

Moving IS Project Control Research into the Digital Era: The ‘Why’ of Control and the Concept of Control Purpose

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Online Appendices A-B

Online Appendix A: Secondary Case Analysis (Methodology)

To evaluate the concept of control purpose, we considered the 57 articles included in a recent review of the IS project control literature (Wiener et al. 2016). We then employed secondary case analysis, which refers to using pre-existing case data and their associated analysis as primary data to generate new insights or theory (Hanson 2010). Here, in line with the approach used by Gallivan (2001), we defined a list of selection criteria and chose an appropriate content-analysis approach.

Two main criteria were applied to select the articles to be included in the secondary case analysis: First, we limited our sample to qualitative (case) research. This criterion enabled us to develop a more detailed understanding of the described IS project controls and the context in which they were used, and therefore to carefully map value-appropriation concerns and value-creation requirements onto the reported study results. Second, the articles needed to contain empirical data and original analysis; that is, the authors themselves must have studied the control of one or more IS projects. On this basis, we finally selected 21 publications (17 journal articles and four conference papers) for inclusion in our analysis. The publications span a time period of almost 20 years (1996-2014). Thirteen of them examine internal IS projects and eight examine (offshore) outsourced projects.

To analyze the theoretical focus of the selected articles and the case studies included in these articles, we used the software *NVivo*. We first analyzed each article in terms of how it defines control. Next, two members of the author team thoroughly read the case-context (if applicable) and case-results sections of each article in an iterative manner to identify statements and interview quotes that explicitly or implicitly refer to manifestations of controls targeted at value-appropriation concerns or value-creation requirements (see Table A1 for coding examples). In this process, we attached conceptual labels to relevant text passages by using an initial coding scheme. To define this scheme, we drew on key concepts of agency theory, such as goal incongruence and information asymmetry (value-appropriation concerns), as well as on concepts related to stewardship theory, such as cooperation and knowledge exchange (value-creation requirements). In particular, we searched for case data that enabled us to relate a given control purpose to the use of specific controls (see “Control Mode(s)” in Table A1). Especially in the first iterations of the data-analysis process, we applied a traditional form of content analysis, whereby we approached the collected data with predefined concepts and searched for text passages that embodied these concepts (Andren 1981, Gallivan 2001). During the data analysis, we iteratively refined and extended our initial coding scheme by codes that emerged from our line-by-line coding in order to remain open to uncover new phenomena (Eisenhardt 1989).

Preliminary coding results were repeatedly discussed with other members of the author team to develop a shared understanding and resolve ambiguities. Through these discussions, we developed a consensus view of the coding results. Here, the authors alternated between constructive and critical positions (Eisenhardt 1989), which helped consolidate the coding scheme and ensure that the codes were applied consistently across the case data. In addition, one member of the author team (not involved in the previous coding) independently coded a subset

of four articles—two on internal and outsourced IS projects each—from the 21 articles (19%). Inter-rater reliability was high as indicated by a kappa value of 0.728. According to Landis and Koch (1977), kappa values within the range from 0.61 to 0.80 are considered “substantial agreement” (p. 165).

Table A1. Coding Examples

Reference	Quote	Control Purpose (Code)	Control Mode(s)
Kirsch (2004, p. 383)	The IS Managing Director provides another example: “I typically do the walk around management style and check up with people, both the checking up from a technical standpoint and also checking up from a user standpoint, the user liaison, to get their feelings on how they feel that things are progressing.”	Value appropriation (Information asymmetry)	Behavior control, Clan control
Choudhury and Sabherwal (2003, p. 307)	“It was at that point we realized we were in trouble and we started getting into our daily meetings and tight control over everything that was happening and working with them, very closely monitoring them.” [IS project manager] ...none of the software would pass the test the first time around. To overcome this problem, [the] IS director called [the vendor’s] president to encourage better self-control (especially in terms of testing)...	Value appropriation (Performance problems, Moral hazard)	Formal control, Self-control
Chua et al. (2012, p. 589)	Unlike the earlier appointment, this “screening and interview process was conducted by both the vendor and corporate management, who emphasized ‘ability to fit’ in the hiring interview.” [Project manager]	Value appropriation (Adverse selection)	Clan control
Heumann et al. (2015, p. 343)	“The release manager must coordinate with each team leader. For example, if he says the time frame [for the next delivery] is three months then he would ask us how the different work packages were connected and whether delivery in time was possible at all.” [Team leader infrastructure]	Value creation (Coordination, Task interdependencies)	Outcome control
Kirsch (2004, p. 386)	...to facilitate cooperation and coordination among stakeholders, formal plans and policies were put in place: “The control is your project plan. You know, making sure that you have got a well thought-out, detailed plan, by country, because all the steps, the resources assigned, who’s doing what to whom, and you know what your fallback position is if somebody slips” [Global implementation manager]	Value creation (Cooperation, Task interdependencies)	Behavior control
Gregory et al. (2013, p. 1219)	“We asked ourselves the question: How can we bring the team up to speed early on [...] One of the things we discussed was that we needed joint workshops in the beginning to establish common understanding, a joint working model, and deal with cultural differences.” [Client chief architect]	Value creation (Knowledge exchange, Cooperation)	Behavior control, Clan control

Online Appendix B: Secondary Case Analysis (Results)

Table B1 reports the definitions of control stated in the 21 analyzed articles and classifies the definitions after underlying view of control (agency vs. stewardship theory).

Table B1. Definitions of Control in Analyzed Articles

Reference	Control Definition (emphasis added)	Underlying View
Beck and Schott (2012)	No definition provided.	NA
Choudhury and Sabherwal (2003)	"This paper views control broadly, in a behavioral sense (Jaworski 1988, Kirsch 1996, 1997), as attempting to ensure individuals act in a manner that is <i>consistent</i> with achieving desired objectives." (p. 292)	Agency theory
Chua et al. (2012)	"A portfolio of controls comprising formal and informal controls is needed to <i>align</i> the efforts of stakeholders." (p. 577-578)	Agency theory
Conboy (2010)	"...control is exerted over the three main axes of project management, namely <i>time, cost and scope</i> ." (p. 274)	Agency theory
Cram and Brohman (2013)	"...control refers to the process used to influence project stakeholders [...] to behave in a way that is <i>consistent</i> with the achievement of project and organisational goals." (p. 137)	Agency theory
Gregory et al. (2013)	"In order for organizations, including temporary organizations such as projects, to achieve their objectives, some type of strategy must be implemented that 'effectively controls members' activities in a manner <i>functional</i> for the organization' (Barker 1993, p. 409)." (p. 1212)	Agency theory
Gregory and Keil (2014)	"...control is viewed from a behavioural perspective as an attempt to motivate individuals to act in a way that is <i>consistent</i> with organizational goals and objectives (Kirsch, 1996)." (p. 344)	Agency theory
Harris et al. (2009)	"...controls to ensure that team decisions are <i>congruent</i> with organizational objectives." (p. 401)	Agency theory
Heiskanen et al. (2008)	"...establishing control mechanisms makes the attainment of desirable outcomes more probable and <i>reduces the level of risks</i> " (p. 269)	Agency theory
Heumann et al. (2015)	"...control is defined as 'attempts to ensure that individuals working on organizational projects <i>act according to</i> an agreed-upon strategy to achieve desired objectives' (Kirsch, 1996: 1)." (p. 338)	Agency theory
Kirsch (1997)	"Exercising control is one powerful approach that managers can use to <i>ensure progress by fusing together</i> the complementary roles and capabilities of [IS] project participants, motivating individuals to <i>work in accordance with</i> organizational goals and objectives." (p. 215)	Agency and stewardship theory
Kirsch (2004)	"...control, which is viewed broadly to mean any attempt to motivate individuals to behave in a manner <i>consistent</i> with organizational objectives" (p. 374)	Agency theory
Kirsch and Cummings (1996)	"...exercise of control: that is, a manager attempts to guide the project team to act in a manner that is conducive to organizational goals and objectives to <i>ensure</i> that the resulting system meets the needs of the organization." (p. 191)	Agency theory
Mao et al. (2008)	"Control refers to actions taken to <i>regulate or adjust</i> the behavior of the controllee (Kirsch 1996)." (p. 2)	Agency theory

McBride (2008)	"Project [control] is the gathering of information to determine the current state and progress of the project <i>in relation to its expected state and progress</i> " (p. 2386)	Agency theory
Persson et al. (2011)	"Control is used broadly to denote any attempt to motivate individuals to behave in a manner <i>consistent</i> with organisational objectives (Ouchi, 1979, Kirsch, 2004)." (p. 4)	Agency theory
Prifling et al. (2008)	No definition provided.	NA
Prifling et al. (2009)	No definition provided.	NA
Remus and Wiener (2012)	"This view implies that when a controller exercises control over a controllee, the controller is taking some action to <i>regulate or adjust</i> the behavior of the controllee (Kirsch, 1996)." (p. 3)	Agency theory
Soh et al. (2010)	"...a controller (e.g., the project manager) applies a portfolio of controls on controllees (e.g., the project team members) to <i>ensure</i> the achievement of project goals (Kirsch, 1996, 1997)." (p. 16)	Agency theory
Zhang et al. (2007)	"Control, a tool for managing projects, is a set of mechanisms that is used by management to motivate team members to behave in a manner that is <i>consistent</i> with organizational norms and project requirements (Choudhury & Sabherwal 2003)." (p. 2)	Agency theory
Note: References listed in alphabetical order.		

Table B2 summarizes the manifestations of value-appropriation concerns (e.g., goal incongruence) and value-creation requirements (e.g., task interdependencies) identified in the analyzed case studies.

Table B2. Empirical Manifestations of Different Control Purposes in Analyzed Articles

Reference IS project type	Manifestations of Value-Appropriation Concerns	Manifestations of Value-Creation Requirements
Beck and Schott (2012) Outsourced (global)	Goal incongruence (divergent values), Information asymmetry (project progress), Performance problems, Moral hazard (bargaining behavior)	Task interdependencies, Inter-vendor cooperation, Knowledge exchange (joint reflection, inter-organizational learning)
Choudhury and Sabherwal (2003) Outsourced (partly offshore)	Performance concerns and problems (quality and time), Information asymmetry (difficulty in monitoring vendor behavior), Adverse selection (project manager), Moral hazard (software testing)	Collaboration (system showcase), Knowledge transfer (testing procedures), Task complexity
Chua et al. (2012) Internal	Performance concerns and problems (quality), Goal incongruence, Adverse selection (primary vendor manager, uncooperative consultants)	Task complexity and uncertainty, Transfer of domain knowledge, Knowledge exchange (between business unit representatives and consultants), Cooperation
Conboy (2010) Internal	Performance concerns and problems (budget), Moral hazard	Task complexity (context)

Cram and Brohman (2013) Internal	Information asymmetry (project cost and progress), Performance concerns (scope creep)	Task interdependencies, complexity, and uncertainty (via agile development approach), Knowledge exchange (between developers)
Gregory et al. (2013) Outsourced (offshore)	Performance problems (quality and time), Goal incongruence (divergent expectations), Information asymmetry (project status and vendor processes)	Cooperation (in various phases), Knowledge exchange, Task complexity (testing process), Transfer of business-functional knowledge
Gregory and Keil (2014) Internal	Information asymmetry (transparency of project progress), Performance concerns and problems, Goal incongruence	Task interdependencies, Knowledge exchange, Participation, Collaboration
Harris et al. (2009) Internal	Performance concerns (bounded scope, quality, time pressure)	Cooperation (of development units), Task complexity and uncertainty, Participation (agile development approach)
Heiskanen et al. (2008) Outsourced	Performance problems (time, quality), Moral hazard (opportunistic behavior)	Cooperation
Heumann et al. (2015) Internal	Information asymmetry (across hierarchical levels), Moral hazard (team member shirking), Performance concerns (efficiency), Performance problems	Task complexity, Task interdependencies, Coordination (among managers and team leaders), Knowledge exchange and transfer (local and global transparency)
Kirsch (1997) Internal	Goal incongruence (different expectations), Information asymmetry (project progress), Performance concerns (danger of missing deadlines)	Knowledge exchange, Cooperation (among remotely located team members), Participation, Task interdependencies (interrelated project)
Kirsch (2004) Internal (globally distributed)	Information asymmetry (progress), Goal incongruence (lack of commitment), Moral hazard (accountabilities and responsibilities), Performance problems (local vs. global requirements), Adverse selection	Cooperation and collaboration, Participation (user), Knowledge transfer (domain knowledge), Task complexity (project/software scope), Task interdependencies (between project phases)
Kirsch and Cummings (1996) Internal	Performance concerns and problems (quality and time), Information asymmetry (performance evaluation)	Task complexity, Coordination (by progress reports and informal communication)
Mao et al. (2008) Internal	Performance problems (time issues), Moral hazard (power struggle and internal conflicts), Adverse selection (developers)	Knowledge exchange (mutual learning), Transfer of domain knowledge, User participation
McBride (2008) Internal	Information asymmetry (project "health"), Performance problems and concerns	Task complexity (breakdown of work tasks), Cooperation
Persson et al. (2011) Outsourced (nearshore)	Goal incongruence (divergent expectations), Information asymmetry (assess project progress through co-mapping tool), Performance problems (in prioritizing features)	Task interdependencies (mutual dependence), Knowledge exchange (discussions)
Prifling et al. (2008) Outsourced (offshore)	Performance problems (with project implementation), Moral hazard (risk and conflict avoidance attitude), Goal incongruence (between client and vendor), Information asymmetry (performance)	Knowledge transfer (from client to vendor), Coordination (of work)

Prifling et al. (2009) Outsourced (offshore)	Performance concerns (quality), Goal incongruence (mismatch in client-vendor expectations), Adverse selection (risk), Moral hazard (accusation of vendor)	Task complexity (breakdown of workload, equal work split), Cooperation (joint development), Knowledge transfer (from client to vendor), Task interdependencies
Remus and Wiener (2012) Outsourced (offshore)	Moral hazard (perceived threat of opportunism, miscommunication), Performance problems (quality)	Task complexity and uncertainty, Cooperation (between onshore and offshore vendor teams)
Soh et al. (2010) Internal	Information asymmetry (work practices), Performance concerns and problems, Adverse selection (primary implementation partner manager), Moral hazard (insufficient responsiveness of users)	Cooperation (among stakeholder groups), Knowledge sharing (among stakeholders)
Zhang et al. (2007) Internal (globally distributed)	Moral hazard (distrust), Performance problems, Information asymmetry, Goal incongruence	NA
Note: References listed in alphabetical order.		

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¹ Articles included in secondary case analysis are marked with an asterisk (*).

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