

A Meta-Analysis Based Modified Unified Theory of Acceptance and Use of Technology (Meta-UTAUT): A Review of Emerging Literature

Yogesh K. Dwivedi (Corresponding Author)

Emerging Markets Research Centre (EMaRC), School of Management,
Swansea University Bay Campus, Swansea, SA1 8EN, Wales, UK

Email: y.k.dwivedi@swansea.ac.uk

Nripendra P. Rana

International Business, Marketing and Branding Research Centre, School of Management,
University of Bradford, Bradford, UK

Email: nrananp@gmail.com

Kuttimani Tamilmani

International Business, Marketing and Branding Research Centre, School of Management,
University of Bradford, Bradford, UK

Email: kuttimani.tamilmani@gmail.com

Ramakrishnan Raman

Symbiosis Institute of Business Management, Pune & Symbiosis International (Deemed)
University, Pune, India

Email: director@sibmpune.edu.in

Abstract

Over the last more than four decades, several theoretical models have been developed to understand the acceptance and use of information systems. Realising the dilemma in selecting the appropriate theoretical model to assess the acceptance and use of technology and considering the pattern of using the Unified Theory of Acceptance and Use of Technology (UTAUT), a modified version (meta-UTAUT) has been developed based on the synthesis of results from 162 existing studies. The aim of this article is to review the emerging literature on meta-UTAUT and offer some future research recommendations. The analysis suggests that studies have started citing the relationships suggested by meta-UTAUT and researchers have reviewed it alongside other alternative models while analysing acceptance and use of technology.

Keywords: Adoption, Acceptance, Information Systems, Information Technology, Meta-UTAUT

1. Introduction

The acceptance and use of information systems (IS) and information technology (IT) has received extensive attention from researchers and practitioners in the last few decades [10, 25, 31, 47]. Several theoretical models have been proposed to understand the adoption of IS/IT including the theory of reasoned action (TRA), technology acceptance model (TAM), theory of planned behavior (TPB), unified theory of acceptance and use of technology (UTAUT) and extended UTAUT (i.e. UTAUT2) to name a few. These theories have used several different technological and contextual factors that influence the adoption of technologies in individual and organisational contexts.

Based on the extensive review and synthesis of alternative theoretical models, Venkatesh et al. [47] proposed UTAUT, which has become one of the most frequently used models of IS/IT adoption in current times [9, 10, 50]. UTAUT had included four moderators (i.e. age, gender, experience and voluntariness of use) to improve the predictive power of the model, which were not considered by preceding adoption theories. Since the evolution of UTAUT and its extension to UTAUT2, it has been utilised to examine adoption of various technologies in different contexts [50] including mobile health

[11], mobile banking [4], m-wallet [16], mobile payment [42], mobile commerce [39], smart phone [5] and blockchain [30]. Based on these (and other such) studies it can be observed that although the UTAUT model explained considerable variance on intention and use behavior, such studies omitted examining certain relationships and testing the role of moderators. The model was also claimed to be complicated and was not used in its original form in several of the studies that utilised it.

Considering such issues, Dwivedi et al. [10] conducted a meta-analysis on results reported by 162 UTAUT-based empirical studies to modify the UTAUT model that we refer (hereafter) as the meta-UTAUT model. In order to evaluate advances related to this modified meta-UTAUT model, the aim of this review article is to systematically review the emerging literature to assess the current state of employing meta-UTAUT for understanding individual adoption and use of IT/IS.

2. Meta-analysis-based modified version of UTAUT (Meta-UTAUT)

The meta-UTAUT model [10] has included four core exogenous variables (i.e. performance expectancy, effort expectancy, social influence and facilitating conditions) and two endogenous variables (i.e. behavioral intention and use behavior) of the original UTAUT [47]. Performance expectancy is the level to which an individual believes that an IS/IT system use will help them gain job performance whereas effort expectancy is the level of ease associated with the use of such system. Social influence is the degree to which an individual's important others believe that they should use the system whereas facilitating conditions are the measure of infrastructural support available for use of the system [47]. As per the meta-UTAUT model [10] (see Figure 1), performance expectancy, effort expectancy, social influence and facilitating conditions have both direct as well as indirect influence (via the attitudes construct) on behavioral intention to use IS/IT-based systems. The model also posits that the attitudes construct has both direct as well as indirect (via behavioral intention) effects on use behaviour. The model also demonstrates the role of facilitating conditions and intentions for directly predicting use behaviour. As outlined above and shown in Figure 1, meta-UTAUT has established the central role of attitudes as an additional mediating variable along behavioral intention between core exogenous variables (i.e. performance expectancy, effort expectancy, social influence and facilitating conditions) and ultimate dependent variable (i.e. use behavior) of the UTAUT model. Meta-UTAUT posited attitudes as an individual characteristic, which was not included in both UTAUT as well as the extended UTAUT (i.e. UTAUT2) model. The attitudes construct has been utilised along with different adoption models by previous studies [see for example, 9, 12], which suggests its appropriateness to be included as a core construct in IT/IS adoption models.

The model also provides the direct and mediating effect of attitudes onto use behavior, which implies that IS/IT-based innovation is used by individuals based on their attitudes towards technology in question even though they do not deliberately anticipate using such innovation. The significant departure of moderators from the meta-UTAUT model also makes it parsimonious and easier to use. As moderators may not be unanimously applicable in all different contexts, meta-UTAUT does not advocate a mandatory role of any moderating variable in this modified model.

3. A review of citations of originating article of Meta-UTAUT

A cited reference search for meta-UTAUT in Scopus resulted in 71 fully downloadable articles. The next phase involved classification of these articles through systematic review to uncover emerging use of meta-UTAUT theory across various technology use contexts. This resulted in classification of the citing articles into six broad categories as depicted in Table 1.

Conceptual model development and research design emerged as the largest category with 20 citations. A majority of the studies in this category operationalised constructs similar to meta-UTAUT and cited the theory to support the proposed casual relationships across a range of contexts including Jordanian consumers' behavioural intention towards mobile food ordering applications [1] and British students' cyberslacking behavioural intention [33]. In addition, studies in this category also adapted the research design employed in meta-UTAUT such as citation analysis [44] and meta-analysis and structural modelling (SEM) [6]. Literature review and theoretical background emerged as the second largest citation category comprising studies that cited meta-UTAUT in those sections. This involves drawing

references to extant literature on how researchers have adopted/adapted a number of dominant technology adoption models including TAM, UTAUT and meta-UTAUT to identify factors that determine user intention to adopt new information technologies [2, 38].

The next category reference to the evolution of IS theories comprised 15 studies, which cited meta-UTAUT in the introduction section. Researchers in this category acknowledged the necessity to re-examine popular models over time to accommodate evolving needs of technology users such as meta-UTAUT that revised UTAUT through inclusion of attitudes as a mediator [8] and exclusion of UTAUT moderators [3]. Ten studies in the fourth category supporting findings with Meta-UTUAT cited the theory to support specific results that they obtained in their studies. This involves outcomes evolving from both construct/moderator relationships such as the mediating role of attitude in predicting intention and usage [14] and/or supporting reliability values of various constructs [27]. Four studies in the penultimate category acknowledged their limitation and how they can be addressed in the future using meta-UTAUT. Such studies recommended that inclusion of attitudes in the future may better explain variance of the research model to examine issues ranging from helpfulness of online reviews [26] to individual acceptance and use of mobile based IT solution [35]. The final category comprised three studies, which either utilised the theory as a whole [19] or in part by including external variables [20, 22].

Table 1. Meta-UTAUT general citation categories (Approach adapted from Tamilmani et al. [43])

Citation category	Freq	Description	Example citations
Conceptual model development and research design	20	Studies employing meta-UTAUT casual relationships in their conceptual model and adopting the elements of meta-UTAUT research methodology	Alalwan [1]; Chatterjee et al. [6]; Hossain et al. [21]; Kaffashi and Shamsudin [23]; Kapoor and Dwivedi [24]; Mehta et al. [29]; Rana et al. [33]
Literature review and Theoretical background	19	Reviewed meta-UTAUT study alongside other dominant technology adoption theories to fill the research gap	Alam et al. [2]; Lithoxidou et al. [28]; Sharma et al. [38]; Shiferaw and Mehari [40]
Reference to the evolution of IS theories	15	Cited meta-UTAUT study while discussing the evolution of technology adoption theories	Ameen and Willis [3]; Chatterjee et al. [7]; Chea and Luo [8]; Gaspar et al. [13]; Gursoy et al. [17]; Shareef et al. [36, 37]; Tey and Moses [45]
Supporting findings with Meta-UTAUT	10	Cited meta-UTAUT to support their findings	Gong et al. [14]; Gopalakrishna-Remani et al. [15]; Heidt et al. [18]; Hossain et al. [20]; Reading et al. [34]; Veeramootoo et al. [46]
Limitations and Future research directions	4	Cited meta-UTAUT while acknowledging their limitation and how they can be addressed in future	Kaushik et al. [26]; Seethamraju et al. [35]; Sinha et al. [41]
Meta-UTAUT utilization	3	Studied that employed meta-UTAUT as a theoretical lens for their research investigation	Hoi [19]; Hossain et al. [20]; Huseynov and Yıldırım [22]

4. Discussion

The systematic review of meta-UTAUT citations reveals that the first two categories together represent 55% studies. This indicates meta-UTAUT is used to select constructs for their research model. Prior research suggests that while selecting constructs researchers should focus on including attributes specific to the context rather than having the urge to replicate the entire baseline model [48]. For instance, meta-UTAUT findings on underusage of moderators in the UTAUT model served as a basis for examining the role of a gender gap in smartphone adoption and use in Arab countries [3].

Meta-UTAUT has highlighted various such shortcomings of UTAUT and made significant contributions to theory through the re-examined model. Whetten [49] proposed a cross-context theorising framework to evaluate theory contributions from the contextulization perspective. Context

effects can be broadly defined as the set of factors surrounding the focal phenomenon that exerts direct or indirect influence on it [49]. Three studies that utilised meta-UTAUT theory explicitly stated how the theory fits into the contextual setting commonly referred as contextualising theory (theories in context). Hoi [19] employed meta-UTAUT model without any modification in Vietnam – a developing country to examine mobile assisted language learning (MALL) among higher education learners. In addition, researchers have extended the meta-UTAUT model with additional constructs such as personal innovation and resistance to change to examine physicians adoption of electronic health records (EHR) in Bangladesh’s healthcare system [20]. Meanwhile, Huseynov and Yildirim [22] extended the model with perceived enjoyment, compatibility, perceived information security, and perceived social pressure in the Turkish context to examine consumers’ shopping behaviours in B2C e-commerce platforms.

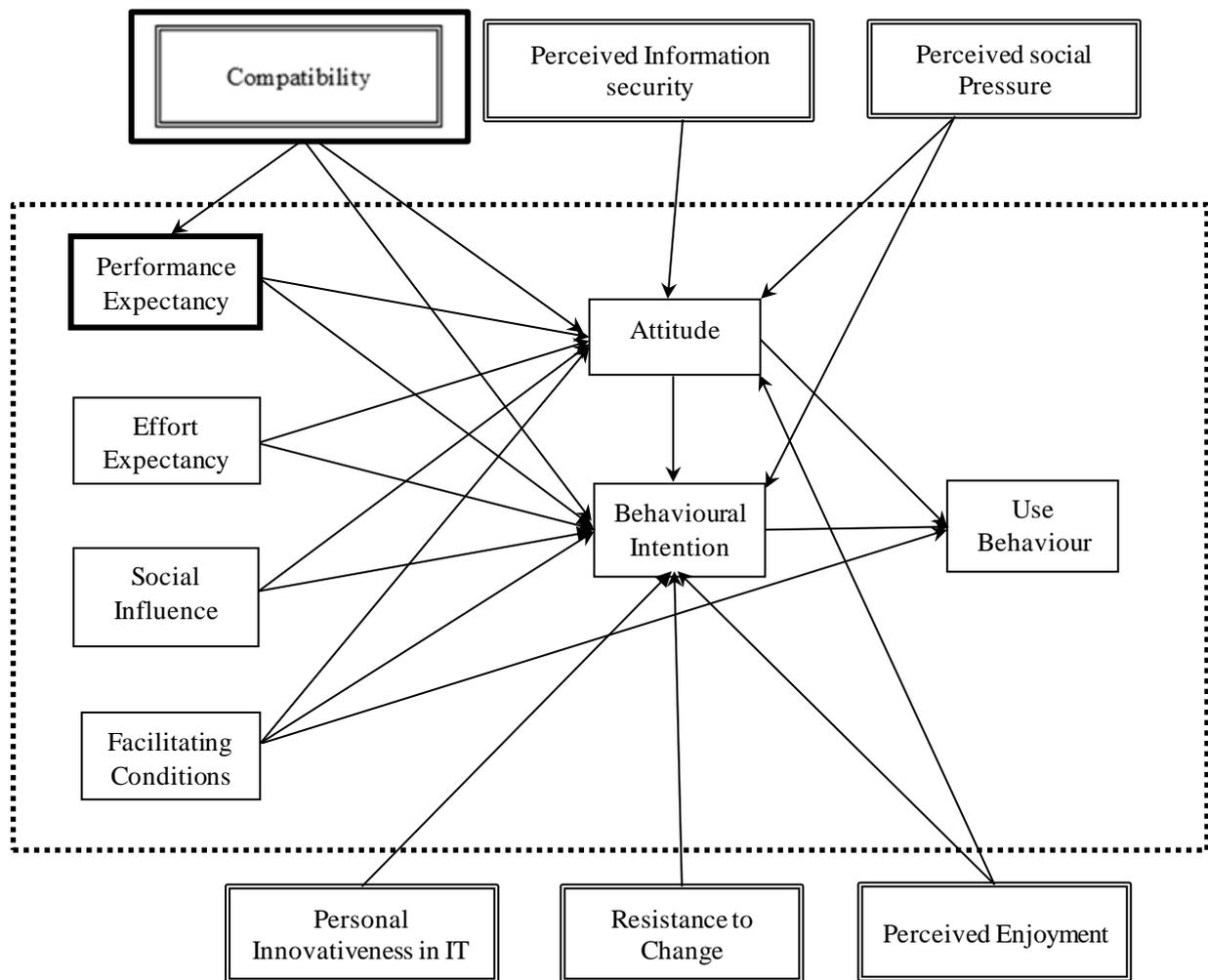


Figure 1. Meta-UTAUT extensions (Source: Adapted from Dwivedi et al. [10]; Hossain et al. [20]; Huseynov and Yildirim [22])

 Meta-UTAUT
 New Exogenous mechanism
 New Endogenous mechanism

Venkatesh et al.'s [48] synthesis of UTAUT literature spanning across more than a decade found the UTAUT extensions category as a significant contributor of individual technology acceptance research. Along the similar lines, citation analysis of meta-UTAUT revealed two types of extension mechanisms and the emerging model is depicted in Figure 1. A new endogenous mechanism was the most popular meta-UTAUT extension, which refers to new associations between external variables and any of the three meta-UTAUT endogenous variables such as attitudes, intentions and usage. In addition, there was one exogenous mechanism, which refers to new associations between external variables and any of the

four meta-UTAUT exogenous variables. Thus, meta-UTAUT has made contributions to theory by serving as a baseline model for guiding researchers to extend their conceptual model based on contextual conditions. In future, researchers should explore opportunities to extend meta-UTAUT through other mechanisms such as new outcome mechanisms that involve measuring consequences of technology use aside from behavioural intention and use behaviour [48].

5. Conclusion

This research paper performed a citation analysis and a brief review of articles that cited meta-UTAUT. The analysis suggests that the largest category of studies selected constructs similar to meta-UTAUT and cited the theory to support the proposed casual relationships. The second largest category comprised studies that cited meta-UTAUT in their literature review and theoretical background sections whereas the third largest category involved the studies where meta-UTAUT was cited while discussing the evolution of technology adoption models. The further use of meta-UTAUT was done where researchers used the reference of the paper on meta-UTAUT to support their findings. However, only a very limited number of studies have yet utilised meta-UTAUT as the underpinning theory for their proposed research model. The analysis presented in this article led to the conclusion that although the originating article of meta-UTAUT [10] has already gained sizable citations (more than 121 as per Scopus and 253 as per Google Scholar), it is yet to be widely utilized as a theoretical alternative for understanding adoption of emerging technologies.

Conflict of interest statement - Nothing declared

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Papers of particular interest, published within the period of review, have been highlighted as:

* of special interest

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