



# Factors affecting adoption of online banking: A meta-analytic structural equation modeling study



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## ABSTRACT

Despite the potential benefits that online banking offers consumers, it has low adoption rate. We systematically review online banking adoption literature to propose two research models of factors affecting pre-adoption and post-adoption of the online banking. To test our proposed models, we applied a two-stage random-effects meta-analytic structural equation modeling method to data collected from 25,265 cases from primary empirical studies of online banking adoption. Our findings show that ten factors affect consumers' adoption of the online banking. Furthermore, we show that the relative importance of these factors differs depending on consumers' pre-adoption and post-adoption of the online banking.

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## 1. Introduction

Online banking is expected to appeal to consumers via benefits such as cost savings, greater control over service delivery, reduced wait times, higher perceived levels of customization, and convenient access to services without time or space constraints. This application of information technology appeals to financial institutions because it can standardize service delivery, reduce labor and service costs, expand the options for delivery, and reach consumers who are unreachable through other channels [35]. Notwithstanding its appeal, online banking adoption by consumers is low. According to the research firm comScore [33], 423.5 million people accessed online banking sites globally during April 2012,

reaching 28.75% of Internet users. This consisted of 45% of the Internet users in North America, 37.8% in Europe, 25.1% in Latin America, 22% in Asia Pacific, and 8.8% in Africa. Such a low adoption rate is troublesome for banking institutions [145]. To increase the adoption rate, banks need to better manage factors that affect consumer adoption of online banking. Thus, scholars have proposed a variety of models to explain the factors affecting consumers' adoption of online banking. A recent descriptive literature review shows that the interest in the topic of online banking adoption grew significantly between 1999 and 2012, and remains a popular research agenda [51]. However, despite more than a decade of research, the extant online banking adoption literature remains somewhat fragmented [36,51,135]. Researchers have chosen to study factors based on their individual interests, and there is no systematic integration among them. Moreover, the growth of the literature increases the likelihood of replicating studies and cross-checking the effects of factors across studies. At the same time, we begin to observe relations that are inconsistent or contradict one another across studies. For example, Gu et al. [50]

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identify trust in the physical bank as a key antecedent of a consumer's intention to use online banking. In contrast, Luo et al. [94] show that trust in the physical bank has no significant effects on a consumer's intention to use online banking. Systematic meta-analysis is likely to help us ameliorate these problems.

Meta-analysis is a method for reviewing a domain of scientific literature and quantitatively determining the degree to which a particular finding has been successfully replicated [39]. Meta-analysis extends knowledge by clarifying and quantitatively synthesizing existing research findings [39]; it has gained widespread recognition as an indispensable tool for quantitatively integrating knowledge garnered in different empirical studies on a topic [39,53]. The widespread use of meta-analysis in the technology adoption literature (see Appendix A, Table A1) attests to its growing stature in this field as a tool for synthesizing accumulated knowledge, explaining the inconsistent findings, and identifying gaps in the literature for future research. Moreover, structural research models can be tested using structural equation modeling (SEM) after the meta-analysis has summarized the relations of interest [28,39,120]. SEM can illuminate or eliminate certain theoretical explanations that advance researchers' knowledge and understanding of the literature. In this paper, we address two research questions: (1) What factors affect the consumers' pre- and post-adoption of online banking? (2) What is the relative importance of each factor in the consumers' pre- and post-adoption of online banking? To answer these research questions, we use the innovation diffusion theory [2,113] as our theoretical foundation, and the "Grounded Theory Literature Review" [100,142] and meta-analytic structural equation modeling (MASEM) [27,28] as our methods to systematically and quantitatively synthesize the primary empirical studies pertinent to the adoption of online banking.

Diffusion of an innovation involves a process that occurs over time and consists of two stages: pre- and post-adoption [64,113], with actions and decisions occurring at each stage. The pre-adoption stage begins with the consumers' awareness, which leads to mental evaluation, which, in turn, may lead to the adoption of the innovation [89]. The post-adoption of the innovation consists of a trial that may lead to the continued use of the innovation [89]. Guided by the innovation diffusion theory as the theoretical foundation, this paper systematically reviews the extant online banking adoption literature using the Grounded Theory Literature Review method and proposes two research models. The first research model pertains to the factors affecting the *pre-adoption*, and the second research model addresses the factors affecting the *post-adoption* of online banking. Thus, we identified 29 empirical studies examining 7151 cases of the pre-adoption intention to use, and we identified 52 empirical studies examining 18,114 cases of the post-adoption intention to continue the use of online banking. These studies have proposed a variety of different models to explain the factors affecting the adoption of online banking. To quantitatively synthesize the literature, we subject our two proposed research models to two-stage random-effects MASEM analyses. MASEM refers to the meta-analytic methods that use SEM to quantitatively contrast and combine results from different studies to identify patterns among study results, sources of disagreement among those results, and other interesting relations that may appear in the context of multiple studies [28].

The remainder of this paper proceeds as follows. Section 2 explains our theoretical foundation for this study and proposes two research models to investigate the factors affecting the pre- and post-adoption of online banking. In Section 3, we explain the Grounded Theory Literature Review method adapted for our theory-driven review of online banking adoption literature towards identifying and synthesizing the factors affecting the pre- and post-adoption of online banking. Furthermore, we explain

and apply the two-stage random-effects MASEM method to test our two proposed research models with data collected from 29 independent empirical studies of the pre-adoption and 52 independent empirical studies of the post-adoption of online banking. Findings from our two-stage random-effects MASEM analyses are presented in Section 4. Section 5 provides a discussion of our findings and their implications for theory and practice. Section 6 explains the study limitations with the recommendations for future research, followed by Section 7, which concludes this paper.

## 2. Theoretical foundation

The innovation diffusion theory posits that the pre-adoption stage of the innovation adoption process involves the consumer's decision regarding whether to accept or reject the adoption of the innovation, and the post-adoption stage of the innovation adoption process involves the consumer's decision regarding whether to continue or discontinue using the innovation. Three innovation characteristics, *relative advantage*, *complexity*, and *compatibility*, have been consistently related to both stages of the innovation adoption process [2,134]. *Relative advantage* captures the extent to which a consumer views the innovation as offering an advantage over previous ways of performing the same task [2]. *Relative advantage* is similar to the notion of usefulness in the technology acceptance model (TAM) [29]. Rogers' [113] notion of *complexity*, the second innovation characteristic, is similar to the ease of use factor in TAM that pertains to the degree to which a consumer views usage of the target technology to be relatively free of effort [37]. Innovations that are perceived to be more useful and easier to use have a higher likelihood of being accepted and used by consumers, at both stages of the innovation adoption process [2]. The third innovation characteristic that affects consumer's adoption decision is *compatibility* [113,134]. *Compatibility* is a multidimensional construct defined as the degree to which using an innovation is consistent with the existing sociocultural values and beliefs, past and present experiences, and needs of consumers [113]. Innovations are inherently uncertain and risky, and there is no guarantee that their adoption will, in fact, produce the anticipated benefits [2]. *Compatibility* captures the degree of disruption and the magnitude of change the individual is likely to experience when using a new technology [63]. An innovation that is less compatible is more uncertain to the consumers [113]. Uncertainty makes consumers reluctant to engage in online exchange relationships with service providers, particularly for high-involvement technologies such as online banking [109]. Thus, Rogers described the innovation diffusion process as "an uncertainty reduction process" [113] (p. 232). In this study, we draw on the three aforementioned dimensions of the innovation diffusion theory, namely *relative advantage*, *complexity*, and *compatibility*, as our theoretical foundation to identify and synthesize the factors that affect consumers' pre- and post-adoption of online banking.

To that end, we used the Grounded Theory Literature Review method [100,142] to perform a thorough and theoretically relevant analysis of the extant online banking adoption literature to identify and synthesize the factors that affect consumers' pre- and post-adoption of online banking. As a result, we have identified the *perceived usefulness* factor in the extant online banking adoption literature that represents the relative advantage dimension of innovation diffusion theory; the *perceived ease of use* factor that represents the complexity dimension of the innovation diffusion theory; and *trust*, *personal innovativeness*, and *social influence* factors that mitigate uncertainty in the adoption of online banking. Thus, these represent the compatibility dimension of the innovation diffusion theory, for the pre- and post-adoption of online banking. Additionally, we have identified *systems quality*,

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