

Application of Dual-process Theory to Information Systems: Current and Future Research Directions

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Foundations and Trends[®] in Information Systems

Published, sold and distributed by:

now Publishers Inc.
PO Box 1024
Hanover, MA 02339
United States
Tel. +1-781-985-4510
www.nowpublishers.com
sales@nowpublishers.com

Outside North America:

now Publishers Inc.
PO Box 179
2600 AD Delft
The Netherlands
Tel. +31-6-51115274

The preferred citation for this publication is

S. Watts. *Application of Dual-process Theory to Information Systems: Current and Future Research Directions*. Foundations and Trends[®] in Information Systems, vol. 1, no. 2, pp. 69–162, 2015.

This Foundations and Trends[®] issue was typeset in L^AT_EX using a class file designed by Neal Parikh. Printed on acid-free paper.

ISBN: 978-1-68083-059-0

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Foundations and Trends[®] in Information Systems, 2015, Volume 1, 4 issues. ISSN paper version 2331-1231. ISSN online version 2331-124X. Also available as a combined paper and online subscription.

Foundations and Trends® in Information Systems
Vol. 1, No. 2 (2015) 69–162
© 2015 S. Watts
DOI: 10.1561/29000000004



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Abstract

This monograph presents a research agenda for the application of dual-process theories to Information Systems (IS) research. It begins by clarifying exactly what a dual-process approach to attitude formation is, explaining how and why it can provide insights that other theoretical approaches cannot. Similarities and differences between the two dominant dual-process theories — the Elaboration Likelihood Model (ELM) and the Heuristic Systematic Model (HSM) are discussed. These concepts are illustrated in a review of 26 published dual-process-based IS studies. This body of research is categorized according to a logical schema based on the locus of attitude formation. We then distill from these studies those heuristic cues and moderating factors that are most relevant to understanding IS phenomena. Finally, we identify the following three IS phenomena as offering great potential for further applications of the dual-process approach: First, information filtering under information surplus; second, how credibility assessment interacts with system design features; and third, mediated knowledge work in situ. We hope that by so doing, we can prevent future fragmentation of this widely varied body of research, and avoid premature closure around only a subset of potential areas for dual-process-based IS research.

S. Watts. *Application of Dual-process Theory to Information Systems: Current and Future Research Directions*. Foundations and Trends[®] in Information Systems, vol. 1, no. 2, pp. 69–162, 2015.

DOI: 10.1561/2900000004.

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Introduction

This monograph addresses the dual-process approach to attitude formation as it has been applied to the domain of Information Systems (IS). It describes 26 empirical research studies published in the IS literature that have been based on the Elaboration Likelihood Model (ELM) or the Heuristic Systematic Model (HSM) — variants of the dual-process approach. Some of the IS phenomena these studies have explored include, among others, the IS training process [???]; website trust and privacy assurance [??]; perceptions of online health records [?]; adoption of expert systems' advice [??]; design of recommendation systems [??]; computer-mediated communication [?]; and knowledge management [??].

Clearly the lens of dual-process theory can engender insights across a wide range of phenomena. The methods used in the studies discussed here include controlled laboratory experiments, field experiments, field quasi-experiments, field surveys of IS professionals, online surveys of wider populations, and big-data analyses of social media archives. The fact that one theoretical approach can shed light on so many different phenomena, and be amenable to the application of so many different methods, attests to its power and versatility. The dual-process theories

seek to explain the general process of *attitude formation* in response to new information, and IS researchers are increasingly applying them to understand how individuals interact with information technologies in a wide variety of information-rich contexts.

However, there are several problems that the great flexibility afforded by this theoretical approach creates: First, the model has been applied in so many different IS contexts in so many different ways that its contributions are becoming fragmented. We need to take care that the insights it has engendered thus far do not get lost among the plethora of different phenomena studied and the methods used. Another problem is that some of these studies have been executed in ways that are inconsistent with the precepts of the approach. This creates general confusion about what the theory is and how to apply it. At the same time, we need to take what is valuable from these studies by making explicit theoretical extensions to the model where appropriate. Another issue we face is one of lost opportunity: dual-process theories explain how people process information, and because so much of the information that people process today is technology-mediated, findings from this approach can inform how these technologies can be optimally designed. This potentially allows for a deeper theoretical understanding of such phenomena as information filtering, first impressions of websites, formation of credibility perceptions, knowledge management, and interactions of these with usability and other design factors. We need to guard against premature closure on a small sub-sample of the many IS phenomena that the approach is well-suited for, particularly those that present easiest access to data. Finally, of the 26 dual-process IS studies discussed here, 10 have been published in the past three years, since 2012. Clearly this approach is gaining momentum among IS researchers, which underscores the need to address these problems. It is the objective of this paper to do so.

We begin by clarifying exactly what a dual-process approach is and how to apply it, in order to ensure that future IS researchers either adhere to the precepts of the approach, or make clear why they choose not to, and include the requisite theoretical extensions. We then define a logical schema for categorizing the extant dual-process IS research (see Figure 4.1), and use it to group these studies into these categories,

briefly reviewing each study as we do so. This addresses the first problem — the need to understand these studies in relation to each other, with the aim of integrating them and forestalling fragmentation of this body of work. In Section 9 we begin by identifying three streams of this research that are outliers, which is not to say that they should not be pursued. We then discuss those heuristic cues and moderating factors in the studies reviewed that are clearly IS constructs, suggesting they bear further dual-process based IS research. Finally, we elucidate three particular IS phenomena that we believe present excellent opportunities for applying this approach in the future: information filtering during complex problem solving; how trust and credibility assessment interact with system design features; and organizational knowledge work. The information surplus that characterizes current organizational contexts gives rise to the need for understanding these phenomena in more depth, particularly for increasing the efficiency of organizational information processing. This is not to say that other IS phenomena should not be studied using this approach; the dual-process approach theoretically informs individual attitudinal response to new information. And when that new information is online, mediated, delivered via technology artifact, and so on, the approach can shed light on the particular phenomenon, whatever it may be. It is a valuable tool in the IS researcher's toolbox.