	72	19.5%	31-60 minutes	67	18.1%
No response	68	18.3%	1-2 hours	60	16.2%
Total	370	100.0%	2-3 hours	54	14.6%
% time using OT work-related			More than 3 hours	130	35.1%
0-25%	49	13.2%	Total	370	100.0%
26-50%	83	22.4%			
51-75%	122	33.0%	OT use for engagement		

76-100%	116	31.4%	Yes	137	37.0%
No response	-	-	No	233	63.0%
Total	370	100.0 %	Total	370	100.0 %

4.3.2 Survey 2

Survey 2 used the items and sampling technique used in the first survey, with the only difference that there was not a distinction between SNS and other online technologies, as there are not SNS specifically designed for connecting academics with the public (like Academia.edu, ResearchGate etc. that can be used in the case of academic engagement). As the invitations for participation in the study were sent to the same email list with academics used in the Survey 1, there are some academics that have participated in both surveys. However, as the responses were anonymous and some participants found the link of the survey on social media platforms, a percentage of the academics that answered both questionnaires cannot be provided. Here, the valid sample after discarding incomplete responses and outliers was 250 responses.

The sample's profile is similar to the one of the previous survey, with most academics being based in Europe (72.8%) and conducting research in the discipline of social sciences (57.6%). 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 for engaging with the public. Like in the first survey, the distribution among genders, posts, age groups and academic experience was reasonable (Table 10).

Table 10. Sample Demographics of Survey 2

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	Africa	-	-
11-20	99	39.6	Total	250	100.0 %
21-30	40	16.0	Online Technologies' use 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%			

4.3.3 Survey 3

Survey 3 involved the six key variables of UTAUT2 model. The online questionnaire that was used in the study was constructed by previously validated scales adapted from the literature. The questionnaire was pre-tested on a small number of social media users (30 respondents) to refine the wording, readability and clarity of the measures before conducting the final survey. During the main data collection, participants were asked separately to think about their potential online engagement with the academic community a) for learning purposes and b) in order to get information about research and evaluate the various factors for doing so on a Likert scale of 1 to 7.

The author used a random sample drawn from a panel of UK residents provided by a research company. This decision was based on the fact that UK universities have shown a strong interest in public engagement and therefore UK residents are quite likely to have come across the term ‘public engagement’. Public engagement has increasingly become an important aspect of the UK’s higher education system, with universities in the UK being assessed for their research outcomes through such exercises as the ‘Research Assessment Exercise’ (RAE) and ‘Research Excellence Framework’ (REF). The latter, which replaced RAE from 2008, has put greater emphasis on research impact, which refers to the degree to which research outcomes are relevant to society’s needs and interests (Murphy & Sage, 2014). The ongoing pressure for research impact has motivated UK universities to intensify their attempts to engage with the public, making the UK an ideal field for studying public engagement. After removing outliers and unengaged responses, 241 valid responses remained for the analysis. Table 11 presents the demographics of the sample. The sample had a good distribution among age groups and a balance between males and females (55.6% and 44.4% respectively). Most of the participants stated that they have a lot of experience with online technologies (73.0%) and that this experience was a positive one (77.2%).

Table 11. Sample Demographics of Survey 3

Characteristic	Number	%	Characteristic	Number	%
Gender			Income		
Male	134	55.6	Below £10,000	7	2.9
Female	107	44.4	£10,000 –£19,999	21	8.7
Age			£20,000 - £29,999	45	18.7
18 – 24	9	3.7	£30,000 – £39,999	47	19.5
25 – 34	41	17.0	£40,000 - £49,999	30	12.4
35 – 44	55	22.8	£50,000 - £59,999	25	10.4
45 – 54	70	29.0	£60,000 - £69,999	19	7.9
55 - 64	51	21.2	£70,000 - £79,999	9	3.7
65 and over	15	6.2	£80,000 or more	33	13.7
			Prefer not to answer	5	2.1
Education					
Primary School	9	3.7			
High School	28	11.6			
Some College	47	19.5			
Bachelor’s Degree	68	28.2			
Postgraduate/Master Degree	52	21.6			
Doctorate	22	9.1			
Other	15	6.2			

It is also interesting to have a look at the nature of the Internet use regarding engagement with academic community (Table 12). Although the majority of respondents does not use currently online technologies for engagement with academia either for learning or information purposes, the percentage of people stated that interact with academia online for learning purposes is higher (40.7% instead of 35.7%). Also the majority of the ones that they do engage online with academics, do so for more than three years (43.9% for learning and 39.5% for information acquisition). Most of the current users (around 62% in both cases of learning and information acquisition) stated that more than the half time spent online interacting with academic community is for work related reasons rather than for personal use (e.g. hobbies, general interest towards science etc.).

Table 12. Use of online technologies for engagement with academia by the public

Characteristic	For learning	For information acquisition
Use OT to interact with academia		
Yes	98 (40.7%)	86 (35.7%)
No	143 (59.3%)	155 (64.3%)
Percentage of online interaction with academia that is work – related		
0-25%	25 (10.4%)	28 (11.6%)
26-50%	67 (27.8%)	65 (27%)
51-75%	74 (30.7%)	64 (26.5%)
76-100%	75 (31.1%)	84 (34.9%)
Percentage of online interaction with academia that is for personal use		
0-25%	78 (32.4%)	86 (35.7%)
26-50%	98 (40.6%)	94 (39%)
51-75%	41 (17%)	34 (14.1%)
76-100%	24 (10%)	27 (11.2%)
Start using OT for interacting with academic community		
Less than 6 months ago	8 (8.2%)	19 (22.1%)
Between 6 and 12 months ago	22 (22.4%)	16 (18.6%)
Between 1 and 3 years ago	25 (25.5%)	17 (19.8%)
More than 3 years ago	43 (43.9%)	34 (39.5%)
Total	98 (100%)	86 (100%)

4.4 Analytical Strategy

The main analysis of the data was conducted by using AMOS 22.0. A Structural Equation Modelling (SEM) technique was chosen, as it makes it possible to examine a series of relationships simultaneously, and therefore test complex models in a more comprehensive way than any other multivariate technique (Hair et al., 2014). The author followed a two-step approach like the one suggested by Anderson and Gerbing (1988), which includes “*the separate estimation and respecification of the measurement model prior to the simultaneous estimation of the measurement and structural submodels*”. The model that combines both the measurement and the structural sub-models is called ‘hybrid’ and if both the structural and the measurement model is identified then the whole model is also identified (Kenny & Milan, 2012, p. 153).

As soon as the model is specified, it is important to determine the degree to which the hypothesised model fits the observed data on each of the variables. The model fit as it is called, can be judged based on various indices like the χ^2/df ratio, the goodness-of-fit (GFI), the Standardised Root Mean Square Residual (SRMR), the Root Mean Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI) (West, Taylor, & Wu, 2012).

Although there is not a strict rule about which indices the researcher has to report in order to prove a good model fit, three to four indices provide adequate evidence, as long as they include at least one incremental index (e.g. CFI), one absolute index (e.g. SRMR) and the χ^2 with the associated degrees of freedom (Hair, Black, Babin, & Anderson, 2014, p. 583). As far as the cut-off values are concerned, the author has decided to follow the more recent and updated ones, proposed by Hair et al. (2014). Table 13 presents the proposed values that demonstrate a good model fit across different model cases.

Table 13. Model fit indices cut-offs (adapted from Hair et al. 2014).

No. of observed variables (m)	No. of observations < 250			No. of observations > 250		
	m ≤ 12	12 < m < 30	m ≥ 30	m ≤ 12	12 < m < 30	m ≥ 30
χ^2	Insignificant p-values expected	Significant p-values even with good fit	Significant p-values expected	Insignificant p-values even with good fit	Significant p-values expected	Significant p-values expected
CFI	.97 or better	.95 or better	Above .92	.95 or better	Above .92	Above .90
SRMR	Biased upward, use other indices	.08 or less (with CFI of .95 or higher)	Less than .09 (with CFI above .92)	Biased upward, use other indices	.08 or less (with CFI above .92)	.08 or less (with CFI above .92)
RMSEA	Values < .08 with CFI = .97 or higher	Values < .08 with CFI = .95 or higher	Values < .08 with CFI above .92	Values < .07 with CFI of .97 or higher	Values < .07 with CFI of .92 or higher	Values < .07 with CFI of .90 or higher

Apart from the above, the researcher may have to conduct extra analysis, like Exploratory Factor Analysis (EFA) or a Confirmatory Factor Analysis (CFA) in which a measurement model for a specific construct or scale is tested, in order to determine the best way to conceptualise and model item-level indicators (Boomsma, Hoyle, & Panter, 2012, p. 343). Although the items used in the surveys of this thesis come from previous validated scales found in the literature, the author decided to run EFA for the items of each survey in order to make sure that the scales are still valid in the context of the thesis.

4.5 Reliability and Validity Analysis

4.5.1 Reliability and validity analysis for Survey 1

Data were screened for normality issues and all the values of skewness and kurtosis were found to be within the recommended range of ± 2.58 (Tabachnick and Fidell, 2012). The author ran both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA)

in order to assess the construct reliability and validity. The Kaiser–Meyer–Olkin (KMO) and maximum likelihood analysis were conducted to examine the adequacy of the study sample and the validity of the study instrument, respectively. After removing one item from New Contacts (Table 14), due to failure to load with the expected factor, it was found that the value of KMO for the SNS model was 0.932 and 0.930 for the OT model. All the remaining items loaded on each distinct factor and explained 76.16% and 81.35% of the total variance in the SNS and OT model respectively.

Table 14. Study 1 – EFA loadings.

Construct	Items	EFA Loadings SNS	EFA Loadings OT	Source
Intention	I1	0.876	0.762	(Ajzen, 2002; Lin 2006)
	I2	1.002	0.764	
	I3	0.835	0.698	
Attitude	A1	0.789	0.897	(Peslak et al. 2011)
	A2	0.852	0.918	
	A3	0.904	0.898	
	A4	0.904	0.895	
	A5	0.924	0.897	
Subj. Norms	SN1	0.850	1.004	(Lin 2006; Taylor and Todd 1995)
	SN2	1.001	0.907	
PBC	PBC1	0.447	0.631	(Lin 2006; Taylor and Todd 1995)
	PBC2	0.808	0.926	
	PBC3	0.788	0.708	
Privacy Control	PC1	0.904	0.970	(Xu et al. 2013)
	PC2	0.937	0.966	
	PC3	0.912	0.951	
	PC4	0.769	0.725	
Old Ties	OT1	0.820	0.970	(Foregger 2008)
	OT2	0.508	0.750	
	OT3	0.869	0.957	
	OT4	0.692	0.756	
	OT5	0.902	0.854	
New Contacts	NC1	0.804	0.921	(Kim et al. 2011)
	NC2	0.877	0.825	
	NC3	0.579	0.745	
	NC4	Removed	Removed	
Info Seek	ISK1	0.814	0.754	(Kim et al. 2011)
	ISK2	0.732	0.599	
	ISK3	0.973	1.002	
	ISK4	0.904	0.938	
Image	IMG1	0.488	0.670	(Moore and Benbasat, 1991)
	IMG2	0.724	0.811	
	IMG3	0.979	1.034	
	IMG4	0.974	1.014	
	IMG5	0.896	0.771	
Peer Influence	PI1	0.995	0.930	(Taylor and Todd 1995)
	PI2	0.853	0.862	
External Influence	EI1	0.706	0.784	(Hsu and Chiu 2004)
	EI2	0.946	0.961	
	EI3	0.783	0.932	

Self-Efficacy	EI4	0.886	0.890	(Lin 2006)
	SE1	0.767	0.837	
	SE2	1.078	0.886	
	SE3	0.724	0.735	
	SE4	0.628	0.861	
Self-Promotion	SE5	0.697	0.825	(Bolino and Turnley, 1999)
	SP1	0.624	0.754	
	SP2	0.880	0.917	
	SP3	0.984	0.973	
	SP4	0.955	0.970	
	SP5	0.805	0.885	

The reliability of the scales was also tested and the Cronbach's alphas of all scales ranged between 0.787 and 0.976 (Table 15), indicating very good reliability according to Fornell and Larcker (1981). Table 16 shows the means and standard deviations of the constructs.

Table 15. Composite reliability, AVE and Cronbach's α of the models in Survey 1.

Construct	SNS			Other Online Technologies		
	C.R.	AVE	Cronbach α	C.R.	AVE	Cronbach α
Intention	0.967	0.908	0.965	0.972	0.921	0.972
Attitude	0.943	0.767	0.942	0.963	0.837	0.962
Subj. Norms	0.944	0.893	0.943	0.976	0.953	0.976
PBC	0.774	0.641	0.787	0.841	0.638	0.843
Privacy Control	0.927	0.760	0.930	0.953	0.837	0.951
Old Ties	0.899	0.640	0.896	0.939	0.756	0.941
New Contacts	0.913	0.777	0.911	0.901	0.752	0.899
Info Seek	0.920	0.743	0.918	0.929	0.766	0.924
Image	0.932	0.735	0.937	0.943	0.767	0.947
Peer Influence	0.946	0.897	0.945	0.954	0.912	0.954
External Influence	0.906	0.706	0.902	0.952	0.831	0.951
Self-Efficacy	0.910	0.672	0.916	0.924	0.708	0.922
Self-Promotion	0.920	0.703	0.925	0.954	0.805	0.953

Table 16. Means and standard deviations of the constructs in Survey 1.

Construct	Mean -SNS	Standard deviation -SNS	Mean - OT	Standard deviation - OT
Intention	3.75	1.01	3.65	0.96
Attitude	3.67	0.84	3.68	0.84
Subj. Norms	4.16	1.54	4.08	1.59
PBC	5.25	1.33	4.95	1.44
Privacy Control	3.74	1.66	3.55	1.60
Old Ties	3.60	0.94	3.30	1.01
New Contacts	3.49	1.07	3.29	1.00
Info Seek	3.46	1.13	3.56	1.03
Image	3.62	1.62	3.76	1.60
Peer Influence	3.85	1.58	3.85	1.62
External Influence	3.73	1.56	3.78	1.55
Self-Efficacy	4.71	1.52	4.93	1.36
Self-Promotion	2.67	1.08	2.64	1.08

The author further tested construct reliability and validity by conducting CFA using the AMOS software package. The results of CFA are shown in Table 15. It should be noted that one item from Perceived Behavioural Control (PBC3) in the SNS model was removed as it had poor loading during CFA. All the constructs have Composite Reliabilities (CR) above the recommended value of 0.70 and the Average Variance Extracted exceeds the threshold of 0.50 (Hair et al., 2014) and therefore reliability and convergent validity have been established. In addition, the square root of AVE is greater than inter-construct correlations for every construct; thus, there is discriminant validity among them (diagonals of Table 17 and Table 18).

Table 17. Construct Correlation Matrix for the SNS model (AVE on the diagonal).

	I	A	SN	PBC	OC	NC	Img	SP	PI	EI	PC	SE	IS
I	0.953												
A	0.764	0.876											
SN	0.438	0.497	0.945										
PBC	0.705	0.728	0.463	0.800									
OC	0.527	0.582	0.410	0.553	0.800								
NC	0.607	0.644	0.459	0.548	0.617	0.881							
Img	0.436	0.520	0.529	0.414	0.365	0.492	0.857						
SP	0.375	0.348	0.335	0.362	0.413	0.491	0.404	0.838					
PI	0.303	0.281	0.561	0.367	0.289	0.327	0.514	0.285	0.947				
EI	0.284	0.282	0.410	0.356	0.303	0.362	0.499	0.232	0.583	0.840			
PC	0.133	0.208	0.215	0.126	0.230	0.243	0.199	0.159	0.144	0.279	0.872		
SE	0.598	0.661	0.394	0.652	0.477	0.571	0.486	0.387	0.424	0.423	0.255	0.820	
IS	0.534	0.628	0.520	0.575	0.567	0.779	0.520	0.419	0.380	0.396	0.180	0.585	0.862

Table 18. Construct Correlation Matrix for the OT model (AVE on diagonal).

	I	A	SN	PBC	OC	NC	Img	SP	PI	EI	PC	SE	IS
I	0.959												
A	0.787	0.915											
SN	0.476	0.447	0.976										
PBC	0.597	0.616	0.569	0.799									
OC	0.376	0.417	0.309	0.419	0.869								
NC	0.508	0.557	0.439	0.481	0.654	0.867							
Img	0.390	0.398	0.537	0.407	0.302	0.396	0.876						
SP	0.414	0.316	0.369	0.374	0.346	0.396	0.399	0.897					
PI	0.393	0.377	0.718	0.472	0.338	0.398	0.568	0.379	0.955				
EI	0.242	0.322	0.499	0.374	0.307	0.416	0.469	0.270	0.613	0.912			
PC	0.122	0.275	0.283	0.327	0.145	0.182	0.307	0.182	0.300	0.339	0.915		
SE	0.468	0.519	0.307	0.616	0.378	0.469	0.392	0.349	0.329	0.380	0.281	0.841	
IS	0.524	0.595	0.519	0.585	0.489	0.621	0.457	0.326	0.445	0.439	0.211	0.529	0.875

According to Hair et al. (2014), when the number of observations is above 250 and the model contains more than 30 observed variables, significant p-values are expected for χ^2 and a good model fit has been established when CFI is above 0.90, SRMR is 0.08 or less and RMSEA is less than 0.07. Our measurement model for SNS meets all the above thresholds ($\chi^2/df = 1.765$, CFI = 0.954, SRMR = 0.0563, RMSEA=0.046), demonstrating a good model fit. Similarly, the measurement model of OT meets all the aforementioned criteria ($\chi^2/df = 1.928$, CFI = 0.952, SRMR =0.0441, RMSEA= 0.050).

4.5.2 Reliability and validity analysis for Survey 2

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, and therefore it was removed from the analysis. During the EFA, the author had to remove items 2 and 4 from the construct ‘old ties’, 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 19) and explained 77.07% of the total variance, while KMO had the value of 0.918.

Table 19. Study 2 – EFA loadings.

Construct	Items	EFA Loadings OT	Source
Intention	I1	0.944	(Ajzen, 2002; Lin 2006)
	I2	0.953	
	I3	0.919	
Attitude	A1	0.701	(Peslak et al. 2011)
	A2	removed	
	A3	0.941	
	A4	0.905	
	A5	0.935	
Subj. Norms	SN1	0.721	(Lin 2006; Taylor and Todd 1995)
	SN2	1.036	
PBC	PBC1	0.662	(Lin 2006; Taylor and Todd 1995)
	PBC2	0.518	
	PBC3	0.616	
Privacy Control	PC1	0.920	(Xu et al. 2013)
	PC2	0.957	
	PC3	0.946	
	PC4	0.878	
Old Ties	OT1	0.765	(Foregger 2008)
	OT2	Removed	
	OT3	0.802	
	OT4	Removed	
	OT5	0.760	
New Contacts	NC1	0.838	(Kim et al. 2011)
	NC2	Removed	
	NC3	0.573	

	NC4	0.592	
Info Seek	ISK1	0.808	(Kim et al. 2011)
	ISK2	0.747	
	ISK3	Removed	
	ISK4	0.586	
Image	IMG1	0.751	(Moore and Benbasat, 1991)
	IMG2	0.741	
	IMG3	0.917	
	IMG4	0.856	
	IMG5	0.835	
Peer Influence	PI1	0.634	(Taylor and Todd 1995)
	PI2	0.657	
External Influence	EI1	0.781	(Hsu and Chiu 2004)
	EI2	0.839	
	EI3	0.807	
	EI4	0.746	
Self-Efficacy	SE1	0.936	(Lin and Huang, 2008)
	SE2	0.890	
	SE3	0.892	
	SE4	0.942	
Self-Promotion	SP1	0.643	(Bolino and Turnley, 1999)
	SP2	0.837	
	SP3	0.940	
	SP4	0.907	
	SP5	0.838	

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 have Composite Reliabilities (CR) above the recommended value of 0.70 and the Average Variance Extracted exceeds the threshold of 0.50 (Hair et al., 2014) and therefore reliability and convergent validity have been established (Table 20). Furthermore, the square root of AVE is greater than inter-construct correlations for every construct; thus, there is discriminant validity among them (Table 21).

Table 20. Composite reliability, AVE, Cronbach's α and constructs' statistics in Survey 2.

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 Ties	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 21. Construct Correlation Matrix –Survey 2 (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

As far as the model fit of the measurement model is concerned, all the indices meet the required thresholds ($\chi^2/df=1.581$, CFI = 0.951, SRMR = 0.045, RMSEA=0.048).

4.5.3 Reliability and validity analysis for Survey 3

Data screening for normality issues and all the values of skewness and kurtosis was undertaken, with results being within the recommended range of ± 2.58 (Tabachnick & Fidell, 2012). EFA was conducted using Maximum Likelihood with Promax rotation to test if the observed variables loaded together as expected, were adequately correlated, and met the criteria of reliability and validity. After removing one item from ‘Facilitating Conditions’ in the Learning model and one from ‘Habit’ in the Information Acquisition model due to poor loadings (below 0.350, which according to Hair et al. (2014) is the minimum threshold for samples of this size), it was found that the value of Kaiser–Meyer–Olkin (KMO) was 0.921 (Learning model) and 0.915 (Information Acquisition model). All the other items loaded on each distinct factor (Table 22) and explained 78.8% (Learning model) and 82.73% (Information Acquisition model) of the total variance.

Table 22. Survey 3 – EFA Loadings

Construct	EFA Loadings Learning model	EFA Loadings Info model	Reference
Intention (I)			(Brown, Dennis, and Venkatesh 2010)
I1	0.960	0.944	
I2	1.012	0.970	
I3	0.970	0.935	
Performance expectancy (PE)			(Powell et al., 2012; Venkatesh, Thong, Chan, Hu, & Brown, 2011)
PE1	0.817	0.851	
PE2	0.964	0.850	
PE3	0.812	0.973	
PE4	0.820	0.971	
Effort expectancy (EE)			(Venkatesh et al., 2011)
EE1	0.394	0.539	
EE2	0.705	0.828	
EE3	0.933	0.992	
EE4	0.915	1.020	
Social influence (SI)			(Venkatesh et al., 2011)
SI1	0.956	1.004	
SI2	0.961	0.958	
SI3	0.693	0.558	
Facilitating conditions (FC)			(Brown et al., 2010)
FC1	0.760	0.869	
FC2	0.832	0.857	
FC3	Removed	0.513	
Hedonic Motivation (HM)			(Calder et al., 2009)
HM1	0.859	0.978	
HM2	0.911	0.941	
HM3	0.637	0.654	
HM4	0.612	0.755	
Habit (H)			(Calder et al., 2009)
H1	0.681	Removed	
H2	0.922	0.690	
H3	0.720	0.706	
H4	0.751	0.869	

Also, the factors demonstrated sufficient discriminant validity, as the correlation matrix showed no correlations above 0.700. The reliability of the scales was also tested and the Cronbach’s alphas of all scales ranged between 0.820 and 0.985 for Learning model and 0.866 and 0.988 for Information Acquisition model (Table 23), indicating very good reliability according to Fornell and Larcker (1981).

Table 23. Survey 3 – Cronbach's α

Construct	Mean (Learning/Info)	Standard deviation (Learning/Info)	Cronbach's α (Learning/Info)
Intention	3.93/4.08	2.05/1.89	0.985/0.988
Habit	3.78/3.51	1.92/1.85	0.929/0.948
Hedonic Motivation	3.78/3.79	1.68/1.62	0.877/0.912
Performance Expectancy	5.06/4.93	1.29/1.44	0.919/0.958
Effort Expectancy	4.99/4.88	1.26/1.32	0.926/0.936
Social Influence	4.00/3.91	1.50/1.58	0.917/0.908
Facilitating Conditions	5.41/4.80	1.24/1.47	0.820/0.866

Construct reliability and validity was also tested by conducting CFA using the AMOS software package. As can be seen in Table 24 and Table 25, all the constructs have Composite Reliabilities (CR) above the recommended value of 0.70 and the Average Variance Extracted exceeds the threshold of 0.50 (Hair et al. 2014) and therefore reliability and convergent validity have been established. In addition, the square root of AVE for both models is greater than inter-construct correlations for every construct; thus, there is discriminant validity among them (diagonals of Table 24 and Table 25).

Table 24. Construct Correlation Matrix – Learning model

	CR	AVE	SI	I	H	HM	PE	EE	FC
Social Influence	0.922	0.798	0.893						
Intention	0.986	0.959	0.492	0.979					
Habit	0.924	0.753	0.554	0.783	0.868				
Hedonic Motivation	0.881	0.650	0.614	0.582	0.737	0.806			
Performance	0.914	0.730	0.582	0.445	0.502	0.591	0.854		
Effort	0.936	0.785	0.498	0.323	0.413	0.518	0.784	0.886	
Facilitating Conditions	0.821	0.697	0.225	0.346	0.264	0.268	0.418	0.547	0.835

Table 25. Construct Correlation Matrix – Information Acquisition model

	CR	AVE	SI	I	H	HM	PE	EE	FC
Social Influence	0.914	0.782	0.884						
Intention	0.988	0.964	0.548	0.982					
Habit	0.949	0.861	0.626	0.629	0.928				
Hedonic Motivation	0.914	0.728	0.646	0.527	0.791	0.853			
Performance	0.952	0.832	0.552	0.634	0.438	0.566	0.912		
Effort	0.938	0.791	0.423	0.334	0.333	0.426	0.566	0.889	
Facilitating Conditions	0.880	0.713	0.510	0.477	0.229	0.329	0.649	0.711	0.844

As far as model fit is concerned, the following values were observed for our measurement models: $\chi^2/df = 1.783$, CFI= 0.97, SRMR= 0.0517, RMSEA= 0.057 (Learning model) and $\chi^2/df = 2.492$, CFI= 0.951, SRMR= 0.064, RMSEA=0.079 (Information Acquisition model). According to Hair et al. (2014) when the number of observations is below 250 and the number of observed variables is between 12 and 30, significant p-values are expected for χ^2 and a good model fit has been established when CFI is above 0.95 and both SRMR and RMSEA are 0.08 or less. Thus, both measurement models demonstrated a good model fit.

4.6 Common Method Bias

The term “common method bias” refers to the variance that stems from the measurement method rather than from the constructs of the study and can be caused by various reasons, such as the measurement of dependent and independent variables at the same time with the same tool (i.e. questionnaire), the way that items are grouped in the questionnaire (e.g. items from different constructs that are grouped together can decrease intra-construct correlations and increase inter-construct correlation), or the short length of the questionnaire that may result in participants remembering what they have answered in previous questions and respond to the next questions accordingly (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Various methodological (e.g. archival measures, primary or secondary observation and implicit measures) and statistical (e.g. ANOVA, correlations, structural equation modelling with single factor, correlated uniqueness and direct product models) approaches have been proposed in literature as remedies for common method bias, although in practice very few empirical studies discuss or address the issue (Burton-Jones, 2009). This may be due to the fact that it is not clear whether common method bias is an actual problem. In fact, it has been found that even if common method bias is present, its effect is not necessarily substantial, especially when it comes to studies from the Information Systems research field (Malhotra, Kim, & Patil, 2006). Similarly, scholars from the organisational research field have argued that there are many misconceptions about common method bias such as, that relationships among self-reported variables are always biased in an upward way, other measures are superior to self-report measures and that different rating sources (e.g. supervisor, peer, subordinate and self-rating etc.) can be perceived as different methods of measuring performance (Conway & Lance, 2010). The same authors argue that post hoc statistical remedies for common method bias are not really useful, as all of them have important disadvantages and some of them have presented poor empirical outcomes (Conway & Lance, 2010).

Despite the uncertainty around the importance of common method bias in general and the limitations that the relevant statistical approaches have on detecting and/or controlling it, the author has tried to evaluate the effect that common method bias may have on the surveys of this thesis, in order to provide to the reader a holistic view of the data used in the thesis. Two different techniques were used in order to assess whether common method bias was a serious issue in each of the surveys of the thesis. Firstly, the author ran the Harman's single factor test suggested in the study of Podsakoff et al. (2003). According to them, common method bias is not an issue if after running an unrotated principal component factor analysis a) more than one factor emerges and b) the first (largest) factor does not account for the majority of the variance. The second technique is based on multiple regression analysis among the latent factors of a research model and validates the existence of common method bias based on the VIF values. More specifically, common method bias is not a serious issue in a study if the VIF values of the latent factors are below the threshold of 5 (Kock, 2015; Kock & Lynn, 2012).

After running the unrotated principal component factor analysis for each of the two models in Survey 1, it was found that in both models a) more than one factor emerged and b) the first (largest) factor did not account for the majority of the variance (37.0% in the SNS model and 37.9% in the OT model). Secondly, after running the multiple regression analysis using the composites of the latent factors it was found that VIF values ranged from 1.234 to 4.265 for SNS model and from 1.257 to 3.329 for OT mode. Thus, all the values were below the recommended VIF threshold of 5, for covariance-based SEM. Based on the results of the two tests it was concluded that common method bias is not an issue in the first survey. Similarly, more than one factor emerged during the unrotated principal component analysis in Survey 2 and the largest factor accounted for 35.2% of the total variance. At the same time the VIF values from the multiple regression analysis ranged from 1.138 to 4.628. Thus, it was concluded that common method bias does not play an important role in Survey 2. Finally, the unrotated principal components analysis for both models (the learning model and the information model) in Survey 3 resulted in the emergence of more than one factor which did not account for the majority of variance (the largest factor of the learning model accounted for 47.9% of the total variance and the largest factor of the information model accounted for 50.3% of the variance). As for the results of the multiple regression analysis test, the VIF values for the learning model ranged from 1.600 to 3.717 and for the information model they ranged from 2.534 to 4.134. Thus, all the values were below the recommended VIF threshold

of 5, for covariance-based SEM. Based on the above, it was concluded that common method bias is not a serious issue in the third survey either.

4.7 Invariance Tests

Researchers have to test for measurement invariance when they want to make group comparisons based on the demographics of the sample (e.g. testing the moderating effects of variables like age, gender etc.), so they can ensure that there is equivalence of the measured constructs among the different groups and all the groups interpret the questions in the same way (Chen, Sousa, & West, 2005). Violations of invariance indicate that influences, other than the targeted latent variables, may be responsible for systematic group differences on the measured variables and thus, firm conclusions cannot be drawn based on the group comparisons (Millsap & Olivera-Aguilar, 2012). Measurement invariance can be tested at various levels, from configural and metric invariance to variance and covariance invariance; however, as the more advanced levels represent very strict ideal standards that usually cannot be reached, in practice scholars focus on testing invariance at the first levels (Byrne, 2010, p. 199; Chen et al., 2005).

Configural and metric invariance tests were conducted before testing for moderating effects of age, gender and education level on both models of Survey 3. Configural invariance means that *“the same number of factors holds for each group, and the same variables define each factor across groups”*, and it is achieved if the original measurement model fits adequately in each group (Millsap & Olivera-Aguilar, 2012). Metric (or factor loading) invariance, on the other hand, is achieved when the linear relation between each factor and its associated items has the same strength across groups (Chen et al., 2005). Achieving metric invariance across all groups means that the common factors are responsible for any population differences observed in the covariances between the measured variables (Millsap & Olivera-Aguilar, 2012). The following results were obtained after testing for measurement invariance in Survey 3:

Gender: The model fit of the measurement models (with the two groups ‘males’ and ‘females’ loaded separately) had an adequate fit for both the Learning model ($\chi^2/df= 1.641$, CFI= 0.953, RMSEA= 0.052) and the Information Acquisition model ($\chi^2/df= 1.809$, CFI= 0.949, RMSEA= 0.058), indicating that the models are configurally invariant. Both measurement models met also the criteria for metric invariance, as the chi-square difference tests were found to be non- significant ($p > 0.05$) after the models were constrained to be equal in both occasions.

Age: The sample was divided into two age groups, namely 'Younger individuals' (< 45 years old) and 'Older individuals' (\geq 45 years old). In the case of the learning, model the model fit for age was good ($\chi^2/df=1.504$, CFI=0.962, RMSEA=0.046) and the chi-square difference test was again nonsignificant ($p>0.05$). With regard to the Information Acquisition model, the model fit for age was generally good, with the exception of CFI, which was below the recommended threshold of 0.95 ($\chi^2/df=1.933$, CFI=0.941, RMSEA=0.062). The chi-square difference test was again nonsignificant ($p>0.05$). Having not established configural invariance the author decided to test for differences between age groups only in the case of the Learning model.

Education level: The sample was again separated into two groups, depending on whether the respondent had a University degree (i.e. Bachelor, Master Degree or Doctorate) or not (i.e. Primary or High School, Some College etc.). Configural and metric invariance was present in the case of Learning model, with the model fit being adequate ($\chi^2/df= 1.522$, CFI= 0.961, RMSEA=0.047) and the chi-square difference test being non-significant. The same was true for the Information Acquisition model, although CFI was at the borderline ($\chi^2/df=1.879$, CFI= 0.945, RMSEA=0.061) and therefore any differences that may be observed in this model based on the education level have to be interpreted with caution.

5. Results

This chapter presents the findings of the three surveys of the thesis. Section 5.1 presents some preliminary analysis of the data collected for the survey about online academic engagement, and then it presents the results of the Structural Equation Modelling analysis of the two research models (i.e. SNS and OT). Similarly, Section 5.2 gives a report of some preliminary analysis of Survey 2 data and then it provides the main results of the structural model. Finally, Section 5.3 presents the findings of the two structural models of Survey 3 (i.e. learning and information acquisition).

5.1 Survey 1: Engagement within Academia - Differences between intention to adopt Social Networking Sites and other online technologies

5.1.1 Examining potential differences between users and non-users

Before testing the structural models, the author checked for differences in the means of the four main constructs (Intention, Attitude, Subjective Norms and Perceived Behavioural Control) between academics that already use SNS/OT for engagement and academics that do not, by conducting a series of independent samples t-tests. It was found that academics that already use SNS for engagement rated their intention to use SNS for engagement purposes higher ($M = 4.16$, $SD = 0.69$) than the rest ($M = 3.12$, $SD = 1.02$), $t(234) = 10.85$, $p < 0.001$. In addition, users rated their attitude towards SNS higher ($M = 3.91$, $SD = 0.61$) than non-users ($M = 3.31$, $SD = 0.80$), $t(255) = 7.81$, $p < 0.001$. The same was true for Subjective Norms (users: $M = 4.48$, $SD = 1.39$, non-users: $M = 3.68$, $SD = 1.53$, $t(294) = 5.11$, $p < 0.001$) and Perceived Behavioural Control (users: $M = 5.62$, $SD = 0.96$, non-users: $M = 4.90$, $SD = 1.16$, $t(275) = 6.27$, $p < 0.001$). Similarly, differences were observed in OT data. Academics that already use online technologies for engagement rated their intention to use them for such purposes higher ($M = 4.20$, $SD = 0.75$) than those who do not ($M = 3.33$, $SD = 0.89$), $t(324) = 9.97$, $p < 0.001$. Differences were also observed in Attitude (users: $M = 4.08$, $SD = 0.68$, non-users: $M = 3.45$, $SD = 0.75$, $t(305) = 8.29$, $p < 0.001$), Subjective Norms (users: $M = 4.64$, $SD = 1.47$, non-users: $M = 3.74$, $SD = 1.53$, $t(368) = 5.53$, $p < 0.001$) and Perceived Behavioural Control (users: $M = 5.46$, $SD = 1.17$, non-users: $M = 4.65$, $SD = 1.20$, $t(368) = 6.29$, $p < 0.001$).

The author then explored potential factors that may affect the continuance intentions of academics that already use online technologies for engagement and explain the above differences between users and non-users. A linear regression analysis was conducted by using the stepwise method and including potential predictors such as Satisfaction with SNS/OT,

number of published papers, conference papers and books, academic experience in years, gender, age, time spent on using SNS/OT and number of contacts in SNS. In the case of SNS, the regression analysis, neither a person's outputs (which could be considered a proxy for content creation and sharing), nor individual characteristics play a significant role. The regression results showed that only satisfaction with SNS (Hsu and Chiu, 2004) (Cronbach's α : 0.865) and the number of SNS contacts had a significant relationship with Intention to continue using SNS for engagement and were included in the model. More specifically, Satisfaction with SNS (β = 0.480, p <0.001) and number of SNS contacts (β = 0.176, p <0.01) are significantly and positively related to Intention to use SNS for engagement (adjusted R^2 = 0.281). As far as online technologies are concerned, the variables that were found to be significantly related to Intention to use OT for engagement (Adjusted R^2 =0.365) were Satisfaction with OT (Cronbach's α : 0.910) (β = 0.608, p <0.001) and gender (β = 0.192, p <0.01). The Variance Inflation Factor (VIF) for the variables included in these models ranged between 1.018 and 1.028 and the tolerance between 0.973 and 0.983, values that are less than the threshold of 10 and above the threshold of 0.1 respectively (Hair et al. 2014), and hence multicollinearity was not considered an issue.

5.1.2 The structural models of Survey 1

After testing the full hybrid model of SNS (χ^2/df = 1.945, CFI = 0.942, SRMR = 0.0767, RMSEA = 0.051) and OT (χ^2/df = 2.069, CFI = 0.943, SRMR = 0.0755, RMSEA = 0.054), the results presented in Figure 5 and Figure 6 were obtained.

As far as the SNS model is concerned, Maintaining Old Contacts (β = 0.212, p <0.001), Creating New Contacts (β = 0.285, p <0.001), Information Seeking (β = 0.165, p <0.05), and Image (β = 0.231, p <0.001) had a significant positive effect on Attitude towards using SNS for academic engagement and therefore H1.4a, H1.5a, H1.3a and H1.2a were supported. The effect of Self-promotion, on the other hand, was not significant and thus H1.1a was rejected. Peer Influence (β =0.483, p <0.001) and External Influence (β =0.145, p <0.05) had significant positive effects on Social Norms, and thereby H1.6a and H1.7a were supported. While Self-efficacy (β = 0.664, p <0.001) had a significant positive effect on Perceived Behavioural Control, the effect of Privacy Control was not significant and therefore only H1.9a was supported, whereas H1.8a was rejected. Finally, H1.10a and H1.12a were supported as Attitude (β =0.524, p <0.001) and Perceived Behavioural Control (β = 0.335, p <0.001) affected Intention to use SNS for academic engagement positively. H1.11a, however, was rejected as the effect of Social Norms on Intention was not significant.

Taking the OT model into consideration, Creating New Contacts ($\beta = 0.262, p < 0.001$), Information Seeking ($\beta = 0.361, p < 0.001$), and Image ($\beta = 0.105, p < 0.05$) had a positive effect on Attitude towards using online technologies for academic engagement and thus H1.5b, H1.3b, and H1.2b were supported. H1.4b and H1.1b were rejected as Maintaining Old Contacts and Self-promotion did not have significant effects on Attitude. Both Peer Influence ($\beta = 0.664, p < 0.001$) and External Influence ($\beta = 0.100, p < 0.05$) had significant and positive effects on Social Norms, supporting H1.6b and H1.7b. Similarly, Privacy Control ($\beta = 0.164, p < 0.001$) and Self-efficacy ($\beta = 0.586, p < 0.001$) affected Perceived Behavioural Control positively, supporting H1.8b and H1.9b. H1.10b, H1.11b and H1.12b were supported as well, since Attitude ($\beta = 0.703, p < 0.001$), Social Norms ($\beta = 0.132, p < 0.001$) and Perceived Behavioural Control ($\beta = 0.104, p < 0.01$) significantly and positively affected Intention to use online technologies for academic engagement.

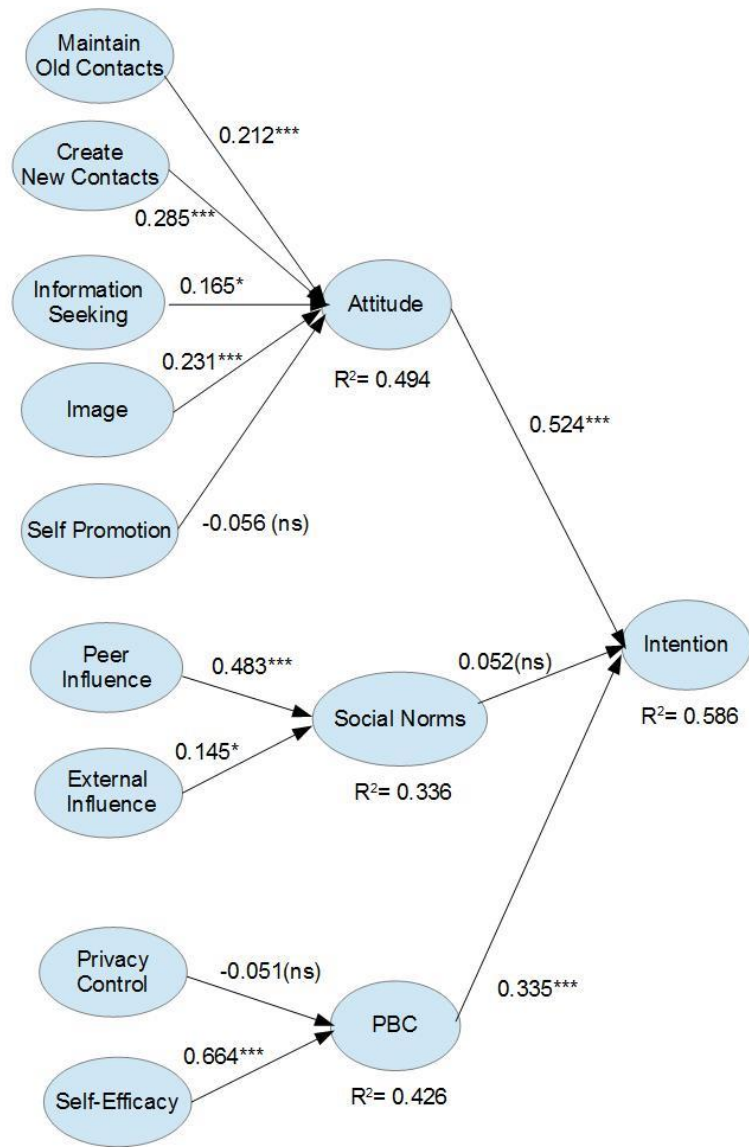


Figure 5. Paths for SNS model

(Note: ***sig. at 0.001, **sig. at 0.01, *sig. at 0.05 and ns= non-significant)

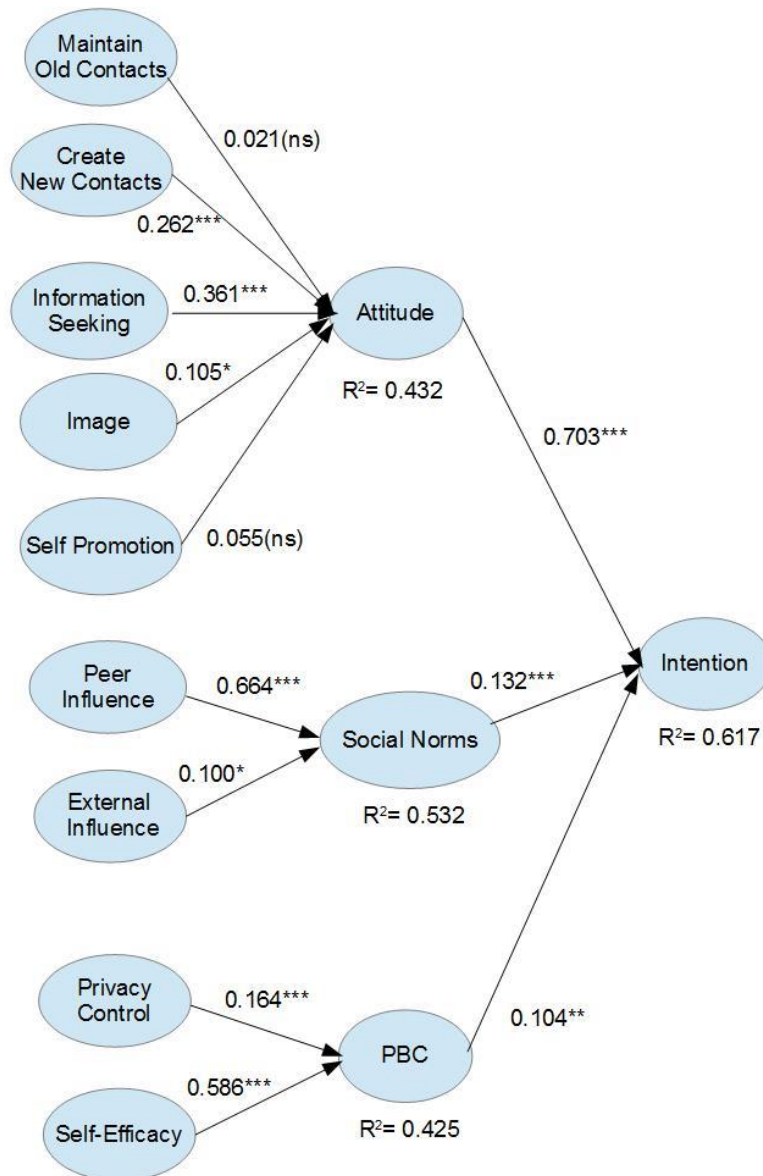


Figure 6. Paths for OT model

(Note: ***sig. at 0.001, **sig. at 0.01, *sig. 0.05, ns= non-significant)

5.2 Survey 2: Public Engagement – the Academic Perspective

5.2.1 Examining potential differences between users and non-users

Considering that in Survey 2 the participants did not have to answer the questions about Social Networking Sites separately from the other online technologies, it may be useful to consider which type of online technologies academics who already use them for public engagement prefer (Table 26). Not surprisingly, Social Networking Sites are preferred by the

majority of users (86.2%), along with websites (70.9%). These types of online platforms are widely used by both academics and the public, so they offer more opportunities for public engagement, compared to less popular tools like Bookmarking Sites (e.g. Delicious, StumbleUpon etc.) or RSS Feeds. Interestingly, Massive Open Online Courses (MOOCs) were not as popular as a choice for public engagement as one may have expected, given that they are designed to facilitate the communication between academics and the public. This may be due to the fact that the development of an MOOC requires a lot of preparation and probably institutional support, not to mention that its purpose is mainly to provide e-learning services to the broader public rather than disseminating and/or discussing research.

Table 26. Online technologies preferred by academics who engage with the public online (n=189)

Online technology	Frequency	%	Online Technology	Frequency	%
Websites	134	70.9	Forums	50	26.5
Blogs	62	32.8	RSS Feed	16	8.5
SNS	163	86.2	Wikis	21	11.1
Newsletters	51	27.0	Chat/IM	56	29.6
Portals	46	24.3	MOOCs	18	9.5
Bookmarking Sites	23	12.2			

Independent sample t-tests were also performed in this case 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 OT 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 OT 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: $M = 4.74$, $SD = 1.12$, $t(248) = 4.97$, $p < 0.001$).

5.2.2 The structural model of Survey 2

Figure 7 shows the results that were obtained after testing the full hybrid model ($\chi^2/df = 1.643$, $CFI=0.944$, $SRMR=0.071$, $RMSEA=0.051$).

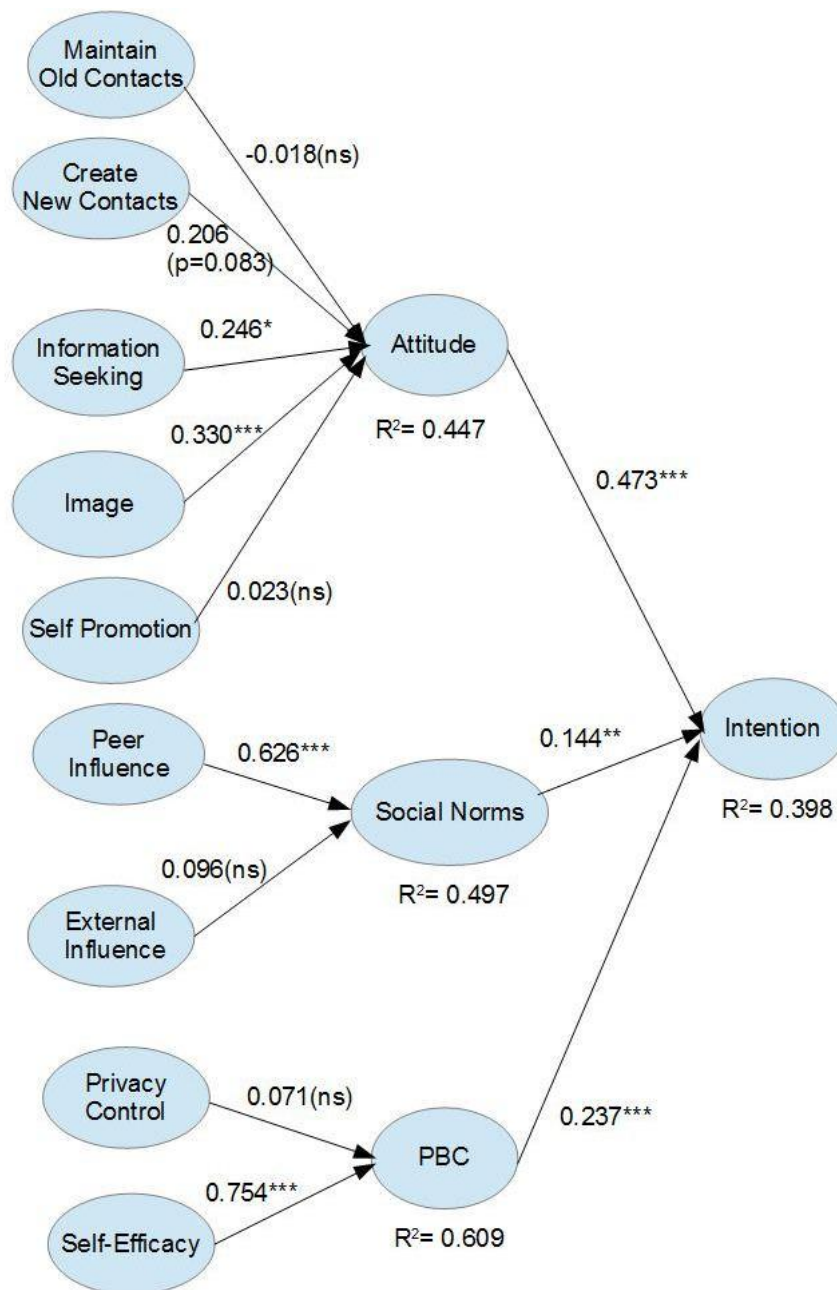


Figure 7. Survey 2 – Results

(Note: ***sig. at 0.001, **sig. at 0.01, *sig. 0.05, ns= non-significant)

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 H2.2 and H2.3 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 H2.5 was rejected. H2.4 and H2.1 were also rejected as the effects of Maintaining Old Contacts and Self Promotion were not significant. As far as the determinants of Social Norms are concerned, only Peer Influence ($\beta = 0.626$, $p < 0.001$) had a significant and positive effect on Social Norms and therefore H2.6 was accepted while H2.7

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 H2.9 was supported, whereas H2.8 was rejected. Finally, all the three hypotheses related to the basic Theory of Planned Behaviour (H2.10, H2.11 and H2.12) 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.

5.3 Survey 3: Public Engagement – the Public’s Perspective

After testing the full hybrid model for learning ($\chi^2/df = 1.860$, CFI=0.967, SRMR=0.0531, RMSEA=0.060) and information acquisition ($\chi^2/df = 2.510$, CFI=0.951, SRMR=0.066, RMSEA=0.079) the results that are presented in Figure 8 and Figure 9 were obtained.

As far as the Learning model is concerned, Facilitating Conditions ($\beta=0.204$, $p < 0.001$) and Habit ($\beta=0.704$, $p < 0.001$) had significant positive effects on Intention and therefore H3.4a and H3.6a were supported. Social Influence ($\beta=0.100$, $p=0.096$) also had a positive effect on Intention, but this effect was only significant at the 0.1 level. Effort Expectancy ($\beta=-0.217$, $p < 0.01$) had a significant negative effect on Intention and therefore H3.2a was rejected. Performance Expectancy ($\beta=0.115$) and Hedonic Motivation ($\beta=0.001$), on the other hand, had positive effects on Intention. However, H3.1a and H3.5a were rejected as these effects were not significant.

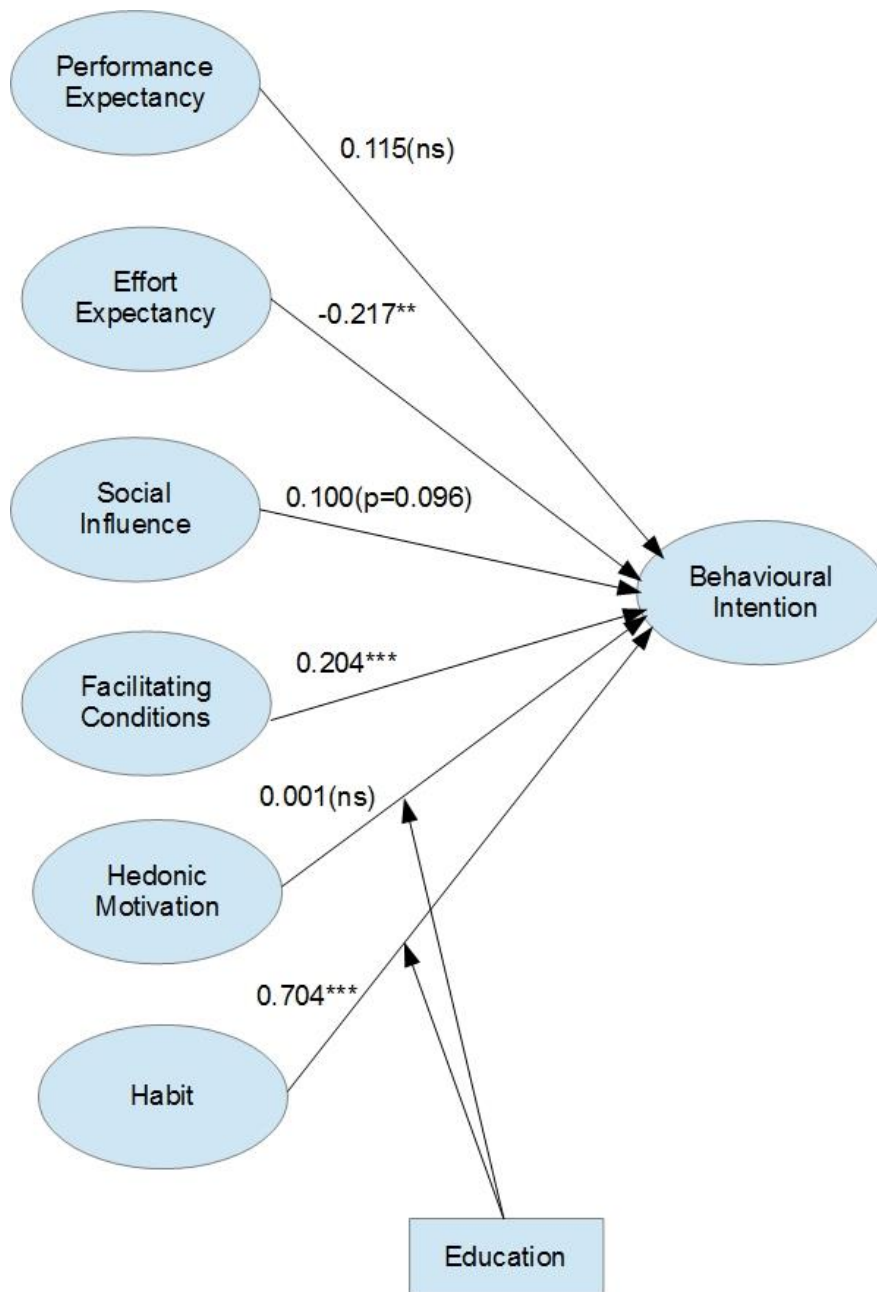


Figure 8. Survey 3 Results – Learning model

(Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ns= non-significant)

As far as moderation is concerned, H3.7a was partially supported as age and gender did not have any moderating effects on the relationships of the model. However, some significant differences were observed between the two groups based on the education level. More specifically, the effect of Habit was stronger (ΔZ score=-2.883, $p < 0.001$) for individuals that do not have any university degree ($\beta = 0.957$, $p < 0.001$) than the ones that have attended university ($\beta = 0.464$, $p < 0.001$). Also, there was a significant difference between the two groups related to Hedonic Motivation (ΔZ score=2.654, $p < 0.001$), which affected Intention negatively in the case of individuals without any university degree ($\beta = -0.227$, $p < 0.05$). In the

case of individuals who have finished university, the effect of Hedonic Motivation was positive, but not significant ($\beta=0.181$, $p=0.126$).

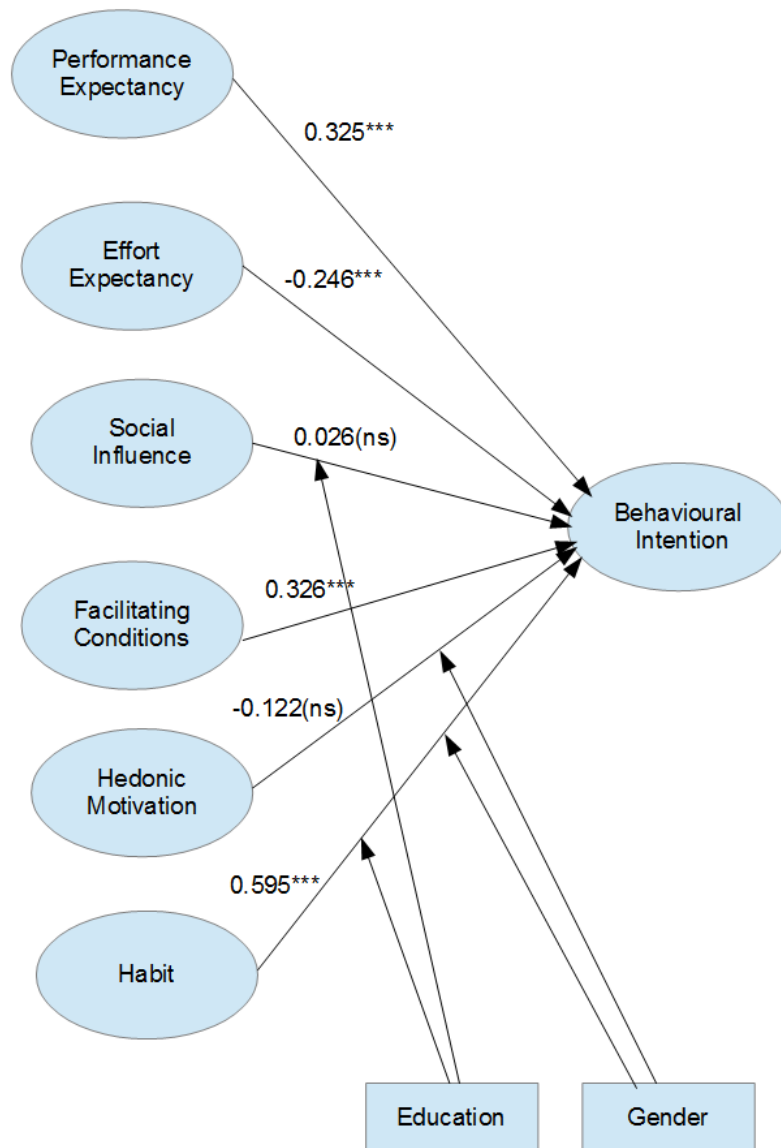


Figure 9. Survey 3 Results –Information Acquisition model

(Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ns= non-significant)

With regard to the Information Acquisition model, Performance Expectancy ($\beta=0.325$, $p<0.001$), Facilitating Conditions ($\beta=0.326$, $p<0.001$) and Habit ($\beta=0.595$, $p<0.001$) had significant positive effects on intention and therefore H3.1b, H3.4b and H3.6b were supported. Effort Expectancy ($\beta=-0.246$, $p<0.001$) had a significant negative effect on Intention and therefore H3.2b was rejected. Social Influence ($\beta=0.026$) and Hedonic Motivation ($\beta=-0.122$) had non-significant effects on Intention and therefore H3.3b and H3.5b were rejected as well.

As far as moderation is concerned, H3.7b was partially supported as age did not have any moderating effects on the relationships of this model either. As in the case of the Learning model, some significant differences were observed between the two groups based on the education level. More specifically, there was a significant difference in the relationship of Habit and Intention ($\Delta Z_{score} = -4.335$, $p < 0.001$) as the effect of Habit was significantly positive for individuals that do not have any university degree ($\beta = 0.918$, $p < 0.001$) and non-significant for the ones that have attended university ($\beta = 0.139$). Also, there was a significant difference between the two groups related to Social Influence ($\Delta Z_{score} = 2.839$, $p < 0.001$), which affected Intention in the case of individuals without any university degree ($\beta = -0.332$, $p < 0.05$) negatively. In the case of individuals who have finished university, the effect of social influence was positive, but significant only at the 0.1 level ($\beta = 0.260$, $p = 0.085$).

Gender also moderated two of the relationships in the model. More specifically, it was found that there is a difference ($\Delta Z_{score} = 4.719$, $p < 0.001$) between males and females regarding Habit, as its effect was much stronger for women ($\beta = 0.975$, $p < 0.001$) than for men ($\beta = 0.136$, non-sig.). Also, Hedonic Motivation had a significant negative effect in the case of women ($\beta = -0.403$, $p < 0.05$), while its effect on men was insignificant ($\beta = 0.120$). However, this difference was only significant at the 0.1 level ($\Delta Z_{score} = -1.939$, $p < 0.1$).

In both cases the variance explained by the model (direct effects only) was relatively high ($R^2 = 0.654$ for Learning model and $R^2 = 0.590$ for Information Acquisition model), compared to the original UTAUT2, which explained 44% (direct effects only) and 74% (direct effects and interactions) of the variance (Venkatesh et al., 2012).

6. Discussion

Chapter 6 presents the discussion of the thesis's findings. Section 6.1 discusses the results of Survey 1 about online academic engagement, Section 6.2 discusses the results of Survey 2 about the academic perspective on online public engagement, and finally, Section 6.3 discusses the results of Survey 3 about the public's perspective on online public engagement.

6.1 Survey 1: Online Engagement within Academia

The aim of Survey 1 was to examine the factors that motivate academics to use online technologies in order to engage with their peers and determine whether there are any differences between using SNS and other online technologies. Based on the data analysis, nine out of the twelve hypotheses were supported in the SNS model and ten out of twelve in the OT model.

Starting with the Uses and Gratifications part of the model, it is interesting to note that the main difference regarding the factors that affect academics' attitude in the two models is that the need to maintain old contacts affects Attitude positively only in the case of SNS. This shows that academics probably consider using SNS also as a way to maintain old contacts rather than just connecting with other academics that they do not know. For other online technologies, academics were found to use them for connecting to other academics in their research area, rather than peers that they already know. This difference may be due to the networking characteristics of SNS, which support more enhanced forms of communication than other OT (Foregger, 2008; Pai & Arnott, 2013), and thus make them more suitable for connecting with old friends and colleagues.

A second interesting finding is that the effect of image was much stronger in the case of SNS than in the OT model. The perceived utility of SNS in maintaining a professional image in academia was expected, as has also been reported in other studies (Ferguson and Wheat, 2015). The weaker effect in the OT model may be related to the way that such online technologies are used, often focusing more on the utilitarian academic-oriented and not the aesthetic personal-oriented one. Whereas in SNS academics create profiles and their online presence is apparent and thus their image as an academic may be enhanced, the use of other online technologies may not be particularly evident, unless the academic has a personal website or blog.

A difference in the strength of the relationship with Attitude has been observed in the case of Information Seeking. The effect of the variable is stronger in the OT model, indicating that

academics primarily consider online technologies other than SNS for seeking information related to their work. This could be attributed to the fact that online technologies, such as websites, newsletters, RSS feeds and wikis, have been long-established as reliable information channels (Kaye & Johnson, 2004; Luo, Chea, & Chen, 2011; Roy, 2009) and thus academics are more likely to accept and adopt them for seeking information for academic tasks. This may also be the reason why Privacy Control affects Perceived Behavioural Control significantly only in the OT model. As privacy control is relevant to information exchange online, it is understandable why it seems to be more important in the case of OT, which seem to be preferred by academics as sources of information. Also, previous research has shown that academics do not upload any documents on SNS (Nández and Borrego, 2013) and their willingness to share information is limited by concerns about copyright issues and the risk of their ideas being plagiarised (Lupton, 2014). It would be normal for academics to consider privacy control as a relatively unimportant factor of the overall control they believe they have over their SNS use, if they do not disclose any sensitive or significant information. In fact, it has been found that privacy concerns and information sharing on SNS are related, with privacy concerns having a negative effect on the self-disclosure of personal information (Xu et al., 2013).

Finally, the self-promotion motive has insignificant effects on Attitude in both models. This finding agrees with the results of (Stewart, 2015), who found that Twitter was not used by academics for self-promotion. A potential explanation is that self-promotion may be considered as something undesirable in academia as the focus should be on advancing knowledge and not one's personal interests. Indeed, it has been found that, in general, continuous posting about the user's success can have the opposite effect of being considered as undesirable posts, as well as affecting the self-esteem of people reading these posts (Osorio, 2015).

When it came to the second part of the model, Attitude was found to have a strong and significant effect on academics' intentions in both the SNS and OT models. Similarly, Perceived Behavioural Control affects Intention positively in both cases, a finding that is in line with the expectations of TPB. The same is not true for Social Norms. While Social Norms affect Intention positively in the case of online technologies, their effect in the case of SNS is not significant. This is not completely unexpected. For instance, Lin (2006), who looked into the intention to participate in virtual communities, found that Social Norms do not influence behavioural intention. An explanation for this discrepancy may be that while certain types of online technologies are used officially by universities and academics are

encouraged or even required to use them in order to communicate with the organisation and their colleagues (e.g. websites, newsletters, portals etc.), this does not apply to SNS. On the other hand, as relevant studies have showed, the use of SNS for academic purposes is often considered illegitimate and superficial and academics that decide to use them after all do so even if they are not supported or encouraged by their institutions (Ferguson and Wheat, 2015; Nández and Borrego, 2013; Stewart, 2015).

6.2 Survey 2: Online Public engagement – Academics’ Perspective

The aim of Survey 2 was to examine the factors that motivate academics to use online technologies for public engagement. Seven out of the twelve hypotheses were supported based on the results of the analysis.

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. This is generally in line with the findings of Survey 1, however, academics’ need for a professional image affects their attitude towards using online technologies to a greater extent when it comes to engaging with the public ($\beta = 0.330$, $p < 0.001$ in contrast to the corresponding effects of Image in the case of academic engagement via SNS: $\beta = 0.231$, $p < 0.001$ and via other online technologies: $\beta = 0.105$, $p < 0.05$), while the effect of Information Seeking on Attitude is stronger when it comes to academic engagement via online technologies other than social networking sites ($\beta = 0.361$, $p < 0.001$, in contrast to academic engagement via social networking sites: $\beta = 0.165$, $p < 0.05$ and public engagement via online technologies: $\beta = 0.246$, $p < 0.05$). This denotes that academics’ motives regarding the use of online technologies may differ depending on with whom they want to engage (i.e. peers or public), a view that is reinforced by the thesis’ findings related to networking factors.

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 is in contrast to the findings of Survey 2 (Table 27), where Creating New Contacts had a positive effect on Attitude in both models and Maintaining Old Contacts had a similar effect in the case of SNS. This difference may not be a surprise considering that most of the time academics collaborate with other academics rather than with practitioners or the lay public, but it may also reflect the way that many academics see public engagement in general and how they engage with the public online. Although, as discussed in the literature review section, public engagement is

about a two-way communication between the public and academia, 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 a 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 interested in creating long-lasting linkages with society, at least via online technologies. 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, 2013a; Jolibert & Wesselink, 2012; Rowe & 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.

Table 27. Comparing academics' intention to use online technologies for academic and public engagement

Hypotheses	Online Academic Engagement		Online Public Engagement
	SNS	OT	
Self-promotion → Attitude	Rejected	Rejected	Rejected
Image → Attitude	Supported	Supported	Supported
Information Seeking → Attitude	Supported	Supported	Supported
Maintaining Old Contacts → Attitude	Supported	Rejected	Rejected
Creating New Contacts → Attitude	Supported	Supported	Rejected
Peer Influence → Social Norms	Supported	Supported	Supported
External Influence → Social Norms	Supported	Supported	Rejected
Privacy Control → Perceived Behavioural Control	Rejected	Supported	Rejected
Self-Efficacy → Perceived Behavioural Control	Supported	Supported	Supported
Attitude → Intention	Supported	Supported	Supported
Social Norms → Intention	Rejected	Supported	Supported
Perceived Behavioural Control → Intention	Supported	Supported	Supported
R ² Intention	0.586	0.617	0.398

The fact that the hypothesis about the effect of Self-promotion on Attitude was rejected in all three models (Table 27) strengthens the assumption that self-promotion is considered as bad practice by academics and it is avoided no matter what the target population of engagement is (other academics or the public). This is interesting considering the significant positive effect that Image has on Attitude. Comparing the two findings shows that academics are interested in maintaining a successful, professional image and 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 opposite 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 (in contrast to the case of academic engagement where both effects were significant). It is true that the call for public engagement comes mainly from within academia (e.g. in the form of peer pressure) rather than 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 online with the public. Mass media on the other hand, promote the benefits of using online technologies (e.g. LinkedIn) for professional networking in general, so it is not unexpected that in the case of academic engagement external influence affects academics' social norms. 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 academic level. Future research could shed more light on how this process works internally, which can in turn help inform internal communication strategies.

When it comes to Perceived Behavioural Control, Self-efficacy appears to be the most important determinant. This is quite interesting considering that in other studies in the area academics have expressed concerns about their privacy while using social media (Gruzd et al., 2012; Lupton, 2014). The insignificant effect that Privacy Control had on 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 minor. Again, the relationship between communicating/sharing information online and concerns about privacy control found in the study of Xu et al. (2013) seems to be confirmed in this case, too. Self-efficacy, on the other hand, plays an important role in all the three models, signifying that training on using online technologies can be beneficial for both academic and public engagement.

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 & Todd, 1995). According to Gruzd et al. (2012), academics' concerns about their control over using online technologies, such as social

media, are mainly related to the potential loss of ‘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 are “social media use becoming an obligation” and “commercialisation of the content/copyright issues”. In the same study the positive relationship between attitude towards social media and social media use is depicted, 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). Finally, it should be noted that the positive effects of Attitude, Social Norms, and Perceived Behavioural Control on Intention in the case of the public engagement model agree with the findings of Survey 1 about academics’ intention to engage with their peers via online technologies. However, the R^2 of Intention in the case of public engagement was considerably lower than in the two cases of academic engagement (0.398 in contrast to 0.586 and 0.617 respectively). This suggests that although Decomposed TPB is generally successful in predicting behavioural intention, when it comes to online public engagement there may be additional factors that affect academics’ intention to use online technologies.

6.3 Survey 3: Online Public Engagement – the Public’s Perspective

The aim of Survey 3 was to study the factors that motivate practitioners and other members of the public to engage with the academic community via online technologies. The study looked separately at the two main reasons for which people join such online communities, namely learning and information acquisition. As can be seen from Table 28, only few differences were observed between the two models.

Table 28. Results of Survey 3

Hypotheses	Study 3	
	Learning Model	Information Model
Performance Expectancy → Intention	H3.1a: rejected	H3.1b: supported
Effort Expectancy → Intention	H3.2a: rejected	H3.2b: rejected
Social Influence → Intention	H3.3a: rejected	H3.3b: rejected
Facilitating Conditions → Intention	H3.4a: supported	H3.4b: supported
Hedonic Motivation → Intention	H3.5a: rejected	H3.5b: rejected
Habit → Intention	H3.6a: supported	H3.6b: supported
Moderating effects of age, gender and education	H3.7a: partially supported (Habit was stronger and Hedonic Motivation had a negative effect for individuals without a university degree.)	H3.7b: partially supported (Habit was significant and Social Influence had a negative effect only for individuals without university degree. Habit was also stronger for women.)
R^2 Intention (direct effects only)	0.654	0.590

Based on the analysis, Facilitating Conditions and Habit are the main drivers of the adoption of online technologies for both learning and information acquisition. These results are reflected in the attributes of our sample. More than a third of the respondents (40.7% for learning and 35.7% for information acquisition) stated that they already use online technologies for engaging with the academic community and the majority of them (69.4% for learning and 59.3% for information acquisition) have been doing so for more than a year. Hence, it is only reasonable to assume that for many of them engaging with the academic community online has become a habit. This explanation is supported by previous research according to which the more frequent and the more comprehensive a particular IS usage behaviour is, the more likely it is to turn into a habit (Limayem et al., 2007). Repeated behaviours may involve following academics and academic institutions on Twitter, reading blogs relevant to one's interest or joining groups on social networks on topics of interest. The direct nature of such engagement mechanisms and the ease with which monitoring can take place can lead to repeated behaviours that effectively become habitual. Past research has suggested that the use of the Internet is not always purpose-driven; in fact it seems that online activities resemble habits as people "*are drawn into these activities helplessly and cannot explain why they do them*" (Hills & Argyle, 2003). In that case, the engagement that takes place online between academics and the public could fall into the categories of "Science Communication" or "Public Understanding of Science" (Davies, 2013a; Palmer & Schibeci, 2014), as it does not involve two-way interactions in the form of dialogue between the two parties that could be described by the terms of "public dialogue" or "upstream engagement" (Rogers-Hayden & Pidgeon, 2008; Watermeyer, 2012). This would agree with the current studies in the area of public engagement that show that the model of "science communication" continues to dominate when it comes to opening research to the public (Kurath & Gisler, 2009; McNeil, 2013; Palmer & Schibeci, 2014).

As no specific information has been gathered regarding how these habits are manifested, it is not possible to deduce the users' modus operandi. It may be, for instance, that they follow very active accounts that post a lot of new content or that they are simply scanning for new material. However, this finding highlights the point that academics need to regularly post content relevant to their audiences in order not just to attract, but maintain and reinforce, the engagement and turn habits into relationships.

As far as facilitating conditions are concerned, the majority of the respondents answered that they have a lot of experience with online technologies (73%) and that this experience has been positive (77.2%). This probably explains the positive relationship between facilitating

conditions and intention, as the experienced online users would feel that they have the required skills and knowledge to engage with the academic community online. After all, all that one needs to engage with the academic community online is an internet-connected device and basic computer skills, which are increasingly accessible. On one hand this may suggest that the Internet can help expand the scope and reach of engagement, but on the other it can still add barriers, as even the most basic of facilitating conditions may not be present on the user's side. For instance, this may be true for research related to less affluent groups, who are not likely to be regularly connected to the Internet and cannot afford the time and resources to engage with academics. Consequently, the nature of the research undertaken and the intended stakeholders should be taken into consideration so that a more holistic engagement plan can be put in place.

The positive experience with online technologies that many of the respondents have and the fact that online academic engagement is not any different to using any other online technologies may also be the reason why Effort Expectancy does not have the expected effect on Intention. Respondents may have felt that effort related to using online technologies was not significant. For instance, a negative effect of Effort Expectancy on Intention was also found in a study about using websites for purchasing air-tickets (Escobar-Rodríguez and Carvajal-Trujillo 2013), indicating that people feel confident about using online technologies these days no matter what the context is. It has also been found that the higher the level of education an individual has, the less Internet skill-related problems he or she faces (Deursen, 2012). More than half of the study's sample has at least a university degree, which may explain why they do not expect to face any difficulties while using online technologies.

One of the main differences between the two models is that Performance Expectancy has a significant positive effect on Intention only in the case of information acquisition. Considering that a relatively high percentage of the respondents (around 62% in both cases) stated that more than half of the time they spend online engaging with the academic community is for work-related reasons, it might be expected that it is only reasonable for them to consider the utilitarian value of such activities. One possible explanation would be that the public engages online with the academic community in a casual way, without expecting to get any professional skills through learning, but rather looking for research-based information that may be relevant to their professions. This agrees with the academics' stance towards online public engagement, as they also seem to engage with the public casually (see previous discussion about the academic perspective).

The high percentage of people that engage with academia for working purposes may also be the reason why, contrary to the study of Venkatesh, Thong, and Xu (2012), the author did not find any significant effect of Hedonic Motivation on Intention. As their online interactions are not related to personal reasons (i.e. fun, hobbies, personal interests etc.), they probably do not consider engaging with academics as a task from which they could derive any fun or pleasure due to its work-related nature. An alternative explanation could be that online engagement with academics is not fun per se for most people. This means that either the channel (i.e. online technologies) or the activity (i.e. engaging with academics) does not offer the opportunity to the public to have fun. Considering that online technologies have always been associated with pleasure/fun (Hsu & Chiu, 2004; Kim et al., 2011; Papacharissi & Rubin, 2000; Yang, 2010), the latter explanation (the activity of engaging with academics being unrelated to fun/pleasure) is more probable.

Finally, when it comes to demographics, age did not have any moderating effects in the study, while gender moderated only the effects of Habit and Hedonic Motivation in the case of information acquisition. This may be due to the familiarity of the public with online technologies, which minimises any 'digital divide' that may exist between men and women and/or younger and older individuals. This finding is in line with other recent studies that show that there are not many significant differences in Internet usage between the sexes any more (Gupta et al., 2008; Shin, 2009). The effect that gender has on the relationship of Hedonic Motivation and Intention agrees to some extent with the findings of Venkatesh, Thong, and Xu (2012), according to which the effect of Hedonic Motivation is stronger for men. However, the finding that Habit was much stronger for women is in contrast with the findings of the aforementioned study, which found that the effect of Habit is stronger for men. More research examining the process by which such habitual usage is formed could shed light on how to attract and maintain users' interest, not just for public engagement but also for other contexts too.

Education appears to moderate the relationships of Habit and Hedonic Motivation, with Intention in the case of learning and those of Habit and Social Influence with Intention in the case of information acquisition. This is not the first time that educational level has played a moderating role when it comes to using the Internet. Previous studies have found that people from more privileged backgrounds are better informed about the capabilities of the Internet and use it for a larger number of activities, with many of them using it for more 'capital enhancing' activities (Hargittai, 2010; Hargittai & Hinnant, 2008). More specifically, it has

been found that more educated individuals are more likely to use the Internet for training/learning and for checking information (Helsper & Eynon, 2010).

In the models of this study, the effect of Habit was stronger for individuals that do not have any university degree, indicating that people from this educational background do not consider engaging with academia either for learning or information acquisition to be a conscious decision, but rather an automatic activity that they perform while online among other tasks. As research in the area is scarce, it is not clear why such Internet habits are formed. In a recent study about Internet use, it was found that when users are familiar with using the Internet and they express deficient self-regulation (i.e. individuals' inability to control their actions) regarding its use, they tend to form Internet habits (Tokunaga, 2013). However, the study did not examine potential relationships between deficient self-regulation and educational background, so there is no evidence that the two factors are somehow related. In general, behavioural habit usually creates "a barrier to change" due to the cost of learning to use a system and potential difficulty to apply this knowledge to alternative systems (Castañeda, Frías, & Rodríguez, 2009). People from lower educational backgrounds may face additional difficulties in changing the medium/the way they engage with academia as they may lack skills, resources or access to universities that individuals with a university degree have (e.g. graduates are often invited to universities' alumni events). This may explain why the effect of Habit on behavioural Intention is much stronger for them.

Also, in the Information Acquisition model, Social Influence had a significant negative effect on Intention in the case of people from lower education levels, showing that they are less likely to consider engaging with the academic community online to get information due to "peer pressure". This is in contrast to the case of academics, for whom social norms (coming from their peers) have a positive effect on their intention to engage with the public online. This difference is in line with the original study that proposed the Decomposed TPB, according to which social norms are more influential in organisational settings and when IT use has real consequences in one's job performance (Taylor & Todd, 1995). Here, only academics' use of online technologies can be considered as part of their practice and is clearly for work-related reasons; the public engages with academia online voluntarily and many times for personal reasons, such as to find information/learn about hobbies or other personal interests. Another possible explanation is that people usually have friends and colleagues from more or less the same educational background, so it is less likely for people without a university degree to be influenced by peers from more privileged backgrounds, who, as noted

previously, tend to use the Internet for more capital enhancing activities (Hargittai, 2010; Hargittai & Hinnant, 2008; Helsper & Eynon, 2010).

In the Learning model, on the other hand, it was hedonic motivation that had a negative effect on intention only in the case of people without a university degree. This finding shows that people from lower educational backgrounds are less likely to consider engaging online with the academic community for learning as a fun activity, although it is not clear why this is the case. While highly educated individuals are more likely to use the Internet for learning (Helsper & Eynon, 2010), educational level does not seem to play an important role in whether an individual will decide to drop out from an online learning programme (Park & Choi, 2009). This shows that educational background is not related at least to the dedication that an individual has towards online learning. The negative relationship between Hedonic Motivation and Intention for the ones that have not attended a university could be due to the perceived differences in status between them and the academics due to the gap in educational attainment. Attending a university, on the other hand, seems to have an impact on an individual's views regarding higher education and lifelong learning, with university graduates often reporting positive feelings developed due to their studies, such as intrinsic interest in their subject of study, confidence in their ability to learn, and enjoyment of learning (Brooks & Everett, 2008).

7. Conclusions

This chapter presents the conclusions of the thesis. Section 7.1 summarises the main findings of the thesis, while Section 7.2 discusses its theoretical and practical contributions. In Section 7.3 the limitations of each survey are presented, along with the overall limitations of the thesis. Finally, Section 7.4 offers suggestions for future research.

7.1 Main Conclusions

The thesis uses a quantitative methodology in order to achieve the two primary goals stated in the Introduction, namely to understand a) the factors that make academics use online technologies in order to engage with other academics and the public, and b) the factors that make the public use online technologies for interacting with academia.

The first survey contributes to our understanding of academic engagement by examining the factors that affect academics' intentions to use SNS and other online technologies as a part of their academic practice. Differences were observed between the model of SNS and the model of online technologies, indicating that academics consider using SNS for different reasons and in different ways from the rest of online technologies. While academics' attitude and perceived behavioural control are the main drivers of their intentions in both cases, social norms play an important role only in the case of online technologies. Academics seem to consider SNS more suitable for networking (either for creating new contacts or connecting with the old ones) and maintaining a professional image in the academic community and the rest of online technologies for making new acquaintances in their research area and seeking academic information. As far as perceived behavioural control is concerned, self-efficacy plays an important role in both models, but privacy control is considered important only in the case of the other online technologies. In the OT model, where social norms are a significant predictor of intention, both peer and external influence are found to affect the social norms of academics.

As far as the second survey is concerned, the findings show that academics' need 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.

The results of the third survey have confirmed the findings of earlier studies about the general use of the Internet, according to which many online activities are driven by the force of habit and associated with the educational level of the individual. The study also stresses the important role that performance expectancy plays in the formation of intention to use a technology. In addition, it was found that in general practitioners and the broader public feel confident that they have the necessary skills to engage with academia online and some of them already do so. Although more research is necessary to understand the motivating factors behind the public's interest and the perceived benefits better, the findings suggest that users have attached a utilitarian rather than a hedonic value to the engagement process.

Both sides, academics and the public, seem to be playing a passive role in the process of online public engagement for the time being. As the need for public engagement has been highlighted only in the last few years within academia and research in the area is still limited, it is hard to predict how online public engagement will evolve over the next few years. The current thesis, based on its findings and the literature review that preceded it, proposes areas for future research that can facilitate the development of more efficient public engagement strategies that take into consideration all the parties involved.

7.2 Theoretical and Practical Contributions

7.2.1 Theoretical Contributions to Public Engagement Literature

The findings of the thesis make several theoretical and practical contributions. The first theoretical contribution to public engagement literature stems from the fact that the thesis has presented the first literature review in the area by gathering and juxtaposing studies that examine the opening of science to the public, either from the academic or the public perspective. This gave the opportunity to the author to highlight issues and topics of interest, such as the vagueness of public engagement as a term, academics' perceptions of public engagement and the evolution of the concept over the years, and identify research gaps, helping towards promoting further research in the field. All the research gaps discussed in the Literature Review section are potential areas for future work. This thesis has focused on some of the gaps relative to the study's topic (i.e. online engagement) and contributed further to both theory and practice by addressing them.

Secondly, the thesis contributes to the growing body of literature studying online public engagement, and more specifically why academics participate in SNS or use other online technologies. By following a quantitative approach it has filled the gap in the relevant literature in which qualitative methodology prevails. 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. They provide a good starting point for the examination of a topic, but quantitative studies are also then necessary. In this thesis, using an established theoretical framework was quite helpful in determining specific factors that affect academics' behavioural intention more broadly.

As far as the public's perspective is concerned, the thesis provides a more holistic understanding of public engagement by also examining the views of the public. In doing so, the thesis contributes to the growing literature on public engagement by addressing the relevant gap (i.e. why the public may be interested in engaging with academics/universities and what they think of academics'/universities' attempts to engage with them) and helps universities and academics to understand their target audience better.

The thesis has also shown that the factors to which academics pay more attention when they engage with the public differ from the ones that they consider when they engage with their peers. This finding is useful for public engagement scholarship as it reflects the views that academics hold on public engagement, which are not necessarily in line with their institutions' expectations or what literature has suggested so far. For instance, the absence of motivation on behalf 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. By juxtaposing the academic and the public perspective, the thesis has also revealed that both sides retain a passive stance towards online engagement, which may explain why online public engagement is still in its infancy. Finally, it has included both academics/members of the public 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 SNS/OT, who already use them for engagement, and which are usually presented in the studies in this research area.

7.2.2 Theoretical Contributions to IT Adoption Literature

When it comes to IT adoption literature, the thesis' contribution stems from the joint use of the Decomposed TPB and the Uses and Gratification Theory. As the majority of the IT adoption theories presented in the literature review are general and do not take into consideration the tasks for which IT technologies are adopted, the use of only one theory may result in less accurate findings. By jointly using the Decomposed TPB and U&G Theory, this thesis has made it possible to examine a number of motives users may have for using the

chosen technologies for performing a given task (in this case engaging with other academics and/or the public). In doing so, the ecological validity of the joint model was demonstrated in three different cases of technology usage.

Also, as the third study is about individuals' online behaviour, its findings contribute to the overall literature about the use of the Internet nowadays. Although there are some studies that try to understand how individuals use the Internet as the whole, most of them were published at least ten years ago. Contemporary research usually focuses on specific tools/platforms, but misses the current trends when it comes to the use of the whole landscape of online technologies. Survey 3 reinforces findings from older studies, such as the moderating effect that education can have on the use of the Internet. In addition, it uses a relatively new research framework in the IT adoption area, namely, the UTAUT2, and contributes to the literature on IT adoption by testing it in two different instances. The results show that when it comes to performing a specific task online many of its proposed relationships do not stand, and thus there is no theoretical model that fits all the occasions.

Overall, the findings of the thesis not only shed light in terms of how different user groups (in this case academics versus the public) utilise online technologies but also how online technology usage can be different when it comes to undertaking the same set of tasks (in this case engagement) by a different user group. The thesis has provided insights on how SNS are seen by users compared to other more established technologies in the case of academic engagement and how the purpose of performing a task (academic versus public engagement) changes the priorities of the users. For example, SNS seem to be considered by academics as more suitable for keeping in touch with their colleagues than other online technologies, but they do not feel the social pressure to use them as happens with other OT.

7.2.3 Practical Contributions

From a practical perspective the findings of the two first surveys provide information about how academics think about online engagement and adapt their engagement strategies accordingly. In an increasingly competitive sector, effective use of online technologies can provide tangible benefits for individual users. For instance, academics that are interested in engaging with their peers online can use the findings of the first survey to inform their online practices in a way that is more successful for creating/maintaining their professional networks (e.g. they may want to use SNS for engaging with old contacts and OT for engaging with new ones). The findings of the second survey can also be used at an individual level, as academics can use them as 'benchmark' values to help them understand where they stand compared to other academics on online public engagement.

Similar strategies can be formed and executed at an institutional level. As academics are the ones that undertake research and create impact it is important that they feature at the foreground of their institution's engagement efforts with other researchers and the public. Providing training and support on how to use SNS and other online technologies could be helpful since self-efficacy has been found to play a crucial role in academics' perceived behavioural control. Training on how to maintain one's privacy could also be helpful in making academics feel more competent in using online technologies for engaging with their peers. In addition, associating the use of SNS for academic engagement with a professional image that is desirable in academia and recognising online engagement activities as a part of formal academic practice may result in more academics adopting social media for professional reasons.

Moreover, the findings can help academic online service providers, such as Academia.edu and ResearchGate, understand the needs of their members and design more effective services. For example, as academics focus on maintaining their connections and building their professional image, SNS providers can aim to offer new innovative online services that meet these needs and enhance the networking experience on their platforms. In addition, as social norms do not affect academics' intention to use SNS, marketing approaches that stress the actual benefits that an academic can gain by using SNS could prove to be more efficient in the recruitment of new members than approaches that encourage academics to join a social network because their peers are already members. When it comes to public engagement, however, universities may wish to promote the idea of using online technologies for engaging with the public within their faculties, as in this case social norms have some effect on behavioural intention.

The findings of the third survey also have important practical implications. Considering the important role that habit plays in the public's intention, universities may find it beneficial to formulate engagement strategies that aim to create such a habit. This means that universities should intensify their attempts to engage with the public online and use a greater variety of online technologies (e.g. not just the traditional webpages and social media pages, but also portals, newsfeeds, forums etc.). At the same time, they should try to promote the university's online presence during 'traditional' public engagement activities (e.g. workshops, public lectures etc.), so more and more people are aware that there is an option to interact with the university online and are given the opportunity to try this alternative form of engagement.

In addition, universities may adapt their online content in a way that meets practitioners' needs. It seems that most of the people that engage online with the academic community do so in order to get information relevant to their professional practice. Academics could try to

provide more practical information based on their research findings instead of presenting general or theoretical research findings and organise their online content in a way that helps the public to realise the applicability of their research results in everyday practice. In doing so, the utilitarian benefits that the public gains by engaging with the academic community online will increase and this could spark more interest from the public in research and academic practice. Also, considering the moderating role of individuals' education, it may be useful for universities/academics to target different socio-economic groups separately and follow tailored approaches for engaging with them. For example, strategies that aim to create the habit of engaging with academia online may work in the case of individuals that come from lower educational backgrounds, but for more educated individuals such approaches may not suffice.

Finally, the findings of the thesis can inform the public engagement agendas of third-party organisations, like research councils, or governments. As these actors are quite interested in promoting research dissemination and public engagement, they may find the thesis' findings useful in understanding how they can foster public's appetite to engage with academics/universities online. Also, the findings give them the necessary information to understand how they can motivate academics in engaging 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 can promote further the idea of engaging with the public online by acknowledging the importance of online public engagement (e.g. include online public engagement activities in the funding criteria) and linking online public engagement with a desirable academic image.

7.3 Limitations

With regard to the limitations of the first two surveys, due to the specific context on which the research focuses, asking questions that capture actual use reliably was not feasible. Although the study captured the general use of SNS/online technologies by asking respondents to self-report the time they spend on them, specific questions about the time spent on online technologies solely for engaging with other academics/the public were considered too complicated as it is often difficult to separate personal from professional use. This is also due to the fact that most academics do not consciously separate the time they spend using online technologies for engagement purposes from the time they spend using them for other reasons. Consequently, the research models account only for intentions and not for actual use. Also,

the models do not differentiate intention from continuance intention and therefore there is not much information about the role that previous experience may have on academics' future intentions to engage with the public online. Finally, the generalisability of the findings may be limited due to the demographics of the sample. Although special attention has been paid to including academics from different countries, levels of experience and disciplines, the majority of the respondents in Surveys 1 and 2 work in universities in Europe and almost half of them come from the social sciences. Using the results of the thesis to understand academics' motives from other disciplines and/or geographical areas should be done with caution.

As far as the limitations of the third survey are concerned, the use of a UK sample may limit the generalisability of the results to other geographical regions. Geography may play a role not just in terms of the users' preferences related to the universities with which they would opt to engage but also with regard to their national higher education culture, which may influence the appetite for online public engagement. Also, the use of an online questionnaire as a data collection tool may have affected the demographics of the study as people comfortable with using online technologies were more likely to answer the questionnaire. As far as the moderating effects are concerned, the fact that configural invariance was not established for age groups in the case of the Information Acquisition model did not allow the test for differences based on age. As model fit is affected by the number of variables along with the number of observations, a larger sample could have provided a clearer picture regarding moderation.

The fact that the surveys in this thesis are cross-sectional could also be a limitation. As online trends change quite quickly, the thesis can only give insights into how behavioural intention is currently formed; future studies may find different results. The cross-sectional nature of the surveys 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.

Finally, as only quantitative data were collected during the surveys, there is no much detail about some unexpected findings of the thesis (such as the negative effect of effort expectancy in Survey 3). The interpretation of such findings was based solely on the findings of previous studies and thus no firm conclusions can be reached. Also, the questions used in all the surveys were about public engagement in general; they did not make a distinction between dissemination, deliberation, and participation (i.e. the three main streams of opening science to the public as discussed in the Literature Review section), so we cannot draw conclusions about the strength and the depth of the relationships that the thesis participants reported while

answering the questionnaires. A future qualitative study could shed light on this and clarify the current nature of online engagement between academics and the public by asking both parties to describe and reflect on their experiences.

7.4 Areas for Future Research

First of all, for practical reasons this thesis has examined only some of the interactions that take place online as part of the public engagement process. Having a look at the relevant framework that was presented in the Introduction, we see that there are also other interesting interactions that can be examined (Figure 10). For example, future studies could focus on the stance that universities as organisations hold towards using online technologies for engaging with the public. How are their relevant strategies formed? To what extent do they use online technologies as part of their public engagement activities? Similarly, to what extent do they use online technologies for engaging with their academic staff? And most importantly, what kind of approaches do they follow in order to persuade their academics to support the organisation’s goals and use online technologies for public engagement? Considering that these research questions have the organisation as the unit of analysis, qualitative methodology may be more appropriate for examining the relevant strategies and policies in depth.

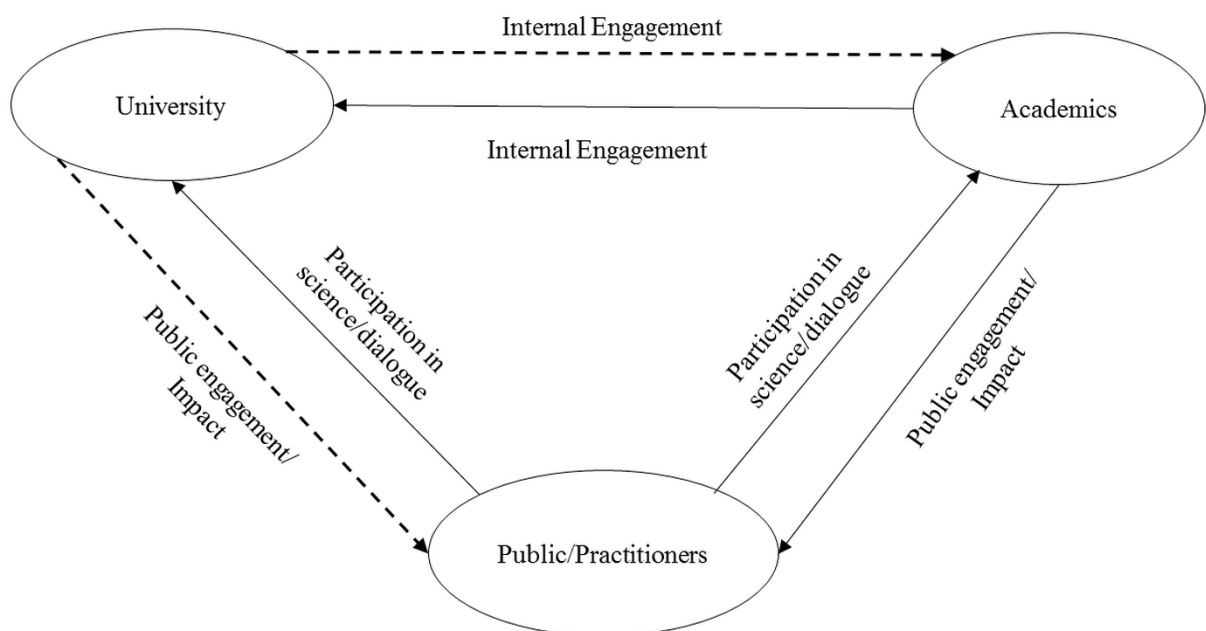


Figure 10. Unexplored interactions among key players (marked with dotted lines).

Also, despite the fact that the thesis has examined the reasons why academics engage with other academics/institutions online, the interactions described by the term ‘internal engagement’ are not necessarily limited to academic engagement. The extent to which academics are willing to support the attempts of their institutions to engage with the public

could reflect their work engagement. Future research might 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.

As far as academic engagement is concerned, the results of the independent t-tests in Survey 1 showed that users rate intention, attitude, social norms and perceived behavioural control more highly than potential users in both the cases of SNS and OT. Also, the regression analysis showed that satisfaction affects continuance intention. Therefore, future research could focus on continuance intention to use online technologies and how satisfaction affects the other variables of the model.

As far as the public is concerned, future studies could focus on countries where public engagement is not one of the main goals on universities' agendas and see whether there is a difference in the public's perceptions. Also, it will be of interest if future studies consider the motivations behind engaging or not with academics online qualitatively. This could give more information about the effects that some factors have on their decisions to engage with academia online (e.g. it could explain the negative effect of effort expectancy, the insignificant effect of hedonic motivation, or how 'habit' is formed when it comes to engaging with academia).

Last but not least, the propositions presented in the Literature Review chapter can guide future research in the area of public engagement in general. Thus, future research could explore how public engagement is perceived by different disciplines and countries, and try to develop contextual definitions and evaluative criteria for public engagement. Also, more research is needed to understand the perspectives of the public and the university as an organisation more fully. Understanding how public engagement works in offline settings can inform practices of online public engagement, too.

Appendix A

Table 29. Items used for the Survey I

Construct	Items	Number of items	Source
Intention	I plan/intend/expect to participate in SNS in the future in order to engage with other academics.	3	(Ajzen, 2002; Lin 2006)
Attitude	When it comes to engaging with other academics, participating in SNS will be good/useful/worthwhile/helpful/valuable	5	(Peslak et al. 2011)
Subj. Norms	Academics who influence my behaviour/are important to me will encourage me to participate in SNS to engage with other academics.	2	(Lin 2006; Taylor and Todd 1995)
PBC	I will be able to/am in control when it comes to/ have the resources, the knowledge and the ability to participate in SNS in order to engage with other academics.	3	(Lin 2006; Taylor and Todd 1995)
Privacy Control	I believe I will have control over who could access my information collected by SNS/what information will be released by SNS/how my information will be used by SNS/information provided to SNS.	4	(Xu et al. 2013)
Maintain Old Contacts	To keep in contact with past academic peers/ To contact distant academic peers/To track down past academic peers/To see where academic peers are at now/To maintain connections with past academic peers	5	(Foregger 2008)
Create New Contacts	To meet new academic peers/To find academics like me/To talk to academics with the same interests/To hang out with academics I enjoy talking to	4	(Kim et al. 2011)
Information Seeking	To learn about unknown things relevant to my academic research/To do research/To learn about useful academic topics/To get new academic ideas	4	(Kim et al. 2011)
Image	Using SNS will improve my image among other academics/Because my use of SNS, other academics will see me as a more valuable academic/Academics in my field who use SNS have more prestige among academics than those who do not/Academics in my field who use SNS have a high profile among other academics/Having a profile in SNS is a status symbol in academia	5	(Moore & Benbasat, 1991)
Peer Influence	My friends in academia/My colleagues think that I should participate in SNS in order to engage with other academics.	2	(Taylor and Todd 1995)
External Influence	I have seen in news reports that participating in SNS is a good way to engage with other academics/The popular press depicts/Expert opinions depict a positive sentiment for participating in SNS in order to engage with other academics/Mass media reports are	4	(Hsu and Chiu 2004)

	encouraging me to participate in SNS in order to engage with other academics		
Self-Efficacy	I feel confident about finding academic information through participating in SNS/exchanging information with other academics in SNS/chatting on SNS with other academics/downloading files from SNS uploaded by other academics/uploading files or posting comments on SNS related to academia.	5	(Lin 2006)
Self-Promotion	Talk proudly about my experience or education/Make people aware of my talents or qualifications/ Let other academics know that I am valuable to my field/that I have a reputation for being competent in a particular area/Make other academics aware of my accomplishments.	5	(Bolino and Turnley 1999)

(Note: the same items have been adapted to fit the second part of the questionnaire about other online technologies).

Table 30. Items used for the Survey 2

Construct	Items	Number of items	Source
Intention	I plan/intend/expect to use online technologies in the future in order to engage with practitioners/the public.	3	(Ajzen, 2002; Lin 2006)
Attitude	When it comes to engaging with practitioners/the public, using online technologies will be good/useful/worthwhile/helpful/valuable	5	(Peslak et al. 2011)
Subj. Norms	Academics who influence my behaviour/are important to me will encourage me to use online technologies to engage with practitioners/the public.	2	(Lin 2006; Taylor and Todd 1995)
PBC	I will be able to/am in control when it comes to/ have the resources, the knowledge and the ability to use online technologies in order to engage with practitioners/the public.	3	(Lin 2006; Taylor and Todd 1995)
Privacy Control	I believe I will have control over who could access my information collected by online service providers/what information will be released by online service providers/how my information will be used by online service providers/information provided to online services.	4	(Xu et al. 2013)
Maintain Old Contacts	To keep in contact with practitioners and members of the public from the past/ To contact distant practitioners and members of the public /To track down practitioners and members of the public from the past/To see where practitioners and members of the public are at now/To maintain connections with practitioners and members of the public from the past.	5	(Foregger 2008)
Create New Contacts	To meet new practitioners and members of the public /To find practitioners and members of the public like me/To talk to practitioners and members of the public with the same interests/To hang out with practitioners and members of the public I enjoy talking to.	4	(Kim et al. 2011)
Information Seeking	To learn about unknown things relevant to my academic research/To do research/To learn about useful things about practice and public interests/To get new academic ideas	4	(Kim et al. 2011)
Image	Using online technologies to engage with the public will improve my image among practitioners and members of the public /Because my use of online technologies, practitioners and members of the public will see me as a more valuable academic/Academics in my organisation/field who use online technologies have more prestige among practitioners and members of the public than those who do not/Academics in my organisation/field who use online technologies have a high profile among practitioners and members of the public	5	(Moore & Benbasat, 1991)

	/Having an online presence is a status symbol in the practice/public communities		
Peer Influence	My friends in academia/My colleagues think that I should use online technologies for public engagement.	2	(Taylor and Todd 1995)
External Influence	I have seen in news reports that using online technologies is a good way to engage with practitioners and members of the public /The popular press depicts/Expert opinions depict a positive sentiment for using online technologies for public engagement/Mass media reports are encouraging me to use online technologies for public engagement.	4	(Hsu and Chiu 2004)
Self-Efficacy	The level of my capability in using online technologies to successfully engage with the public is very high/The level of my understanding about what to do in using online technologies is very high/ The level of my confidence in using online technologies is very high/ In general, the level of my skill in using online technologies for engaging with the public is very high.	4	(Lin and Huang 2008)
Self-Promotion	Talk proudly about my experience or education/Make people aware of my talents or qualifications/ Let practitioners and the public know that I am valuable to my field/that I have a reputation for being competent in a particular area/Make practitioners and the public aware of my accomplishments.	5	(Bolino and Turnley 1999)

Table 31. Items used for the Survey 3

Construct	No. of items	Reference
Intention (I)	3	(Brown, Dennis, and Venkatesh 2010)
I intend to use online technologies for interacting with the academic community in order to get informed about research in the next 6 months.		
I predict I will use online technologies for interacting with the academic community in order to get informed about research in the next 6 months.		
I plan to use online technologies for interacting with the academic community in order to get informed about research in the next 6 months.		
Performance expectancy (PE): The degree to which an individual believes that using the system will help him or her to attain gains in job performance.	4	(Powell et al., 2012; Venkatesh et al., 2011)
Using online technologies for interacting with the academic community ...		
will be useful in order to get informed about research.		
will enhance my efficiency in getting informed about research.		
will make the acquisition of information about research easier.		
will increase the odds of getting informed about research.		
Effort expectancy (EE): The degree of ease associated with the use of the system.	4	(Venkatesh et al., 2011)
I believe that using online technologies in order to get informed about research will be a clear and understandable process.		
It will be easy for me to become skilful at using online technologies in order to get informed about research.		
I believe that using online technologies in order to get informed about research will be an easy task.		
Learning to use online technologies in order to get informed about research will be easy for me.		
Social influence (SI): The degree to which an individual perceives that important others believe that he or she should use the new system.	3	(Venkatesh et al., 2011)
People who influence my behaviour think that I should use online technologies in order to get informed about research.		
People who are important to me think that I should use online technologies in order to get informed about research.		
I would use online technologies in order to get informed about research, because of the proportion of friends and co-workers who use it for this purpose.		
Facilitating conditions (FC): The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.	3	(Brown et al., 2010)
I have the resources necessary to use online technologies in order to get informed about research.		
I have the knowledge necessary to use online technologies in order to get informed about research.		
If I need it, a specific person (or group) is available for assistance with difficulties using online technologies in order to get informed about research.		
Hedonic Motivation (HM): The fun or pleasure derived from using a technology.	4	(Calder et al., 2009)
Using online technologies in order to get informed about research will be a treat for me.		
Using online technologies in order to get informed about research will improve my mood and make me happier.		

I would like to use online technologies in order to get informed about research when I am eating or taking a break.		
If I was using online technologies in order to get informed about research, I would not think about other things I might do.		
Habit (H): The degree to which a user believes that the behaviour is automatic.	4	(Calder et al., 2009)
I envisage using online technologies in order to get informed about research as part of my routine.		
I envisage using online technologies in order to get informed about research being among the activities I do every time I turn on my computer.		
I envisage online technologies being a big part of getting research news every day.		
I envisage using online technologies in order to get informed about research helping me get my day started in the morning.		

(Note: the same items were adapted to fit the second part of the questionnaire about engaging with academics online for learning purposes).

Appendix B

Welcome!

Online technologies (e.g. blogs, forums, portals, social networking sites, podcasts, instant messaging etc.) provide highly interactive platforms via which individuals and communities share, cocreate, discuss, and modify user generated content. Such platforms can be used by academics to disseminate research findings and engage with other online users.

The objective of this project is to investigate the motivating factors for academics to use online technologies in order to engage with their peers with a view to increase the impact of their research.

In the context of our work, **engagement** is defined as a two-way communication process, involving interactions and listening, with the goal of generating mutual benefits for all parties involved.

We would like to invite research active academics of any discipline (including PhD students, research associates, early and senior academics etc.) to complete our survey. You will be asked the questions **twice, once** in relation to engaging other academics in your field via **Social Networking Sites** (SNS, e.g. Facebook, Twitter, ResearchGate, Academia.edu etc.) and **once** for academic engagement via **online technologies** other than SNS.

Important clarifications:

- Please answer the questions **ONLY** thinking about your engagement via online technologies in the context of your academic work (not personal or private usage), unless otherwise stated.
- The questions that follow concern your circumstances. You may want to complete the questionnaire in private, when you are not disturbed.
- Your answers should be dealt with in a confidential manner. Any information provided will be used solely for the purpose of this research.
- It is very important that you answer all the questions.
- There are no right or wrong answers. Please provide the answer that you think suits your circumstances best. You will need approximately 20 minutes to complete the questionnaire.

Figure 11. Survey 1 - Welcome screen

Online technologies (e.g. blogs, forums, portals, social networking sites, podcasts, instant messaging etc.) provide highly interactive platforms via which individuals and communities share, cocreate, discuss, and modify user generated content. Such platforms can be used by academics to disseminate research/knowledge and engage with other online users.

The objective of this project is to investigate the motivating factors for academics to use online technologies in order to engage with **practitioners and the broader public** (i.e. professionals that are interested in research results in your area for working purposes, such as potential investors and/or professionals that could use research results in their practice and/or people outside the academia in general that may be interested in research for personal reasons, such as hobbies or general knowledge).

Public engagement 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 (National Co-ordinating Centre for Public Engagement, 2014).

We would like to invite research active academics of any discipline (including PhD students, research associates, early and senior academics etc.) to complete our survey. You will be asked about your intention to engage with the public via online technologies **in the future (regardless of whether you are currently using them or not)**. The engagement may take the form of **research dissemination** (i.e. inform the public about the results of your work and make people aware of what your research is about) and/or **knowledge dissemination** (i.e. disseminate knowledge relevant to your field, even if you don't actively research the topic, or provide advice for topics in your area of expertise).

Important clarifications:

- Unless otherwise specified, please answer the questions **ONLY** thinking about your public engagement via online technologies in the context of your academic work (not personal usage).
- The questions that follow concern your circumstances. You may want to complete the questionnaire in private, when you are not disturbed.
- Your answers should be dealt with in a confidential manner. Any information provided will be used solely for the purpose of this research.
- It is very important that you answer all the questions.
- There are no right or wrong answers. Please provide the answer that you think suits your circumstances best. You will need approximately 15 - 20 minutes to complete the questionnaire.

Figure 12. Survey 2- Welcome screen

Welcome!

The objective of this project is to investigate the motivating factors for online users to use online technologies in order to engage with the academic community, with a view to become a more informed and engaged citizen.

Online technologies (Social Networking Sites, blogs, email lists, universities' websites etc.) provide highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user generated content. They can be used by academics and universities to disseminate knowledge and engage with other online users. These interactions between the public and the academic community can take either the form of information disclosure (e.g. inform the public and practitioners about the research undertaken by the university through posting photographs, videos and comments on SNS), public dialogue about research (e.g. the public is invited to comment, ask questions or give feedback on research), or teaching/learning activities (e.g. Massive Open Online Courses, podcasts, web-based seminars etc.)

We would like to invite online users around the world to complete our survey. You will be asked questions in relation to using online technologies for interacting with the academic community (i.e. academics/academic institutions) **for learning purposes and then for getting informed about research.**

Participants who complete the questionnaire will be entered into an optional draw to win £50 in cash.

Important clarifications:

- Your answers should be dealt with in a confidential manner. Any information provided will be used solely for the purpose of this research.
- It is very important that you answer all the questions.
- There are no right or wrong answers. Please provide the answer that you think suits your circumstances best.
- You will need approximately 10 - 20 minutes to complete the questionnaire.

Figure 13. Survey 3 - Welcome screen

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