Communications of the Association for Information Systems

Volume 49 Article 16

10-12-2021

Information System Quality Judgment for Continued E-Government Use: Theorizing the Role of Positive and Negative Affect

Shirish C. Srivastava
HEC School of Management, srivastava@hec.fr

Thompson S.H Teo
National University of Singapore, bizteosh@nus.edu.sg

Recommended Citation
Srivastava, S. C., & Teo, T. S. (2021). Information System Quality Judgment for Continued E-Government Use: Theorizing the Role of Positive and Negative Affect. Communications of the Association for Information Systems, 49, pp-pp. https://doi.org/10.17705/1CAIS.04916

Communications of the Association for Information Systems

Research Article DOI: 10.17705/1CAIS.04916 ISSN: 1529-3181

Information System Quality Judgment for Continued E-Government Use: Theorizing the Role of Positive and Negative Affect

Shirish C. Srivastava
HEC Paris
srivastava@hec.fr

Thompson S.H. Teo
National University of Singapore
bizteosh@nus.edu.sg

Abstract:

Affect and emotions play an important role in how individuals form judgments. Yet, the literature on technological judgments has primarily relied on the cognitive belief perspective. By segregating emotions into positive and negative affect, we incorporate affect in addition to cognitions to understand what drives perceptions about IS quality and, specifically, e-government website quality. Grounding our discussion in the affect infusion model (AIM) and prospect theory, we examine the mechanisms through which positive and negative affect infuse into IS quality judgments. We also theorize that both positive and negative affect have a moderating role in the relationships between cognitions and IS quality perceptions. We tested the model via surveying e-government website users and found that affect had a significant direct role in how they judged IS quality. While negative affect significantly moderated the relationship between experienced usefulness and how individuals perceived the three IS quality measures (i.e., information quality, system quality, and service quality), positive affect did not moderate this relationship. Finally, we theorize about the differential role that affect has on how individuals perceive the three IS quality measures depending on their affect infusion potential. We conclude by discussing our study's theoretical and practical implications.

Keywords: Emotions, Cognitions, Affect Infusion Model, Prospect Theory, E-Government.

This manuscript underwent [editorial/peer] review. It was received 11/24/2019 and was with the authors for fourteen months for three revisions. Shuk Ying Ho served as Associate Editor.

1 Introduction

As "services" continue to grow in importance, we need to better understand the mechanisms that foster information systems (IS) quality. Such an understanding would help researchers and practitioners develop systems that the users want to use. For example, past research has shown that IS quality is positively associated with IS usage (e.g., Sharma, Gaur, Saddikuti, Rastogi, 2017). Quality constitutes a fuzzy concept, yet prior IS research has been instrumental in providing substantial clarity to the IS quality construct's definition. However, most such studies have conceptualized IS quality perceptions from a utilitarian cognitive perspective: as what users experience and *think* about technology (e.g., Srite, Galvin, Ahuja, & Karahanna, 2007; Tate, 2010; Yang, Stafford, & Gillenson, 2011). However, IS quality perceptions may also depend on users' subjective judgments: as what they sense and *feel* about technology. Hence, affect and emotions may also play a significant role in how individuals form IS quality judgments. By incorporating *affect* into the nomological network relating cognitions to IS quality judgments, we focus on advancing our theoretical knowledge about the mechanisms through which IS quality perceptions manifest.

Management research has studied the pervasive role that affect and emotions have in judgments and decision making in various contexts (Forgas & George, 2001; Noval & Stahl, 2017). Yet, prior IS research on affect has primarily examined its role in technology adoption and acceptance (e.g., Deng & Poole, 2010; Djamasbi, Strong, & Dishaw, 2010), compliance with information security policies (D'Arcy & Lowry, 2019) and privacy assessment (Kehr, Kowatsch, Wentzel, & Fleisch, 2015). Despite the apparent significance that affect has in how evaluative judgments that individuals require to continue to or repeatedly use IS form, IS research has clearly not focused on it (e.g., Beaudry & Pinsonneault, 2010; Zhang, 2013). Few studies have examined the role that affect (namely, positive and negative emotions) has in a continued usage scenario. Moreover, research has not examined affect as a factor that influences quality judgements in continued usage scenario. However, past research has acknowledged that "emotions can have a crucial influence on our judgments. It seems uncontroversial to say that emotions play a role in how we judge things…. We act and judge out of emotions" (Steinert & Roeser, 2020, p. 7).

We note that technology adoption constitutes a one-off decision (adopt or do not adopt) but continued usage constitutes an ongoing decision. Consequently, the factors that affect adoption may differ from the factors that affect continued usage, which we can see in cases where individuals initially adopt technology but stop using it afterwards (Bhattacherjee, 2001). Further, we do not know the effect that emotions have on this issue. Emotions tend to vary across time (Kuppens & Verduyn, 2017), and it would be interesting to look at how a time-variant variable affects continued usage. We need to examine continued usage because an information system's benefits and long-term viability depend more on post adoption usage and continued use than on initial adoption (Saeed & Abdinnour, 2013; Venkatesh, Thong, Chan, Hu, & Brown, 2011). In this study, which we anchor in the affect infusion model (AIM), we address this significant gap by examining the role that positive and negative affect have on IS quality judgments in the continued IS usage context.

AIM describes how affect-laden information infuses into judgments via individuals' cognitive and behavioral processes. This infusion plays an important role in individuals' thoughts and constructive deliberations in that it colors their judgments in an affect-congruent direction (Forgas, 1995). Individuals who experience positive affective states will generally make positive judgments, whereas individuals who experience negative affective states will make negative judgments. AIM, therefore, suggests that affective states will likely be associated with what individuals recall and, ultimately, the kind of judgments they make, which will generally concur with the valence of their affective state.

The traditional view on quality judgment primarily takes a cognitive perspective. For example, Juran and Bingham (1974) define quality as fitness for use. Emanating from this concept, recent IS research has also conceptualized "usefulness" as a factor that predicts IS quality judgments (e.g., Hu, Brown, Thong, Chan, & Tam, 2009; Tate, 2010; Yang et al., 2011). In this paper, we move beyond conceptualizing quality in general and IS quality in particular from a cognitive perspective and use the AIM to incorporate "affect" into the nomological network that relates cognitions to IS quality evaluations in order to further explain the mechanisms through which IS quality perceptions manifest. To more clearly understand affect's role, we distinguish and aggregate emotions as positive and negative affect. We propose that, when individuals interact with an IS (especially in a continued usage context), they experience affect, which infuses into their quality judgments about the IS. We further propose that the negative affect experienced when using

an IS interacts with individuals' cognitions and, thereby, moderates the relationship between cognitions and quality judgments when they subsequently use the IS.

In particular, we ask two key research questions (RQ):

RQ1: In the continued usage context, what relationship do positive and negative affect have with IS quality?

RQ2: In the continued usage context, how do positive and negative affect moderate the relationship between cognitions (defined based on usefulness) and IS quality?

With this study, we make several contributions. First, prior research has primarily conceptualized quality in general, including IS quality, from a cognitive perspective. In contrast, we conceptualize affect infusion as playing a key role in how individuals perceive IS quality. In particular, situating our arguments in the AIM, we theorize the mechanisms through which affect infuses into IS quality judgments and, thereby, contribute to the literature on IS quality. Second, we contribute to the IS literature on affect. Prior literature in this stream has tended to focus on a limited set of emotions (such as anxiety and enjoyment) generally in the IT adoption and usage context. Relatively few IS studies have examined a wider range of emotions and affect (e.g., Beaudry & Pinsonneault, 2010; Zhang, 2013) or the joint impact of cognitions and affect (Kim, Chan, & Chan, 2007; Park, Hill, & Bonds-Raacke, 2015). Using the AIM, we add to this research stream by aggregating emotions into positive and negative affect and examining the role that affect plays in IS quality judgments. In addition to examining the different mechanisms through which affect infuses into IS quality judgments, we theorize that positive and negative affect moderate the relationship between cognitions and quality judgments. Consistent with prospect theory (Kahneman, 2011; Barberis, 2013), which proposes that negative outcomes (e.g., losses) are stronger than positive outcomes (e.g., gains), we empirically show that negative affect (but not positive affect) has a moderating effect—a significant contribution because few prior studies have distinguished between the role of positive and negative affect (e.g., Cenfetelli, 2004). Third, we emphasize the need to examine cognition (usefulness) and affect as antecedents to the specific IS quality variables (i.e., information quality, system quality, and service quality) in order to understand the different ways that affect infuses into quality deliberations. We complement and augment the existing work on affect in IS research by examining the differences in affect infusion potentials among the three IS quality variables. Further, we also fill a gap in existing research since researchers have rarely combined cognition with affect as antecedents to IS quality dimensions. In fact, relatively few papers have examined antecedents to IS quality dimensions as Petter, DeLone, and McLean (2013) have highlighted.

2 Background Literature and Theory Development

2.1 Emotions and Affect in Online Settings

One can define emotions as mental states of readiness that arise when individuals appraise events or thoughts and may be accompanied by physiological processes that lead to specific actions that depend on the meaning and valence attached to the emotion (Bagozzi, Gopinanth, & Nyer, 1999). One can also describe them as mental states of preparedness for responding and adjusting to situational demands in the environment in an optimal way (Beaudry & Pinsonneault, 2010; Ethier, Hadaya, Talbot, & Cadieux, 2006). Although the literature has used the terms emotion and affect interchangeably (e.g., Isen, 2000), several studies distinguish between the two (e.g., Frederickson, 2001; Russell & Barrett, 1999). In this study, we make a slight distinction between the two terms. Specifically, we use affect to indicate the holistic experience, a subjective sense of positivity or negativity; in contrast, we use emotion to describe the precise directed feeling associated with a particular experience stimulus (Zhang, 2013).

The marketing and consumer behavior fields have traditionally considered affect and emotions as important study subjects (Bagozzi et al., 1999; Erevelles, 1998). In recent years, IS research has also increasingly begun to consider them (for a review of IS studies that use affect and emotions, see Beaudry & Pinsonneault, 2010; Zhang, 2013). Several studies have investigated how affect develops in online environments and demonstrated its relationships with online shopping behavior (e.g., Ethier et al., 2006; Pappas, Kourouthanassis, Giannakos, & Chrissilopoulos, 2016) or social media engagement (Alibakhshi & Srivastava, 2019). Findings from these studies indicate that fulfilling users' emotional needs is of the utmost importance in online settings as their emotions are associated with desired consumer buying behaviors such as loyalty and repeat visits. However, despite affect's salience, researchers have seldom

explored the influence of positive and negative affect in the e-government context, which we address in this study.

2.2 Positive and Negative Affect (Emotions)

Researchers have suggested different types of emotions and affect. For example, Smith and Lazarus (1993) identified four emotions: anger, guilt, sadness, and fear/anxiety; Scherer (1997) delineated between seven emotions: joy, fear, anger, sadness, disgust, shame, and guilt; and, in their extensive framework, Roseman, Antoniou, and Jose (1996) specified 17 different emotions: surprise, hope, joy, relief, liking, pride, fear, sadness, distress, frustration, disgust, dislike, anger, contempt, regret, guilt, and shame. In addition, Roseman et al. (1996) described emotions as arising from an event's consistency or inconsistency with an individual's motives, and they classified emotions accordingly as motive consistent or motive inconsistent. Motive-consistent emotions indicate an individual appraised a situation positively, and one can aggregate these "feel good emotions" as a "positive affect". Motive-inconsistent emotions, on the other hand, indicate that an individual appraised a situation negatively, and one can aggregate these "feel bad emotions" as a "negative affect". This description complements the way in which Lazarus (1991) and Oatley (1992) have defined emotions (i.e., as high-intensity directed affective states associated with actors' ability or inability to attain their goals). However, not only the actual goal attainment but also the process experienced that one experiences when pursuing it describe the aggregated affect. We examine this nuanced distinction in the e-government website context.

2.3 Quality and Information System Quality: Cognitions and Affect

2.3.1 Quality Perceptions

Researchers have recognized quality as one among the most important factors that contribute to business success, yet the concept remains elusive. Owing to quality's manufacturing sector origins, many researchers have conceptualized it from a cognitive standpoint, which implies quality constitutes an outcome that results when an individual mindfully processes information related to learning, memory, and expectations. Over the years, researchers have defined quality variously as value (Abbott, 1955), conformance to specifications (Levitt, 1972), conformance to requirements (Crosby, 1979), fitness for use (Juran & Bingham, 1974), and meeting and/or exceeding customers' expectations (Parasuraman, Zeithaml, & Berry, 1985). Recent IS research also supports defining quality in this cognitive-appraisal manner in various IS contexts where "usefulness" has significantly predicted quality judgments (e.g., Hu et al., 2009; Tate, 2010; Yang et al., 2011). Further, usefulness rather than ease of use tends to have a persisting impact after initial adoption as numerous longitudinal studies based on the technology acceptance model (TAM) evidence (Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003). This finding has particular relevance in our study since we examine a continued IS use context.

2.3.2 Objective and Subjective Quality: Role of Cognitions and Emotions

Although the myriad definitions of quality adopt different perspectives for appraisal, they all incorporate elements from both "objective" and "subjective" attributes. In the manufacturing scenario, where the term quality has gained considerable importance over the past few decades, quality generally equates to the "conformity to specifications" paradigm and, thus, predominantly constitutes an objective attribute. In contrast, in the service scenario, quality refers to a "perception in the eyes of the beholder" and, thus, largely constitutes a subjective attribute. Juran (1951) first proposed a distinction between objective and subjective quality attributes in separating quality into "quality of conformance" (objective quality) and "quality of design" (subjective quality). Later, Juran (1988) argued that the way he originally defined quality—"fitness for use"—incorporated elements from both objective and subjective quality. As the services sector gained prominence, researchers shifted their focus to quality's subjective components that evaluated intangible aspects, which made it harder to assess and judge. Zeithaml, Parasuraman, and Berry (1990) contended that, in a customer-centric service scenario, only customers can judge quality and all other judgments essentially lack relevance. Grönroos (1990) and Buzzell and Gale (1987) also stressed quality's "subjective component".

In addition to acknowledging that quality has both objective and subjective components, we need to understand how individuals form quality judgments. Owing to quality's manufacturing predisposition, the literature on quality judgments generally takes a cognitive utilitarian perspective and states that quality refers to what the individual *thinks* about quality's various aspects, such as fitness of use, conformity to

specifications, and conformity of expectations. Conceptualizing quality judgments in this way also concurs with cognitive theories such as the theory of reasoned action (TRA) that link beliefs to attitudes (Ajzen, 1985; Ajzen & Fishbein, 1980). Attitude, an evaluative judgment, is primarily cognitive and the summation of salient cognitive beliefs towards a referent target (Ajzen, 2008; Bagozzi et al., 1999). Hence, cognitive beliefs formed on based on experienced usefulness relate to how one perceives quality. Taking an affective viewpoint, we argue that individuals construct quality via their cognitive deliberations but that it is also associated with their affect state. For example, many people experience food as testing better in a restaurant with good ambience and pleasant service than in a restaurant with dull ambience and poor service. Thus, positive affective states may be associated with more favorable judgments, whereas negative affective states may be associated with more critical evaluations. Thus, quality judgment (especially the subjective quality component) may depend on what and how individuals *feel* about an experience.

Figure 1 visualizes how cognition and affect together influence objective and subjective judgments. We propose that quality judgment (including IS quality judgment) comprises two components: objective and subjective components (in varying proportions). The proportion of the two components depends on the output's tangibility. The more tangible (unambiguous) the output (e.g., manufactured products), the greater the objective component and, hence, the greater the role that cognition plays; in contrast, the more intangible (ambiguous) the output (e.g., information and services), the greater the subjective component and, hence, the greater the extent to which affect infuses into the quality judgment.

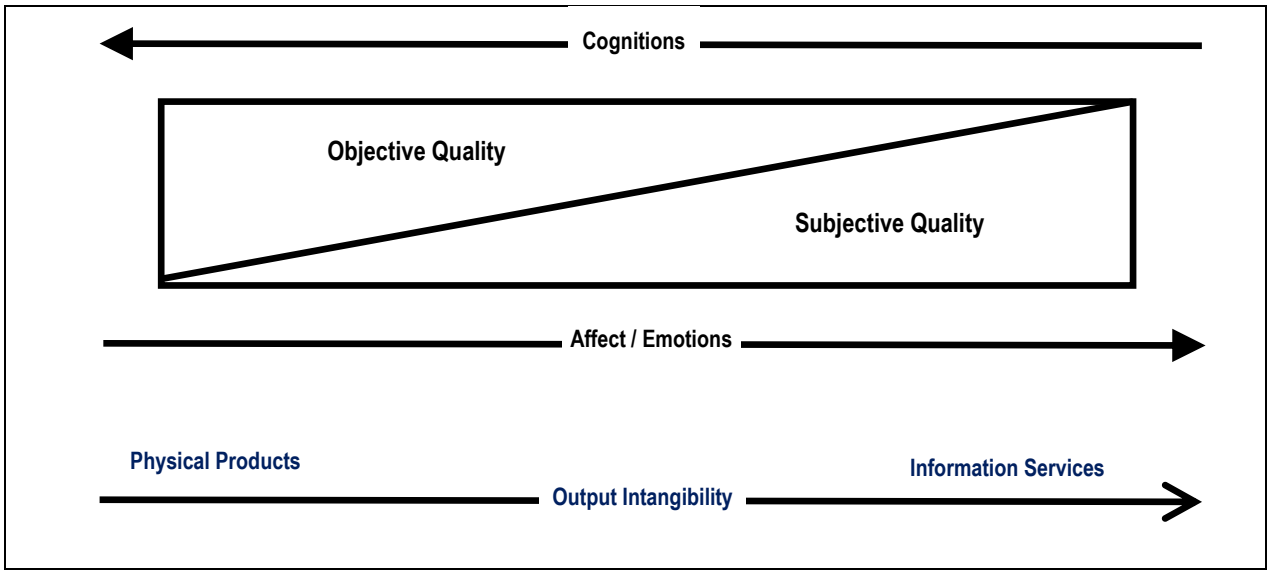

Figure 1. Quality Components: Cognitions, Affect Infusion, and Output Intangibility

2.3.3 Information Systems Quality

Researchers often view IS quality as an antecedent to usage and user satisfaction. For example, the IS success model views information quality and system quality as factors that predict use and user satisfaction, which, in turn, influence individual impact and subsequent organizational impact (DeLone & McLean, 1992). Researchers later extended the IS success model to include a service quality measure as part of IS success (Kettinger & Lee, 1995; Li, 1997; DeLone & McLean, 2003). Hence, we can consider IS quality to comprise information quality, systems quality, and service quality. Information quality signifies the quality of the information that an IS produces. Researchers have conceptualized information quality from the perspective of the information's usability in terms of measures such as accuracy, validity, and timeliness (Seddon, 1997; Seddon & Kiew, 1994). System quality indicates the quality of the information-processing system itself in terms of the information retrieval and delivery process. Overall, system quality signifies whether the system lacks problems and bugs and whether users find the system easy to learn and use to process information (Seddon 1997; Seddon & Kiew 1994). Service quality relates to users' interactional experience and describes their perceptions about how well an organization interacts with them through an IS interface. Thus, service quality captures the service quality that users experience in

terms of measures such as dependability, promptness, and responsiveness (Pitt, Watson, & Kavan, 1995).

Note that, while DeLone and McLean (1992, 2003) view IS quality as a success measure that predicts other success variables (e.g., net benefits), other researchers (e.g., Grover, Jeong, & Segars, 1996) view IS quality dimensions as antecedent success constructs that predict IS success (e.g., use, satisfaction, market measures, etc.). In fact, most past research uses IS quality dimensions as independent variables that predict IS success (e.g., in terms of satisfaction) by testing or modifying DeLone and McLean's IS success model (e.g., Gable, Sedera, & Chan, 2008; Wang & Teo, 2020) rather than examining factors that predict IS quality dimensions.

In a 15-year review, Petter et al. (2013) identified more than 450 empirical papers related to the IS success model. Of these papers, they analyzed 140that examined direct relationships between IS success determinants and IS success dimensions. They found that the "most widely studied, and the most robust, predictors of system quality are the characteristics of the users of the system, specifically, *attitudes toward technology*, *technology experience*, and *self-efficacy*" (p. 30). They also found few studies that examined factors that predict information quality and highlighted that the lacking studies in this area constitutes "a significant gap in the IS research" (p. 30). Similarly, they also found few studies that examined factors that predict service quality. In reviewing antecedents to IS quality dimensions, we also found relatively few studies. We found that cognitive-related constructs as antecedents appeared more frequently than affect-related constructs (Appendix 1). One study used affect in terms of satisfaction as an antecedent to employee service quality (Hsieh, Rai, Petter, & Zhang, 2012), while another examined affect (excitement) as an antecedent to e-service quality (Gounaris, Dimitriadis, & Stathakopoulos, 2005). Consequently, we need to examine cognition in combination with affect as antecedents to IS quality dimensions. By combining both cognition and affect, we can examine their relative influence on different IS quality dimensions and, thus, better explain antecedents to IS quality dimensions and fill a research gap as Petter et al. (2013) have highlighted.

Based on our prior arguments in Section 2.3.2, we posit that IS quality also has both objective and subjective components that describe the way in which users perceive information quality, system quality, and service quality (Delone & McLean, 1992, 2003). As IS quality has a substantial subjective quality component, we expect affect infusion to play a significant role in determining it.

2.4 Affect Infusion Model and Affect Infusion Mechanisms

The affect infusion model (AIM) that Forgas (1995) proposed comprehensively explains the mechanisms through which individuals' affective states infuse into their judgmental strategies. Affect infusion refers to the process whereby affectively loaded information becomes incorporated into a person's deliberations and evaluative processes and their judgments. Furthermore, affect infusion plays a role in the outcome of a judgmental evaluation in an affect-congruent direction (i.e., positive affect is associated with a positive evaluation, whereas negative affect is associated with a negative evaluation). The AIM identifies and describes two basic mechanisms through which affect infuses into judgmental deliberations: the affect-as-information and affect priming mechanisms (Forgas, 1995; Sedikides, 1995).

The affect-as-information mechanism refers to the simple direct route that explains the direct role that affect has on individuals' judgments. The affect-as-information argument suggests that individuals, when faced with an evaluative situation, largely depend on what they feel about the situation rather than carefully evaluating it to calculate a judgment. This argument draws from Clore and Byrne's (1974) early conditioning theory according to which individuals simply act according to what they feel. In evaluative situations, affect serves as a heuristic for simplifying the judgment process through effort minimization. That is, by using affect as a judgmental heuristic, individuals minimize their information-processing effort in evaluating a situation.

On the other hand, the affect priming mechanism explains the indirect route that affect takes in coloring evaluative judgments. The affect-priming argument suggests that affect can indirectly inform evaluative judgments about a situation by accessing related cognitive categories accumulated from prior experience (Isen, 1987). Affective states closely link to any information that individuals store and recall. Thus, affect can prime individuals to recode, retrieve, and select information for evaluative judgments. A positive affective state makes individuals more likely to access and recall positive information from their memory, whereas a negative affective state will trigger them to recall negative information. In turn, recalling such information will infuse into individuals' evaluation and judgments about the situation at hand because they

can only meaningfully interpret events by calling on their memories and prior experiences to interpret them.

Individuals make evaluative judgments by processing available situational information. Situations with objective evaluation criterion and unambiguous available evaluation information require only relatively simple and straightforward information-processing strategies for evaluation. On the other hand, situations with subjective evaluation criterion and ambiguous available evaluation information require more complex and deeper information-processing strategies for evaluation (Sedikides, 1995). Generally, because ambiguous situations lack clear objective evaluation criteria, the experienced *affect* infuses into the evaluative information-processing for forming judgments (through the two mechanisms that we describe earlier in this section). But affect does not infuse into constructive deliberations for evaluation to the same extent across all situations.

The affect infusion potential for a particular situation depends on the nature of the stimulus domain and other situational forces. Unfamiliar, atypical, and ambiguous stimulus domains in which individuals cannot objectively and easily interpret evaluation information to form a judgment generally have greater affect infusion potential (Davis, Kirby, & Curtis, 2007; Lowry, Twyman, Pickard, Jenkins, & Bui, 2014). Thus, the extent to which affect infuses into evaluative information processing depends on the degree of ambiguity in the evaluation process. Situations with fuzzy, subjective evaluation criteria have a high potential for affect to infuse into their evaluative judgments, whereas situations with unambiguous, objective evaluation criteria clearly have a low potential for such affect to infuse into their evaluative judgments (see Forgas, 1995; Frijda, 1986; Schwarz, 2011).

In addition to the affect-infusion mechanisms that we describe above, the AIM also describes the different information-processing strategies that individuals adopt depending on an evaluative task's affect infusion potential. Grounded in an information-processing perspective, the AIM identifies four information-processing strategies that individuals use in judgmental settings for situations with different levels of affect infusion potential: direct-access processing, motivated processing, heuristic processing, and substantive processing.

The first two strategies are low affect infusion strategies, whereas the latter two are high affect infusion strategies. The direct-access processing strategy accesses a pre-existing or ready-made response to a situation in an evaluative scenario; a clear-cut criterion exists for making the judgment. The motivated processing strategy involves the individual in the evaluation at a slightly higher level since it relates to a pre-existing goal; it uses highly predetermined and direct information-search patterns that require little generative or constructive processing. In contrast to the low affect infusion situations that prompt direct-access and motivated processing strategies, when an evaluative task requires generative and constructive information processing, individuals use heuristic and/or substantive processing strategies—both high affect infusion strategies that involve open constructive thinking. The heuristic processing strategy constitutes an open-ended strategy in which individuals adopt shortcuts and affect infuses into the evaluative processes through the affect-as-information mechanism (Clore et al., 1994). The substantive processing strategy, on the other hand, constitutes an open constructive information-processing strategy in which affect infuses more deeply into the evaluative process through the affect priming mechanism in addition to the affect-as-information mechanism (Forgas & Bower, 1987).

Over the years, the AIM has received substantial empirical support (Forgas & George, 2001; Lowry et al., 2014). Researchers have applied it in various organizational behavior areas such as affect in decision making (Noval & Stahl, 2017), affect in work motivation (George & Brief, 1996), and affect in group functioning (Trope, Ferguson, & Ragunanthan, 2001). In the IS area, past research has examined the role that affect and emotions play in judgments and decisions related to information systems (e.g., Beaudry & Pinsonneault, 2010; Wu & Lu, 2013; Zhang, 2013). We did a search using the terms "affect infusion model" and "information systems" and found relatively few papers in key IS journals using the AIM. For example, researchers have used the AIM to examine the relationship between emotional facial expression and knowledge-sharing decisions in a computer-mediated environment (Fehrenbacher, 2017), the relationships between high and low affect infusion with Web vendor trust (Lowry et al., 2014), and the relationship between mood and social presence with consumer purchase behavior in consumer-to-consumer (C2C) ecommerce (Hanpeng, Lu, Shi, Tang, & Zhao, 2017). Based on our earlier arguments in Sections 2.3 and 2.4, we provide details on how we applied the theoretical mechanisms that the AIM describes for to develop our hypotheses in Table 1.

Table 1. Cognitions, Affect and Quality Judgments: Summary of Key Theoretical Arguments

Table 1. Cognitions, Affect and Quality Judgments: Summary of Key Theoretical Arguments

Quality metrics/ evaluation information	Affect infusion potential	Information-processing strategies		Determinants of quality judgments	Cognitions and affect infusion mechanisms in quality judgments
Objective → (unambiguous)	Low →	Low affect infusion strategies	Direct access	Cognitions	Cognitions important with negligible infusion of positive and negative affect.
			Motivated	Cognitions	Cognitions important with minimal infusion of positive and negative affect.
← Subjective (Ambiguous)	← High	High affect infusion strategies	Heuristic	Cognitions, positive affect, negative affect	In addition to cognitions, both positive and negative affect infuse directly when individuals adopt shortcuts/heuristics and affect infuses directly through the affect-as-information mechanism.
			Substantive	Cognitions, Negative affect	In addition to cognitions, in accordance with prospect theory, individuals want to minimize their negative experiences, which leads to substantive processing for negative affect. Thus, in addition to the direct affect-as-information mechanism, negative emotions also infuse indirectly through affect priming mechanisms.

3 Hypothesis Development

3.1 Research Model

As we note in Section 2.3, quality in general and IS quality in particular comprises cognitive and affective appraisals; hence, we begin with a baseline model (Figure 2) that relates cognitive appraisal (experienced usefulness) to how individuals perceive information quality, system quality, and service quality. We show our proposed research model that incorporates affect (positive and negative) in addition to cognitions (experienced usefulness) for understanding IS quality perceptions in Figure 3. The way we conceptualize both cognition and affect concurs with Kim et al. (2007) who suggested that both influence judgment (in our case, judgment about IS quality). Further, our model also recognizes that some websites have non-functional features in the sense that they do not contribute to a task (usefulness) but do help to engender a positive ambiance or aesthetics and, thereby, contribute to affect. Consequently, in our research model, we have both affect (positive and negative) and cognition as antecedents to the IS quality dimensions.

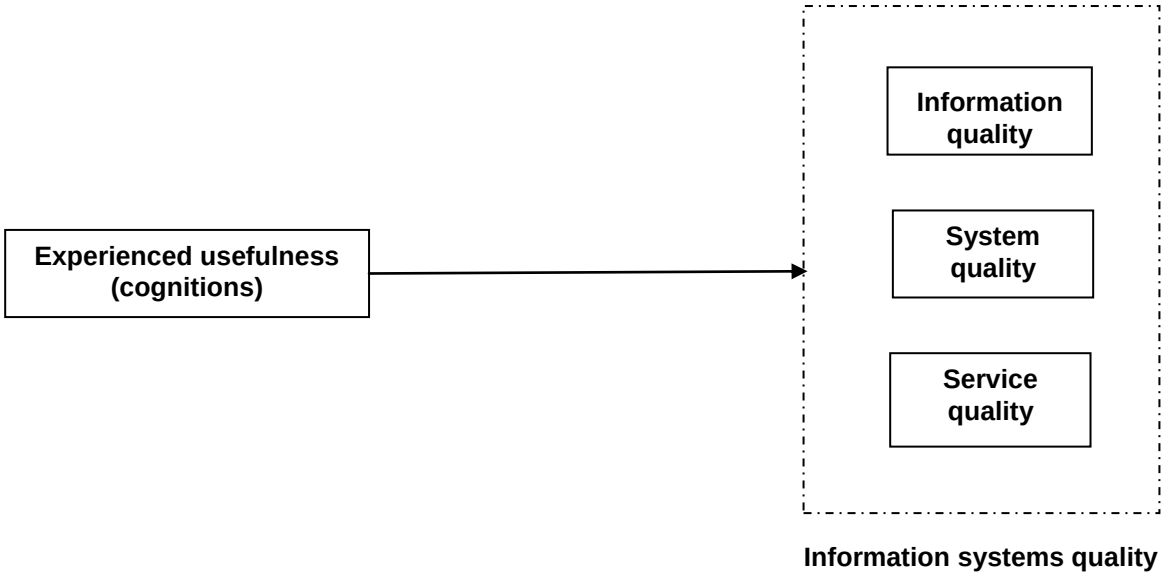

Figure 2. Baseline Model (Cognitions)

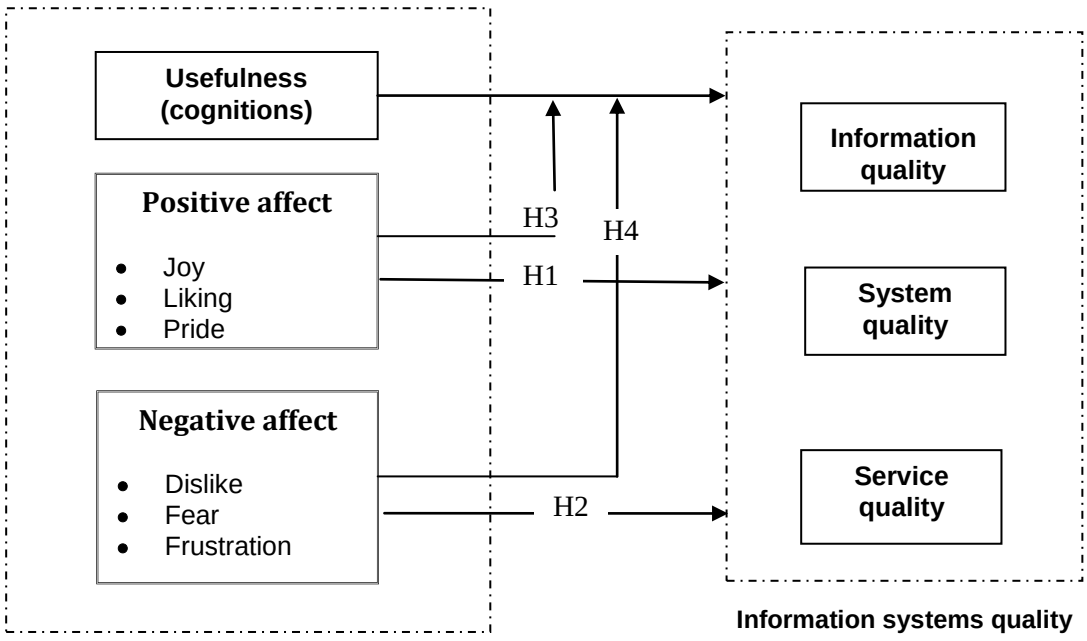

Figure 3. Proposed Research Model (Cognitions, Affect, and Interactions)

Prior studies have indicated that, for richer theorization, researchers need to incorporate the unique contextual elements in which their research resides (see Hong, Chan, Thong, Chasalow, & Dhillon, 2014; Johns, 2006; Nishant, Srivastava, & Teo, 2019; Srivastava & Chandra, 2018). Hence, in developing the hypotheses, we allude to the specific e-government user context. We emphasize that we capture a *continued use* scenario in which respondents have previously used e-government websites and know about their specific functionalities and usefulness. Moreover, such repeat users also experience certain emotions as they continue to use the websites, and these emotions (aggregated as positive and negative affect in a continued use scenario) are associated with how they perceive information quality, system quality, and service quality. E-government as a research setting has two major strengths: 1) it has a mass

appeal as most citizens use some e-government services in some form and 2) e-government often reflects the presence and/or absence of professionalism, efficiency, service, and engagement (Rose, Persson, Heeager, & Irani, 2015). Consequently, using e-government websites often simultaneously arouses both positive and negative affect in individuals. For example, by applying for a passport online, a Singapore citizen could save US$7.50 as compared to handing in the application form at the counter. Thus, individuals could feel joy about completing the application online but also fear that authorities will not accept their digital photo. Also, the responsibility to not have any typographical error in entry rests with the online applicant, which might also evoke fear.

Returning to Section 2.3, researchers have generally defined an object's quality according to its usefulness (e.g., Juran and Bingham (1974) defined quality as fitness for use). So, an object's quality refers to what it does (i.e., the experienced usefulness). Because the respondents in our research context had used e-government websites for a sufficient period, they knew about its usefulness. Thus, we expected them to base their judgments about such websites' quality on their "useful experiences" with such websites (Yang et al., 2011). Further, grounding our arguments in the AIM, we posit that the quality judgments that individuals form do not depend on the "experienced usefulness" alone but that experienced appraisal emotions, which we define in terms of positive and negative affect, influence them.

3.2 Linking Affect with IS Quality Judgments

We ground our framework in the AIM to establish a link between user affect and quality judgments. Assessing IS quality does not represent a simple, straightforward task since user perceptions contain significant subjectivity. Moreover, the three IS quality measures—information quality, system quality, and service quality—connote different meanings to different users based on their prior experiences and expectations. Information quality denotes the quality of a system's information-related output in terms of accuracy, validity, and timeliness (Seddon, 1997; Seddon & Kiew, 1994); system quality denotes an information-processing system's quality in terms of how well it retrieves and delivers information (Seddon, 1997; Seddon & Kiew, 1994); and service quality refers to user perceptions about how well an IS interface facilitates interactions with the focal agency (Pitt et al., 1995). Similar to the notion that quality has both objective and subjective aspects (Juran, 1951, 1988), the three IS quality measures represent different aspects of quality. Specifically, they all include significant subjective (ambiguous) evaluation criteria that require an inherently open constructive thinking style for their judgment. Due to the ambiguity in the stimulus domain, we posit that IS quality measures have a relatively high potential to infuse affect into the corresponding cognitive appraisals. Hence, from an information-processing perspective, we expect users to employ generative information-processing strategies that correspond to a high affect infusion scenario so that, when they judge IS quality, they will likely adopt heuristic and/or substantive information-processing strategies. As we discuss in Section 2.4, both heuristic and substantive information-processing strategies constitute high affect infusion strategies in which affect should significantly influence the judgment outcomes through direct (affect-as-information) and/or indirect (affect priming) mechanisms (Table 1).

Hence, for IS information quality, positive feelings that individuals experience while using an e-government website can indicate that they perceive it to present accurate, valid, and timely information. Similarly, for IS system quality, positive feelings that individuals experience while using an e-government website can indicate that the website's information-retrieval and -delivery process performs well in terms of ease of use and learnability. Following a similar logic for IS service quality, positive feelings that individuals experience while using an e-government website can indicate that they perceive the website to offer a reliable, responsive, and dependable way to interact with the government. Clearly, consistent with the AIM, the positive affect that comprises motive-consistent emotions such as joy, liking, and pride may be associated with judgments in an optimistic way by evoking affirmative memory and thought content. Hence, we propose:

> **H1:** In the e-government context, the level of positive affect that individuals experience is positively associated with the level of perceived a) information quality, b) service quality, and c) system quality.

In contrast, the negative affect that comprises motive-inconsistent emotions such as dislike, fear, and frustration will infuse into judgments in a pessimistic way by evoking negative memory and thought content. Hence, for IS information quality, negative feelings that individuals experience while using an e-government website can indicate that they perceive it to have inaccurate, invalid, and ill-timed information. In a similar vein, for IS system quality, negative feelings that individuals experience while using an e-

government website can indicate that they perceive deficiencies in the system's information-retrieval and -delivery process. Following a similar logic for IS service quality, negative feelings that individuals experience while using an e-government website can indicate that they perceive the website to offer an unreliable, unresponsive, and undependable way to interact with government. Hence, we propose:

H2: In the e-government context, the level of negative affect that individuals experience is negatively associated with the level of perceived a) information quality, b) service quality, and c) system quality.

3.3 Theorizing the Moderating Role of Positive and Negative Affect

Researchers have proposed that cognitions and affect have an interactional relationship with judgments based on extensive evidence that suggests both thinking and feeling play an important role in multiple scenarios (Forgas, 2000; Forgas, 2002). Affect can infuse into judgments by interacting with cognition in two ways: 1) it may be associated with the thinking process and 2) it may be associated with *how* people deal with a given task (Forgas, 1998; Forgas & Fiedler, 1996). From an information-processing perspective, positive and negative affect tend to evoke different information-processing strategies that may differentially moderate the relationship between cognitions and quality judgments.

Positive affect promotes a more internally driven, flexible, and generative information-processing style, whereas negative affect promotes a more externally oriented and systematic information-processing style (Bless, 2000; Fiedler, 2000). In positive affective states, individuals tend to be more permissive in their evaluations, whereas, in negative affective states, they tend to be more conservative in their evaluations (Bless, 2000; Fiedler, 2000). The difference emerges because, in positive affective states, people tend to view the world favorably and/or misread their good mood as indicating a favorable situation. Consequently, they need not allocate cognitive resources and need to expend only minimal cognitive effort (Roesch, 1999), In contrast, in negative affective states, people tend to view the world less favorably. Consequently, they tend to be extra cautious and feel that they need to expend yet more effort before reaching a conclusion in order to avoid negative consequences. Hence, a currently negative affective state motivates individuals to devote extra effort to preclude a future situation with continued negativity. These observations also signal that individuals use *different* information-processing strategies for positive and negative affective states based on the amount of effort they expend in judging the situation (see Table 1).

As we discussed in Section 2.4, when individuals make complex constructive evaluations such as subjective IS quality judgments, they use two kinds of information-processing strategies: a heuristic processing strategy and/or a substantive processing strategy. Positive affect tends to encourage heuristic processing in which individuals seek to produce a response with the least amount of effort, which implies that, in a positive affective state, people generally use affect-as-information and affect directly infuses affect into evaluative judgments (Clore & Bryne, 1974; Clore, Schwarz, & Conway, 1994). Thus, in a positive affect-as-information scenario, individuals to expend rather low effort in evaluating quality, and the positive affect towards an IS will tend to substitute for their usefulness perceptions (cognition) about the IS (refer to Table 1).

Building on this similar logic for e-government websites' quality—a) information quality, b) system quality, and c) service quality—positive affect that individuals experience while using an e-government website promotes an internally driven, flexible, generative, and permissive processing style (Bless, 2000; Fiedler, 2000), which minimize cognitive effort. Consequently, positive affect supports and can substitute usefulness perceptions (cognition) about the website in terms of a) the accuracy, validity, and timeliness of the information it generates; b) usability and learnability; and c) dependable and responsive services, respectively. A positive affective state tends to encourage heuristic processing with direct infusion of affect-as-information (Clore & Bryne, 1974; Clore et al., 1994). Thus, users may need to expend less effort in evaluating the a) information quality in a scenario where a website generates adequate useful information, b) system quality in a scenario with a usable and learnable website, and c) service quality in a scenario with adequate services. Specifically, in a continued usage context, positive affect tends to substitute for useful (cognitive) as a heuristic for quality judgments. Users may tend to depend on their positive feelings rather than their usefulness perceptions (cognition) to make their quality judgments. Therefore, we propose:

H3: In the e-government context, positive affect negatively moderates the relationship between cognitions and a) information quality, b) system quality, and c) service quality perceptions.

In the AIM, the affect-as-information mechanism suggests that positive affect signals higher safety and predictability. Consequently, individuals tend to minimize their cognitive efforts and use the heuristic processing strategy (Clore & Bryne, 1974; Clore et al., 1994). Conversely, negative affect signals lower safety and predictability, and, thus, individuals tend to expend more effort when making judgments (Forgas & Bower, 1987). Thus, in addition to direct infusion of affect-as-information, there will also be indirect infusion through affect priming mechanisms for making evaluative judgments. Users will expend substantially higher effort in evaluating the quality in such a scenario compared to a positive affective state. Moreover, as per prospect theory, users will expend significantly greater effort to evaluate negative experiences (Tversky & Kahneman, 1992). Due to greater effort and substantive information processing, users will be able to discover and use a website more deeply.

In a continued/repeated use context, continuing to use an e-government website despite the negative affect suggests that the user finds it useful. Thus, in a scenario with negative affect, the salience of a website's usefulness in describing its quality becomes higher, which will strengthen the relationship between a website's perceived usefulness and its quality judgment. Therefore, grounding our arguments in prospect theory and the AIM, we posit that negative affect will positively moderate the relationship between cognitions (experienced usefulness) and quality judgments.

We argue that, for a) information quality, b) system quality and c) service quality, negative affect that individuals experience while using an e-government website promotes an externally oriented, systematic, and conservative processing style (Bless, 2000; Fiedler, 2000) that contradicts usefulness perceptions about the website in terms of a) information that it generates, b) a usable and learnable information-retrieval and -delivery process, and c) prompt, dependable, and responsive interactions with the government, respectively. For a continued/repeated use context, a scenario with high negative affect entails substantive processing to allow users to discover and use a website's capabilities more deeply. Rather than depending on their negative feelings, users who have had the opportunity to examine a website's usefulness more deeply may more significantly consider usefulness perceptions. Hence, the more the negative affect, the greater the substantive processing. Thus, in such cases, individuals will more deeply examine a website's usefulness to determine its quality. Furthermore, these usefulness perceptions would need to compensate for the negative affect. Thus, in situations with higher negative affect, the relationship between an e-government website's usefulness and the three quality perceptions will tend to be stronger. Therefore, we propose:

H4: In the e-government context, negative affect positively moderates the relationship between cognitions and a) information quality, b) system quality, and c) service quality perceptions.

3.4 Theorizing the Role of Affect Infusion Potential in IS Quality Judgments

The three IS quality constructs that we examine in this research—information quality, system quality, and service quality—measure different IS quality aspects that vary in their objective and subjective components. Because the affect infusion potential depends on the subjective component, we posit that the relationships that affect has with the three IS quality measures will differ. In this section, we discuss the reasons for the differences in affect infusion potential for the three IS quality measures and propose a related hypothesis. Specifically, we consider the context and nature of the IS quality variable in our study's context to develop our arguments (refer to Table 1).

IS information quality: e-government website users generally visit these websites to access different types of information. Thus, in their perception, information quality depends more on the objective usefulness of the information that the website generates/that they access on the website in terms of its accuracy, validity, and timeliness than on the subjective criteria. If users find the information accurate, valid, and timely, they will perceive the website to have high information quality. Whether they do so depends on whether the users view the government as a trusted and reliable authority for such information. In our study's context (Singapore), people have high trust in the government and generally view the information that government websites provide as valid (Srivastava & Teo, 2009; Lim, Tan, Cyr, Pan, & Xiao, 2012). Due to the greater objectivity in the information quality evaluation criteria, affect has a relatively lower potential to infuse into the information quality evaluation process.

IS system quality: e-government website users may not necessarily be experts in using IT. Hence, if the find a website easy to learn and use in terms of the information-retrieval and -delivery process, they will perceive it as having higher system quality (Seddon, 1997; Seddon & Kiew, 1994). Moreover, people evaluate a system's information-retrieval and -delivery process in quite a subject manner, and their

evaluation may depend less on the website's actual usefulness than other factors. For example, variability in the users' computer skills and Internet connection speed affects the experience people have in the information-retrieval and -delivery process, which makes assessing system quality more subjective. Thus, the subjective experience while using the website appears to be more salient for assessing the system quality. Due to the greater subjectivity in the system quality evaluation criteria, affect has a relatively high potential to infuse into the system quality evaluation process.

IS service quality: e-government website users generally visit government websites to access information and/or to transact/interact with the government. Thus, perceived service quality depends not only on the objective transactional criteria but also to some measure on the subjective process that defines the extent to which they perceive the interactions with the government as dependable, prompt, and responsive (Pitt et al., 1995). Thus, how users perceive service quality may depend on both objective and subjective quality assessment criteria. Because of the element of subjectivity in addition to the objectivity in quality evaluation criteria, the affect infusion potential in the service quality evaluation process is expected to be higher than the evaluation of information quality and lower than that of system quality.

Thus, we expect that, in our study's context, among the three IS quality variables, system quality has the highest affect infusion potential followed by service quality and information quality in that order. Therefore, we propose:

H5: In the e-government context, a) the relationship between affect and system quality is stronger compared to the relationships of affect with service and affect with information quality and b) the relationship between affect and service quality is stronger compared to the relationship of affect with information quality.

We summarize the theoretical logic for the association between cognitions and affect with the three IS quality measures in Appendix B.

4 Method

4.1 Data Collection

We used a survey method to collect data and test our hypotheses. We adapted validated scales from the existing literature to the research context as we show in Appendix C. To measure the items, we used a seven-point Likert scale. We pretested the survey instrument using PhD and undergraduate students who had used e-government websites for several years. We collected data through questionnaires that we distributed to 214 e-government using university students in Singapore (100% response rate). We solicited the participants from a cross-faculty module (a module that students from various faculties take) in a large university. Students could freely to choose whether to participate either in our study or in other similar studies. We screened the respondents to ensure that they had previously used e-government websites; we allowed only respondents who fulfilled this criterion to participate in the study. Singapore's young population commonly interacts with government websites for various purposes such as education, national service, youth activities, and sports. The respondents in our study who all had sufficient experience with e-government websites answered questions about real-life situations they faced in their regular interaction with the government. Our survey asked respondents to choose an e-government website that they are familiar with and to respond with that website in mind. We also asked respondents to indicate the duration of the web experience and the duration they had used e-government websites for.

Singapore also provides an excellent context for this study because it has a relatively well-developed e-government (Srivastava & Teo, 2009; Teo, Srivastava, & Jiang, 2008). Further, Singapore ranked second (after Denmark) in the 2018 Waseda University International Digital Government Ranking (Waseda University, 2018) and first in the Networked Readiness Index (World Economic Forum, 2016). According to a survey that the Infocomm Development Authority (IDA) of Singapore conducted, 84 percent of Singapore's citizens used electronic means (e.g., the Internet or email) to interact or transact with government agencies (Infocomm Development Authority of Singapore, 2010). This report also found most e-government users in Singapore as being between 20 and 39 years old. Hence, the respondent sample we chose closely approximates the age group range of actual e-government users in Singapore.

4.2 Control Variables, Validity, and Reliability

We incorporated suitable controls in the regression equations for the three IS quality variables to better understand the variance that the research variables explained. We included three different types of control variables in the research model to account for alternative explanations: 1) respondent demographics: age and gender, 2) respondent experience: Internet experience and e-government experience, and 3) type of e-government use: active (messaging and transacting) or passive (browsing and downloading). We used number of years to measure age, Internet experience, and e-government experience. For gender, we used dummies to indicate male and female, and, for e-government use, we added dummies for active and passive users in the regression equations.

From Appendix C, one can see that the Cronbach's alpha for constructs ranged between 0.84 and 0.89, which indicates adequate reliabilities. We checked for three types of validity: content validity, convergent validity, and discriminant validity. Content validity assesses whether the chosen measures appropriately capture the construct's full domain. In this research, we examined content validity was by first checking for consistency between the measurement items and the existing literature and then pre-testing the instrument (Srivastava & Teo, 2007). Convergent validity detects whether the measures for a construct correlate more with one another than with the measures for another construct (Petter, Straub, & Rai, 2007). As Appendix D shows, the factor loadings (shaded) show a strong correlation between each indicator and their corresponding constructs. Furthermore, we found that the indicators had low cross-loadings on other constructs, which verified our various constructs' discriminant validity. Appendix E provides the descriptive statistics and correlations for all the research variables. To allay the possibility of biased estimates, we performed Harman one-factor test and marker variable technique to confirm that common method bias did not confound our results (Appendix 6).

5 Results and Discussion

We analyzed the respondents' demographics and found that 57.9 percent were male—close to the actual proportion of male Internet users in Singapore (i.e., 57%) (Dholakia, Dholakia, & Kshetri, 2004). As such, gender did not bias our sample. On average, respondents were 22.08 years old (S.D. = 1.69) and had 7.90 years (S.D. = 1.92) of Web experience and 3.36 years (S.D. = 1.74) of experience using e-government websites. Appendix F provides the means, standard deviations, and correlations for all variables we used in the study. Note that the correlations that positive and negative affect had with usefulness were just 0.27 and -0.19, respectively (Appendix 5), and the three constructs loaded on distinct components (Appendix D), which indicates that affect (positive and negative) and usefulness constitute distinct attributes.

The research model examines the relationships between cognitions and affect (positive and negative) with the three IS quality measures (information quality, system quality, and service quality). As all three dependent variables in this research measure quality, the possibility for unobserved relationships between them emerges, which implies the error terms for the three dependent variables might correlate with each one another due to omitted factors associated with perceptions about information quality, system quality, and service quality. To allay the possibility that we obtained biased estimates from using ordinary least squares, we estimated our model using seemingly unrelated regression (SUR) (e.g., Maruping, Venkatesh, & Agarwal, 2009; Srivastava & Teo, 2012). Specifically, we used a four-step hierarchical SUR model to test the hypotheses. In the first step, we introduced all control variables. In the second step, we introduced cognitions. In the third step, we introduced positive and negative affect to examine their direct relationships with the three IS quality measures. In the final step, we added the interaction terms between cognitions and affect. Following the guidelines that Aiken and West (1991) outline, we mean-centered all values prior to creating the interaction terms to reduce collinearity between the main effects and interaction terms. We also checked for multicollinearity of our predictors and calculated the variance inflation factor (VIF), which ranged from 1.07 to 1.59. As all VIF values were less than 5 and all correlations among independent and control variables were below 0.80, our model had no significant multicollinearity problems (Gujarati, 2003; Hair, Anderson, Tatham, & Black, 2006). We present the stepwise regression results in Table 2. Control variables together explained 2.7 percent of the variance in perceived information quality, 1.3 percent of the variance in perceived system quality, and 1.8 percent of the variance in perceived service quality. After incorporating the cognitions (usefulness) into the regression equation (second step, baseline model), we observed a significant change in variance (ΔR^2)—12.7 percent (information quality), 5 percent (system quality), and 22.8 percent (service quality)—

compared to the control variable IS quality model. We also observed a stronger relationship between usefulness cognitions and IS quality for information and service quality than for system quality.

Table 2. Results of Seemingly Unrelated Regressions (SUR)

	Information quality				**System quality**			
	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4
	Control variables	Cognitions	Emotions	Interaction effects	Control variables	Cognitions	Emotions	Interaction effects
Constant	-0.001 (0.050)	0.001 (0.047)	-0.001 (0.045)	0.017 (0.045)	-0.001 (0.066)	-0.001 (0.064)	0.001 (0.055)	0.022 (0.054)
Age	-0.013 (0.037)	-0.007 (0.035)	0.001 (0.334)	0.013 (0.033)	-0.054 (0.049)	-0.050 (0.047)	-0.029 (0.041)	-0.011 (0.040)
Gender	-0.081 (0.121)	0.019 (0.114)	-0.038 (0.110)	-0.039 (0.107)	0.085 (0.157)	0.166 (0.155)	0.029 (0.134)	0.030 (0.130)
Internet experience	0.047 (0.031)	0.035 (0.029)	0.047 (0.028)	0.053* (0.028)	0.012 (0.040)	0.002 (0.040)	0.032 (0.034)	0.040 (0.034)
E-government experience	-0.035 (0.034)	-0.053 (0.032)	**-0.065* (0.031)**	**-0.067* (0.030)**	0.007 (0.044)	-0.007 (0.043)	-0.038 (0.037)	-0.042 (0.036)
Use type (active/passive)	-0.172 (0.102)	**-0.204* (0.096)**	-0.117 (0.093)	-0.107 (0.092)	-0.024 (0.133)	-0.050 (0.130)	0.151 (0.114)	0.163 (0.111)
Usefulness (cognitions)		**0.285** (0.050)**	**0.208** (0.051)**	**0.186** (0.053)**		**0.230** (0.069)**	0.045 (0.063)	0.019 (0.065)
Positive affect			**0.147** (0.052)**	**0.158** (0.051)**			**0.370** (0.063)**	**0.384** (0.062)**
Negative affect			**-0.165** (0.052)**	**-0.139** (0.052)**			**-0.367** (0.063)**	**-0.326** (0.062)**
Usefulness x positive affect				0.024 (0.042)				0.049 (0.051)
Usefulness x negative affect				**0.137** (0.046)**				**0.206** (0.056)**
R^2	0.027	**0.154****	**0.227****	**0.262****	0.013	**0.063***	**0.307****	**0.352****
ΔR^2		**0.127****	**0.073****	**0.035****		**0.050***	**0.244****	**0.045****
Chi-square	5.94	38.80	62.78	75.85	2.91	14.31	94.84	116.16
P Value	0.311	0.000	0.000	0.000	0.714	0.043	0.000	0.000
Parms	5	6	8	10	5	6	8	10
	Service quality							
Constant	-0.001 (0.058)	-0.001 (0.051)	-0.001 (0.047)	0.022 (0.046)				
Age	-0.032 (0.043)	-0.023 (0.038)	-0.011 (0.035)	0.001 (0.034)				
Gender	-0.091 (0.138)	0.062 (0.122)	-0.017 (0.114)	-0.022 (0.111)				
Internet experience	-0.016 (0.036)	-0.035 (0.032)	-0.018 (0.029)	-0.012 (0.029)				
E-government experience	0.064 (0.039)	0.036 (0.034)	0.018 (0.031)	0.017 (0.031)				
Use type (active/passive)	-0.094 (0.117)	-0.144 (0.102)	-0.026 (0.097)	-0.012 0.095				
Usefulness (cognitions)		**0.436** (0.054)**	**0.328** (0.053)**	**0.294** (0.055)**				
Positive affect			**0.214** (0.054)**	**0.229** (0.053)**				
Negative affect			**-0.215** (0.054)**	**-0.190** (0.053)**				
Usefulness x positive affect				0.004 (0.043)				

Table 2. Results of Seemingly Unrelated Regressions (SUR)

Usefulness x negative affect				**0.142** (0.048)**				
R^2	0.018	**0.246****	**0.353****	**0.386****				
ΔR^2		**0.228****	**0.107****	**0.033****				
Chi-square	3.84	69.65	116.51	134.58				
P Value	0.573	0.000	0.000	0.000				
Parms	5	6	8	10				

The results from the baseline model show that the cognitive belief experienced usefulness had a positive significant relationship with all three IS quality constructs. In the third step, we incorporated the affect terms (positive and negative affect) in the regression equation. We again observed a significant change in variance (ΔR^2): 7.3 percent for information quality, 24.4 percent for system quality, and 10.7 percent for service quality. The infusion of affect for the explanation of the perceived system quality is significantly greater than for service and information quality. Further, positive affect had a significant positive relationship with all three IS quality measures—information quality ($\beta = 0.15$, $p < 0.01$), system quality ($\beta = 0.37$, $p < 0.01$), and service quality ($\beta = 0.21$, $p < 0.01$)—which supports H1a, H1b, and H1c. In addition, negative affect had a significant negative relationship with all three IS quality measures—information quality ($\beta = -0.17$, $p < 0.01$), system quality ($\beta = -0.37$, $p < 0.01$), and service quality ($\beta = -0.22$, $p < 0.01$)—which supports H2a, H2b, and H2c. Comparing this model with the baseline model, we observe that cognitions become less important when we added affect constructs to the model. In fact, the relationship between experienced usefulness and perceived system quality became nonsignificant, which highlights the key role that affect plays in infusing into perceptions about system quality.

In the fourth step, we tested to see whether affect (positive and negative) had a moderating effect on the relationship between usefulness cognitions and the IS quality variables. We established the low versus high dichotomy using one standard deviation from the mean as researchers commonly apply for moderator tests (Aiken & West 1991). Positive affect did not significantly moderate the relationship between usefulness and perceived information quality ($\beta = 0.02$, N.S.), system quality ($\beta = 0.05$, N.S.), or service quality ($\beta = 0.01$, N.S.). Hence, we did not find support for H3a, H3b and H3c. However, negative affect did significantly moderate all three relationships—information quality ($\beta = 0.14$, $p < 0.01$), system quality ($\beta = 0.21$, $p < 0.01$), and service quality ($\beta = 0.14$, $p < 0.01$)—which supports H4a, H4b, and H4c. Thus, as theorized, we found a difference in the way negative and positive affect infuse into the relationships between usefulness cognitions and IS quality judgments. Moreover, we can also conclude that a model that incorporates emotions as having a moderating role in the relationship between cognitions and affect in addition to the direct effect between cognitions and affect significantly better explains IS quality judgments.

For all three IS quality variables, negative affect moderated the relationship between cognitions (experienced usefulness) and quality perceptions such that the relationship between cognitions and perceived IS quality became stronger in situations with high negative affect. Thus, usefulness cognitions compensate for the quality judgment in situations with negative affect. To better understand the interaction pattern between cognitions and affect, we plotted the significant interactions following Aiken and West's (1991) guidelines. We plotted the line slopes one standard deviation of negative affect above and below the mean. Figures 4, 5, and 6 show the interaction effects that the relationship between usefulness and affect had with perceived information quality, system quality, and service quality, respectively.

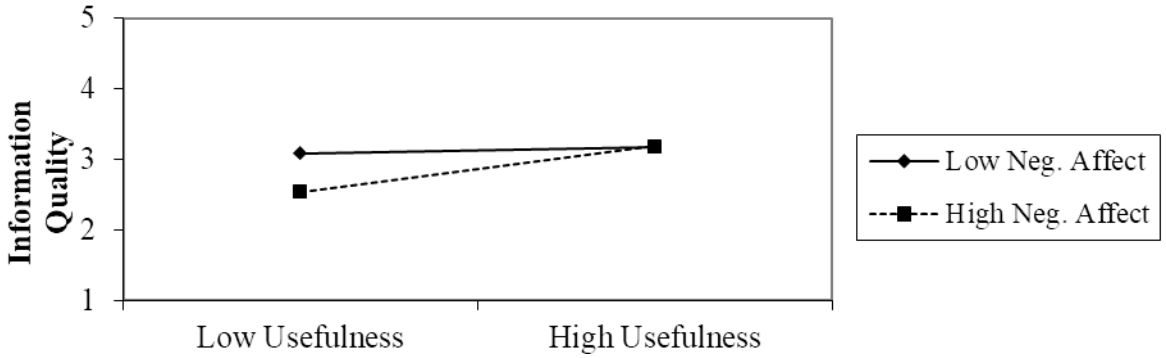

Figure 4. Information Quality: Low/High Usefulness and Low/High Negative Affect

From Figure 4, we observe that, in a situation with high negative affect, higher experienced usefulness significantly enhanced perceptions about information quality. However, we also observed that, for a high level of usefulness, the infusion of negative affect on perceived information quality attenuates. Thus, in situations with high levels of cognitions of usefulness, the perception of information quality remains relatively stable under conditions of low negative affect. This finding also concurs with the argument that we present in Section 3.4 about the lower affect infusion potential for perceptions about information quality compared to other quality measures. Further, we also performed a slope test and found that the slope for high negative affect significantly differed from zero (t = 3.86), whereas the slope for low negative affect did not (t = 1.08). This finding implies that experienced usefulness has a significant relationship with the perception about information quality in situations with high negative affect but not in situations with low negative affect. Moreover, we observed that the slopes for the high and low interaction plots significantly differed from each other (t = 3.08), which confirms the infusion of negative affect and its interaction with cognitions in information quality judgments.

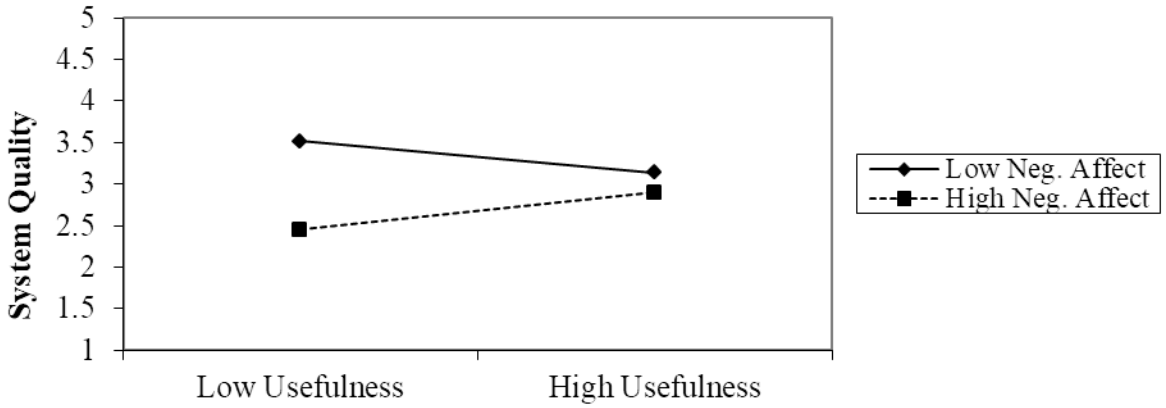

Figure 5. System Quality: Low/High Levels of Usefulness and Low/High Negative Affect

From Figure 5, we observe that, in situations with high negative affect, individuals perceived system quality to be consistently lower than in situations with low negative affect even with high usefulness. This finding concurs with our argument about the high potential for affect to infuse into system quality judgments. However, in situations with high negative affect, higher experienced usefulness significantly enhanced perceptions about system quality (dotted line). Further, we performed a slope test and found that the slope for high negative affect significantly differed from zero (t = 2.30). We found that the slope for low negative affect also significantly differed from zero but, surprisingly, in the opposite direction (t = -2.51). This result signifies that, in situations with low negative affect (firm line), perceptions about system quality actually decrease in strength as perceived usefulness increases. We can explain this finding by examining the nature of the system quality variable itself, which concerns using a system to retrieve and deliver information. But we also see that this finding is true only in a scenario of low negative affect: for higher negative affect, the relationship that experienced usefulness had with perceived system quality became stronger. We believe that this interesting relationship that indicates a different moderation direction (cross-over) for low and high negative affect arose due to the nature of the system quality

variable itself. From the Figure 5, it seems that cognitions and affect had a crossover effect (or rather merger) on system quality. From the results in Table 2, we also see that, when we entered affect terms into the regression equation, the relationship between usefulness and perceived system quality was not significant. Future research should examine these interesting results. Finally, we observe that the slopes for the high and low interaction plots significantly differed from each other (t = 3.80), which confirms that negative affect infusion has a significant moderating effect on the relationship between cognitions and system quality.

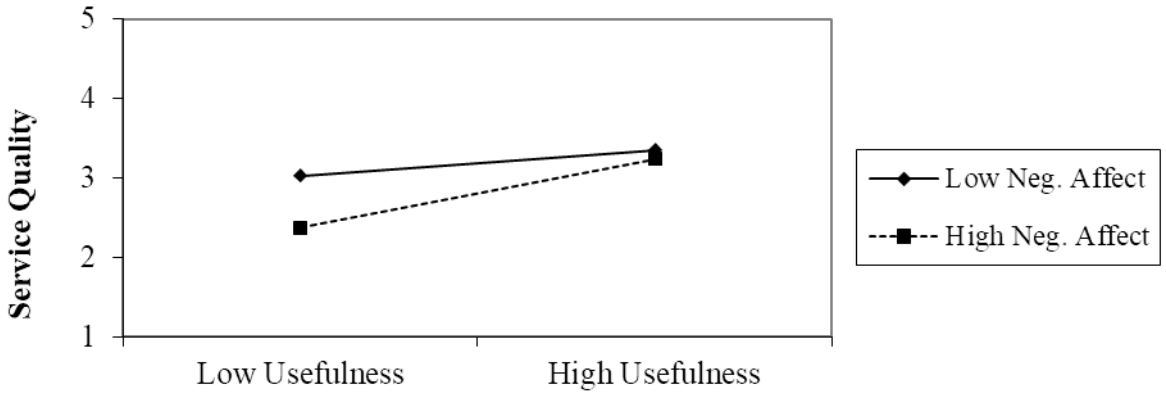

Figure 6. Service Quality: Low/High Levels of Usefulness and Low/High Negative Affect

Figure 6 shows the moderating effect that negative affect had on the relationship between usefulness and perceived service quality. From the plot, we can clearly see that the relationship between usefulness and perceptions about service quality increased in situations with both high and low negative affect. A slope significance test on the interaction plots revealed essentially similar results. First, the slopes for the high (t = 5.21) and for low negative affect (t = 3.16) significantly differed from zero, which suggests that negative affect strengthens the relationship between experienced usefulness and perceived service quality for high and low negative affect. Second, we observed that the slopes for the high and low interaction plots significantly differed from each other (t = 3.06), which confirms that cognitions of experienced usefulness assume significantly greater importance for service quality perception in situations with high negative affect.

To test H5, we assessed the affect infusion potential across the three IS quality measures. First, we examined the differential influence that cognitions (usefulness) had on the three quality measures. From Table 2, we can see that cognitions appears to have had a lower influence on perceived system quality ($\Delta R^2 = 0.050$) than perceived information quality ($\Delta R^2 = 0.127$) and perceived service quality ($\Delta R^2 = 0.228$) in terms of the change in extracted variance after we introduced the cognition (usefulness) variable (second step in the analysis for the three quality variables in Table 2). As such, we obtained an initial indication that, in our study's context, system quality constitutes a cognitive variable to a lesser degree (lower in objectives quality) than information quality and service quality. Next, from the third step in Table 2, we can see that perceived system quality ($\Delta R^2 = 0.244$) had a relatively higher change in its explained variance after we introduced the affect terms than information quality ($\Delta R^2 = 0.073$) and service quality ($\Delta R^2 = 0.107$). This result indicates a higher affect infusion, over and above cognitions, for system quality (24.4% change in variance due to affect terms) compared to information quality (7.3% change in variance due to affect terms) and service quality (10.7% change in variance due to affect terms). To further confirm if the affect infusion significantly differed in extent across the three IS quality variables, we performed overlapping confidence interval tests for affect variables' coefficients[1] (Cumming, 2009; Meservy, Fadel, Kirwan, & Meservy, 2019). We found that the confidence interval for system quality variable did not overlap with the confidence intervals for information quality and service quality variables at the 95 percent confidence level. Hence, from our analysis, we can conclude that system quality has a significantly higher affect infusion potential compared to information and service quality, which confirms H5a. However, we found a confidence overlap between information and service quality at the 95 percent confidence level, which does not support H5b. From the results, we can conclude that, although affect influences all three

[1] We sincerely thank the associate editor for making the excellent suggestion to conduct this test.

IS quality measures, it affects system quality significantly more than service quality and information quality. Thus, we found partial support for H5. We summarize our results from testing the hypotheses in Table 3.

Table 3. Summary of Hypotheses Testing

Hypotheses	Result
H1: In the e-government context, the level of positive affect that individuals experience is positively associated with the level of perceived a) information quality, b) service quality, and c) system quality.	Supported
H2: In the e-government context, the level of negative affect that individuals experience is negatively associated with the level of perceived a) information quality, b) service quality, and c) system quality**.**	Supported
H3: In the e-government context, positive affect negatively moderates the relationship between cognitions and a) information quality, b) system quality, and c) service quality perceptions.	Not supported
H4: In the e-government context, negative affect positively moderates the relationship between cognitions and a) information quality, b) system quality, and c) service quality perceptions.	Supported
H5: In the e-government context, a) the relationship between affect and system quality is stronger compared to the relationships of affect with service and affect with information quality and b) the relationship between affect and service quality is stronger compared to the relationship of affect with information quality.	Partially Supported

We can glean some important insights from the differences we found in the results from the interaction analyses for positive and negative affect. First, we found that negative affect had a significant role as a moderator in the relationship between cognitive usefulness appraisals and IS quality perceptions. Second, we found that the mechanisms through which affect infuses into evaluative judgments differ for positive and negative affect and that negative affect infuses such judgments to a greater degree.

We can explain the stronger infusion of negative affect compared to positive affect by invoking prospect theory, which suggests that the value function for losses is much steeper than that for gains (Tversky & Kahneman, 1992). Hence, negative affect may have a significantly greater relationship with evaluation outcomes than positive affect (see Brown, Venkatesh, & Goyal, 2012; Venkatesh & Goyal, 2010). Thus, we would expect the infusion of negative affect to be higher than that of positive affect, leading to differences in the information-processing mechanisms for the two affective states. As we note in Section 2.4, negative affect is associated with substantive information processing, which involves more effort. Thus, in addition to the affect-as-information mechanism, negative affect informs quality judgments through an intense affect priming mechanism that involves substantial constructive thinking.

Positive affect, on the other hand, is primarily associated with heuristic information-processing mechanisms, which involve less intensity and effort. Thus, positive affect informs quality judgments through the relatively straightforward and mechanistic affect-as-information mechanism. The more intense information-processing mechanisms in situations with negative affect serve to moderate the relationship between usefulness cognitions and quality judgments. To compensate for the intense negative infusion that negative affect has on quality judgments, a significantly stronger relationship between cognitions of usefulness and quality judgments is required. Thus, our results show that negative affect tends to strengthen the relationship between cognitive beliefs and IS quality judgments. In situations with positive affect, because the affect does not infuse as intensely into the IS quality judgments and because it and usefulness have a strong direct relationship with quality variables (in the same direction), positive affect does not have a significant substitution/heuristic role.

Further, our results demonstrate that affect does not uniformly infuse into the three IS quality judgments (i.e., information, system, and service quality). The extent to which affect is associated with perceptions about individual quality measures largely depends on their affect infusion potential. Specifically, we found that a significantly stronger relationship between affect and system quality than between affect and information and between affect and service quality. We can explain the nonsignificant difference between the information and service quality by the fact that, similar to information quality, citizens often equate service quality to the website fulfilling the desired task successfully. Parameters such as promptness and responsiveness are not so much of a concern as long as the task is completed in a reasonable amount of time (Nishant et al., 2019). Moreover, in Singapore where citizens know e-government websites to provide

accurate and updated information and offer a safe channel for executing e-government transactions, service quality depends more on objective criteria and prior experience in a continued use context. However, affect influences perceptions about system quality to a significantly greater degree, and the country may need to manage citizens' affect to foster better system quality perceptions for continued use. In summary, we need to understand each specific quality measure's nature before making deductions about its relationship with affect.

6 Contributions

6.1 Implications for Research

This work contributes to research in several ways. First, researchers have generally conceptualized quality from an objective cognitive perspective due to its manufacturing sector origins, which implies that quality perceptions result from mindfully processing information related to learning, memory, and expectations. We can see as much in how researchers have previously defined quality as value (Abbott, 1955), conformance to specifications (Levitt, 1972), conformance to requirements (Crosby, 1979), and fitness for use (Juran & Bingham, 1974). Moreover, some recent studies on IS quality also take a cognitive perspective, which implies that cognitions of perceived usefulness are associated with IS quality perceptions (e.g. Hu et al., 2009; Tate, 2010; Yang et al., 2011). With the services industry's growing importance, the quality paradigm has begun to shift from being a purely objective construct to a more subjective measure, particularly in the IS quality context. This apparently growing subjectivity in conceptualizing the quality measure highlights the vital relationship between affect and quality. Hence, in contrast to prior research, we theorize the key relationship between affect (in addition to cognitions) and IS quality judgments. Specifically, grounding our work in the affect infusion model (AIM), we theorize the mechanisms through which affect infuses into IS quality judgments. Further, via empirically validating the theorized model, we demonstrate that, in the present study's context, affect has relatively greater salience (as compared to cognitions) in infusing into IS quality judgments. Thus, with this study, we contribute to the quality literature in general and to the IS quality literature in particular.

Second, we use insights from the affect infusion model (AIM) to extend how research has cognitively conceptualized IS quality judgments by adding variables for positive and negative affect. Situating the discussion in prospect theory and integrating it with concepts from the AIM, we theorize about the differences in information-processing strategies and mechanisms associated with positive and negative affect. Strategies associated with negative affect are more substantive and deeper than the strategies associated with positive affect, which implies that negative affect infuses into quality judgments to a higher degree. Empirically, we show that, though both positive and negative affect (over and above the perceived usefulness cognitions) have a direct relationship with quality judgments, only negative affect moderates the relationship between perceived usefulness and IS quality judgments. This nuanced understanding provides richer insights into the integrated relationship that cognitions and emotions have with IS quality judgments. Thus, we contribute to the literature on affect in the IS context, especially with respect to the mechanisms through which positive and negative affect infuse into the relationship between cognitions and IS quality judgments.

Third, integrating the objective-subjective quality conceptualization with the discourse on affect infusion potential, we theorize about the differences in the ways affect infuses into information quality, system quality, and service quality. The empirical results clearly support differences across the three quality measures based on their affect infusion potentials, which confirms the need to analyze each quality variable's nature to assess affect's mechanisms and role. Our results indicate that system quality has a significantly higher infusion potential compared to information quality and service quality. This theorization further extends the literature and theory on IS quality. Specifically, our results extend previous work on IS quality (e.g., Seddon & Kiew, 1994; DeLone & McLean 2003; Petter et al., 2013; Tan, Benbasat, & Cenfetelli, 2013) by extending IS quality nomological network via including affect.

Fourth, with this study, we enrich our understanding about the important role that affect plays in the IS context. Prior research on affect and emotions in IS has mainly focused on technology adoption intentions (e.g., Venkatesh, 2000). Likewise, researchers have focused primarily on a small number of emotions, such as enjoyment and anxiety (Beaudry & Pinsonneault, 2010). Complementing previous work, we extend the research to a broader set of emotions, which we aggregate as positive and negative affect, in a repeated usage (continued use) scenario. Moreover, we note that affect explained more variance than cognitions for IS system quality (see Table 1).

In addition to the above contributions, our results suggest two key directions for future research. First, we see that affect explains substantial variance in the perceived IS quality variables in the continued usage context. Past research (Homberg, Koschate, & Hoyer, 2006) has suggested that the role of cognitions tend to increase while that of affect tends to decrease over time. Given that we conducted our research in the continued usage context, our results highlight the possibility for affect to explain even more variance during early experiences with technology. Thus, researchers need to consider affect in addition to cognitions to explain evaluations, especially in the initial use/adoption stage, which most prior IS studies on affect and emotion have rightfully examined (Beaudry & Pinsonneault, 2010; Zhang, 2013). Future IS studies can examine whether such a longitudinal variation in the role that emotions plays in explaining evaluative judgments actually holds true.

Second, we found that affect explained significantly more variance than cognitions for IS system quality compared to information and service quality. However, through their experimental study, Homburg et al. (2006) showed both cognition and affect explain customer satisfaction but that the variance they each explain over time changes such that the impact that cognition has on satisfaction evaluation increases whereas the effect that affect has on satisfaction decreases. Following this argument, we expect the same to be true for IS quality evaluations. Since we considered the continued usage context in this study (i.e., respondents had used an e-government website over a sufficient time period), the role of affect should be attenuated. Future research can examine the change in affect over time and its relationship with IS quality variables by designing a longitudinal study.

We believe that the AIM has the potential to become an alternative theoretical paradigm for examining affect-related questions in IS research and that future IS research can apply the AIM in other contexts to theorize detailed affect-related processes and their relationships with organizational decisions and judgments.

6.2 Implications for Practice

In addition to implications for research, our study has three key implications for practitioners such as policy makers and e-government Web designers who should consider the expected affect elicited for users in order to encourage them to continue to use their e-government websites, which may ultimately contribute to their success. First, IS designers in general and website designers in particular should ensure that their websites' features, content, and functionality maximize positive affect and—more importantly—that they minimize negative affect. Specific measures include designing interactive multimedia interfaces to enhance user emotional experience, considering emotional aspects when enhancing existing services and/or designing new services, providing reassurance to users that they regularly update the information they provide, and that the government can provide help when required. In other words, paying attention to how IS interact with users' cognition and affect and, in particular, how they can sustain or diminish positive/negative affect can help designers design systems that users continue to use.

Second, we note that negative affect significantly moderated the relationship between cognitions (experienced usefulness) and IS quality such that cognitions become more salient with higher negative affect. Hence, practitioners should seek strategies that mitigate negative affect evocation during IS use. Furthermore, they need to realize that negative affect tends to have a stronger effect than positive affect.

Third, this study highlights the differential relationship that affect has with the three IS quality measures. Affect had a significantly stronger relationship with system quality than information and service quality. This result has significant policy implications. It highlights the need to make directed efforts to upgrade e-government website users' skills and knowledge to foster better system quality perceptions for continued use. Thus, depending on the IS quality variable's contextual importance, practitioners can frame differential strategies for better results. We also show that affect can be as important as usefulness for e-government websites. Overall, practitioners should ensure that they design user-friendly websites since they foster positive affect in users. Though practitioners need to consider all quality measures, from an affect infusion perspective, when they focus on system quality, they should focus on minimizing possible negative affect arousal. Such negative affect can translate into negative system quality perceptions, which can have detrimental effects. Practitioners also need to understand affect design systems to achieve the desired affect in order to obtain better quality judgments and, consequently, encourage usage continuance.

6.3 Limitations and Future Research Directions

As with any study, ours has several limitations. First, we asked respondents to select the e-government website that they found most familiar and to respond to our survey with it in mind. In doing so, we helped to enhance their responses' validity since we examined the continued usage context. However, by doing so, we could not control for the level of positive and negative affect they experienced. Further, the tasks they performed on the website could have varied and possibly confounded the affect. We tried to mitigate this issue by controlling for active versus passive users. Future research could examine the extent to which users use a system for various tasks and their relationships with affect. Future research could also conduct an experiment in which they designed some websites to elicit strong negative affect, others to elicit strong positive affect, and still others to elicit both. In addition, future research could examine whether a tax website linked to negative affect may need to be better design than say a picnic website linked to positive affect.

Second, we used self-reported data that we measured at the same time; hence, our results have a correlational rather than causal nature. We checked for common method bias and found it not to pose an issue. Future research could collect data on independent and dependent variables at different points in time. Future research could also design an experiment to capture positive and negative affect and perceptions about IS quality variables when using a website.

Third, we focused on e-government websites, which tend to differ from other websites (e.g., commercial websites) in that they lack suitable substitutes (e.g., going or phoning e-government offices would entail more time and effort than using the e-government website). Consequently, our findings might not hold where users do not need to continually interact with a negative-affect inducing website (see Nishant et al., 2019). Future research could examine the relationship between affect and information systems quality for commercial websites.

Fourth, we collected our data in Singapore, which ranks highly in e-government development and has a predominantly "Eastern" culture. Thus, researchers could examine the role that culture plays in in the continued use context in a Western country. Researchers could conduct a cross-cultural study to examine similarities and differences in the relationship between affect and IS quality variables across different cultures.

7 Concluding Remarks

In this study, we show that both cognitions (experienced usefulness) and affect (positive and negative) relate to perceptions about IS information quality, system quality, and service quality. Interestingly, we found that negative affect (but not positive affect) moderates the relationship between experienced usefulness cognitions and the three IS quality measures. Our results provide empirical evidence that one should consider both cognitions and affect to fully understand perceptions about IS quality and that they together should stimulate a future research agenda.

References

Abbott, L. (1955). *Quality and competition*. New York, NY: Columbia University Press.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In Kuhl, J., & Beckman, J., (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Heidelberg: Springer.

Ajzen, I. (2008). Consumer attitudes and behavior. In C.P. Haugtvedt, P. Herr, & F. R. Kardes (Eds.), *Handbook of consumer psychology* (pp. 525-548). New York, NY: CRC Press.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Alibakhshi, R., & Srivastava, S. C. (2019). Should we say what we show? Examining the influence of image and text sentiments on social media engagement. In *Proceedings of the International Conference on Information Systems.*

Bagozzi, R. P., Gopinanth, M., & Nyer, P. U. (1999). The role of emotions in marketing. *Journal of the Academy of Marketing Science, 27*(2)*,* 184-206.

Barberis, N. C. (2013). Thirty years of prospect theory in economics: A review and assessment. *Journal of Economic Perspectives*, *27*(1), 173-96.

Beaudry, A., & Pinsonneault, A. (2010). The other side of acceptance: Studying the direct and indirect effects of emotions on IT use. *MIS Quarterly*, *34*(4)*,* 689-710.

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, *25*(3), 351-370.

Bless, H. (2000). Moods and general knowledge structures: Happy moods and their impact on information processing. In J. P. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition* (pp. 201-222). New York, NY: Cambridge University Press.

Brown, S. A., Venkatesh, V., & Goyal, S. (2012). Expectation confirmation in technology use. *Information Systems Research*, *23*(2), 474-487.

Buzzell, R., & Gale, B. (1987). *The PIMS principles: Linking strategy to performance*. New York, NY: Free Press.

Cenfetelli, R. T. (2004). Getting in touch with our feelings towards technology. In *Academy of Management Annual Meeting Proceedings.*

Cenfetelli, R. T., & Schwarz, A. (2011). Identifying and testing the inhibitors of technology usage inhibitors. *Information Systems Research*, *22*(4), 808-823.

Cenfetelli, R. T., Benbasat, I., & Al-Natour, S. (2008). Addressing the what and how of online services: Positioning supporting-services functionality and service quality for business-to-consumer success. *Information Systems Research*, *19*(2), 161-181.

Clore, G. L., & Byrne, D. (1974). The reinforcement affect model of attraction. In T. L. Huston (Ed.), *Foundations of interpersonal attraction* (pp.143-170). San Diego, CA: Academic Press.

Clore, G. L., Schwarz, N., & Conway, M. (1994). Affective causes and consequences of social information processing. In R. S. Wyer, Jr., & T. K. Srull, (Eds.).*Handbook of social cognition.* Hillsdale, NJ: Erlbaum.

Crosby, P. B. (1979). *Quality is free: The art of making quality certain*. New York, NY: New American Library.

Cumming, G. (2009). Inference by eye: Reading the overlap of independent confidence intervals. *Statistics in Medicine*, *28*(2), 205-220.

D'Arcy, J., & Lowry, P. B. (2019). Cognitive-affective drivers of employees' daily compliance with information security policies: A multilevel, longitudinal study. *Information Systems Journal*, *29*(1), 43-69.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Davis, M. A., Kirby, S. L., & Curtis, M. B. (2007). The influence of affect on goal choice and task performance. *Journal of Applied Social Psychology*, *37*, 14-42.

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60-95.

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, *19*(4), 9-30.

Deng, L., & Poole, M. S. (2010). Affect in Web interfaces: A study of the impacts of web page visual complexity and order. *MIS Quarterly*, *34*(4), 711-730.

Dholakia, R. R., Dholakia, N., & Kshetri, N. (2004). Gender and internet usage. In H. Bidgoli (Ed.), *The Internet encyclopedia* (pp. 12-22). New York, NY: Wiley.

Djamasbi, S., Strong, D. M., & Dishaw, M. (2010). Affect and acceptance: Examining the effects of positive mood on the technology acceptance model. *Decision Support Systems*, *48*, 383-394.

Erevelles, S. (1998). The role of affect in marketing. *Journal of Business Research*, *42*, 199-215.

Ethier, J., Hadaya, P., Talbot, J., & Cadieux, J. (2006). B2C website quality and emotions during online shopping episodes: An empirical study. *Information and Management*, *143*(5), 627-639.

Fehrenbacher, D. D. (2017). Affect infusion and detection through faces in computer-mediated knowledge-sharing decisions. *Journal of the Association for Information Systems, 18*(10), 703-726.

Fiedler, K. (2000). Towards an integrative account of affect and cognition phenomena. In J. P. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition* (pp. 223-252). New York, NY: Cambridge University Press.

Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin*, *117*(1), 39-66.

Forgas, J. P. (1998). Asking nicely? Mood effects on responding to more or less polite requests. *Personality and Social Psychology Bulletin*, *24*, 173-185.

Forgas, J. P. (2000). *Feeling and thinking: The role of affect in social cognition*. New York, NY: Cambridge University Press.

Forgas, J. P. (2002). Feeling and doing: Affective influences on interpersonal behavior. *Psychological Inquiry*, *13*(1), 1-28.

Forgas, J. P., & Bower, G. H. (1987). Mood effects on person perception judgments. *Journal of Personality and Social Psychology*, *53*, 53-60.

Forgas, J. P., & Fiedler, K. (1996). Us and them: Mood effects on intergroup discrimination. *Journal of Personality and Social Psychology*, *70*, 36-52.

Forgas, J. P., & George, J. M. (2001). Affective influences on judgments and behavior in organizations: An information processing perspective. *Organizational Behavior and Human Decision Processes*, *86*(1), 3-34.

Frederickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*, 218-226.

Frijda, N. H. (1986). *The emotions*. Cambridge, UK: Cambridge University Press.

Gable, G. G., Sedera, D., & Chan, T. (2008). Re-conceptualizing information systems success: The IS-impact measurement model. *Journal of the Association for Information Systems*, *9*(7), 377-408.

George, J. M., & Brief, A. P. (1996). Motivational agendas in the workplace: The effects of feelings on focus of attention and work motivation. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior.* Greenwich, CT: JAI Press.

Gounaris, S., Dimitriadis, S., & Stathakopoulos, V. (2005). Antecedents of perceived quality in the context of internet retail stores. *Journal of Marketing Management*, *21*(7/8), 669-700.

Grönroos, C. (1990). *Service management and marketing: Managing the moments of truth in service competition.* Lexington, MA: Lexington Books.

Grover, V., Jeong, S. R., & Segars, A. H. (1996). Information systems effectiveness: The construct space and patterns of application. *Information & Management, 31*(4), 177-191.

Gujarati, D.N. (2003). *Basic econometerics*. New York, NY: McGraw-Hill.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2006). *Multivariate data analysis*. Englewood Cliffs, NJ: Prentice Hall.

Hanpeng, Z., Lu, Y., Shi, X., Tang, Z., & Zhao, Z. (2017). Mood and social presence on consumer purchase behavior in C2C e-commerce in Chinese culture. *Electronic Markets, 22*(3), 143-154.

Homburg, C., Koschate, N., & Hoyer, W. D. (2006). The role of cognition and affect in the formation of customer satisfaction: A dynamic perspective. *Journal of Marketing*, *70*(3), 21-31.

Hong, W., Chan, F. K., Thong, J. Y., Chasalow, L. C., & Dhillon, G. (2014). A framework and guidelines for context-specific theorizing in information systems research. *Information Systems Research*, *25*(1), 111-136.

Hsieh, J. J. P-A, Rai, A., Petter, S., & Zhang, T. (2012). Impact of user satisfaction with mandated CRM use on employee service quality. *MIS Quarterly*, *36*(4), 1065-1080.

Hu, P. J. H., Brown, S. A., Thong, J. Y. L., Chan, F. K. Y., & Tam, K. Y. (2009). Determinants of service quality and continuance intention of online services: The case of eTax. *Journal of American Society for Information Science and Technology*, *60*(2), 292-306.

Hussein, R., Karim, N. S. A., & Selamat, M. H. (2007). The impact of technological factors on information systems success in the electronic-government context. *Business Process Management Journal*, *13*(5), 613-627.

Igbaria, M., & Tan, M. (1997). The consequences of information technology acceptance on subsequent individual performance. *Information & Management*, *32*(3), 113-121.

Infocomm Development Authority of Singapore. (2010). *Annual digital government perception survey (citizen) conducted in 2010s*. Retrieved from https://www.tech.gov.sg/digital-government-perception-survey-citizen-2010

Isen, A. (1987). Positive affect, cognitive processes and social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology*. San Diego, CA: Academic Press.

Isen, A. M. (2000). Positive affect and decision making. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of emotions* (pp. 417-435). New York, NY: Guilford Press.

Johns, G. (2006). The essential impact of context on organizational behavior. *Academy of Management Review*, *31*(2), 386-408.

Juran, J. M. (1951). *Quality control handbook*. New York, NY: McGraw-Hill.

Juran, J. M. (1988). *Juran's quality control handbook (4th ed.)*. New York, NY: McGraw-Hill.

Juran, J. M., & Bingham, R. S. (1974). Service industries. In J. Juran, F. G. Jr., & R. Bingham (Eds.), *Quality control handbook* (pp. 7-35). New York, NY: McGraw-Hill.

Kahneman, D. (2011). *Thinking, fast and slow.* London, UK: Allen Lane.

Kehr, F., Kowatsch, T., Wentzel, D., & Fleisch, E. (2015). Blissfully ignorant: The effects of general privacy concerns, general institutional trust, and affect in the privacy calculus. *Information Systems Journal*, *25*(6), 607-635.

Kettinger, W. J., & Lee, C. C. (1995). Perceived service quality and user satisfaction with the information services function. *Decision Sciences*, *25*(5-6), 737-765.

Kim, H., & Niehm, L. S. (2009). The impact of website quality on information quality, value, and loyalty intentions in apparel retailing. *Journal of Interactive Marketing*, *23*(3), 221-233.

Kim, H.-W., Chan, H. C., & Chan, Y. P. (2007). A balanced thinking-feeling model of information system continuance. *International Journal of Human-Computer Studies*, *65*, 511-525.

Kuppens, P., & Verduyn, P. (2017). Emotion dynamics. *Current Opinion in Psychology*, *17*, 22-26.

Lazarus, R. S. (1991). *Emotion and adaptation*. New York, NY: Oxford University Press.

Levitt, T. (1972). Production-line approach to service. *Harvard Business Review*, *50*(5), 41-52.

Li, E. Y. (1997). Perceived importance of information system success factors: A meta-analysis of group difference. Information & Management, *32*(1), 15-28.

Lim, E. T. K., Tan, C.-W, Cyr, D., Pan, S. L., & Xiao, B. (2012). Advancing public trust relationships in electronic government: The Singapore e-filing journey. *Information Systems Research*, *23*(4), 1110-1130.

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, *86*(1), 114-121.

Lowry, P. B., & Wilson, D. (2016). Creating agile organizations through IT: The influence of internal IT service perceptions on IT service quality and IT agility. *The Journal of Strategic Information Systems*, *25*(3), 211-226.

Lowry, P. B., Twyman, N. W., Pickard, M., Jenkins, J. L., & Bui, Q. N. (2014). Proposing the affect-trust infusion model (ATIM) to explain and predict the influence of high and low affect infusion on Web vendor trust. *Information and Management*, *51*(5), 579-594.

Malhotra, N. K., Kim, S. S., & Patil, A. (2006). Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. *Management Science*, *52*(12), 1865-1883.

Maruping, L. M., Venkatesh, V., & Agarwal, R. (2009). A control theory perspective on agile methodology use and changing user requirements. *Information Systems Research*, *20*(3), 377-399.

Meservy, T. O., Fadel, K. J., Kirwan, C. B., & Meservy, R. D. (2019). An fMRI exploration of information processing in electronic networks of practice. *MIS Quarterly*, *43*(3), 851-872.

Nelson, R. R., Todd, P. A., & Wixom, B. H. (2005). Antecedents of information and system quality: An empirical examination within the context of data warehousing. *Journal of Management Information Systems*, *21*(4), 199-235.

Nishant, R., Srivastava, S. C. & Teo, T. S. H. (2019). Using polynomial modeling to understand service quality in e-government websites. *MIS Quarterly*, *43*(3), 807-826.

Noval, L., & Stahl, G. (2017). Accounting for proscriptive and prescriptive morality in the workplace: The double-edged sword effect of mood on managerial ethical decision making. *Journal of Business Ethics*, *142*(3), 589-602.

Oatley, K. (1992). *Best laid schemes: The psychology of emotions*. New York, NY: Cambridge University Press.

Oh, L., & Teo, H. H. (2010). Consumer value co-creation in a hybrid commerce service-delivery system. *International Journal Electronic Commerce*, *14*(3), 35-62.

Pappas, I. O., Kourouthanassis, P. E., Giannakos, M. N., & Chrissilopoulos, V. (2016). Explaining online shopping behavior with fsQCA: The role of cognitive and affective perceptions. *Journal of Business Research*, *69*(2), 794-803.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, *4*(4), 41-50.

Park, J., Hill, W. T., & Bonds-Raacke, J. (2015). Exploring the relationship between cognitive effort exertion and regret in online vs. offline shopping. *Computers in Human Behavior*, *49*, 444-450.

Petter, S., DeLone, W., & McLean, E. R. (2013). Information systems success: The quest for the independent variables. *Journal of Management Information Systems*, *29*(4), 7-62.

Petter, S., Straub, D., & Rai, A. (2007). Specifying formative constructs in information systems research. *MIS Quarterly*, *31*(4), 623-656.

Pitt, L. F., Watson, R. T., & Kavan, C. B. (1995). Service quality: A measure of information systems effectiveness. *MIS Quarterly*, *19*(2), 173-187.

Podsakoff, P., & Organ, D. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management Information Systems*, *12*(4), 531-544.

Podsakoff, P., MacKenzie, S., Lee, J., & Podsakoff, N. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903.

Roesch, S. C. (1999). Modeling the direct and indirect effects of positive emotional and cognitive traits and states on social judgments. *Cognition and Emotion*, *13*(4), 387-418.

Rose, J., Persson, J. S., Heeager, L. T., & Irani, Z. (2015). Managing e-government: Value positions and relationships. *Information Systems Journal*, 25(5), 531-571.

Roseman, I. J., Antoniou, A. A., & Jose, P. E. (1996). Appraisal determinants of emotions: Constructing a more accurate and comprehensive theory. *Cognition and Emotion*, *10*(3), 241-277.

Russell, J. A., & Barrett, L. F. (1999). Core affect, prototypical emotional episodes, and other things called emotion: Dissecting the elephant. *Journal of Personality and Social Psychology*, *76*, 805-819.

Saeed, K. A., & Abdinour, S. (2013). Understanding post-adoption IS usage stages: An empirical assessment of self-service information systems. *Information Systems Journal*, *23*(3), 219-244.

Scherer, K. R. (1997). Profiles of emotion-antecedent appraisal: Testing theoretical predictions across cultures. *Cognition and Emotion*, *11*(2), 113-150.

Schwarz, N. (2011). Feelings-as-information theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *The handbook of theories of social psychology* (pp. 289-308). Thousand Oaks, CA: Sage.

Seddon, P. B. (1997). A respecification and extension of the DeLone and McLean model of IS success. *Information Systems Research*, *8*(3), 240-253.

Seddon, P. B., & Kiew, M. Y. (1994). A partial test and development of the DeLone and McLean model of IS success. In *Proceedings of the International Conference on Information Systems*.

Sedikides, C. (1995). Central and peripheral self-conceptions are differentially influenced by mood: Test of differential sensitivity hypothesis. *Journal of Personality and Social Psychology*, *69*(4), 759-777.

Sharma, R., Yetton, P., & Crawford, J. (2009). Estimating the effect of common method variance: The method–method pair technique with an illustration from TAM research. *MIS Quarterly*, *33*(3), 473-490.

Sharma, S. K., Gaur, A., Saddikuti, V., Rastogi, A. (2017). Structural equation model (SEM)-neural network (NN) model for predicting quality determinants of e-learning management systems. *Behaviour & Information Technology, 36*(10), 1053-1066

Smith, C. A., & Lazarus, R. S. (1993). Appraisals components, core relational themes and emotions. *Cognition and Emotion*, *7*, 233-269.

Srite, M., Galvin, J. E., Ahuja, M. K., & Karahanna, E. (2007). Effects of individuals' psychological states on their satisfaction with the GSS process. *Information and Management*, *44*(6), 535-546.

Srivastava, S. C., & Chandra, S. (2018). Social presence in virtual world collaboration: An uncertainty reduction perspective using a mixed methods approach. *MIS Quarterly*, *42*(3), 779-803.

Srivastava, S. C., & Teo, T. S. H. (2007). E-government payoffs: Evidence from cross-country data. *Journal of Global Information Management*, *15*(4), 20-40.

Srivastava, S. C., & Teo, T. S. H. (2009). Citizen trust development for e-government adoption and usage: Insights from young adults in Singapore. *Communications of the Association for Information Systems*, *25*(31), 359-378.

Srivastava, S. C., & Teo, T. S. H. (2012). Contract performance in offshore systems development: Role of control mechanisms. *Journal of Management Information Systems*, 29(1), 115-158.

Steinert, S., & Roeser, S. (2020). Emotions, value and technology: Illuminating the blind spots. *Journal of Responsible Innovation*, *7*(3), 298-319.

Tan, C.-W., Benbasat, I., & Cenfetelli, R. T. (2013). IT-mediated customer service content and delivery in electronic governments: An empirical investigation of the antecedents of service quality. *MIS Quarterly*, 37(1), 77-109.

Tate, M. (2010). Reflections on perceived online service quality: Structure, antecedents, ontology, theory and measurement. Wellington, NZ: Victoria University.

Teo, T. S. H., Srivastava, S. C., & Jiang, L. (2008). Trust and electronic government success: An empirical study. *Journal of Management Information Systems*, *25*(3), 99-132.

Trope, Y., Ferguson, S., & Ragunanthan, R. (2001). Mood as a resource in processing self-relevant information. In J. P. Forgas (Ed.), *The handbook of affect and social cognition*. Mahwah, NJ: Erlbaum.

Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty*, *5*(4), 297-323.

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*, *11*(4), 342-365.

Venkatesh, V., & Davis, F. (2000). A theoretical extension of the technology acceptance model: Four longitudinal studies. *Management Science*, *46*(2), 186-204.

Venkatesh, V., & Goyal, S. (2010). Expectation disconfirmation and technology adoption: polynomial modeling and response surface analysis. *MIS Quarterly*, 34(2), 281-303.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425-478.

Venkatesh, V., Thong, J. Y. L., Chan, F. K. Y., Hu, P. J.-H., & Brown S. A. (2011). Extending the two-stage information systems continuance model: Incorporating UTAUT predictors and the role of context. *Information Systems Journal*, *21*(6), 527-555.

Wang, C., & Teo, T. S. H. (2020). Online service quality and perceived value in mobile government success. *International Journal of Information Management*, *52*(C), 1-12.

Waseda University. (2018). *The 14th Waseda-IAC international digital government rankings 2018 report.* Retrieved from https://idg-waseda.jp/pdf/The_2018_Waseda-IAC_Digital_Government_Rankings_Report.pdf

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research*, *16*(1), 85-102.

World Economic Forum. (2016). *Global information technology report 2016.* Retrieved from http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/

Wu, J., & Lu, X. (2013). Effects of extrinsic and intrinsic motivators on using utilitarian, hedonic, and dual-purposed information systems: A meta-analysis. *Journal of the Association for Information Systems*, *14*(3), 153-191.

Xu, J. D., Benbasat, I., & Cenfetelli, R. T. (2013). Integrating service quality with system and information quality: An empirical test in the e-service context. *MIS Quarterly*, *37*(3), 777-794.

Yang, Y., Stafford, T. F., & Gillenson, M. (2011). Satisfaction with employee relationship management systems: The impact of usefulness on systems quality perceptions. *European Journal of Information Systems*, *20*(2), 221-236.

Zeithaml, V. A., Parasuraman, A., & Berry, L. L. (1990). *Delivering quality service*. New York, NY: Free Press.

Zhang, P. (2013). The affective response model: A theoretical framework of affective concepts and their relationships in the ICT context. *MIS Quarterly*, *37*(1), 247-274.

Appendix A

Table A1. Key Research on Antecedents of IS Quality Dimensions

Authors	Method	Antecedents and results	Comments
Cenfetelli, Benbasat, & Al-Natour (2008)	Survey data from 1,235 B2C customers	Perceived service functionality is positively associated with service quality.	Examined cognition but not affect.
Cenfetelli & Schwarz, (2011)	Conducted field study of 387 individuals nested in 32 different websites	Modeled information inhibitors (information overload, irrelevant requests for information, deceptiveness) and system inhibitors (intrusiveness, effort redundancy, process uncertainty) as information quality antecedents. Inhibitors can have different effects than enablers.	Examined cognition but not affect.
Gounaris et al. (2005)	Survey data from 240 Internet users	Internet familiarity, previous experience with e-commerce, motives for buying online, and excitement with e-commerce significantly relate to perceived e-service quality.	Examined cognition and affect (excitement).
Hsieh et al. (2012)	Survey data from 163 employees	User satisfaction has a positive effect on employee service quality beyond the effect from job dedication and embodies service knowledge.	Examined cognition and affect (user satisfaction)
Hu et al. (2009)	Longitudinal survey of 518 participants using eTax service in Hong Kong	Perceived usefulness, security, and convenience are significant predictors of eTax website service quality.	Examined cognition but not affect.
Hussein, Karim, & Selamat (2007)	Survey data from 201 users in four e-government agencies	Technological factors (IS competency, IS facilities, IS integration, IS structure, and user support) significantly correlate with system quality and information quality.	Examined cognition but not affect.
Kim & Niehm, (2009)	Surveyed 266 students	Interactivity, online completeness, ease of use, and entertainment significantly influence perceived information quality.	Examined cognition but not affect.
Lowry & Wilson (2016)	Conducted online panel with 400 IT employees using Amazon Mechanical Turk	Internal IT service perceptions is positively associated with IT service quality	Examined cognition but not affect.
Nelson, Todd, & Wixom (2005)	Surveyed 465 users from seven organizations	Validated an information quality determinants model (completeness, accuracy, format, currency) and system quality (reliability, flexibility, accessibility, response time, integration).	Examined cognition but not affect.
Oh & Teo (2010)	Surveyed 300 consumers assessing hybrid commerce stores	Integrating promotion information, product and pricing information, and transaction information enhances information quality.	Examined cognition but not affect.
Tan et al. (2013)	Surveyed 647 respondents online	Both service content and delivery significant contribute to achieving e-government service quality.	Examined cognition but not affect.
Teo et al. (2008)	Surveyed 214 users	Trust in e-government websites is positively related to information quality, system quality, and service quality.	Examined cognition but not affect.
Wixom & Todd (2005)	Surveyed 465 users from seven different firms	Information quality antecedents comprise completeness, accuracy, format, and currency. System quality antecedents comprise reliability, flexibility, integration, and accessibility.	Examined cognition but not affect.

Table A1. Key Research on Antecedents of IS Quality Dimensions

Xu, Benbasat, & Cenfetelli (2013)	Conducted experiment with 32 subjects each in four treatment conditions	System quality is positively associated with information quality. Information quality is positively associated with service quality. No relationship between system quality and service quality.	Examined cognition but not affect.
Yang et al. (2011)	Surveyed 487 individuals who used an employee relationship management (ERM) portal in a university	Experienced ERM system usefulness significantly and positively relates to system quality and satisfaction.	Examined cognition (usefulness as IV) and affect (satisfaction as DV)

Appendix B

Table B1. Role that User Cognitions and Experienced Affect Play in IS Quality

	Information quality	System quality	Service quality
Definition in the research context	Information quality is the user's assessment of whether the information on the website is accurate, valid, and timely.	System quality is the user's perception of the technical performance of the website in the information retrieval and delivery process.	Service quality is the user's perception of the excellence of interactions between the user and the government through the e-government website.
Quality judgment criterion	Does the e-government website provide accurate, valid, and timely information to the user?	Is the e-government website easy to use and learn in terms of the information retrieval and delivery process?	Does the e-government website provide dependable, prompt, and responsive interactions with the government?
Quality judgment mechanism	Users of e-government generally visit government websites for accessing different types of information. Thus in their perception, information quality is more dependent on the objective usefulness of the information generated/accessed in terms of its accuracy, validity and timeliness than on subjective criteria. If users find the information produced to be accurate, valid, and timely, they will perceive the website to have high information quality.	Users of e-government websites may not necessarily be experts in using IT. Hence, if a website is easy to learn and use in terms of the information retrieval and delivery process, it will be perceived as having higher system quality. Moreover, the evaluation of the information retrieval and delivery process is quite subjective and may be less dependent on the actual usefulness of the website. Thus, the subjective experience while using the website appears to be more salient for assessing the system quality.	Users of e-government visit government websites for accessing information and/or for transacting/ interacting with the government. The perceived service quality is thus dependent not only on the objective transactional criteria but also on the subjective process defining the interaction between the website and the user in terms of dependable, prompt, and responsive user interactions with the government. Thus, the user's perception of service quality relies on both objective and subjective quality assessment criteria.
Role of cognitions (usefulness)	Experienced usefulness of the e-government website can inform about the utility of the website in terms of accuracy, validity, and timeliness of the information generated/accessed through the website.	Experienced usefulness of the e-government website can indicate an adequate system information retrieval and delivery process in terms of the ease of learning and using the website.	Experienced usefulness of the e-government website can point to excellence in service with respect to the reliability, responsiveness, and dependability of the website for interacting with the government.
Role of affect (positive affect)	Positive feelings experienced while using the e-government website can inform about excellence in information with respect to the website being accurate, valid, and timely. Thus, positive affect is directly associated with the perceived information quality of the website. (H1a)	Positive feelings experienced while using the e-government website can point to the desired system information retrieval and delivery process in terms of ease of use and learnability. Thus, positive affect is directly associated with the perceived system quality of the website. (H1b)	Positive feelings experienced while using the e-government website can inform about excellence in service with respect to the website's reliability, responsiveness, and dependability for interacting with the government. Thus, positive affect is directly associated with the perceived service quality of the website. (H1c)

Table B1. Role that User Cognitions and Experienced Affect Play in IS Quality

Role of affect (negative affect)	Negative feelings experienced while using the e-government website can inform about deficiencies in information with respect to the website not being accurate, valid, and timely. Thus, negative affect is inversely associated with the perceived information quality of the website. (H2a)	Negative feelings experienced while using the e-government website can point to deficiencies in the system's information retrieval and delivery process. Thus, negative affect is inversely associated with the perceived system quality of the website. (H2b)	Negative feelings experienced while using the e-government website can be interpreted as deficiencies in service with respect to the website's reliability, responsiveness, and dependability for interacting with the government. Thus, negative affect is inversely associated with the perceived service quality of the website. (H2c)
Interaction of usefulness with positive affect (Cognitions x positive affect)	Positive affect experienced while using the e-government website promotes an internally driven, flexible, generative, and permissive processing style that supports perceptions of the *usefulness* of the website in terms of the accuracy, validity, and timeliness of the information generated for the user. A positive affective state tends to encourage heuristic processing with direct infusion of affect-as-information. Thus, the user effort expended in evaluating the information quality in a scenario of adequate useful information being generated is low. But, the positive affect towards the website will substitute usefulness of the website in its information quality judgment. Hence, positive affect negatively moderates the relationship between usefulness and perceived information quality. (H3a)	Positive affect experienced while using the e-government website promotes an internally driven, flexible, generative, and permissive processing style that supports perceptions of the *usefulness* of the website in terms of its usability and learnability. A positive affective state tends to encourage heuristic processing with direct infusion of affect-as-information. Thus, the effort expended by the user in evaluating the system quality in a scenario of a usable and learnable website is low. But, the positive affect towards the website will substitute usefulness of the website in its system quality judgment. Hence, positive affect negatively moderates the relationship between usefulness and perceived system quality. (H3b)	Positive affect experienced while using the e-government website promotes an internally driven, flexible, generative, and permissive processing style that supports perceptions of the *usefulness* of the website in terms of dependable and responsive services for the user. A positive affective state tends to encourage heuristic processing with direct infusion of affect-as-information. Thus, the user effort expended in evaluating the service quality in a scenario of adequate useful services is low. But, the positive affect towards the website will substitute usefulness of the website in its system quality judgment. Hence, positive affect negatively moderates the relationship between usefulness and perceived service quality. (H3c)

Table B1. Role that User Cognitions and Experienced Affect Play in IS Quality

Interaction of usefulness with negative affect (Cognitions × negative affect)	Negative affect experienced while using the e-government website promotes an externally oriented, systematic, and conservative processing style that contradicts perceptions of the *usefulness* of the website in terms of information generated for the user. A negative affective state tends to encourage substantive processing, which is more constructive and extended. Such a scenario entails direct infusion of affect-as-information and also indirect infusion through affect priming mechanisms. The user effort expended in evaluating the information quality in such a scenario is substantially high. Moreover, as per prospect theory, users will expend significantly greater effort to evaluate negative experiences. Because of this greater effort, users will be able to discover and use the website more deeply. This will make the relationship of perceived usefulness of the website stronger with its information quality. Thus, the role of usefulness in describing information quality becomes more salient. Hence, negative affect positively moderates the relationship between experienced usefulness and perceived information quality. (H4a)	Negative affect experienced while using the e-government website promotes an externally oriented, systematic, and conservative processing style that contradicts perceptions of the *usefulness* of the website in terms of a usable and learnable information retrieval and delivery process. A negative affective state tends to encourage substantive processing, which is more constructive and extended. Such a scenario entails direct infusion of affect-as-information and also indirect infusion through affect priming mechanisms. The user effort expended in evaluating the system quality in such a scenario is substantially high. Moreover, as per prospect theory, users will expend significantly greater effort to evaluate negative experiences. Because of this greater effort, users will be able to discover and use the website more deeply. This will make the relationship of perceived usefulness of the website stronger with its system quality. Thus, the role of usefulness in describing system quality becomes more salient. Hence, negative affect positively moderates the relationship between experienced usefulness and perceived system quality. (H4b)	Negative affect experienced while using the e-government website promotes an externally oriented, systematic, and conservative processing style that contradicts perceptions of the *usefulness* of the website in terms of prompt, dependable, and responsive interactions of the user with the government. A negative affective state tends to encourage substantive processing, which is more constructive and extended. Such a scenario entails direct infusion of affect-as-information and also indirect infusion through affect priming mechanisms. The user effort expended in evaluating the service quality in such a scenario is substantially high. Moreover, as per prospect theory, users will expend significantly greater effort to evaluate negative experiences. Because of this greater effort, users will be able to discover and use the website more deeply. This will make the relationship of perceived usefulness of the website stronger with its service quality. Thus, the role of usefulness in describing service quality becomes more salient. Hence, negative affect positively moderates the relationship between experienced usefulness and perceived service quality. (H4c)
Affect infusion potential and the role of affect in quality judgment	Because of the greater objectivity in the information quality evaluation criteria, the affect infusion potential in the information quality evaluation process is lower.	Because of the greater subjectivity in the system quality evaluation criteria, the affect infusion potential in the system quality evaluation process is high.	Because of the subjectivity in addition to the objectivity in quality evaluation criteria, the affect infusion potential in the service quality evaluation process is moderate
	In a scenario of higher potential for affect infusion, the relationship between affect and IS quality judgment will be stronger. Hence, the relationship between affect and system quality will be stronger compared to the relationships of affect with service and information quality. And the relationship between affect and service quality with be stronger compared to the relationship of affect with information quality. (H5)		

Appendix C

Table C1. Construct Indicators and Reliabilities

Item	Description
PAF	**Positive affect** (Ethier et al., 2006) (α = 0.88)
	During my interaction with this website, I felt…
JOY1	Pleasure
JOY2	Enthusiasm
LIK1	Appreciated
LIK2	Liked
PRI1	Pride
PRI2	Self-assurance
NAF	**Negative affect** (Ethier et al., 2006) (α = 0.85)
	During my interaction with this website, I felt…
DIS1	Dislike
DIS2	Aversion
FEA1	Afraid
FEA2	Insecure
FRU1	Prevented from getting what I wanted
FRU2	Blocked from certain actions
USF	**Experienced usefulness** (Davis, 1989; Igbaria & Tan, 1997), α = 0.84
	In my interaction with the government agency, using this website…
USF1	Increases my productivity
USF2	Enhances my effectiveness
USF3	Makes it easier for me to interact with the government agency
INQ	**Information quality** (Seddon & Kiew, 1994) (α = 0.88)
INQ1	This Web site provides sufficient information
INQ2	Through this Web site I get the information I need in time
INQ3	I am satisfied with the accuracy of this Web site
INQ4	Information provided by this website meets my needs
INQ5	Information provided by this website is up to date
INQ6	Information provided by this website is reliable
SYQ	**System quality** (Seddon & Kiew, 1994) (α = 0.88)
SYQ1	This website is easy to use
SYQ2	This website is user friendly
SYQ3	Compared to other websites, this website is easy to learn
SYQ4	I find it easy to get this website to do what I want it to do
SEQ	**Service quality** (Pitt et al., 1995) (α = 0.89)
SEQ1	This website provides dependable services
SEQ2	This website provides services at the times it promises
SEQ3	This website gives prompt service to users
SEQ4	This website is responsive to users' request

Note: PAF: positive affect, NAF: negative affect, USF: usefulness, INQ: information quality, SYQ: system quality, SEQ: service quality.

Appendix D

Table D1. Constructs, Indicators, and Cross-Loadings

	PAF	NAF	INQ	SYQ	SEQ	USF
JOY1	0.739	-0.043	0.047	0.161	0.136	0.053
JOY2	0.847	-0.057	0.054	0.110	0.113	0.052
LIK1	0.830	-0.112	0.070	0.172	0.077	0.022
LIK2	0.778	-0.067	0.063	0.213	0.110	-0.023
PRI1	0.730	0.045	0.039	-0.004	0.064	0.106
PRI2	0.649	-0.056	0.191	0.041	0.119	0.278
DIS1	-0.106	0.733	-0.044	-0.151	-0.112	-0.065
DIS2	-0.131	0.746	-0.071	-0.219	-0.162	-0.004
FEA1	0.092	0.637	0.000	-0.382	-0.252	-0.198
FEA2	0.064	0.548	-0.099	-0.334	-0.168	-0.139
FRU1	-0.079	0.853	-0.102	0.064	0.003	0.022
FRU2	-0.034	0.814	-0.092	0.055	0.030	0.026
INQ1	0.038	-0.089	0.735	0.363	-0.046	0.149
INQ2	0.013	-0.189	0.727	0.215	0.100	0.177
INQ3	0.081	-0.077	0.746	0.108	0.326	0.002
INQ4	0.133	-0.121	0.591	0.339	0.223	0.259
INQ5	0.115	-0.028	0.753	0.038	0.249	0.074
INQ6	0.117	-0.011	0.787	0.072	0.252	0.049
SYQ1	0.155	-0.214	0.282	0.795	0.094	0.073
SYQ2	0.157	-0.261	0.240	0.821	0.041	0.038
SYQ3	0.275	-0.043	0.119	0.736	0.079	0.001
SYQ4	0.297	-0.082	0.329	0.636	0.333	-0.027
SEQ1	0.163	-0.104	0.332	0.161	0.697	0.171
SEQ2	0.176	-0.160	0.321	0.055	0.774	0.111
SEQ3	0.166	-0.141	0.232	0.144	0.819	0.190
SEQ4	0.186	-0.123	0.181	0.092	0.721	0.299
USF1	0.177	-0.043	0.142	-0.059	0.177	0.788
USF2	0.150	-0.032	0.128	0.034	0.234	0.871
USF3	0.029	-0.078	0.130	0.123	0.122	0.806

Key: PAF: positive affect, NAF: negative affect, INQ: information quality, SYQ: system quality, SEQ: service quality, USF: usefulness, JOY: joy, LIK: liking, PRI: pride, DIS: dislike, FEA: fear, FRU: frustration.

Appendix E

Table E1. Descriptive Statistics and Correlations

		Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1	Age	22.08	1.69										
2	Gender	0.42	0.50	-0.53**									
3	Internet experience	7.90	1.92	0.36**	-0.21**								
4	E-gov. experience	3.36	1.74	0.29**	-0.12	0.50							
5	Type of use	0.43	0.50	0.03	0.01	0.01	0.01						
6	Positive affect	4.27	0.93	-0.09	0.10	-0.04	0.10	-0.07					
7	Negative affect	2.56	0.92	0.08	-0.08	0.05	-0.01	0.20**	-0.18**				
8	Information quality	5.46	0.75	0.01	-0.05	0.08	-0.02	-0.11	0.27**	-0.29**			
9	System quality	5.19	0.97	-0.11	0.10	-0.01	-0.01	-0.01	0.42**	-0.41**	0.53**		
10	Service quality	5.21	0.85	-0.01	-0.02	0.02	0.10	-0.06	0.38**	-0.35**	0.58**	0.43**	
11	Usefulness	4.76	0.97	0.12	-0.17*	0.17*	0.17*	0.06	0.27**	-0.19**	0.35**	0.20**	0.48**
Significant correlations: ** $p < 0.01$, * $p < 0.05$													

Appendix F

We employed a cross-sectional design in this study. Hence, we had to make sure that no systematic bias influenced our data due to the single method we used to collect data. We took several steps to reduce the common method bias, which concerns the amount of spurious covariance shared among variables due to a common data collection method (Malhotra, Kim, & Patil, 2006). To mitigate the influence that common method bias had on our data, we implemented appropriate instrument design and data-collection procedures as Podsakoff, MacKenzie, Lee, and Podsakoff (2003) suggest. In addition, we performed statistical analyses to assess common method bias's severity in the data. First, we performed Harman's one-factor test, arguably the most widely known test for common method bias in a single-method research design (Podsakoff et al., 2003; Podsakoff & Organ, 1986). It requires one to conduct an exploratory factor analysis on all the measures that one uses in one's research based on the assumption that, if common method bias exists, a single factor or a general factor that accounts for the majority of the covariance among the measures will emerge. Accordingly, we examined the factor structure solution that emerged from an exploratory factor analysis of all the research variables to determine the number of factors necessary to account for the variance in the variables (Podsakoff et al., 2003).

From the first test, we found that six major factors accounted for 69 percent of the variance in total and that the first (largest) factor did not account for a majority of the variance (31%). Because a single factor did not emerge and one general factor did not account for most of the variance, we conclude that common method bias did not pose a significant problem with the data (Podsakoff et al., 2003). However, Podsakoff et al. (2003) argued that the emergence of multiple factors does not always indicate no common method bias and, thus, recommended that authors conduct additional tests (Sharma, Yetton, & Crawford, 2009) because, as the number of latent variables increases in the research model, one factor will not likely explain the majority of the variance in the manifested variables. Lindell and Whitney (2001) suggested that researchers should use a marker-variable test for common method bias since it addresses most problems related to Harman's one-factor test. Therefore, we further tested our data for common method variance using Lindell and Whitney's marker-variable method. The results from these tests, which we discuss below, show that common method bias did not contaminate our research results.

Marker-variable Technique

The marker-variable technique requires one to include a variable that does not theoretically relate and lacks similarity to the other variables in a model. Since the method assumes the marker variable to have no relationship with single or multiple variables in the study, one can assess common method bias based on the correlation between the marker variable and the theoretically unrelated variables.

We added an additional variable "personal innovativeness" as a marker variable in the model as it does not relate to the other focal variables we examined. Any correlation observed between the marker variable and the theoretically unrelated variables would possibly result from some systematic influence. In this case, one would interpret the correlation as estimating common method variance (Lindell & Whitney 2001). The correlations between the marker variable and other research variables were low as Table F1 indicates. In fact, the highest correlation was between system quality (SYQ) and the marker variable (only 0.17). Further, if we square the correlations, we get the maximum shared variance with the other variables in the model (about 3%). This very low shared variance shows that common method bias did not contaminate our research results.

Table F1. Marker Variable with Other Construct Correlations: Marker-variable Test for Common Method Bias

	USF	PAF	NAF	INQ	SYQ	SEQ
PAF	0.27**					
NAF	-0.19**	-0.18**				
INQ	0.35**	0.27**	-0.29**			
SYQ	0.20**	0.42**	-0.41**	0.53**		
SEQ	0.47**	0.38**	-0.35**	0.58**	0.43**	
Marker variable	0.09	0.07	0.09	0.05	0.17*	0.10

Key: PAF: positive affect, NAF: negative affect, USF: usefulness, INQ: information quality, SYQ: system quality, SEQ: service quality.
N = 214, * p < 0.05, **p < 0.01

About the Authors

Shirish C. Srivastava is Professor and GS1 France Chair in Digital Content for Omni Channel at HEC Paris. Prior to joining HEC, he lectured at the National University of Singapore and holds a Ph.D. from the same university. He has also completed his *habilitation à diriger des recherches* (HDR) from Université de Lorraine, France. His research interests include e-government, AI human interaction, social media and open source strategy, emerging technologies, and IT enabled entrepreneurship and innovation. His research has been published in several top-tier journals such as *MIS Quarterly, Information Systems Research, Journal of Management Information Systems, Journal of the AIS, European Journal of Information Systems, Information Systems Journal, Journal of Information Technology,* and *MIS Quarterly Executive*. He has also won multiple awards, including best paper at the Academy of Management, International Conference on Information Systems, Association for Computing Machinery, and Society for Information Management. He was awarded the Prix Académique de la Recherche en Management 2013, 2015, and 2016 in France. He is currently a Senior Editor at the *Journal of AIS, and the European Journal of Information Systems*.

Thompson S. H. Teo is Professor at the School of Business, National University of Singapore. His research interests include knowledge management, sustainability, e-government, and technology adoption. Thompson has served as a Senior Associate Editor for the *European Journal of Information Systems*, an Editorial Review Board member for *IEEE Transactions on Engineering Management*, and Regional Editor (Asia and Pacific) for the *International Journal of Information Management*. He is currently serving as Associate Editor for *Information & Management, Communications of the AIS,* and *Omega*, as well as an Editorial Board Member for *MIS Quarterly Executive*. He has co-edited four books on information systems and is a four-time winner of the SIM Paper Competition. He won the Best Associate Editor Award 2017 from the *Communications of the AIS*.