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THEORY AND REVIEW

CONTROL CONFIGURATION AND CONTROL ENACTMENT IN INFORMATION SYSTEMS PROJECTS: REVIEW AND EXPANDED THEORETICAL FRAMEWORK

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Appendix A

Glossary of Key Terms (in Alphabetical Order)

Authoritative control style: Top-down control style that relies on bureaucratic values and is designed to ensure and, if necessary, enforce compliant controllee behavior and goal-directed effort (Adler and Borys 1996; Gregory et al. 2013; Gregory and Keil 2014).

Behavior control: Mode of formal control in which the controller seeks to influence the process through which the controllee should achieve the desired outputs (Jaworski and MacInnis 1989; Kirsch 1996).

Behavior observability: Key characteristic of the project task that refers to the extent to which the controller has access to information systems that reveal the controllee's behaviors (Kirsch 1996).

Clan control: Mode of informal control that operates when behavior in a peer group is motivated by shared norms and values and a common vision (Kirsch 1996; Kirsch et al. 2010; Ouchi 1980).

Communicational congruence: Degree of shared understanding between the controller and the controllee regarding the enacted controls (Narayanaswamy et al. 2013; Ouchi 1978).

Control: Any attempt to align individual behaviors with organizational objectives (e.g., Cardinal 2001; Jaworski 1988; Kirsch 1996; Ouchi 1979).

Control amount: Variety and intensity of selected control mechanisms (Rustagi et al. 2008).

Control choices: Selection of control modes, amounts, and styles based on the consideration of contextual antecedents.

Control congruence: Degree of similarity between the controller and controllee perceptions of enacted controls, which describes a produced (and reproduced) quality of the control enactment process (Narayanaswamy et al. 2013).

Control dynamics: Changes in control activities over the life of a project (Choudhury and Sabherwal 2003).

Control effects: Intended and unintended consequences of control activities.

Control enactment: Interaction between the controller and the controllee through which the controller implements formal controls and promotes informal controls.

Control mechanism: Specific control activity that manifests a control mode (Kirsch 1997).

Control mode: Type of control mechanisms such as input, behavior, outcome, clan and self-control (e.g., Jaworski 1988; Kirsch 1996; Ouchi 1979).

Control portfolio: Collection of formal and informal control modes and mechanisms used by the controller (Jaworski 1988; Kirsch 1997).

Control portfolio configuration: Way in which control modes and amounts are combined to constitute the control portfolio.

Control style: Manner in which the interaction between the controller and the controllee is conducted; there are two basic control styles: authoritative and enabling (Adler and Borys 1996; Gregory et al. 2013; Gregory and Keil 2014).

Controllee: Target of control activities that are carried out by the controller (Choudhury and Sabherwal 2003; Kirsch 1996).

Controllee's knowledge: Breadth and scope of what the controllee knows about project-related topics including the business and technical domain, the information systems concerned, the project context, and the transformation process (Choudhury and Sabherwal 2003; Kirsch 1996, 1997).

Controller: Individual carrying out specific activities to regulate or adjust the behavior of the controllee (Kirsch 1996).

Controller's IS knowledge: Breadth and scope of what the controller knows about technical project aspects including the technical domain, the information systems concerned, and the transformation process (Kirsch 1996, 1997).

Enabling control style: Collaborative control style that is designed to encourage compliant controllee behavior, while also allowing the controllee to deal more effectively with contingencies (Adler and Borys 1996; Gregory and Keil 2014).

Evaluational congruence : Level of agreement between the controller and the controllee regarding the appropriateness of the enacted controls (Narayanaswamy et al. 2013).

Formal control: Type of control in which the controller attempts to influence controllee behaviors by making explicit prescriptions in writing or verbally; formal control modes include input, behavior, and outcome control (Jaworski 1988).

Informal control: Type of control in which the controller attempts to influence implicit determinants of controllee behaviors; informal control modes are clan and self-control (Jaworski 1988; Mähring 2002).

Input control: Mode of formal control that refers to the allocation and manipulation of human, financial, and material project resources (Jaworski 1988).

IS project performance: Control effectiveness measure that addresses whether an IS project is completed on time and within budget (*efficiency*) as well as meets user requirements and adheres to IS standards (*quality*) (Gopal and Gosain 2010).

IS project ambidexterity: Control effectiveness measure that combines an alignment dimension (i.e., project performance) with an adaptiveness dimension (Tiwana 2010).

Outcome control: Mode of formal control in which the controller focuses on the desired outputs (both interim and final) that the controllee should achieve (Kirsch 1997).

Outcome measurability: Key characteristic of the project task that refers to the extent to which the controller is able to assess whether the desired outputs are reached (Kirsch 1997).

Power: Ability to influence behavior, change courses of action, and make people do things they otherwise would not have done (Pfeffer 1992).

Power distance: Cultural value that describes the extent to which individuals accept unequal distribution of power in institutions and organizations (Hofstede 2001).

Repair: Feature of a control style that relates to the anticipation of breakdowns in control processes and the capabilities for fixing such breakdowns (Adler and Borys 1996).

Self-control: Mode of informal control in which the controllee defines both the specific goals and the actions required to achieve these goals (Henderson and Lee 1992).

Socio-emotional control consequences: Side effects of control activities on controllee satisfaction, motivation, etc. (Cram 2011).

Task complexity: Number, interdependency, and uncertainty of project subtasks (Kirsch and Cummings 1996).

Transparency: Feature of a control style that is concerned with the visibility of the control process and the overall project context (Adler and Borys 1996).

Trust in the controllee: Degree to which the controller believes that the controllee is honest, capable, and will not behave opportunistically (Rustagi et al. 2008).

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Appendix B

Distinction of Reviewed Studies Across Journals and Conferences (in Alphabetical Order)

Distribution of Reviewed Studies Across Journals and Conferences (in Alphabetical Order) ▮▮▮▮▮▮

Type	Name	# Studies
Journal	*Australasian Journal of Information Systems*	1
	Accounting, Management and Information Technologies (now *Information & Organization*)	1
	Business & Information Systems Engineering	1
	Decision Support Systems	1
	European Journal of Information Systems	4
	Information & Management	2
	Information and Software Technology	2
	International Journal of Accounting Information Systems	1
	International Journal of Project Management	2
	Information Systems Journal	3
	Information Systems Research	7
	Journal of Global Information Management	1
	Journal of Information Technology	2
	Journal of Management Information Systems	5
	Journal of Strategic Information Systems	1
	Journal of Systems and Software	1
	Management Information Systems Quarterly (*MIS Quarterly*)	2
	Management Science	2
	Organization Science	3
	Strategic Management Journal	2
Conference	Australasian Conference on Information Systems	1
	Americas Conference on Information Systems	2
	European Conference on Information Systems	2
	Hawaii International Conference on System Sciences	2
	International Conference on Information Systems	1
	Pacific Asia Conference on Information Systems	3
	Dissertation	2
	SUM	57

Appendix C

Reviewed Studies by Control Themes (in Alphabetical Order Within Each Theme) ■■■■■■

Reference	Methodology (Data Sample)	Project Context (Control Dyad(s))	Independent Variable/s (Moderating Variable(s))*	Dependent Variable/s (Mediating Variable(s))*	Key Findings
Theme 1: Control Choices (18 studies)					
Conboy (2010)	Case study (17 interviews in 4 projects in 1 organization)	Internal IS (senior manager–project manager)	IS context factors, IS method factors (na)	Tight budgetary control (na)	Factors that explain the extent of tight budgetary control in IS projects are context complexity, organizational culture, customer type, accounting staff's IS familiarity (context factors), developer involvement, process transparency, length of development iteration, and customer involvement (method factors).
Cram and Brohman (2013)	Case study (26 interviews in 4 organizations)	Internal IS (multiple)	IS development approach (waterfall vs. agile) (na)	Control objective, control practice (na)	New control typology helps differentiate waterfall and agile approaches on the basis of control objectives (process vs. product) and control practices (preventive vs. detective or corrective).
Dekker and Van den Abbeele (2010)	Survey (287 transactions between buyers and suppliers of IT)	IS outsourcing (buyer–supplier)	Focused partner search, partner experience (na)	BC, OC (Supplier information)	Partner search and experience facilitate learning and subsequent control design. Partner experience simultaneously reduces the need for control and the intensity of the partner search process. Thus, partner experience can have both complementary and substitutive effects on formal control.
Heumann et al. (2015)	Case study (30 interviews in single project)	Internal IS (senior management–project management–project team)	Task complexity, legitimacy concerns, performance considerations (na)	Formal control (BC, OC), control style (coercive, enabling)	Senior and project managers differ in their use of control style (coercive vs. enabling) but not in their use of control modes. Task complexity and legitimacy concerns caused senior managers to adopt an enabling control style. Actual and anticipated performance problems triggered temporary shifts to a coercive control style on the senior management level. Efficiency concerns led to a coercive control style on the project management level.
Kirsch (1996)	Survey (96 respondents of 32 projects)	Internal IS (IS manager–project leader; user contact–project leader)	Behavior observability, controller's knowledge of transformation process, outcome measurability (na)	BC, OC, CC, SC (na)	Behavior observability and the controller's IS knowledge determine the use of behavior control. Outcome control is a function of outcome measurability and behavior observability. Self-control is dependent on the extent to which outcomes are measurable and the controller is knowledgeable.

Reference	Methodology (Data Sample)	Project Context (Control Dyad(s))	Independent Variable/s (Moderating Variable(s))*	Dependent Variable/s (Mediating Variable(s))*	Key Findings
Kirsch (1997)	Case study (31 interviews in 4 projects in 4 organizations)	Internal IS (IS manager–project leader; user contact–project leader)	Availability of preexisting mechanisms, project-related knowledge and skills, task charac-teristics, role expectations (na)	BC, OC, CC, SC (na)	Project stakeholders typically implement a portfolio of formal and informal control modes. Constructing a control portfolio is a process that includes selecting appropriate preexisting formal control mechanisms, designing new formal mechanisms, and supplementing them with informal ones. Throughout this process, the choice of control mechanisms depends on task characteristics, role expectations, and project-related knowledge and skills.
Kirsch and Cummings (1996)	Multimethod (Survey: 68 respondents of 35 projects; Case study: 3 projects)	Internal IS (IS manager–project leader)	Organizational tenure, task com-plexity, formaliza-tion, hierarchical coordination (na)	SC (na)	IS project leaders' perceptions of self-control are highest when they have con-siderable job experience (organizational tenure), are able to further refine existing development procedures (formalization), and are involved in smaller, less-complex projects (task complexity).
Kirsch et al. (2010)	Survey (Matched data of 95 projects in 65 organiza-tions)	Internal IS (project manager–team members; project team)	Social capital, out-come measur-ability, behavior observability (Knowledge of the transformation process)	Team-based CC (na)	Social capital is associated with team-based clan control. Clan control also depends on the project manager's business and domain knowledge as well as the extent to which she observes the behaviors of the project team.
Kirsch et al. (2002)	Survey (Matched pairs of 69 projects in 32 organiza-tions)	Internal IS (client liaison–IS project leader)	Behavior observability, outcome measurability (Client's under-standing of the IS process)	BC, OC, CC, SC (na)	Client liaisons exercise behavior control if they are able to observe the relevant behaviors, or if they are knowledgeable about IS. Given high levels of behavior observability, less knowledgeable client liaisons are likely to rely on clan control.
Mao and Zhang (2008)	Case study (17 interviews in single project)	Internal IS (business experts/key users–IS developers)	User participation (na)	BC, OC (Behavior observability, controller's IS knowledge, outcome measurability)	Extensive user participation can change the antecedent conditions for adopting formal control (behavior observability, IS knowledge, and outcome measurability), and thus enable the exercise of strong control by user liaisons.
Mao, Zhang, and Song (2008)	Case study (17 interviews in single project)	Internal IS supplemented by outsourcing partners (project manager–project team)	Environmental maturity (na)	Project success (BC, OC, CC, SC)	Strong clan control and self-control help overcome problems arising from low IS (process) maturity. In a low maturity environment, effective outcome control can be achieved through extensive user participation by collocating domain experts with developers.

Reference	Methodology (Data Sample)	Project Context (Control Dyad(s))	Independent Variable/s (Moderating Variable(s))*	Dependent Variable/s (Mediating Variable(s))*	Key Findings
McBride (2008)	Structured interviews (32 interviews in 28 organiza-tions)	Internal IS (project manager–project team)	Organization size, organizational process maturity, project size, etc. (na)	IC, BC, OC, CC (na)	Project managers use multiple control mechanisms to achieve IS project objec-tives and use same mechanisms to serve multiple objectives. Control portfolios do not vary significantly over organizational and project-related attributes (e.g., maturity and size).
Nieminen and Lehtonen (2008)	Case study (20 interviews in 4 programs in 4 organizations)	Internal IS (program manager–project managers)	Industry sector, program phase and goals, organizational structure (na)	Bureaucratic control (BC, OC), CC, SC (na)	Control mechanisms act as complements rather than substitutes. The overall level of control varied significantly across programs (e.g., depending on the project managers' level of decision power).
Remus and Wiener (2012)	Soft-positivist case study (16 interviews in 12 projects)	IS offshoring (client–vendor)	Project size, project complexity, strategic importance (Project phase, quality problems, trust)	Amount of control (BC, OC, CC) (na)	Project size, complexity, and strategic importance increase the amount of formal control. Dynamics in control amounts are triggered by phase-specific onshore-offshore team ratios, emerging quality problems, and the development of trust between client and vendor.
Rustagi et al. (2008)	Survey (138 matched pairs in 8 projects)	IS outsourcing (client team–vendor team)	Task uncertainty, core competency, management knowledge, trust (na)	Amount of formal control (na)	Task uncertainty is positively associated with the amount of formal control. In contrast, clients who have technical or relationship management knowledge, or high trust in their vendor, use formal control to a lesser extent.
Soh et al. (2010)	Case study (36 interviews in single project)	Internal IS supplemented by implementing partners (project sponsors–project managers–users/consultants)	Project task, role expectations, IS knowledge (Stakeholder group)	BC, OC, CC (na)	Principal controller enacts separate controls for the user and consultant groups. Principal controller coexists with subordinate controllers. Controls enacted by subordinate controllers that cut across stakeholder groups require the support of the principal controller.
Van Fenema (2002)	Case study (18 and 19 interviews in 2 projects)	Geographically dispersed IS (multiple)	Global distributedness (na)	Coordination, control (Determinants, drivers)	Selection and pre-project socialization are essential in distributed projects. It appears challenging to monitor progress at a remote site since communications are less intense. A shift occurs toward a more formalized way of working. Control in offshore rela-tionships requires even more formalization.
Vlasic and Yetton (2004)	Historical case analysis (Australian construction industry)	na (na)	Environmental uncertainty (na)	Control effectiveness (IC, BC, OC)	Organizations in high uncertainty environ-ments should adopt input controls, while those in low uncertainty environments should adopt behavior and output controls.
Theme 2: Control Effects (32 studies)					
Basnet and Lane (2005)	Survey (635 respon-dents)	Open source IS (IS developers)	CC, SC (na)	Group effectiveness (na)	Clan control positively influences all three dimensions of group effectiveness (project output, group cohesion, and group member benefits). Self-control positively influences benefits obtained by group members.

Reference	Methodology (Data Sample)	Project Context (Control Dyad(s))	Independent Variable/s (Moderating Variable(s))*	Dependent Variable/s (Mediating Variable(s))*	Key Findings
Beck and Schott (2012)	Case study (25 interviews in 1 client and 3 vendor organizations)	Global IS outsourcing (client–vendor)	Formal control, informal control, interorganizational learning (project phase)	Cultural differences (na)	Formal control enables effective informal control and interorganizational learning. This interplay supports the mitigation of cultural differences through the harmonization of work-related values and practices.
Beimborn et al. (2009)	Survey (156 respondents)	IS outsourcing (client manager–vendor manager)	BC, OC (Service quality)	Relational trust (na)	Outcome control is positively related to the client's relational trust in the outsourcing vendor. Vendor reliability (responsiveness) substitutes (complements) the trust effect of outcome control by performance reports.
Chua et al. (2012)	Longitudinal case study (79 interviews in single project)	Internal IS supplemented by consultants and software vendors (corporate management–project team)	CC (Formal authority)	Project success (na)	Enactment of clan control is a dual process of building the clan by developing its social capital dimensions, as well as leveraging the clan by reinforcing project-facilitating shared norms and values and by inhibiting those that impede the achievement of project goals. The controller's formal authority plays a critical role in enabling the enactment of clan control.
Du et al. (2007)	Experiment (258 participants)	Internal IS and IS offshoring (project manager–team members)	Risk assessment tool, expertise, perceived control (na)	Risk perception, decision making (na)	Use of a risk assessment tool and a low degree of perceived control (offshore context) result in high risk perception and more risk-averse decision making. Expertise influences risk perception but not decision making.
Gallivan (2001)	Secondary case analysis (9 case studies)	Open source IS (IS developers)	Control (na)	Group effectiveness (Trust)	Trust and control may operate independently of each other to shape behaviors, and to determine group effectiveness in open source IS. Such projects appear to rely on explicit (e.g., rules and norms stated in FAQs) and implicit forms of social and self-control to a much greater degree than on trust.
Gopal and Gosain (2010)	Survey (96 projects in 10 organizations)	IS offshoring (client manager–vendor manager)	BC, OC, CC (Boundary spanning)	Project performance (efficiency vs. quality) (na)	Behavior control and efficiency-based outcome control positively affect project efficiency, but not project quality; quality-based outcome control and collaborative culture provide mixed benefits by enhancing project quality but reducing efficiency; boundary-spanning activities improve formal control effectiveness.
Grabski and Leech (2007)	Survey (33 CIOs and 35 auditors)	Internal IS (multiple)	ERP implementation controls (BC, OC, CC, SC) (na)	ERP implementation success (na)	In ERP implementation projects, a mix of overlapping and redundant control mechanisms is used. Complementary controls need to be employed in the implementation of an ERP system to achieve project success.

Reference	Methodology (Data Sample)	Project Context (Control Dyad(s))	Independent Variable/s (Moderating Variable(s))*	Dependent Variable/s (Mediating Variable(s))*	Key Findings
Gregory and Keil (2014)	Case study (39 interviews in single project)	Internal IS (project manager–subproject managers and team members)	Management style (bureaucratic, collaborative) (na)	Control and project ambidexterity (na)	IS project managers draw upon two contrasting management styles (bureaucratic and collaborative) to achieve project ambidexterity. One way to reach ambidexterity is through a tandem of project managers.
Guinan and Faraj (1998)	Survey (182 respondents of 57 projects in 15 organizations)	Internal IS (client and IS senior managers–IS design team)	Team SC, managerial expertise, team communication (na)	Team performance (Task ambiguity, role ambiguity)	Team performance is associated with decreased levels of role and task ambiguity. An increase in team self-control leads to a decrease in task ambiguity, which in turn increases team performance. Self-control is not directly linked to performance.
Harris et al. (2009)	Case study (18 interviews in 5 project teams in 2 organizations)	Internal IS (managers–IS developers)	Market uncertainty, technology uncertainty (see above)	Product-market match (IS development approach)	Under market and technology uncertainty, a controlled-flexible approach can be used to achieve software product-market match. This approach uses traditional control modes and a new mode called emergent outcome control.
Henderson and Lee (1992)	Survey (310 respondents of 48 projects in 10 organizations)	Internal IS (project manager–team members; project team)	Managerial BC, OC, team-member OC, SC (na)	Team performance (na)	High-performing IS design teams exhibit high behavior control by the project manager and high outcome control by the team members. Increases in the total level of control are positively correlated with team performance.
Keil et al. (2013)	Survey (63 respondents)	Internal IS (user liaison–project team)	Formal and informal control (User risk, requirements risk)	Process performance (na)	Formal and informal control has a positive and significant effect on process performance. User and requirements risks suppress the effectiveness of formal and informal controls.
Liu et al. (2008)	Survey (212 respondents)	Internal IS (management–IS developers)	Software process standardization (BC) (na)	Project performance (Software flexibility)	Behavior control implemented through process standardization leads to an improvement in software flexibility and project performance. In turn, flexibility mediates the relation between standardization and performance.
Liu et al. (2010)	Survey (205 respondents)	Internal IS (senior and IS managers–project team)	BC, OC, user contribution (na)	Project management performance (Team's task completion competency)	Formal management control and user contribution are directly and positively related to project management performance. Project team's task completion competency is a dominant mediator for user contribution only.
Mao, Lee, and Deng (2008)	Survey (110 respondents of 110 projects in 9 organizations)	IS offshoring (client manager–vendor project manager)	Goal setting (OC), cultural blending (CC), etc. (na)	Performance (project quality, cost control) (Trust, control)	While trust has a significant, positive effect on project quality, control has a positive effect on cost adherence. Goal setting and cultural blending significantly increase the client's control over the offshore vendor.
Maruping et al. (2009)	Survey (862 respondents of 110 projects in 1 organization)	Internal IS (project manager–IS project team)	Agile methodology use (Requirements change, OC, SC)	Software project quality (na)	Use of agile methodology and outcome control have a positive effect on project quality. Agile methodology use is (in)effective in enhancing project quality when (self-control) outcome control and requirements change are high.

Reference	Methodology (Data Sample)	Project Context (Control Dyad(s))	Independent Variable/s (Moderating Variable(s))*	Dependent Variable/s (Mediating Variable(s))*	Key Findings
Narayanaswamy et al. (2013)	Survey (113 matched pairs in 109 organizations)	Internal IS (project manager–team members)	Influence tactics (communicational and perceptual congruence) (na)	Control loss (na)	Communicational and perceptual (evaluational) congruence between the controller and the controllee minimize control loss, which in turn is adversely related to IS project performance.
Nidumolu and Subramani (2003)	Survey (56 respondents in 56 organizations)	Internal IS (IS manager–project team)	Method control (BC), OC (Decentralization, standardization)	Competitive performance (Process performance)	IS process performance is enhanced by establishing uniform performance criteria (standardization) while giving each project team the authority to decide on methods (decentralization).
Persson et al. (2011)	Case study (10 observations and 11 interviews in single project)	IS nearshoring joint venture (multiple)	Formal and informal control (Agile methodology, mediated communication)	Project success (na)	Formal and informal control (such as clan-like control inherent in agile development) can be enacted through mediated communication.
Prifling et al. (2008)	Interpretive case study (15 interviews in single project)	IS offshoring (client–vendor)	BC, OC (na)	Project success (Cross-cultural differences)	Three project management techniques help overcome cross-cultural differences, thereby increasing success chances. Outcome control is more effective than behavior control in offshore contexts.
Srivastava and Teo (2012)	Survey (160 projects from 8 Indian vendors)	IS offshoring (client–vendor)	Contract specificity, relational governance (Mechanistic governance, i.e., formal control)	Cost performance, quality performance (na)	Formal control complements the positive effect of contract specificity on both cost and quality performance of offshored IS projects. In contrast, formal control substitutes the impact of relational governance on cost performance.
Tiwana (2008)	Survey (120 respondents in 120 firms)	IS offshoring (client–vendor project manager)	BC, OC (Technological modularity)	Alliance performance (na)	Behavior control, outcome control, and technological modularity enhance IS project performance. Technological modularity substitutes only for behavior control.
Tiwana (2010)	Survey (120 projects in 120 organizations)	IS offshoring (client manager–vendor project manager)	BC, OC (CC)	IS ambidexterity (alignment, adaptiveness) (na)	Behavior control increases, clan control decreases, and outcome control does not influence IS ambidexterity. Clan control strengthens the influence of behavior control on ambidexterity (complement) but weakens the influence of outcome control (substitute).
Tiwana and Keil (2007)	Survey (59 respondents in 59 organizations)	IS outsourcing (client manager–vendor manager)	BC, OC (Peripheral knowledge)	Alliance performance (na)	While peripheral knowledge enhances IS project performance, neither behavior nor outcome control independently influences performance. Peripheral knowledge complements only outcome control.
Tiwana and Keil (2009)	Survey (136 projects in 136 organizations)	Internal IS and IS outsourcing (client department–IT department; client–vendor)	BC, OC, CC, SC (Requirements volatility)	IS performance (na)	Controllers make greater use of control in outsourced projects relative to internal projects. Behavior and self-control enhance performance in internal projects but not in outsourced projects.

Reference	Methodology (Data Sample)	Project Context (Control Dyad(s))	Independent Variable/s (Moderating Variable(s))*	Dependent Variable/s (Mediating Variable(s))*	Key Findings
Wang et al. (2008)	Survey (212 respon-dents)	Internal IS (senior and IS managers–project team)	Change control, BC, OC (na)	Project performance (Software flexibility)	Formal management control is positively associated with IS project performance. Control facilitates software flexibility, which in turn enhances performance.
Wang et al. (2006)	Survey (196 respondents)	Internal IS (senior and IS managers–project team)	BC, OC (na)	Project performance (User-IS personnel interaction)	Formal control is positively related to both user-IS personnel interaction and IS project performance. User-IS personnel interaction increases project performance.
Wiener et al. (2012)	Survey (46 projects from 16 client firms)	IS offshoring (client manager–vendor project manager)	Clan control (BC, OC)	Project performance (na)	Clan control in combination with outcome control positively influences offshore project performance. By contrast, the exercise of clan control alone does not increase performance.
Wiener et al. (2015)	Survey (86 matched pairs from 86 projects)	IS offshoring (client manager–vendor project manager)	Informal control given (CC, SC) (Formal control, national cultural values, project context factors)	Project performance (efficiency, quality) (Informal control received)	While clan control is more difficult to promote than self-control in offshore rela-tionships, only the successful promotion of clan control has a positive impact on performance. Formal control modes, national cultural values, and project context factors moderate the promotion and the effectiveness of informal controls.
Yadav et al. (2007)	Quasi-experiment (102 respon-dents of 16 project teams)	Globally distributed requirements analysis (users–analysts)	Project monitoring/control, project communication, process facilitation (na)	Project success (Communication effectiveness)	Project control positively influences both communication effectiveness and IS pro-ject success. Process facilitation results in greater communication effectiveness, which in turn significantly affects project success.
Zhang et al. (2007)	Longitudinal case study (40 interviews in 4 projects in 1 organization)	Globally distributed IS (project manager–team members; project team)	Informal control (CC) (Formal control, cultural training, relationship building, social interactions and brokers)	Effectiveness of formal control (na)	In distributed IS, formal controls need to be complemented with informal controls, thereby improving the effectiveness of formal controls. Cultural training, personal relationship building as well as social brokers and interactions promote the use of clan controls.
Theme 3: Control Dynamics (7 studies)					
Choudhury and Sabherwal (2003)	Case study (25 interviews in 5 projects)	IS outsourcing and offshoring (client–vendor)	Encounters (na)	BC, OC, CC, SC (Role expectations, IS and domain knowledge, behavior observability)	Initial control portfolios in IS outsourcing projects are dominated by outcome controls. Behavior and self-controls are often added later. The most important influencing factors are the client's percep-tion of the controllee's IS knowledge, consequent role expectations, perceptions of difficulty in monitoring vendor behavior, and vendor performance.

Reference	Methodology (Data Sample)	Project Context (Control Dyad(s))	Independent Variable/s (Moderating Variable(s))*	Dependent Variable/s (Mediating Variable(s))*	Key Findings
Gregory et al. (2013)	Interpretive case study (56 interviews in single project)	IS offshoring (client–vendor)	Shared understanding, client expectations (na)	Client–vendor relationship, project performance (Control balancing in terms of control types, degree, and style)	Balancing control configurations in terms of control type, degree, and style allows the IS offshoring project and relationship to progress. Three control configurations are identified: authoritative, coordinated, and trust-based control. Control balancing is highly intertwined with the development of shared client–vendor understanding.
Heiskanen et al. (2008)	Longitudinal case study (Single project)	IS outsourcing (client–vendor)	Encounters (na)	IS process (Control, trust)	Outsourcing clients exercise trust and control differently during different project episodes. Clients increase control as much as possible within the contract when realizing problems with vendor deliverables.
Kirsch (2004)	Soft-positivist case study (20 interviews in 2 projects in 2 organizations)	Internal IS (senior and IS managers–project managers–team members)	Project context, stakeholder context, global context (Project phase)	Project outcomes (BC, OC, CC)	Control is exercised differently for each project phase: initially, controllers use mostly informal controls as "collective sensemaking"; during development, managers rely extensively on formal controls for "technical winnowing"; in the implementation phase, IS and business stakeholders employ controls as "collaborative coordinating". Control dynamics are triggered by changes in the project, stakeholder, and global contexts, and surfacing problems.
Mähring (2002)	Interpretive case study (31 interviews in single project)	Internal IS (steering committee–project manager)	Task complexity, behavior observability, outcome measurability, preexisting mechanisms, task and domain knowledge (Learning, trust building)	IC, BC, OC, CC, SC (na)	Controllers shape control activities based on preexisting mechanisms and under influence from organizational context. Task uncertainty and complexity as well as lack of controller domain knowledge create adverse conditions for control. Controllers use input control, evolving trust, and collective sensemaking to cope with unfamiliar control tasks.
Prifling et al. (2009)	Interpretive case study (31 interviews in single project)	IS offshoring (client–vendor)	Mutual expectations (na)	BC, OC, CC (Psychological contracts)	Factors influencing control choices can be understood as psychological contracts that are established, sharpened, and changed by incidents (e.g., unfulfilled expectations) occurring during the course of an IS project.
Susilo et al. (2007)	Case study (6 projects in 3 organizations)	Internal IS and IS outsourcing (project manager–team members)	Task uncertainty (Project phase)	Project outcomes (Formal control, informal control)	While formal controls are used for project tasks with clearly defined requirements, informal controls are mainly used for uncertain tasks. Formal controls are dominant at project initiation but often become less dominant over the project course. Informal controls help ensure reaching desired project outcomes.

*Abbreviations used in the table: input control (IC), behavior control (BC), outome control (OC), clan control (CC), and self-control (SC).

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