Online Information Review

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Received 21 September 2015
Revised 30 April 2016
Accepted 12 May 2016

Abstract

Purpose – The purpose of this paper is to clarify the influence of status quo on information system (IS) adoption. Organizations often substantially allocate resources to leverage existing IT investments. The incumbent system deployment and the institutional environment will exert the influence on the new IS adoption of firms. The findings provide insights for explaining why firms conservatively react toward an emerging IT innovation.

Design/methodology/approach – The research design of the present study is consisted of the following steps. First, the related theoretical foundations of system adoption are reviewed for constructing the research framework. Second, based on the status quo bias theory, this study proposes a conceptual model. Third, the research data set was constructed through collecting manuscripts by conducting journal-by-journal searching in electronic databases. Finally, the protocol proposed by Lipsey and Wilson (2001) was used to conduct the meta-analysis.

Findings – Through a meta-analysis with 34 published studies, this study provides three observations. First, the results provide supports for the magnitude and significance of proposed relationships. Second, the relationships between status quo factors, expectations, and IS adoption are indeed related. Third, the considerable variability across effect sizes can be attributed to the type of adoption, the type of focal system, and the type of institutional pressures.

Research limitations/implications – Although the meta-analytic results provide supports for the significance and magnitude of proposed relationships, the follow-up manuscripts searching and further analyses are needed.

Originality/value – This research presents a collective understanding of systems adoption from status quo bias perspective. The findings provide insights for further researches on IS adoption.

Keywords Meta-analysis, Systematic review, Information systems (IS) adoption, IS implementation, Status quo bias

Paper type Research paper

1. Introduction

The implementation of information systems (IS) remains a challenge for contemporary firms. Firms often react conservatively to the "hype" of chasing emerging IT innovation. For instance, although cloud computing has been viewed as a top technology priority, only 3 percent of CIOs indicate that they have used cloud computing resources (Gartner, 2011). Because organizations need to allocate substantial tangible and intangible resources to leverage existing IT investments, the deployment of the incumbent IS and the institutional environment may influence firms' adoption of new ISs.

Previous IS research has proposed several theoretical perspectives to explain why and what determinates trigger firms' systems adoption. Based on the status quo bias theory, this study proposes a conceptual model to explain why firms tend to adhere to their incumbent systems when new alternatives are available. Through a narrative review and meta-analytic approach, the purpose of this research is to provide a collective understanding of systems adoption from the status quo bias perspective.

Online Information Review
Vol. 40 No. 7, 2016
pp. 998-1017

1468-4527
DOI 10.1108/OIR-09-2015-0311

The organization of this paper is as follows. In Section 2, the related theoretical foundations of system adoption are reviewed to construct our research framework. Subsequently, in Section 3, a conceptual framework is proposed, and the research procedure of the meta-analysis is delineated. Section 4 presents the results of meta-analytic reviews. The study concludes with contributions, implications, and suggestions for future research.

2. Literature review

2.1 Theoretical foundations for system adoption

Various theoretical perspectives have been proposed to provide complementary viewpoints on IT innovation adoption (Lee and Xia, 2006). The common theoretical perspectives are diffusion of innovation (DOI) theory, technology-organization-environment (TOE) framework, institutional theory, resource-based view (RBV), and transaction cost economics (TCE). In the following section, the essence and arguments of each theoretical foundation are briefly introduced to provide the foundations for understanding IS adoption.

2.1.1 DOI and TOE framework. Firms are inclined to adopt innovations that can enable them to address encountered organizational or technological challenges (Kraatz and Zajac, 1996). The DOI theory is introduced to explain the process of a new idea or technology's spread throughout a social system. An innovation is communicated, over time, among the members of a social system through particular channels (Rogers, 2003).

Through a meta-analysis, Tornatzky and Klein (1982) find that compatibility, relative advantage, and complexity consistently contribute to innovation adoption. Innovative attributes also play important roles in firms' adoption of new ways of developing, implementing, and maintaining ISs (Mustonen-Ollia and Lyytinen, 2003). Many other innovation attributes have been proposed and distinguished into different categories. For instance, Moore and Benbasat (1991) propose eight categories of attributes influencing the adoption of IT. In addition, other contextual attributes, such as the characteristics of the leader and organization, have been considered to provide more comprehensive viewpoints of IT adoption (Thong, 1999). For example, Grover (1993) suggests that internal push, competitive need, market assessment, proactive technological orientation, impediments, and industry adoptions influence a firm's adoption of an inter-organizational system. Mustonen-Ollia and Lyytinen (2003) also suggest five sets of innovation diffusion factors, namely, innovative, individual, task, environment, and organization.

Among various taxonomies of the innovation diffusion determinants, the TOE framework has been extensively used in IS research. Consistent with Rogers' arguments, Tornatzky and Fleischer (1990) argue that the contextual factors of adopting an IT innovation are threefold, including the technological, organizational, and external environment contexts. Previous research has utilized the TOE framework to investigate the diffusion of different IT innovations, including e-business (Lin and Lin, 2008), EDI (Kuan and Chau, 2001), RFID (Wang *et al.*, 2010), and cloud computing (Low *et al.*, 2011). For example, Chau and Tam (1997) use the TOE framework to distinguish the adopter and non-adopter of open system. Zhu *et al.* (2006b) conduct a worldwide survey to discuss the diffusion process of e-business as well as cultural differences. Base on the TOE framework, Furneaux and Wade (2011) suggest the changing forces and continuous inertia of an incumbent system.

2.1.2 Institutional theory. Institutional theory examines why firms tend to react to comply with institutional legitimacy (Liang *et al.*, 2007). The institutional legitimacy is

about "the expectations for appropriate organizational structures, behaviors and practices" (Ke *et al.*, 2009, p. 841). DiMaggio and Powell (1983) propose three isomorphic institutional forces, including coercive, normative, and mimetic. Coercive pressures refer to the formal rules and cultural expectations in an institutional environment (Ke *et al.*, 2009). Coercive pressures exert influence on a firm through the laws and policies of the government and industrial associations with a relationship of resource dependence. Normative pressures refer to shared norms regarding the conditions and methods of performing certain works (DiMaggio and Powell, 1983). Mimetic pressures refer to an organization's reaction to uncertainty by imitating others (Liang *et al.*, 2007). A firm perceives mimetic pressures from the structurally equivalent competitors with similar goals, customers, and operating constraints (Teo *et al.*, 2003).

Similar to the argument of environmental influence in the TOE framework, higher competition and trading partner pressures will increase the propensity of a firm to adopt an IT innovation. Previous IS researches has also recognized institutional pressures (IP) as an important external influence on the decision of IT adoption. For instance, Teo *et al.* (2003) find that institutional forces enable the adoption of financial electronic data interchange (FEDI). Among small- and medium-sized enterprises, the intention of adopting B2B systems is influenced by external pressures from customers and competitors (Khalifa and Davison, 2006).

2.1.3 RBV. The basic argument of the RBV is that firms' heterogeneous resources enable them to compete with others (Barney, 1991; Wernerfelt, 1984). That is, in RBV, an organization is viewed as a bundle of resources and capabilities. A firm can sustain its competitive advantage by possessing resources that are valuable, rare, imperfectly imitable, and non-substitutable (Barney, 1991). Therefore, adopting an IT innovation is regarded as a strategic investment in information resources. Mata *et al.* (1995) argue that the five attributes of IT are the sources of sustained competitive advantage, namely, switching costs (SC), access to capital, proprietary technology, technical IT skills, and managerial skills. Therefore, the business value of IT rests on the application of IT and complementary organizational resources by improving business process and organizational performance (Melville *et al.*, 2004).

A meta-analytical review reveals that technological and organizational resources can raise internal and external capabilities, which in turn affect firm performance (Liang *et al.*, 2010). Through the theoretical lens of RBV, previous research focuses on the discussion of the IT capability development (Barua *et al.*, 2004), the influence on business processes (Ray *et al.*, 2005), the impacts on firm performance (Hulland *et al.*, 2007), and new system adoption (Benlian *et al.*, 2009).

2.1.4 TCE. TCE is used to explain the needed effort and cost that occur during an exchange (Williamson, 1981). Several characteristics and determinants have been introduced, including asset specificity, uncertainty, opportunism, bounded rationality, and frequency (Miranda and Kim, 2006). Asset specificity refers to the degree of "specialized investment to a particular transaction" (Williamson, 1981, p. 555). Uncertainty refers to the "computational inability to ascertain the structure of the environment" (Williamson, 1975, p. 23). Williamson (1981) argues that a decision agent is often limited to bounded rationality, which refers to an "intendedly rational" decision. In addition, the decision maker tends to act on self-interest (i.e. opportunism). Decision agents often make decision with selective information and uncertainty because of bounded rationality and opportunism. However, the influence of the above four conditions can be mitigated when the transactions are recurrent. Frequency refers to

"buyer activity in the market" (Williamson, 1985, p. 72). With the increase of transaction frequency, decision makers can access more information which improves their decisions and in turn reduces transaction costs over time.

The adoption of IT can help reduce transaction costs. For example, with SCM system or EDI, the coordination between business partners can be enhanced as well as enable the business integration (Subramani, 2004).The TCE has also been applied to discuss IT outsourcing and outsourcing contract design (Chen and Bharadwaj, 2009; Miranda and Kim, 2006). The following section further discuss the theoretical concepts of the status quo bias theory.

2.2 Status quo bias

In contrast with inaction, decision makers take status quo choices when unchanged preferences, uncertainty, or changing costs exist (Anderson, 2003). Every decision has a status quo option, which acts as an anchor for any possible alternatives and has influence on the final decision (Samuelson and Zeckhauser, 1988). Samuelson and Zeckhauser (1988) term the tendency of a decision agent to adhere to the situation or decision already in place as status quo bias. They propose three main categories to explain the status quo bias: cognitive misperception, psychological commitment, and rational decision making.

Cognitive misperception stems from three propensities of decision agents: loss aversion, anchoring, and bounded rationality. Loss aversion refers to the phenomenon where decision agents tend to weigh losses heavier than gains (Kahneman and Tversky, 1979). In addition, the previous decision is often used as an anchor for following decision making. With bounded understanding of a new alternative's pros and cons, decision makers only evaluate the available options. As for new IS adoption, managers use the performance and deployment of incumbent IS to evaluate the possible solutions.

Psychological commitment may be the result of sunk costs, the efforts of making consistent decisions and feeling in control, and the avoidance of regrettable decisions (Samuelson and Zeckhauser, 1988). Firms allocate plenty of tangible and intangible resources to leverage IT investments (Zhu *et al.*, 2006a). These can be sunk costs when companies to move to a new system. In addition, IP shape the norms prevailing over change in the business environment. To maintain competitive advantage or to avoid regrettable decisions, a firm's reaction to a new system depends on the attitudes and reaction of its partners or competitors.

Rational decision making means that decision makers consider the costs and benefits of switching to a new option in the presence of transition costs and uncertainty. The initial choice introduces transition costs for the subsequent decision. However, adopting new IS often accompanies uncertainty of the firm's adaptation. The limited knowledge and experience of new systems may lead organizations to continue with the incumbent systems (Polites and Karahanna, 2012). Although similar arguments have appeared implicitly in past IS research, this study uses the status quo bias theory as the theoretical lens to discuss why firms stick with the existing IS when new alternatives are available.

After reviewing previous IS adoption research, the determinants of IS adoption are organized into four broad categories. The first category, incumbent system deployment (ISD), delineates the concept of cognitive misperception. Based on the status quo bias perspective, the assessment of new ISs is influenced by the firm's incumbent system.

Analogous to the TOE framework, the performance and deployment of current IT infrastructure contribute to the adoption of an IT innovation. According to the arguments of RBV, a firm that expects to achieve competitive advantage may initiate and adopt an IT innovation. However, the adoption decision is limited to bounded knowledge and expertise on the new IS.

The second category is IP which portray a firm's psychological commitment. IP exerted by the government, industrial associations, trading partners, customers, and competitors influence IT adoption. Notably, the arguments of TCE reveal that the higher interdependence and frequency lead a firm to adhere to current business relationships.

The last two categories are benefits and costs of adopting an IS, which represent the concept of rational decision making. According the DOI and TOE, the characteristics of IT innovation affect its diffusion. A firm may adopt a new IS if the alternative provides relative advantages and direct benefits. However, adopting a new IS also brings technical and managerial problems. Table I provides the mapping of these factors in accordance with the status quo bias theory.

3. Research methodology

Based on the status quo bias perspective, this study proposes an integrative model of IS adoption at firm level. A meta-analytic review is conducted to establish the existence

Theoretical lenses	Cognitive misperception Incumbent system deployment	Psychological commitment Institutional pressures	Rational decision making Benefits	 Costs
DOI*			Relative advantage	Compatibility Complexity Trialability Observability
TOE*	Satisfaction with existing systems IT infrastructure	Perceived industry pressure Perceived government pressure Competitive pressure Regulatory environment Trading partner power	Perceived direct benefits Relative advantage	Perceived barriers Perceived compliance Perceived financial cost Complexity Compatibility
Institutional theory		Mimetic pressures Coercive pressures Normative pressures Institutional influences		
RBV*	Process alignment IT infrastructure	Partner readiness Relationship resources		
TCE*	Opportunism Bounded rationality	Interdependence Frequency		Asset specificity Uncertainty

Notes: DOI, diffusion of innovation; TOE, technology-organization-environment framework; RBV, resource-based view; TCE, transaction cost economics

Table I.
Mapping factors from related theoretical lenses to status quo bias perspective

and magnitude of the relationships proposed in the conceptual model. In the following section, the proposed conceptual framework and the research procedures of meta-analysis are presented.

3.1 Conceptual framework

Previous research has proposed corresponding arguments toward the influence of the status quo on adopting a new IS. Van de Ven and Poole (1995) introduce a dialectical model to describe how "confrontation and conflict between opposing entities" enable the progression of an organization. As shown in Figure 1(a), the synthesis is produced by a collision between the opposing thesis and antithesis. Joshi (1991) proposes the equity implementation model to explain the influence of the changes in inputs and outcomes introduced by the new system adoption on user resistance. By extending Joshi's model, Kim (2010) empirically finds that changes in benefits and costs affect user resistance to the open source software through the perceived value (PV) (see Figure 1(b)). In a similar vein, Gosain (2004) suggests that ERP implementation often accompanies the misalignment between the existing institutional logics and those in the new IS, which can lead to resistance, selective appropriation, and unintended side effects (see Figure 1(c)). These arguments provide a supportive foundation for the anchoring effect of current status on the evaluation of new alternatives. Accordingly, a firm's status quo affects its expectation of adopting a new system, which in turn influences the reaction to the alternative (see Figure 1(d)).

The perception of status quo affects a firm's expectations toward adopting a new IS, which in turn influence the reaction to the alternative. Specifically, the ISD, IP, switching benefits (SB), and SC determine the PV and perceived risk (PR) of the alternative. Subsequently, the adoption (A) or resistance of a new IS depends on the perception of value and risk. Figure 2 presents the conceptual model of new system adoption from the status quo bias perspective.

3.2 Data set construction

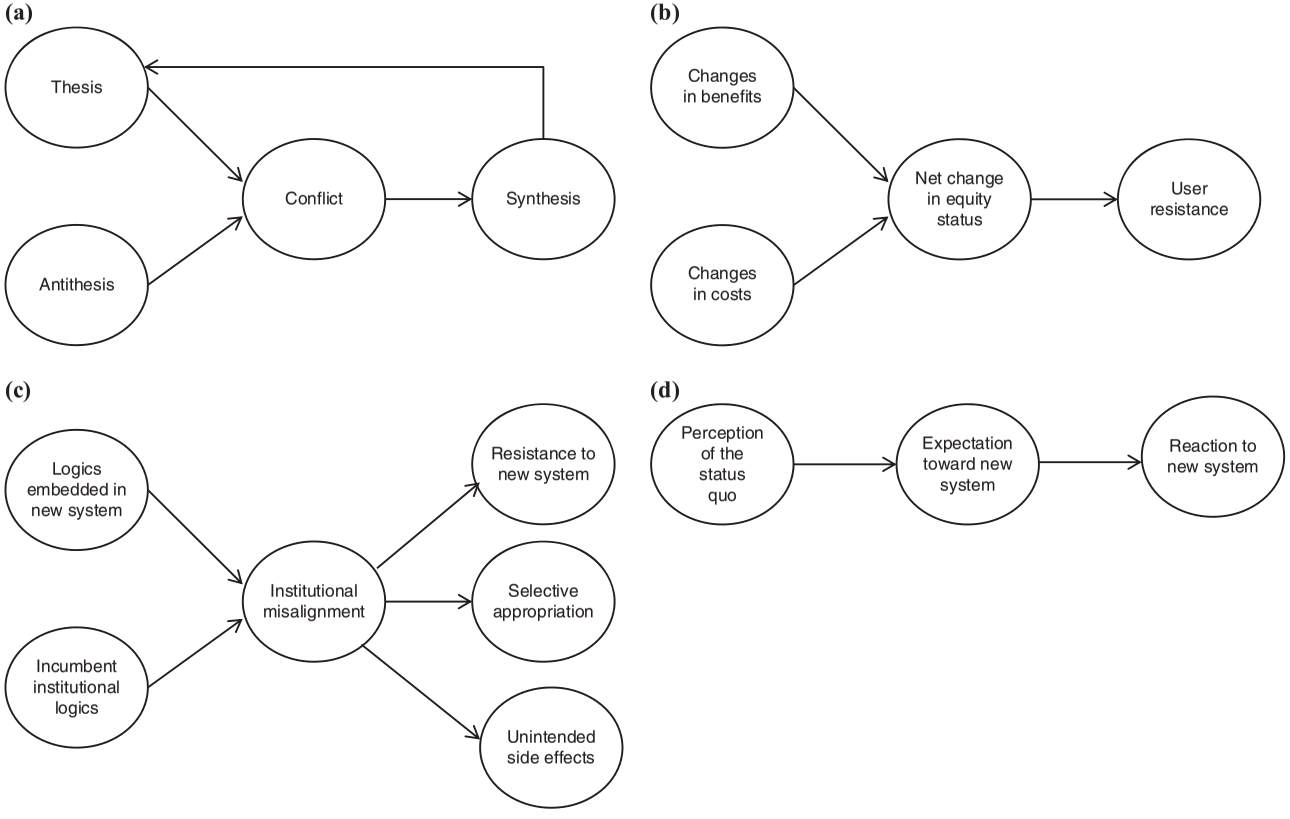
Our meta-analytic research data set was constructed by collecting manuscripts through journal-by-journal searching in electronic databases, including ABI/INFROM, Google Scholar, JSTOR, EBSCOhost, and Elsevier Science Direct. In addition, conference proceedings were also included to minimize the potential publication bias (Wu and Lederer, 2009). Multiple keywords were used, including "IS adoption," "IT adoption," and "organizational IT diffusion." When studies based on the same data set and were reported in different journal articles and proceedings, only one was selected as representative. Articles were excluded according to the following criteria: it did not analyze at firm level, it was theoretical or conceptual research, it did not examine the relationship in our conceptual model, and it did not report required data for conducting meta-analysis (i.e. correlations).

These efforts yielded a sample of 34 primary studies (indicated with an asterisk in the References section), consisting of 26 journal studies and eight conference proceedings. Table II presents the distribution of individual studies by publication source and time period. The time period from 2006 to 2010 represented a relatively major portion of the total research sample.

3.3 Meta-analytic procedure

The meta-analytic procedure follows the four steps suggested by Hofmann *et al.* (2005), including: collection of effect sizes (ESs) and needed information, combination

Figure 1.
Corresponding arguments of new system adoption



Notes: (a) The dialectic process of organizational development and change (Van de Ven and Poole, 1995, p. 520); (b) equity implementation model (Kim, 2010, p. 4); (c) misalignment of new system adoption (Gosain, 2004, p. 166); (d) the status quo bias perspective of new system adoption

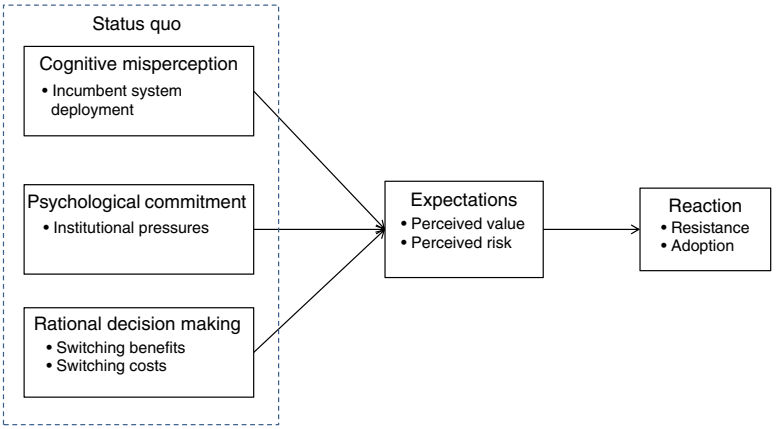


Figure 2.
Conceptual model of system adoption

Sources	Time period 1999	2000-2005	2006-2010	2011-2012	Total
Journal					26
Computers in Human Behavior			1		1
DATABASE for Advances in Information Systems			1		1
Decision Support Systems			2	1	3
IEEE Transactions on Engineering Management		1	2		3
Information & Management		3	1		4
Information Systems Research		1	3		4
International Journal of Information Management			1	1	2
Journal of Management Information Systems	1		1	1	3
Management Science			1		1
MIS Quarterly		1	2		3
Technovation			1		1
Conference					8
European Conference on Information Systems (ECIS)			1		1
International Conference on Information Systems (ICIS)		1	3	1	5
Pacific Asia Conference on Information Systems (PACIS)			1	1	2
Total	1	7	21	5	34

Table II.
Distribution of individual studies included in the meta-analysis

of single correlations within studies, correction for measurement error, and meta-analytic amputations on study correlations. First, the values of sample size, reliability of constructs, and correlation coefficients for each relationship reported in the manuscripts were collected. Then, the decomposed constructs were combined to produce a single correlation for each ES using the formula proposed by Hunter and Schmidt (2004, p. 435). To eliminate attenuation due to measurement error, the correlation of focal effect was corrected by the reliability measure of both constructs. For the studies whose reliability measure was unavailable, an average reliability of the same construct was used as substitute (see Bono and Judge, 2004; Geyskens *et al.*, 1998).

This study used the meta-analytic protocol proposed by Lipsey and Wilson (2001). To measure direct effect, Fisher's r-to-z transformation was used to compute the

corresponding ES of each correlation. Then, the sample size of each study was used to calculate the weighted mean of ES. Using the standard errors of the weighted mean ES, the 95 percent confidence interval for each ES can be created. Both fixed effects and random effects procedures were used to combine study estimates. The combined correlation r was transformed back using inverse Fisher's z-to-r transformation. Because Lipsey and Wilson's procedures rely on the assumption that ESs are normally distributed, the Z-statistics can be calculated to test significance of the combined correlations. In the same vein, the Q-statistic and fail-safe N also can be created. The significant Q-statistics suggest the existence of moderators.

Following Lipsey and Wilson (2001), the analog to the analysis of variance (ANOVA) and weighted least squares (WLS) regression were used to assess the moderating effect of the proposed moderators. Both analog ANOVA and WLS regression can be used to test the explaining power of each moderator. Subgroups with fewer than five ESs were not included for further analysis. As to analog ANOVA, the total variability (Q_T) can be explained by the categorical variable (Q_B) and the residual, within group portion (Q_w). If Q_B is significant, the categorical variable can contribute to explaining the variability. If Q_w is significant, there is need for additional moderators (Wu *et al.*, 2011). For the WLS regression, the ES is inputted as the dependent variable, while the proposed moderators are regarded as independent variables, and the inverse variance weight is treated as the weight. The significance of regression coefficients for the moderators was tested by correcting the standard error of the unstandardized regression coefficients through division of the square root of the residual mean square (Lipsey and Wilson, 2001).

3.4 Coding of correlations and moderators

The correlation coefficient was chosen as the ES metric. The following information was retrieved from each study to construct a data set for meta-analysis: sample size, reliability of constructs (e.g. Cronbach's α or inter-item reliability scores), and correlations for each relationship. Most included studies focus on the relationships between the determinants and IT adoption. Table III reports the distribution of

Relation	k	Range Lower	Range Upper	Positive ($r \geqslant 0.1$)	Low ($0.1 > r > -0.1$)	Negative ($r \leqslant -0.1$)
ISD-PV[a]	1	0.00	0.00	0	1	0
IP-PV	8	−0.17	0.62	7	0	1
SB-PV	5	−0.14	0.62	4	0	1
SC-PV[a]	1	−0.37	−0.37	0	0	1
ISD-PR[a]	2	0.06	0.22	1	1	0
IP-PR	6	−0.50	0.27	3	1	2
SB-PR	8	−0.39	0.23	1	6	1
SC-PR[a]	2	0.39	0.61	2	0	0
ISD-A	10	0.16	0.44	10	0	0
IP-A	59	−0.09	0.73	53	6	0
SB-A	12	0.12	0.74	12	0	0
SC-A	4	−0.79	0.21	1	1	2
PV-A	24	−0.18	0.68	21	3	1
PR-A	22	−0.62	0.25	2	2	18

Table III.
Distribution of uncorrected correlations

Notes: k, number of correlations; ISD, incumbent system deployment; IP, institutional pressures; SB, switching benefits; SC, switching costs; PV, perceived value; PR, perceived risk; A, adoption. [a]The relationships were excluded

uncorrected correlations. Four relationships (i.e. ISD-PV, SC-PV, ISD-PR and SC-PR) were excluded because they lacked enough studies describing them. Therefore, a total of 158 ESs were identified from the 34 studies. The number of ESs that can be used to test each relationship varies from 4 to 59.

IP-A is the most widely studied relationship with 59 ESs. The relationships, PV-A (24 ESs) and PR-A (22 ESs), are also widely referenced. The range of reported correlation coefficients can be quite broad. For example, the correlations for IP-PV range from −0.17 to 0.62, for SB-PV from −0.14 to 0.62, for IP-PR from −0.50 to 0.27, and for PR-A from −0.62 to 0.25. The results show that the magnitude of most relationships is greater than 0.1, but a few inconsistent findings do exist in the published literature. For instance, the relationship between IP and PR has three positive correlations, one low correlation and two negative correlations. These differences may result from chance, sampling error, or research context.

This study focuses on three potential moderators: adoption type, system type, and IP type. Through meta-analysis, Lee and Xia (2006) find that stage of adoption moderates the relationship between organizational size and IT innovation adoption. Therefore, according to the definition of adoption in each study, this study distinguishes the type of adoption into two categories, adoption intention or adoption level, and codes the former "AI" and the latter "AL".

System type has been recognized as an important moderator. Wu *et al.* (2011) suggest that distinguishing the purpose of technology adoption can help researchers explore the different determinants. Lee and Xia (2006) find the relationship between organizational size and IT innovation adoption to be moderated by the type of innovation. According to the research purposes and questionnaires of each study, the manuscripts were identified as "interorganizational" and "non-interorganizational", coded "IE" and "NIE", respectively. In this study, if organizational system adoption mainly focuses on the commercial activities between business partners, such as EDI, eSCM, eProcurement, and B2B markets, the system type is treated as "interorganizational", and others as "non-interorganizational".

As mentioned above, DiMaggio and Powell (1983) propose three isomorphic institutional forces: coercive, normative and mimetic. Some studies use formative constructs to represent the overall IP (e.g. Saya *et al.*, 2010; Shim *et al.*, 2009). Therefore, this study distinguished four types of institutional forces and coded "GP" for general IP, "CP" for coercive pressures, "MP" for mimetic pressures, and "NP" for normative pressures.

Three potential moderators were coded by the defined categories. When information about the moderator was not available, the variable was coded as "n/a (not available)". Table IV presents the coding results of individual studies.

4. Results

4.1 Results of meta-analysis

The results of Lipsey and Wilson's protocol are shown in Table V. The results suggest that all relationships are statistically significant. Cohen and Cohen (1983) advocate that the magnitude of correlation can be distinguished into strong (0.50), moderate (0.30), or weak (0.10). Accordingly, the magnitude of inverse Fisher's z-to-r (r) is weak to moderate, and the absolute values of all relations range from 0.12 to 0.47. All Q-statistics are significant, which suggests that heterogeneity between ESs and moderator may exist. The visual summary of the meta-analysis results is shown in Figure 3.

No.	Study Author(s) (Source)	Year	Innovation type	Sample size	Type of adoption	Type of system	Institutional pressures
1	Benlian and Hess (J)	2011	SaaS (Adopter)	142	AI	NIE	n/a
			SaaS (Non-Adopters)	207	AI	NIE	n/a
2	Benlian *et al.* (J)	2011	SaaS	172	AI	NIE	n/a
3	Chen *et al.* (C)	2009	Green IT	75	AL	NIE	CP, MP
4	Chwelos *et al.* (J)	2001	EDI	268	AI	IE	CP, MP, NP
5	Goebel *et al.* (C)	2009	RFID	153	n/a	IE	CP
6	Goswami *et al.* (C)	2008	RFID	110	AI	NIE	CP, NP
7	Heart (C)	2010	SaaS	143	AI	NIE	n/a
8	Iskandar *et al.* (J)	2001	EDI	103	AL	IE	CP
9	Ke *et al.* (J)	2009	eSCM	134	AI	IE	CP, MP, NP
10	Khalifa and Davison (J)	2006	E-Business	92	AI	IE	CP, MP
11	Kim *et al.* (J)	2009	Ubiquitous Computing	129	AL	NIE	n/a
12	Lai *et al.* (J)	2010	ERP	208	n/a	NIE	MP
13	Lee and Lim (J)	2003	EDI	110	AL	IE	CP
14	Li *et al.* (C)	2005	Open Source Software	81	AI	NIE	n/a
15	Liang *et al.* (J)	2007	ERP	77	AL	NIE	CP, MP, NP
16	Lin and Lin (J)	2008	E-Business	163	AL	IE	MP, NP
17	Liu *et al.* (J)	2008	E-Business	203	AI	IE	GP
18	Malhotra *et al.* (J)	2007	E-Business	41	AL	IE	NP
19	Mishra and Agarwal (J)	2010	B2B markets	296	AL	IE	n/a
20	Mishra *et al.* (J)	2007	eProcurement	424	AI	IE	NP
21	Molla and Abareshi	2011	Green IT	176	AL	NIE	GP
22	Nakayama and Sutcliffe (J)	2005	IOS (Retailers)	99	AL	IE	n/a
		IOS (Suppliers)	72	AL	IE	n/a	
23	Ranganathan *et al.* (J)	2011	eSCM	176	AL	IE	CP
24	Riemenschneider *et al.* (J)	2003	Web Present	156	AI	NIE	GP
25	Saya *et al.* (C)	2010	Cloud Computing	101	AI	NIE	GP
26	Shim *et al.* (J)	2009	Open System	80	AI	NIE	GP
27	Son and Benbasat (J)	2007	eMarketplace (Potential Adopter)	98	AI	IE	CP, MP, NP
		eMarketplace (Current Adopter)	85	AL	IE	CP, MP, NP	
28	Teo *et al.* (J)	2003	FEDI	222	AI	IE	CP, MP, NP
29	Thong (J)	1999	IS adoption	166	AI	NIE	MP
30	Wu *et al.* (J)	2007	eProcurement	144	AL	IE	NP
31	Xu and Quaddus (C)	2006	KMS	285	AL	NIE	GP
32	Xue *et al.* (C)	2011	eSCM	324	AL	IE	NP
33	Zhu *et al.* (J)	2006a	Internet IOS	1394	AL	IE	GP
34	Zhu *et al.* (J)	2006b	E-Business	1875	AI	IE	MP, NP
			E-Business	1875	AL	IE	MP, NP

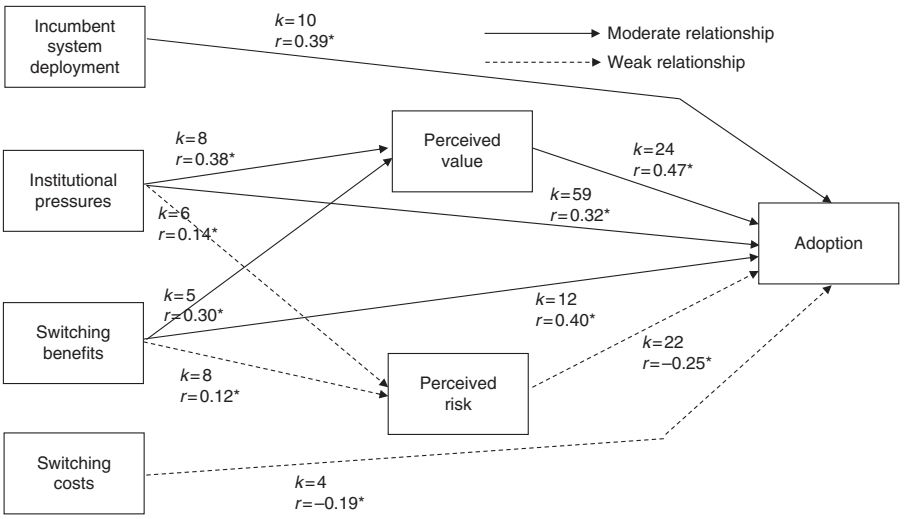
Table IV.
Coding results of individual studies

Notes: C, conference proceedings; J, journal. Type of adoption: AI, adoption intention; AL, adoption level. Type of system: IE, interorganizational; NIE, non-interorganizational. Institutional pressures: GP, general institutional pressures; CP, coercive pressures; MP, mimetic pressures; NP, normative pressures

Relation	k	n	ES	r	SE	Z	95% CI Lower	95% CI Upper	Q	FN
IP-PV	8	1,424	0.40	0.38	0.03	15.04*	0.35	0.45	159.11*	22.53
SB-PV	5	762	0.30	0.30	0.04	8.32*	0.23	0.38	55.35*	9.76
IP-PR	6	2,528	0.15	0.14	0.02	7.28*	0.11	0.18	254.83*	2.66
SB-PR	8	2,504	0.12	0.12	0.02	5.78*	0.08	0.16	194.05*	1.24
ISD-A	10	9,179	0.41	0.39	0.01	39.58*	0.39	0.43	80.31*	29.17
IP-A	59	1,6990	0.33	0.32	0.01	42.44*	0.31	0.34	943.30*	127.49
SB-A	12	3,361	0.43	0.40	0.02	24.58*	0.39	0.46	186.98*	36.27
SC-A	4	1,937	−0.19	−0.19	0.02	−8.34*	−0.23	−0.15	369.62*	11.52
PV-A	24	3,772	0.50	0.47	0.02	30.72*	0.47	0.54	240.87*	87.84
PR-A	22	5,566	−0.25	−0.25	0.01	−18.63*	−0.28	−0.22	572.46*	76.12

Notes: ISD, incumbent system deployment; IP, institutional pressures; SB, switching benefits; SC, switching costs; PV, perceived value; PR, perceived risk; A, adoption; k, number of correlations; n, combined sample size; ES, weighted mean of effect sizes; r, inverse Fisher's z-to- r; SE, standard error of the mean effect sizes. *$p < 0.001$

Table V.
Meta-analysis results by employing the Lipsey and Wilson protocol



Notes: k, number of correlations; r, inverse Fisher's z to r. *$p < 0.001$

Figure 3.
Summary of meta-analysis results

4.2 Moderator analyses

Two methods are employed to assess the influence of proposed moderators, including analog ANOVA and WLS regression. The subsets with fewer than five correlations were not included in the analog ANOVA and WLS regression. The results of analog ANOVA and WLS regression are presented in Table VI.

4.2.1 Type of adoption. The subsets of SC-A and PR-A on which the estimates were based only had a few cases and were not included for the analysis of analog ANOVA and WLS regression. As a follow-up check (see Table VI), the Q_B values of ISD-A ($Q_B = 4.36$, $p < 0.05$), IP-A ($Q_B = 131.93$, $p < 0.001$), SB-A ($Q_B = 43.89$, $p < 0.001$), and PV-A ($Q_B = 21.73$, $p < 0.001$) referring to adoption type significantly moderate these relationships. The significance in Q_W values reflects the existence of other moderators.

Relation	Group	Q by group $Q_{(df)}$	Analog ANOVA $Q_{B(df)}$	$Q_{W(df)}$	WLS regression β	Z	R^2
ISD-A	AI	$46.80_{(4)}$	$4.36_{(1)}$*	$75.95_{(8)}$***	0.04	2.09*	0.05
	AL	$29.15_{(4)}$					
IP-A	AI	$414.19_{(30)}$	$131.93_{(1)}$***	$811.37_{(57)}$***	−0.18	−11.51***	0.14
	AL	$397.18_{(27)}$					
SB-A	AI	$5.89_{(5)}$	$43.89_{(1)}$***	$143.09_{(10)}$***	0.25	6.60***	0.24
	AL	$137.19_{(5)}$					
PV-A	AI	$100.20_{(13)}$	$21.73_{(1)}$***	$219.14_{(22)}$***	−0.16	−4.65***	0.09
	AL	$118.94_{(9)}$					
IP-A	IE	$734.56_{(40)}$	$6.97_{(1)}$**	$936.33_{(57)}$***	0.06	2.63***	0.01
	NIE	201.77(17)					
SB-A	IE	$82.08_{(4)}$	$0.29_{(1)}$	$186.69_{(10)}$***	−0.02	−0.54	0.00
	NIE	$104.61_{(6)}$					
PV-A	IE	$53.95_{(5)}$	$93.54_{(1)}$***	$147.33_{(22)}$***	0.38	9.72***	0.39
	NIE	$93.38_{(17)}$					
PR-A	IE	$161.65_{(4)}$	$300.97_{(1)}$***	$271.48_{(20)}$***	−0.47	−17.42***	0.53
	NIE	$109.83_{(16)}$					
IP-A	GP	$160.53_{(7)}$	$60.55_{(3)}$***	$882.75_{(55)}$***			
	CP	$108.84_{(20)}$					
	MP	$249.53_{(13)}$					
	NP	$363.86_{(15)}$					

Table VI.
ANOVA and WLS regression statistics for moderators

Notes: ISD, incumbent system deployment; IP, institutional pressures; SB, switching benefits; PV, perceived value; PR, perceived risk; A, adoption. Moderator categories with less than five study correlations were excluded from statistical analysis. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

The results of the WLS regression (see Table VI) show that adoption type accounts for a proportion of the variance for the four relationships: ISD-A ($R^2 = 0.05$), IP-A ($R^2 = 0.14$), SB-A ($R^2 = 0.24$), and PV-A ($R^2 = 0.09$). The results also suggest that the research uses adoption level, as the type of adoption results in higher correlations in the relationships of ISD-A ($\beta = 0.04$, $p < 0.05$) and SB-A ($\beta = 0.25$, $p < 0.001$), while it results in lower correlations in the relationships of IP-A ($\beta = -0.18$, $p < 0.001$) and PV-A ($\beta = -0.16$, $p < 0.001$). These results confirm moderation of the type of adoption.

4.2.2 Type of system. In Table VI, the significant Q_B values indicate that notable variability is explained by the type of system in the relationships of IP-A ($Q_B = 6.97$, $p < 0.01$), PV-A ($Q_B = 93.54$, $p < 0.001$), and PR-A ($Q_B = 21.73$, $p < 0.001$). However, all Q_W values are significant, which signals the existence of other moderators. The system type can account for a significant proportion of the variance for PV-A ($R^2 = 0.39$) and PR-A ($R^2 = 0.53$) and only a slight proportion of the variance for IP-A ($R^2 = 0.01$). The results also suggest that the research focusing on the non-interorganizational type of system has stronger magnitude of correlations in the relationships of IP-A ($\beta = 0.06$, $p < 0.001$), PV-A ($\beta = 0.38$, $p < 0.001$), and PR-A ($\beta = -0.47$, $p < 0.001$). These results confirm the moderation of the type of system.

4.2.3 IP. In contrast with the number of IP-A subgroups, the subsets of IP-PV and IP-PR had fewer cases. Therefore, the analysis of analog ANOVA was only used for IP-A, revealing a significant Q_B value of IP-A ($Q_B = 60.55$, $p < 0.001$). The Q_W values signal the existence of other moderators. The results confirm that type of IP moderates the relationship IP-A.

5. Discussion

After conducting a meta-analytic review, this study provides three observations. First, most studies focused on positive reaction toward IS innovation (both adoption intention and adoption level), leaving a gap in understanding of the negative reaction, such as organizational resistance. Similar arguments and findings have implicitly appeared in past IS studies. This limited the meta-analytic review to mainly focusing discussion on the relationships between the perception of status quo, the expectations toward adopting a new system, and the system adoption. The meta-analysis of 34 empirical studies provides support for ten relations of the proposed conceptual model based on the status quo bias theory. The results provide a basic understanding of the magnitude and significance of proposed relationships and contribute further insights for existing IS adoption research.

Second, status quo factors, expectations, and IS adoption are indeed related. However, as shown by the graphical depiction of the meta-analytic findings provided in Figure 3, there are still some relationships under explored, including ISD-PV, ISD-PR, SC-PV, and SC-PR. Of the 14 possible relationships, IP-A, PV-A, and PR-A are most widely studied. The relatively large correlations, including PV-A ($r = 0.47$), ISD-A ($r = 0.39$), SB-A ($\rho = 0.40$), and IP-PV ($r = 0.38$), reveal the important role of both direct and indirect status quo bias in adopting new systems.

Third, the considerable variability across ESs can be attributed to the type of adoption, focal system and IP. These observations clarify and provide a foundation for the following quantitative research. As mentioned before, there are some inconsistent findings in published literature, regarding both direction and magnitude. A relatively small sample may explain why the accounted variance is so small for some relations. The findings suggest the existence of three moderators: type of adoption, type of system, and type of IP.

5.1 Implications for practitioners

Our meta-analysis has several implications for IS managers. First, a manager should play the role of change agent to overcome internal and external resistance to change. The current ISD can be one type of internal resistance. The intertwined relationship between the incumbent system and business processes impedes the introduction of a new system. However, IP can form a climate conducive to adopting a new system. Therefore, managers should first recognize the need to adopt a new system before taking further actions.

Second, the findings also provide important implications for IS vendors and policy makers. Vendors can exert IP by constructing breakthroughs and success stories as well as establishing a positive image of adoption. For instance, vendors can cooperate with leading firms by providing a suitable solution. Once an appealing paradigm of adopting a certain system is established, then the cluster effect occurs by attracting the critical mass. Government promotion often plays an important role in the diffusion of an IT innovation. Governments set up supportive regulations to encourage adoption and host workshops to share experiences with potential adopters. Once a network member successfully adopts an IS, the adoption by other members will unfold through institutional promotion.

Third, the findings can provide suggestions for managers facing the dilemma of adopting new systems. Using the existing system as an anchor, the biased perception of gains and losses from new systems adoption enlarges the risks of adoption. In contrast with adopting a new one, managers may choose to remain with their current

deployment or to upgrade. For example, firms may be inclined to upgrade their ERP systems to prevent running risks of technological and managerial uncertainty, and the lock-in effect (e.g. ERP vendor announces de-support dates of earlier version) escalates the costs of a different solution. To maintain firms' competitive advantage, managers also need to consider the extent of adoption by their competitors and partners. Our results help recognize the various sources of status quo bias regarding the decision to adopt a new system.

5.2 Implications for the academy

This study provides implications for academics and sheds light on possible future research directions regarding IS adoption. First, through a meta-analytic review and an empirical survey, this study proposes an integrated framework of new system adoption from the status quo bias perspective with the aim to understand why companies still adhere to their in-house, on-premise IS architecture. Most previous research employs the status quo bias perspective to explain the decision at the individual level, while this study provides theoretical explanations at the organizational level. Further research can empirically examine the relationships proposed in this research.

Second, although our meta-analytic results provide partial support for the significance and magnitude of the proposed relationships, the results of the *Q*-test suggest the existence of a heterogeneous effect. Therefore, follow-up studies should involve further searching and analyses.

Third, the findings can contribute to organizational change theory. The incumbent IS status quo may lead to a firm's misconception toward adopting new systems. Sutanto *et al.* (2008) note that the change management of post-implementation often falls into "no-man's-land." Our findings provide a rationale to explain the factors that contribute to inaction with respect to adopting a new system. Further research can develop in-depth investigations through the change management perspective.

6. Conclusions

Although previous IS research has accumulated a considerable body of findings on IS adoption, there is no systematic review from the status quo bias perspective. After reviewing related theoretical perspectives, this study proposes an integrated model of IS adoption from the status quo bias perspective. The findings of a meta-analysis of 34 studies suggest that existing system deployment, institutional environment pressures, and bounded rational decision making influence firms' expectations toward an IT innovation, which in turn determine their reaction. This study can provide managers and researchers with inspiration for designing new in-depth and extensive investigations that continue the advance of these important issues.

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