

# Selection Of Privacy Enhanced Communication: An Extension Of The UTAUT2 Theory

*Full Paper*

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## Abstract

In 2013, the capacity and capability of the world's intelligence agencies to monitor communications was revealed, which has resulted in an increased awareness by consumers of the potential that private communications could be monitored on a grand scale. As a result of these disclosures, consumers are more sensitive to privacy related concerns, but there is limited extant literature and models focusing on the impact the perception of privacy has on consumer's selection, acceptance, and use of technology. This paper proposes a theoretical extension of the unified theory of acceptance and use of technology 2 (UTAUT2) to incorporate privacy as an individual factor influencing consumer acceptance and use of technology. The proposed UTAUT2+P theory incorporates the perception of privacy as an individual difference, along with age, gender and experience, which is hypothesized to moderate the effects of extant UTAUT2 constructs on behavioral intention and technology acceptance by consumers.

## Keywords

Privacy, consumer acceptance, UTAUT2, technology acceptance, privacy perception.

## Introduction

In June of 2013, Edward Snowden, an information technology contractor for the United States National Security Agency, began revealing stolen classified documents that partially revealed the capacity and capability of the world's intelligence agencies to monitor communications (Preibusch 2015). As these secrets were revealed to the world, there was a corresponding increase in the general consumer awareness of the need for what Borking and Raab (2001) described as Privacy Enhancing Technologies (PETs), which have been defined as "...a coherent system of information and communications technologies measures that protects privacy by eliminating or reducing personal data or by preventing unnecessary and/or undesired processing of personal data".

As a result of the Snowden disclosures, privacy is an increasingly important concern for consumers (Ermoshina, Musiani, & Halpin 2016) and dozens of mobile communication applications have been developed to address this perceived need, with varying degrees of security, encryption, and adoption ("Secure Messaging Scorecard" 2014). Indeed, Donald Trump, the President of the United States, and his staff are reportedly using a commercially available secure messaging application to limit leaks to the media (Fenton 2017).

The concept of privacy has been extensively studied, but a universally accepted understanding of what constitutes privacy has proven to be an elusive quarry (Culnan & Armstrong 1999; Solove 2008). The concept of privacy encompasses many dimensions and elements, including "the right to be left alone" (Warren & Brandeis 1890), as an element of human dignity (Bloustein 1964), or as Westin (1967) described informational privacy, the ability for entities to "determine for themselves when, how, and to what extent information about them is communicated to others." Despite the lack of a common definition or even a single coherent understanding of the concept, privacy can be described, in a simplified manner, as the absence of intrusion. Similar to how Justice Potter of the United Supreme Court defined

pornography as “I know it when I see it” (Jacobellis v. Ohio 1964), an invasion of privacy is readily apparent to those affected (Dinev, Xu, Smith, & Hart 2013).

The increased awareness of the potential that private communications could be intercepted and monitored as a result of the Snowden disclosures have driven consumer demand for applications and services that provide privacy-enhanced communications (Ermoshina, Musiani, & Halpin 2016), but there is limited extant literature and models focusing on the impact the perception of privacy has on consumer’s selection, acceptance, and use of technology.

The purpose of this paper is to provide a theoretic underpinning for the conceptualization of privacy within the UTAUT2 framework, which we refer to as UTAUT2+P, and lay out goals for empirical support.

## **Literature Review**

Within the study of information systems, the basis for why and how users accept technology is an extensively studied concept, with the evolution of various models and theories being developed and expanded over the years, primarily within organizational constructs. One of the most advanced and developed of these theories is the unified theory of acceptance and use of technology (UTAUT), identified by Venkatesh, Morris, Davis, and Davis (2003). UTAUT aimed to incorporate the primary operant theory, the technology acceptance model, with other predictive theories of acceptance to produce a “best of breed” amalgamated model that has a greater predictive value than the individual components. Expanding on previous work, this model is well grounded in theory and provides for an understanding of the various concepts that influence acceptance, and includes performance expectation, effort expectancy, social influence and facilitating conditions as the primary factors that influence behavioral intention, leading to actual use. Affecting these primary determinants are key moderators of gender, age, experience and voluntariness of use, which seeks to account for individual variables.

While UTAUT has proven to be an excellent predictor of acceptance within organizational structures, its predictive capabilities have proven to be of less value when addressing consumer use contexts. To address these shortcomings, Venkatesh, Thongand, and Xu (2012) developed an extension of the UTAUT model, known as UTAUT2. A brief review of the evolution of user acceptance models provides context to how UTAUT2 was developed, as well as how the conceptualization of privacy within the UTAUT2 framework comports to the foundational concepts previously established.

The foundational concepts regarding user acceptance of technology are largely based on a theory from the social psychology discipline called the theory of reasoned action (TRA) which was developed by Ajzen and Fishbein (1973). The theory of reasoned action proposes that a person’s behavior, referred to as actual behavior, is largely determined by a construct referred to as behavioral intent (BI) and defined as “a measure of the strength of one’s intention to perform a specified behavior” (Davis, Bagozzi, & Warshaw 1989, p. 984). In 1986, Fred Davis took the theory of reasoned action and developed an adaptation of it specific to information systems, which was later known as the technology acceptance model (TAM) (Davis et al. 1989; Davis 1989; Davis Jr 1986). His technology acceptance model (TAM), and its derivative works have formed the bedrock of a vast amount of the scholarly research in information systems.

As work with TAM continued through the 1990’s and into the 2000’s, the focus shifted to the task of better identifying variables by which to operationalize the constructs of TAM and to expanding the scope of TAM, including efforts to test the outer boundaries of the theory’s applicability by validating it based on factors such as culture, gender, and nationality (Adams et al. 1992; Lee et al. 2003; Venkatesh & Bala 2008; Venkatesh & Davis 2000). In 2000, Venkatesh and Davis published an expanded technology acceptance model (TAM2). The primary goal of this model was to conceptually expand TAM by theorizing the determinate constructs which drive perceived usefulness and to explore some moderators of those constructs.

In 2003, a group of researchers including Davis and Venkatesh, embarked on an effort to combine TAM with theories of acceptance originating from other disciplines to create a model that would bring the best predictive capabilities of the various models together into one theory. The eight theories that were amalgamated were the theory of reasoned action (TRA), from which TAM had been derived; TAM and its TAM2 extension; the motivational model (MM) taken from psychology; the theory of planned behavior (TPB), an extension of TRA; a combined TAM and TPB (C-TAM-TPB); the model of PC utilization

(MPCU), a native IS theory that contrasts with TRA and TPB; social cognitive theory (SCT) taken from psychology; and finally, the innovation diffusion theory (IDT) taken from sociology (Venkatesh, Morris, Davis, & Davis 2003). The researchers compared the constructs of each model and derived an amalgamation that had greater predictive value than the eight individual models. The resultant theory is known as the unified theory of acceptance and use of technology (UTAUT).

Each of the constructs included as antecedents to behavioral intention and use behavior is actually a combination of constructs derived from the eight extant theories that were combined into UTAUT. Each of these sub-constructs has its own scale items and brings predictive value to the constructs as a whole. Performance expectancy is defined as “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003, p. 447). Performance expectancy is derived from perceived usefulness, taken from TAM/TAM2 and C-TAM-TPB; extrinsic motivation, taken from MM; job-fit, taken from MPCU; relative advantage, taken from IDT; and outcome expectations from SCT. Effort expectancy is defined as “the degree of ease associated with the use of the system” (Venkatesh et al. 2003, p. 450). Effort expectancy is composed of perceived ease of use from TAM/TAM2, complexity from MPCU, and ease of use from IDT. Social influence is defined as “the degree to which an individual perceives that important others believe that he or she should use the new system” (Venkatesh et al. 2003, p. 451). Social influence consists of the subjective norm from TRA, TAM2, TPB, and C-TAM-TPB; social factors from MPCU and image from IDT. Facilitating conditions is defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system” (Venkatesh et al. 2003, p. 453). Facilitating conditions consists of perceived behavioral control from TPB and C-TAM-TPB, facilitating conditions from MPCU, and compatibility from IDT (Venkatesh et al. 2003). In addition, UTAUT includes a compliment of moderating variables including gender, age, and the moderating constructs of experience and voluntariness of use that were derived from TAM/TAM2. These moderators are hypothesized to moderate various antecedents (Venkatesh et al. 2003). The UTAUT model comprised a step forward in the study of user acceptance in the IS discipline.

In 2008, Venkatesh and Bala introduced the technology acceptance model 3 (TAM3) (Venkatesh & Bala 2008). TAM3 introduces the new determinant constructs in two groups known as “the anchoring and adjustment framing of human decision making” (Venkatesh & Bala 2008, p. 278). The anchors represent individual differences in “general beliefs associated with computers and computer use” (Venkatesh & Bala, 2008 p. 278). TAM3, in particular, provides a fully developed structure of the determinants left vague in the original TAM model. The TAM3 and UTAUT models represent the current state of acceptance theory in information systems.

The concept of privacy, sometimes also referred to as trust, has been approached in a number of ways within the literature, including as a contextual relationship within the existing UTAUT and TAM models, specifically as part of adoption beliefs such as effort expectancy and facilitating conditions (Venkatesh et al. 2011), but generally not as an independent moderating factor. Other works, such as Dinev, McConnell and Smith’s (2015) expanded Antecedents–Privacy Concerns–Outcomes (APCO) approach recognizes the impact privacy plays in individuals’ choices, which is not reflected in current technology acceptance models.

There have been a number of studies that focus on incorporating privacy as a factor within the UTAUT2 model, generally focusing on the intention to use of specific technologies, such as near-field communication (Morosan and DeFranco 2016), social media messaging (Lai and Shi 2015), and the sharing of user generated content within social media platforms (Herrero et al. 2017), among others. These studies generally focus on privacy as a barrier or impediment to the use of existing technology without addressing the concept of privacy as a primary factor.

## **Theoretical Framing**

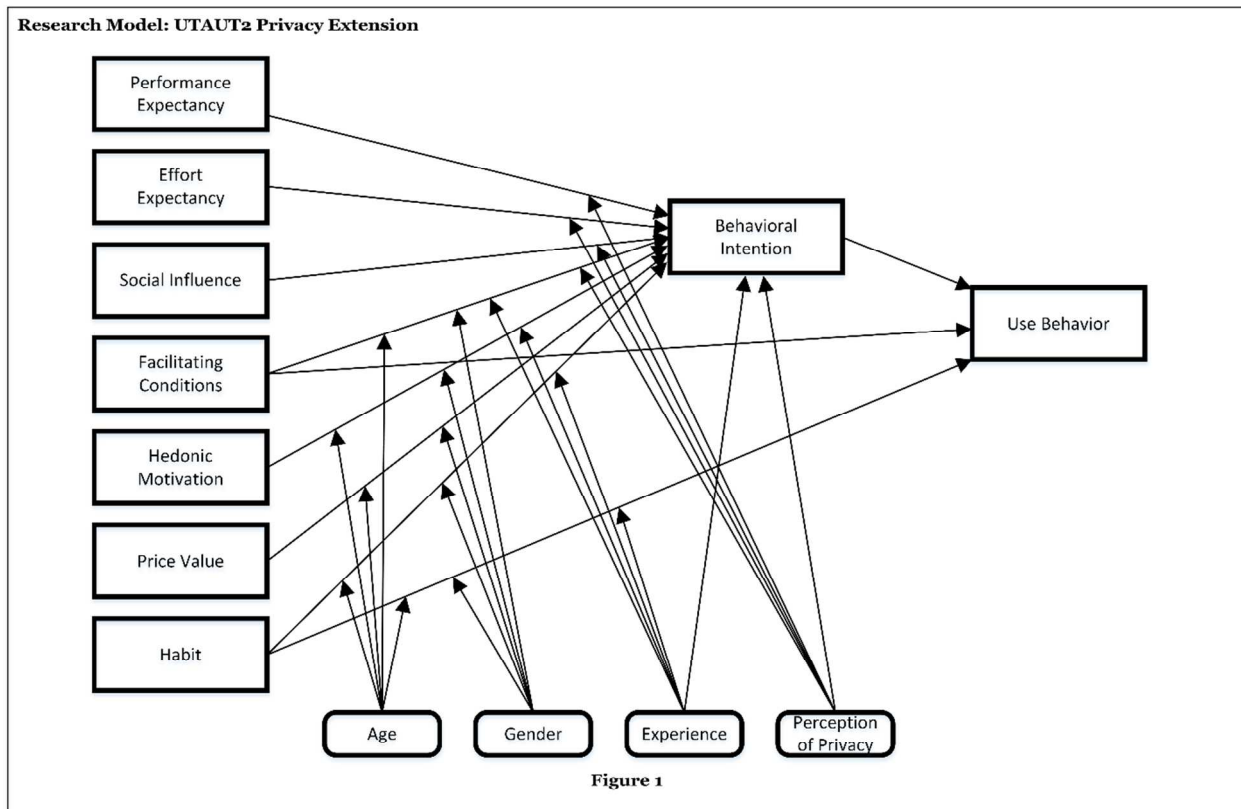
Our research model, which we refer to as UTAUT2+P, expands on these works and the model developed by Venkatesh et al. (2012) and is shown with additions in Figure 1. The primary theoretical addition, shown in Figure 1, is the incorporation of the perception of privacy within the extant framework. This model proposes that the perception of privacy can have an overriding influence on the selection and use of technologies, as demonstrated by the selection of privacy-enhanced mobile communication applications.

This model identifies that the perception of privacy, along with age, gender, and experience, are uniquely individual factors with broad effects on consumer’s acceptance and use of technology.

The incorporation of privacy as a factor presents several challenges. The first challenge is there is no consistent definition of privacy, and the second challenge is that there is no consistent measurement scale for the impact of privacy on the acceptance of the use of technology. The latter is partially ameliorated through Preibusch’s (2013) work examining existing survey instruments for measuring privacy concerns.

We proposed that the perception of privacy influences, and in some cases, overrides UTAUT2’s factors of performance expectancy, effort expectancy, social influence, and facilitating conditions to directly affect behavioral intention. Our proposed model is designed to provide a theoretical underpinning for the conceptualization of the perception of privacy within the UTAUT2 framework by providing a construct that incorporates the vagaries of user’s situational and operational privacy concerns. The concept of privacy is a nebulous and difficult concept to define with precision, but we assert that the perception of privacy is a significant factor in the acceptance and use of technology, and in some cases, is an overriding factor.

This model conceptualizes that the concept of privacy is a trade-off between competing values that influence whether consumers select, accept, and use technology, somewhat influenced by facilitating conditions. Performance expectancy is affected by the perception of privacy in that some users are willing to accept lowered performance and capabilities in exchange for enhanced security and privacy, while effort expectancy is also affected in that as the amount of effort required to effectively use the technology decreases, behavioral intention increases. The perception of privacy also affects the concept of social influence as there is an inverse relationship between privacy and social influence, except within closed groups. However, the perception of privacy can also have a positive effect on social influence based on the closed nature of privacy enhanced communications, which would increase behavioral intention. Consequently, the perception of privacy can have a direct effect on behavioral intention to use specific technologies and applications.



## Future Work

The primary contribution of this paper is theory. In order to develop empirical support for this proposed conceptualization of privacy within an expanded UTAUT2 framework, we envision a mixed-method approach, consisting of a series of qualitative and quantitative studies that explore and measure the perception of privacy against existing UTAUT2 constructs. We believe that qualitative analysis, in the form of open-ended interviews of a randomized selection of consumers will provide grounded observations (Creswell 2008) on the issues related to the perception of privacy and technology, which will allow the proposed quantitative components to be refined.

Subsequent to the conduct of qualitative analysis, the proposed first stage of quantitative analysis is a preliminary exploratory study with a sample size of approximately 200, with the intention to use PLS-SEM to operationalize UTAUT2+P (Hair Jr et al. 2016). This analysis would be followed by theory confirmation and model validation with a larger sample (Hair et al. 2010), with a goal of approximating the general consumer population, both within the United States and in several foreign countries, in order to measure the influence the perception of privacy has on the acceptance and use of technology, with a focus on the use of privacy enhanced communication applications. Conducting surveys in several countries will likely allow for the incorporation of varying perceptions of privacy and security, as well as varying degrees of experience, social influence, facilitating conditions and other factors.

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