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Title	Project failure en masse: a study of loose budgetary control in ISD projects
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Publication Date	2010-05-18
Publication information	Conboy, K. Project failure en masse: a study of loose budgetary control in ISD projects. Eur J Inf Syst, 19(3), 273-287
Publisher	Palgrave Macmillan
Item record	http://hdl.handle.net/10379/1368



Project failure *en masse*: a study of loose budgetary control in ISD projects

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Abstract

This paper investigates the tightness of budgetary control over projects in a large systems development multinational. This represents a case of extreme information systems development (ISD) failure *en masse*, where all but two of the 22 projects in a business unit went over budget, causing senior executives to refocus their strategic priorities and cancel all current and potential projects that followed. This study focuses specifically on the two best performing (12 and 4% under budget) and worst performing (223 and 320% over budget) of these projects. Using a framework drawn from control systems theory, this study examines the 'tightness' of budgetary control exerted over each project, and what was done or could have been done to avert such failure. The study then identifies a set of emerging factors affecting tight budgetary control in ISD.

European Journal of Information Systems advance online publication, 18 May 2010; doi:10.1057/ejis.2010.7

Keywords: budgeting; system development; control; project management

Introduction

It is well known that the majority of information systems development (ISD) projects run drastically over-budget or fail altogether. Various studies have found that between 40 and 60% of ISD projects fails to meet budget estimates and that the degree of overspend can exceed 200% (Whittaker, 1999; Keil *et al.*, 2000; Robey & Keil, 2001; Chiang & Mookerjee, 2004; Goldfinch, 2007; Bartis & Mitev, 2008). There is no reason to suggest that this trend is improving. Such failures are not restricted to certain industry sectors or project types; rather they occur with some regularity in systems development projects and organizations of all types and sizes (Ewusi-Mensah, 2001; Park *et al.*, 2008) in both the private and public sector (Whittaker, 1999; Goldfinch, 2007).

Despite the fact that overspending is such a concern, little research has focused specifically on how budgeting or other general management accounting techniques are being used in ISD. An analysis of the relevant ISD literature shows that blame is attributed to the developers, managers or customers; the development method or process was flawed, inappropriate or obsolete; the team were not managed, directed and monitored sufficiently; or requirements were poorly elicited because the customers did not know their own business. Rarely if ever is the budget target itself ever questioned. Studies that highlight these disastrous overruns provide little or no information on how the budget was set, how it was communicated, whether it was attainable, how adherence to the budget was monitored and controlled, or how it was integrated into the performance evaluation and reward functions of the project or organization. In particular, attention has not focused on the tightness of budgetary control

Received: 12 May 2009
Revised: 17 September 2009
2nd Revision: 1 December 2009
3rd Revision: 12 January 2010
4th Revision: 18 January 2010
Accepted: 19 January 2010

over ISD projects, which is somewhat surprising given the prevalence of unacceptable budgetary performance throughout the field.

Given that there has been little research on budgetary control in ISD projects, and none specifically on the tightness of these controls, this study sought to identify the ISD factors that explain the degree to which tight budgetary control is applied in ISD projects. Factors in the context of this study refers to the characteristics, practices and structures of an organization or team, or the characteristics of individuals in those organizations or teams which may impact the ability to apply tight budgetary control. The objective of this research is thus *to investigate and identify the ISD factors that explain the degree to which tight budgetary control is applied in ISD projects.*

The next sections of the paper summarize the pertinent literature and describe the theoretical basis and research approach adopted in this study. The findings from four 'revealing' case studies are then presented and discussed, and through further analysis, the emerging set of factors affecting tight budgetary control is presented. The paper concludes with a discussion of the implications of the study and possible avenues for future research.

Managing ISD projects

Project management control

According to one of the seminal texts on management control, the concept of control itself is probably 'one of the most ill-defined in the English language' (Emmanuel *et al.*, 1990). Many others have noted the inconsistency and ambiguity associated with the term (Merchant, 1985; Merchant, 1998), none more so than Rathe (1960) who identified 57 variants at a time when management control was said to be a relatively simple concept. The importance of effective project control has been highlighted, both in general (Cicmil, 1997; Avison *et al.*, 2001; Rozenes *et al.*, 2006), and specifically in ISD projects (Henderson & Lee, 1992; Kirsch, 1997; Whittaker, 1999; Schmit *et al.*, 2001; Kirsch *et al.*, 2002; Choudhury & Sabherwal, 2003; Chiang & Mookerjee, 2004; Chow & Cao, 2008), and has been shown to 'play a major role as the cause of project failures' (De Falco & Macchiaroli, 1998).

There are many ways to implement project control, and most use a combination of many input-oriented, process-oriented and output-oriented controls also referred to by Merchant (1998) as result, action and personnel controls. The focus of the control also varies, and is almost always multi-dimensional (Rozenes *et al.*, 2006). In most projects, control is exerted over the three main axes of project management, namely time, cost and scope. While this is not applicable in every industry and project type, this is inevitably the case where ISD projects are concerned (DeMarco, 1982; Jurison, 1999; Chapman & Ward, 2002). The three are inexorably intertwined, and an impact on one usually has an impact on the others. However, cost is often regarded as the most important

and powerful control system in most organizations and projects (Merchant, 1981, 1985, 1998; Armstrong *et al.*, 1996; Ekholm & Wallin, 2000; van der Stede, 2001). Given the prevalence of poor budgetary performance in ISD projects as discussed earlier, the remainder of this paper focuses largely on this one aspect of control; however issues regarding scope and schedule are inexorably linked to cost and it is impossible to consider one without giving some consideration to the impact the others may have. Therefore the other aspects of control are referred to where appropriate.

Measuring 'tight budgetary control'

Van der Stede (2001) highlights a general lack of agreement as to what defines and constitutes 'tight budgetary control'. His study identifies one of the earliest, and at the time most commonly used interpretations of the term (Merchant, 1985), and then illustrates how subsequent research adapted and extended it (Simons, 1995; Anthony & Govindarajan, 1998; Merchant, 1998). He contributes to the literature by constructing a measurement instrument to capture tight budgetary control. His original research instrument contained five subcomponents, namely *low tolerance for interim budget deviations*, *line item control*, *intensity of budget-related communication*, *emphasis on meeting the budget*, and *level of tolerance for budget revisions during the year*. While he found that the first four were all indicative of tight budgetary control, he found no support for the level of tolerance for budget revisions during the year.

- *Tolerance for interim budget deviations*: In a loose control environment, corporate management do not routinely inspect deviations at all, or do so only if there is 'something clearly amiss' (van der Stede, 2001). In a very tightly controlled environment, a deviation immediately triggers corporate reviews or other forms of intervention, and the manager is often required to report the causes of the deviation and the corrective action taken.
- *Line item control*: In some cases, senior management only analyze adherence to the overall budget, commonly referred to as the 'bottom-line' figure. This gives the manager a lot of freedom as they can offset positive and negative line-item variances but still achieve the overall budget target. If tighter control is exerted, a manager may be required to submit line-by-line deviation reports, and their performance evaluation may take these more detailed variances into account.
- *Intensity of budget-related communication*: This attribute of tight budgetary control covers a range of issues. Contributing items listed by van der Stede include (i) high frequency of budget-related communication between manager and corporate superiors; (ii) face-to-face meetings between manager and corporate representatives; (iii) the formation of a team to discuss budget matters comprising the manager, the manager's corporate superiors, and the manager's sub-ordinates;

(iv) budget-related communication regardless of whether there is no negative deviations; and (v) consultation between manager and superiors as to ways of achieving the budget.

- *Emphasis on meeting the budget*: This attribute considers the importance corporate superiors attach to meeting the budget. Contributing items, van der Stede suggest, include the extent to which the manager's performance and promotion prospects are judged on meeting the budget, and the extent to which meeting the budget equates to success. In addition, a key item of budget emphasis is the extent to which superiors consider meeting short-term budgets essential.

There were a number of reasons for basing this study on van der Stede's interpretation and measure of tight budgetary control. Firstly, other studies of budgetary control measures tend to focus at an operational level or certainly at some level within a particular business unit or function (Hopwood, 1972; Merchant, 1981, e.g. Brownell, 1985). Perhaps the most important motivation behind the use of van der Stede's model is that it contains items relevant to 'the junction between corporate management and business unit managers' (van der Stede, 2001), which is appropriate given that the objective of this study is to determine the ISD factors that explain the extent to which ISD project managers are tightly controlled in terms of budget. The rigor and general quality of the measure is also evidenced by its use in a number of subsequent studies in the management accounting domain (e.g. Hansen & van der Stede, 2004; Marginson & Ogden, 2005; Bisbe *et al.*, 2007; Tayles *et al.*, 2007). In fact, many subsequent researchers have directly commented on the quality of the paper. For example, Noeverman *et al.* (2005) believed it to be a rare example in the whole area of Reliance on Accounting Performance Measures (RAPM) that 'seems to be free of validity and reliability problems'. In their call for higher precision

in the specification of management accounting concepts Bisbe *et al.* (2007) cite van der Stede's model as one of a few good examples to follow.

Previous applications of van der Stede's model

While the van der Stede model has been analyzed in literature reviews (e.g. Noeverman *et al.*, 2005; Bisbe *et al.*, 2007), and isolated constructs from the model have been used or adapted (e.g. Hansen & Van der Stede, 2004; Tayles *et al.*, 2007), as far as the researcher is aware, Nylinder (2009) is the only study to date to fully apply the model. In that case it was used to study managers' perceptions of tight budgetary control in Swedish hospitals. To date, while much research has focused on the poor budgetary performance in systems development, no study has focused on the tightness of budgetary control in these failed or poorly performing projects, and certainly none has applied the van der Stede model. Given the purpose of the study is to investigate and identify the factors affecting tight budgetary control in ISD projects, and van der Stede's model is to be used to measure tight budgetary control, these can be combined to form the proposed conceptual framework for this study, shown in Figure 1.

Research design

Research site

This study explores the tightness of budgetary control exerted over four systems development projects. These projects were based in one large multinational consulting organization, and were part of the same business unit. The business unit under scrutiny focused solely on providing advice and solutions for financial services clients of that consulting organization within one country. This business unit had been a part of the organization for the previous 11 years, and had always performed quite well, consistently ranked in the top

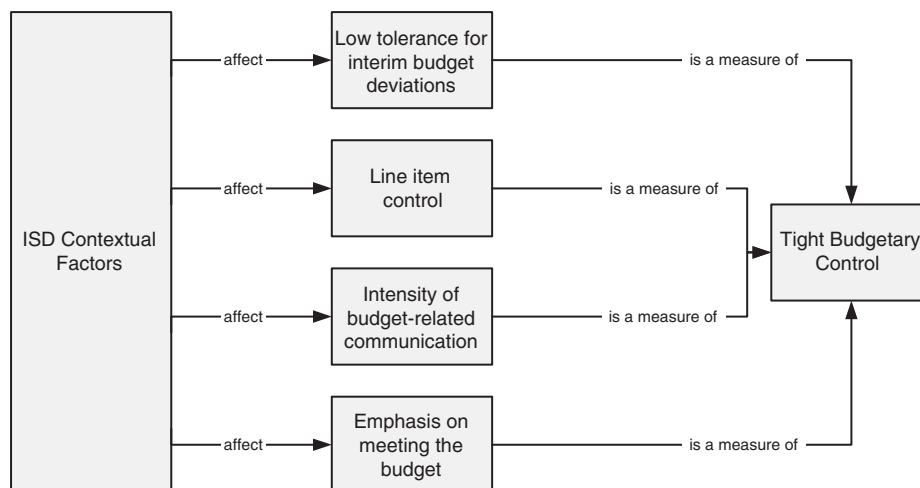


Figure 1 Proposed conceptual framework.

four of seven business units in that country in terms of revenue and staff numbers. The business unit was terminated in June 2007. All non-critical projects and projects in the pipeline were cancelled with immediate effect and only 15% of the yearly budget was allocated to allow core projects to continue, and even these were re-scoped to save cost. Only projects that were two months from completion were allowed to continue.

The business unit and underlying projects were purposively selected for this study. Firstly, the business unit within which the four projects reside was terminated due to poor budgetary performance (only two of 22 projects were completed within budget). Of course, such a significant decision is usually based on many factors. However, an analysis of the internal report from senior management circulated at the time showed that, while the business unit and its projects were 'very satisfactory and in some cases exemplary', the termination was the result of a 'severe appraisal' of budgetary performance across all organizational units due to the prevailing economic climate at the time. Almost all projects were 'time and materials' contracts as opposed to fixed price, which usually reduces the impact of poor budget performance. The reason that budget deviations were so significant in this case is that all project contracts had very significant bonus payments for meeting the budget (often as much as 30% of the total project cost), and overhead costs rendered the unit structurally unprofitable as a whole. Tight budgetary control is unnecessary and occasionally counterproductive if meeting the budget is not considered very important by any of the stakeholders involved (Merchant & van der Stede, 2007), and so indicators of budget importance were critical when choosing cases for this study. The fact that the entire business unit was disbanded due to budgetary problems is a strong indicator that meeting the budget was very important in these cases. The two best performing projects (12 and 4% under-budget) and worst performing projects (223 and 320% over budget) were chosen as 'revelatory cases' (Yin, 2003) to allow effective comparison and contrast between projects and identify interesting insights. This choice helps distinguish between what may be an organizational or business unit problem (across all projects) and what may be a problem at the project or team level (Table 1).

In terms of governance, each project was lead by a single senior manager with a number of subordinate managers reporting to him or her. Within the accounting function, an account manager was assigned to each project to deal with monitoring and control of the budget and any related issues. All time and expense reports were submitted fortnightly to the accounting system, and the account manager's formal role includes ongoing communication with the senior project manager. An audit team was also in place to conduct random interim assessments of selected projects. A steering committee was in place, comprised of senior management executives within the region. This committee evaluated and approved project

proposals in line with a governing strategy emanating from corporate headquarters in the U.S.

It is clear that the four projects under scrutiny are different in many ways, varying according to team size (failed projects are larger), team composition (failed projects have significantly less team leads), use of development method, project type and location. Any and perhaps all of these variables may have affected the degree to which each project was over or under budget. In addition, one can question the value of analyzing the budget deviations; given that poor estimation may have resulted in the budget target itself may have been inappropriate from the outset. From a methodological point of view, however, the extent of the budget deviations, the cause of the deviations, or the accuracy of the original estimations are not a significant concern, as this study does not seek to determine whether budgetary control, or indeed any other variable, influenced the final budget deviation. Rather the objective is simply to determine what ISD factors explain the tightness of that budgetary control.

There are some variables however which may have directly affected the tightness and control of the budget. Firstly, the choice of method needs to be discussed as the method sometimes incorporates the budget setting process. This was not an issue in these cases, as senior executives allocated the budget before the method was decided. In any case, a basic analysis of the data shows that the choice of method did not appear to be a significant factor. Nine of the 22 projects used XP, Scrum, or a combination of the two, with an average budget overrun of 21%, while the 13 projects adopting Method ALPHA had similar outcomes, averaging 18%. Also, political manipulation of budgets can affect studies such as this. For example, managers may deliberately spend 100% of the budget to ensure a similar allocation in future years. This was not a concern in these projects as budgets were not allocated recurrently, but rather on a project-by-project basis. Also, problems with fixed price contracts may have impacted budgetary control. However, all projects involved 'time and materials' contracts as opposed to fixed price.

Data collection and analysis

Data were collected over a 6-month period from March to August 2007. Data collection was primarily personal face-to-face interviews, a technique well suited to case study data collection, and particularly for exploratory research such as this because it allows expansive discussions which illuminate factors of importance (Oppenheim, 1992; Yin, 2003). The information gathered is likely to be more accurate than information collected by other methods since the interviewer can avoid inaccurate or incomplete answers by explaining the questions to the interviewee (Oppenheim, 1992). The interviews lasted between 50 and 120 min. The questions were largely open-ended, allowing respondents freedom to convey their experiences and views, and expression of the socially complex contexts that underpin ISD (Oppenheim, 1992; Yin,

Table 1 Profile of the four cases

	<i>Project A</i>	<i>Project B</i>	<i>Project C</i>	<i>Project D</i>
Budget deviation at project end	12% under	4% under	223% over	320% over
Project duration	19 months	30 months	32 months	19 months
Annualized deviation	-7.58%	-1.6%	83.63%	202.1%
Random audit	Yes, after 18 months	No	Yes, after 4 months	No
Team size	20	24	31	29
Team composition	1 senior manager 2 managers 2 team leads 11 developers 4 testers	1 senior manager 3 managers 4 team leads 19 developers/testers	1 senior manager 5 managers 0 team leads 26 developers 4 testers	1 senior manager 3 managers 1 team lead 20 developer/testers
Location	Same building	Collocated in an open office space	Collocated in an open office space	Distributed across three countries
Development method	Scrum/XP	Scrum/XP	MethodALPHA	MethodALPHA
Project managers' management experience	4 years	3.5 years	3 years	3 years
Type of system developed	Commercial product	Commercial product	Organizational intranet	System for project management accounting
Customer type	External	External	Internal	Internal
Personnel interviewed for this study 2 phases – Phase 1 March/April 2007 Phase 2 July/August 2007	1 senior manager 2 managers	1 senior manager 3 managers	1 senior manager 5 managers	1 senior manager 3 managers

2003). The interviews were conducted in a responsive (Wengraf, 2001; Rubin & Rubin, 2005), or reflexive (Trauth & O'Connor, 1991) manner, allowing the researcher to follow up on insights uncovered mid-interview, and adjust the content and schedule of the interview accordingly.

To improve the reliability and repeatability of the research, a traceable, 'audit trail' of the research process, from data collection through to the drawing of conclusions, was sought. Kirsch's (2004) model was followed; this model defines a set of procedures to (i) identify and selecting project cases, (ii) determine who to interview and (iii) how the interviews were to be conducted. An interview protocol was prepared based on van der Stede's (2001) model of tight budgetary control, and specifically its four underlying constructs (tolerance for interim budget deviations, line-item control, intensity of budget-related communication and emphasis on meeting the budget). These provided a list of 'intellectual

bins' or 'seed categories' (Miles & Huberman, 1999) to structure the data collection and the open coding stage of data analysis. A sample of open coding data is shown in Appendix A. All interviews were transcribed, generating a total of 87 pages of data, which were subsequently coded using nVivo. Also, venting was used, whereby results and interpretations are discussed with professional colleagues to avoid the problem of what Kaplan and Duchon (1988) call multiple realities. Findings were continuously presented and discussed with colleagues and practitioners informally and also through two formal project workshops. In order to aid analysis of the data after the interviews, all were recorded with each interviewee's consent, and were subsequently transcribed, proof-read and annotated by the researcher. While the researcher conducted the interviews, an assistant listened and took notes. In any cases of ambiguity, clarification was sought from the corresponding interviewee, either via telephone or e-mail. Supplementary documentation

was also collected, including project management plans, budgets and budget reports, meeting minutes and relevant e-mail communications.

Data analysis used Strauss & Corbin's (1998) *open coding* and *axial coding* techniques. Open coding is 'the process of breaking down, examining, comparing, conceptualizing, and categorizing data' (Strauss & Corbin, 1998). Glaser (1992) argues that codes and categories should emerge from the data, while with Strauss & Corbin's approach (1998) these are selected prior to analysis. The approach adopted in this study is more akin to the latter, where the interview questions and subsequent analysis was based on van der Stede's (2001) model of tight budgetary control, and specifically its four underlying constructs (*tolerance for interim budget deviations, line-item control, intensity of budget-related communication and emphasis on meeting the budget*). These provided a list of 'intellectual bins' or 'seed categories' (Miles & Huberman, 1999) to structure the data collection and the open coding stage of data analysis. A sample of open coding data is shown in Appendix A.

The second phase of analysis used axial coding. Axial coding is defined by Strauss & Corbin (1998) as a set of procedures whereby data are put back together in new ways after open coding; whereas open coding fractures the data into categories, axial coding puts the data back together by making connections between the categories and sub-categories. As the data were coded, theoretical questions, propositions and code summaries arose. These were documented in analytic *memos* (Miles & Huberman, 1999) to aid understanding of the concepts being studied and to refine further data collection. Miles & Huberman (1999, pp. 72-74) offer advice on effective analytic memos, and these practices were followed where possible. As categories emerged follow-up interviews were arranged with all of the original interviewees to elicit further, richer, more focused information. This was done to confirm, extend, and sharpen the evolving list of categories. As categories became integrated, further data collection did not tend to cause any additional categories to emerge, but rather reinforced those already in existence. At this point, the categories were deemed to be 'theoretically saturated' (Strauss & Corbin, 1998), and data collection ended (Appendix B).

Findings

In this section, the results of the four case studies are presented and discussed. Firstly, the tightness of budgetary control over each project is discussed, in accordance with the four measures of control in the conceptual framework adopted in this study. The factors affecting tightness of budgetary control, which emerged from the axial coding phase of the analysis, are then presented and further illustrated with quotes from the interviews. Quotes attributed to senior managers are referred to as Senior Manager A, Senior Manager B and so on for the four projects. General manager quotations include an additional numeric identifier given there is more than

one manager on each project, for example, Manager A1, A2, Manager B1, B2, B3 and so on.

Tolerance for interim budget deviations

While it is known that projects A and B completed under budget while projects C and D eventually performed very poorly, this does not necessarily mean that the interim budget figures followed similar trends. One single event near the end could have brought a trend of overspending back on target, and likewise may send a previously well-managed project spiraling out of budgetary control. However, Figure 2 shows that this was not the case in any of these projects. Projects A and B never went over budget at any stage, and it is also clear that in the case of C and D, signs of the eventual overruns were evident from an early stage in the project, and this trend continued consistently throughout both projects. As A and B experienced no significant interim deviations it is difficult to determine from Figure 2 alone whether tolerance would have been low or high. The early and continuous overruns on Projects C and D suggest that tolerance was high. However, this is by no means conclusive; all that is evident from this data is that corporate superiors did not terminate either project prior to its completion.

An analysis of the underlying sub-constructs within the tolerance for interim budget deviations reveals more conclusively that the projects were loosely controlled in this regard. In a tightly controlled environment, the project manager is required to explain (i) causes for interim deviations and (ii) corrective action that will be taken to correct or address the deviation. At the time of the interviews, the formal organizational procedures in ALPHA required all senior project managers to submit a monthly status report. This was a very rudimentary, one-page document where each project was flagged as green, amber or red, signifying increasing levels of concern, ranging from 'no issues' to 'show-stopper' issues. This document did include a field for explanation of variances and details of any corrective action to be taken. However, according to all four senior managers, the norm

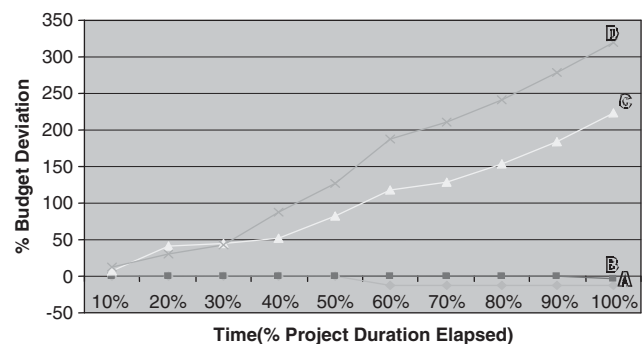


Figure 2 Interim budget deviations across projects (The deviation at any point in time was based on a standard calculation carried out at the end of each month comparing the expected spend at that date vs the actual spend.).

in the organization was that all managers tick the green, amber or red status box, but never complete the explanation or corrective action columns. Regardless of whether managers did or did not complete this document, there was evidence to suggest this document was not effectively used as a mechanism for tight budgetary control. For example, 15 of the 19 reports submitted by Senior Manager D had his project status set to red, yet there was no subsequent query or action taken as a result. Senior Manager B never submitted any of these reports throughout his 30-month project, and while an automatically generated reminder was issued, there was no subsequent follow-on query or action taken by the accounting function.

Line item control

Apart from Project C where travel spending was restricted to 11% of the overall project budget, there was no evidence of control at the budget line item level across any of the four projects. The control reports did not have to explain budget variances on a line-by-line basis. The four senior managers all stated that corporate superiors were only interested in the bottom line budget figure. Regardless of the managers' opinions, it was also clear from the interim management accounts that corporate superiors did not investigate budgets on a line-by-line basis. The line items on the interim account reports of Projects A, B, and C were all incorrectly aligned to some degree. One monthly report of Project C's budget provides an illustrative example (Table 2). The account was set up incorrectly by the assigned project accountant at the start of the project, and so all labor expenses were erroneously allocated as 'travel'. Therefore the travel spend was reported as being over by more than 600%, when in actual fact very little had been spent. Also

£150,990 of regular, in-house developer labor was incorrectly labeled as a subcontractor cost, a line item which had a zero budget allocation. £87,460 was spent but reported simply as 'other costs'. All three of these issues had a significant material affect on the budget and caused three line items to incorrectly appear grossly over budget. It is not uncommon that an accountant may make an error when setting up an account. The reasons for such an error are not that important in this case. The interesting issue here is that none of these adverse figures triggered a query from corporate head office, showing that line item control was not just loose but non-existent.

It must be noted in the analysis that detailed, line-by-line budgeting was not particularly relevant in Projects A and B. Developer time accounted for 97 and 94% of these projects' original budgets respectively, and so other costs were insignificant and not worthy of detailed monitoring and reporting; essentially there was only one line item on each project, and so was more or less equivalent to the bottom line figure. This was not the case with Projects C and D where line-by-line budgeting was very relevant. In the case of Project C, significant line items included not just developer time (62%) but also training (22%), travel (11%) and materials (5%). Part of Project D was outsourced, causing an external consultants line item of 41%. Owing to the distributed nature of the project, costs included travel (13%) and accommodation/subsistence (17%). In addition to the regular line item of developer time (29%), this meant that Project D's budget was dispersed across many significant line items.

Intensity of budget-related communication

Formal budget-related communication between the managers and corporate superiors was low across all four projects. One formal meeting was organized by senior

Table 2 Example of line item discrepancies – Project C interim budget status

<i>BUSINESS UNIT:</i>	<i>Budget</i>	<i>Actual to date</i>	<i>Committed^a</i>	<i>Budget % remaining</i>
<i>SERVICE GROUP:</i>	£	£	£	
<i>CLIENT:</i>				
<i>PROJECT CODE:</i>				
Pre-contract				
Labor – business unit	625,123	0	0	100.0%
Labor – non-business unit	0	0	0	0
Labor – subcontractor	0	150,990	0	—
Travel	122,000	523,280	190,140	–601.16%
Durables	50,413	40,117	0	20.42%
Training	221,818	0	0	100.0%
Services	0	0	0	
Overhead	0	0	0	100.0%
Other	0	87,460	0	—
	8455	0	0	
Total expenditure	8455	0	0	100.0%

^aThe term 'committed' refers to an expense that will be incurred at a future date on the project, and while not paid at the time of the statement, will need to be paid at a future date.

executives every six months and was attended by the project managers of each of the 22 IS development projects. While the meeting did focus on budgeting issues it was minimal, and consisted of approximately 5-min discussion around a slide that ranked the projects in terms of budget performance.

According to 17 managers, these meetings simply highlighted which projects were underachieving, but did not focus on constructive ways of rectifying the situations and achieving the budgets, something recommended by van der Stede.

I wasn't that enthralled by my project being listed as an underperformer, but I was still looking forward to this meeting. I expected to get great feedback from these executives, with point-by-point recommendations drawn on their vast experiences of projects across the globe. Maybe it was just me but I didn't take anything away from this meeting. (Senior Manager C)

The only other communication initiated by corporate superiors was with the managers of Projects A and B. Ironically, both of these queries related to the reasons for the budget under spend. According to van der Stede's model, face-to-face meetings to discuss budget deviations are the strongest indicator of budget-related communication intensity. However, none of the four senior managers were called to discuss budget deviations face-to-face. This is despite the fact that three of the four managers (A, B and D) were located in the same building as their regional executives and both the financial accounting and management accounting functions.

Van der Stede's model advocates the creation of a team comprising of a project manager, his superiors and his subordinates to discuss and solve budgeting matters. No meeting involving all three parties took place at any stage in any of the four projects. While this form of corporate superior involvement was non-existent, according to all four senior managers, budget-related communication between them and their respective subordinate managers and team was very frequent and intensive.

Emphasis on meeting the budget

According to all four senior managers, meeting the budget was certainly a factor when their end-of-year performance was assessed. However, all felt that the budget attainment was a much lower priority criterion than the quality of the system, customer satisfaction and the extent to which it is eventually used.

Going over budget is never usually a problem at all here [in Alpha Consulting]. The key issue is that when we inevitably seek more money after the first allocation runs out, and we always will have to seek money, we need to have a good rationale for the additional funds and how we are going to use it. (Senior Manager D)

In van der Stede's model, a measure of budget emphasis is the extent to which unforeseen opportunities are considered more important than achieving the budget. All managers on Project A stated that while meeting the

original budget wasn't mandatory, they did not believe they were in a position to go well beyond the budget simply to exploit new opportunities.

I knew there was a comfort factor and that missing the budget wasn't a problem. I would draw a line between letting the budget slip because we simply fell behind vs letting it slip because we went after some large new piece of functionality. Something like that would require renegotiation of the budget and the setting of a different target. (Senior Manager A)

On the other projects however, a looser interpretation was clearly evident:

We were adding in new specs all the time. I would say after a month the budget was nothing more than a nominal figure. (Manager B2)

We had a budget figure, but this wasn't tied to any set list of requirements. We were always looking for new opportunities to improve the system from the customer perspective and the budget was rarely considered. (Manager C5)

New opportunities were always chased. The budget was only an afterthought. (Manager D2)

These comments suggest that there was not much emphasis on meeting the budget and thus are further evidence of loose budgetary control.

Emergent factors affecting tight budgetary control

It was clear from the first phase of data analysis that budgetary control was quite weak across all four projects. There was a high tolerance for interim budget deviations, there was little control at the budget line-item level, budget-related communication was largely non-existent and there was little emphasis on meeting the project budgets. As a result of the subsequent axial coding process, a number of core factors emerged across the four constructs, which contributed to the looseness of budgetary control. Table 3 shows which seed categories (the four measures of tight budgetary control list on the horizontal axis) informed each of the emergent categories (vertical axis), according to the empirical data. An 'X' denotes each of these linkages, that is, where it is evident that an emergent factor affected one of the constructs of tight budgetary control. Relevant quotes are then presented to further illustrate each of these factors.

Development context factors

The *complexity of the business and development context* being built did affect the ability to exert tight control. For example, Project A involved the simple creation of a web-based version of an existing system. Therefore requirements were clear and unambiguous and much of the work was 'simple and repetitive' (Senior Manager A). In contrast, Projects C and D involved the development of completely new systems, both of which were highly complex, and involved emerging, untested technology.

Table 3 Emergent factors influencing tight budgetary control in systems development

	Tolerance for interim budget deviations	Line item control	Intensity of budget-related communication	Emphasis on meeting the budget
<i>Development context factors:</i>				
Complexity of the business/development context	X		X	X
Organizational culture	X		X	X
Project culture	X		X	X
Customer type	X	X	X	X
Accounting staff familiarity with ISD context	X	X	X	X
<i>ISD method factors:</i>				
Developer involvement in budgeting process	X	X	X	X
Transparency of budget process	X	X	X	X
Length of development iteration	X	X	X	
Customer involvement	X		X	X

As a result requirements were very abstract and vague. Budgeting and measuring progress against a budget in this turbulent environment proved very difficult. Tolerance for budget deviations increased as ‘everything was so complicated and hard to estimate, we knew we would never make the budget target and so we accepted overruns as a given’ (Manager C2). The managers on Projects C and D stated that project complexity and the resulting acceptance of overruns reduced the intensity of budget communication normally seen, and the emphasis on meeting the budget was also reduced. Instead, ‘management take a hands-off approach’ and the emphasis shifts to ‘delivery of a quality product regardless of the budget figure’ (Manager D3).

Organizational culture was also an issue, according to Senior Manager C, who cited a lack of budget-related communication within the organization as an example. He claimed that in his previous organization, budget overruns were openly discussed among managers ‘around the water cooler’ and that even if the accounts office tolerated it, poor budgetary performance would informally be the talking point of every managerial conversation. In contrast, within the current organization there doesn’t seem to be the same visibility: ‘I don’t think anybody else even knows whether my project is over or under’ (Senior Manager C). All four senior managers agreed that, while budgets weren’t completely disregarded, there was much more emphasis on the quality of the system being developed. It was also clear that this cultural issue was not just an organizational variable, but that *project culture* was also a distinguishing factor. Manager A2 stated for example that while she believed budgets weren’t perceived as very important in the organization, her manager (Senior Manager A) ‘instilled a belief in meeting the budget, whether it was important or not’. The fact that this was clearly not the case on Projects C and D indicates a cultural variance at the project level.

The *type of customer* also influenced the tightness of control applied. Managers of Projects A and B raised the

point that, as their systems were for external, commercial sale, that is, for profit, there was an expectation that the profitability of the project would be assessed at some stage in the future. All four senior managers agreed that an internal project is not so critical in terms of profitability and that functionality and adoption are much more vital metrics of project success. While the respective customers of Projects A and B did not impose extra reporting requirements ‘the fear they would query spending’ increased both senior managers’ control of deviations and also increased budget-related communication across the team. This intensity was illustrated by Manager B3:

There were some spends that we were happy with and knew were justified but we often spent so much extra time saying ‘Well we know this spend is OK but how are we going to justify this in the eyes of the customer’.

According to 11 managers, a *lack of familiarity among the accounting function staff* also contributed. These claims are supported by a report (Table 4) listing the acceptable deviation bands for every project in Britain. This shows the extent to which a budget can deviate before triggering a query from the accounting function. The most restrictive of the 22 ISD projects was 15%, and in 19 of the projects there were no variance controls at all. This exceptionally high tolerance for budget deviation is in stark contrast to the other types of project, many of which were allowed zero deviation; even the most restrictive trigger was 7%. This shows that the accounting function did treat ISD projects differently to the others. This eliminates the possibility that such loose control as discussed earlier is simply prevalent across the organization and all project types, and not just ISD. It was also clear that this lack of familiarity also impacted line item control, and the level of communication between the ISD team and the accounting function:

HQ accountants don’t really understand what we do here (in the ISD group), and that is why they don’t drill

Table 4 ALPHA Consulting - acceptable interim budget variances by project type

Type of project	Lowest variance allowed	Highest variance allowed	Mean variance allowed	Std. deviation of variances
IS Development (n= 22)	15%	No limit	n/a	n/a
Administration/Process Reengineering (n=7)	0%	7%	6%	0.72%
Management and Strategy (n=4)	0%	0%	0%	0%
Accounting and Performance Evaluation (n= 41)	0%	7%	5.7%	0.8%
Sales and Customer Relationship Management (n= 12)	0%	7%	5.82%	0.8%

down on our variances or contact us that often (Senior Manager D).

Accountants can't fathom our high level tasks and figures. The last thing they want to do is drill down on the detail underneath them. (Senior Manager B)

ISD method factors

Developer involvement in the estimation and budgeting process was important in some of the cases studied. In Projects A and B, the developers decided upon all estimates, recorded them, and monitored their own progress against them. According to both senior managers (A and B), this self-regulatory process resulted in 'healthy competition' (Senior Manager A) between the developers, 'a sense of pride' (Manager B2), and of particular relevance in this study 'a heightened awareness of budget issues' (Senior Manager B) and 'a much tighter control over the budget than I could ever manage' (Senior Manager A). According to both, all developers were aware of line item budgets and of the implications of their actions on those figures. Communication about budgets was also 'much higher than I would be used to' (Senior Manager A).

Transparency of the budget process also emerged as a distinguishing factor, tightening budgetary control when present. For example, on projects A and B, peer-reviewed estimation, daily stand-up meetings, pair programming, and storyboards highlighted excess time spent on user stories the day they occurred.

There was no opportunity for developers to hide delays. They would have to tell us at the 4pm stand up meeting, and if not the developer they were paired with would soon say something. If not we can also tell if their post-its are not moving across the storyboard. (Manager B2)

Every developer estimate was discussed by the team. Nobody would give bloated or overly safe estimates of their own work in front of their peers. (Manager A1)

In Projects C and D where the more plan-driven ALPHAMethod was used, it was clear that transparency was lower and was loosening control.

We did have status meetings but some developers' work never saw the light of day until testing began. Only then would it become obvious that the work was sub-standard and that there would be budget implications to fix it. (Manager D2)

The *length of iteration* was also an important factor. The contrast between Projects A and C highlighted this issue:

Each 2 week iteration highlighted any deviations incredibly quickly. We estimated how many hours or days it will take to complete each user story. At the end of each iteration we automatically know how many hours we are over budget. (Manager A2)

Major deliverables occurred every 4–6 months. It was only within the last week or so that we could start to say whether we would hit the budget target or not. (Senior Manager D)

The level of *customer involvement* also played a role in the tightness of control. In the projects where a customer was continuously involved (A, B and C), the senior managers acknowledged that there was more emphasis on accurate estimation and progress against those estimates. According to Senior Manager D, the lack of a customer presence meant the project 'operated in a vacuum', and the team was not exposed to 'the pressures of accountability'.

Discussion

Despite the pervasiveness of ISD project failure, and that overspending in particular is such a concern, little research has focused specifically on how budgeting or other general management accounting techniques are being used in ISD. An analysis of relevant ISD literature shows that blame for poor budgetary performance is attributed in many different directions, but rarely if ever is the budget target or process itself ever questioned. In particular, attention has not focused on the tightness of budgetary control over ISD projects, which is somewhat surprising given the prevalence of unacceptable budgetary performance throughout the field.

This study describes an organization where there was a distinct lack of emphasis on budgetary matters, and loose control throughout the projects studied, but then the projects in question, and in fact the whole division, were terminated solely due to poor budgetary performance. It is very significant that the problem did not seem to be symptomatic of poor control across the organization; relatively tight control was imposed on non-ISD projects (process re-engineering, management/strategy, accounting/performance evaluation, sales/CRM), and the problem seemed limited to ISD initiatives. Given the fact

that so many ISD projects fail drastically in terms of budget, it is therefore worth questioning whether such loose control is prevalent across the field. Organizations that use cost as the primary determinant of success need to evaluate the extent to which they exert control over project budgets, particularly if they are prone to cancellation as was the case in this study. By no means does this study alone suggest that this apparent lack of control is prevalent across the ISD field; this was simply a revelatory case of four projects in a single organization. However, it does provide one possible explanation as to why ISD projects perform so poorly, and merits further, more extensive research across a much greater number of these projects.

The primary objective of this paper was to investigate and identify the ISD factors that explain the extent of tight budgetary control in ISD projects. The factors that emerged from this study are (i) complexity of the business/development context, (ii) organizational culture, (iii) project culture, (iv) customer type, (v) the familiarity of accounting staff with ISD, (vi) developer involvement in the budgeting process, (vii) transparency of the budget process, (viii) length of development iteration, and (ix) customer involvement. The revised version of the conceptual model in this study is now presented (Figure 3), complete with a set of affecting factors. This is the first study that focuses on the tightness of budgetary control in ISD, and the first to identify a set of ISD-specific factors that can hinder such control, and so makes a theoretical contribution to the field.

These factors have significant implications for practice. Organizations can use the list of factors to determine if their projects are amenable to tight budgetary control, to identify potential shortcomings, and to determine mechanisms to overcome these shortcomings. For example, the research showed that a lack of familiarity of

accounting staff with ISD projects can cause loosening of what would otherwise be tight budgetary control. To address this, senior management could provide accounting staff with ISD-specific training, or could increase exposure to these projects by requiring face-to-face meetings between the ISD manager and the accounting staff, as opposed to the standard uploading of monthly reports. They could also 'lock' the control measures to ensure that ISD projects are forced to comply with the same limits and rules as any other project type, which was not the case in the projects studied as part of this research. The factors above can be used as the structural basis for an action plan to increase amenability to tight budgetary control, for example, justification to provide new managers with project accounting training.

In terms of limitations of the study, it should be noted that while budgets are a key mechanism for exerting tight control, they are by no means the only mechanism; see Merchant & Otley (2007), Merchant & van der Stede (2007) and Anthony & Govindarajan (1998) for extensive discussions of other control mechanisms. Organizations should ensure that budgetary control is considered within this wider portfolio. Furthermore, it should not be assumed that tightening budgetary control is always a good thing; while tight budgetary control is often positively co-related to budgetary performance, this is not always the case, and overly restrictive budgetary control can stifle a project and increase the chance of failure (Simons, 1995; Widener, 2007). Therefore, before measuring the tightness of budgetary control over an organization or project, assessing the factors affecting that control, or taking any corrective action, it is important to determine whether meeting the budget is the most important dimension of success in that instance.

The study also identifies opportunities for future research efforts. Firstly, as Eisenhardt (1989) suggests,

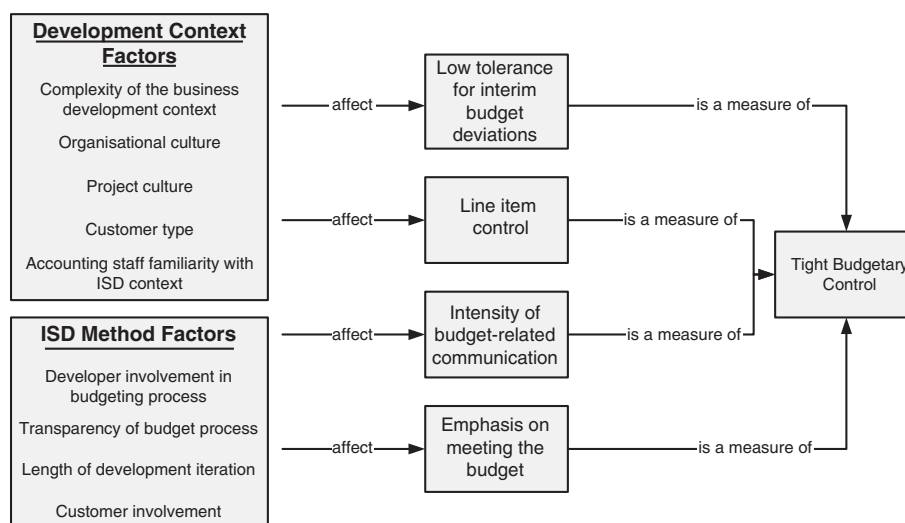


Figure 3 Revised framework complete with factors.

theory building from case studies is iterative, and it is only through repeating the process that one can reach 'theoretical saturation'. Therefore future research could repeat this piece of research, identifying further factors affecting budgetary control in ISD, until this saturation point is reached. Furthermore, upon examination of Eisenhardt's process for such theory building (1989, p. 533), another extension of this research would be to elaborate this list by deriving and testing measurable hypotheses, thus 'sharpening the construct definition and the validity and measurability of the factors'.

Secondly, the business unit was selected for study primarily due to the richness of the setting (i.e. closure resulting from serious budgetary problems), and the four underlying projects selected from the 22 available based on their performance in terms of budget targets. The latter rationale was due to the fact that it was not possible to measure the tightness of each project's controls in advance, and there was a notion that budget target performance may sometimes be a good indicator for budget tightness. While the case was rich and significant factors did emerge, what resulted was a study of four cases that exhibit reasonably loose control with only certain aspects of tight control present. If it were possible for future researchers to measure tightness of project budgetary controls in advance of case selection, it would be beneficial to compare and contrast cases with a high level of tightness vs those with a low level of tightness.

Some of the factors identified in this study are common to those factors found to affect ISD in general (e.g. Gasson, 1999; Fitzgerald *et al.*, 2002; Madsen *et al.*, 2006; Conboy & Fitzgerald, 2011). This helps verify the plausibility and relevance of the identified factors. While some factors identified in these other studies were not evident in this particular set of cases, and the others studies focus on general ISD issues as opposed to those specific to budgeting, one could also draw on these to extend the list of factors used in further exploratory research. For example one could extend Madsen *et al.*'s (2006) emphasis on long-term social relations or history to see if the long-term relationship and history between the project accountant and the project team have any impact on the tightness of budgetary control. Likewise future research could include factors identified by Fitzgerald *et al.* (2002) such as developer autonomy, developer motivations and political issues. It is also interesting that some of the ISD factors emerging from this study are ones that characterize certain development methodologies, for example, transparency, shorter iterations, and continuous customer involvement are all distinguishing facets of agile methodologies. Researchers could therefore examine the suitability of a range of methodologies to facilitate tight budgetary control using the factors developed in this study as a lens. This would be particularly useful given that many have pointed to the low number of rigorous studies of agile approaches using appropriate theoretical lenses

(Conboy & Fitzgerald, 2007; Abrahamsson *et al.*, 2009; Conboy, 2009).

Further research in this area should not be restricted to the ISD body of knowledge. Given that some of the blame in this study was attributed to the accounting function overseeing these projects, interesting insights could also be gained by studying the perception of people in that role, and not just ISD personnel as was the case in this study. This could make an interesting contribution to the existing knowledge about tight budgetary control in the accounting literature, given that, as discussed earlier, there was only one previous application of the van der Stede model in its entirety. ISD is a great example of a complex and turbulent business environment, and so accounting research should benefit from further research in this area. If more research was conducted with an accounting audience in mind, there are many areas of existing literature that could be used to ground the factors in that domain. For example, literature on participative budgeting could underpin further research on the factor regarding developer involvement in the budgeting process.

Conclusions

The majority of ISD projects run drastically over-budget and there is no reason to suggest that this trend is improving. Despite the fact that overspending is such a concern, little research has focused specifically on how budgeting or other general management accounting techniques are being used in ISD. Blame is often attributed to the people or process involved but studies that highlight these disastrous overruns provide little or no information on how the budget was set, how it was communicated, whether it was attainable, how adherence to the budget was monitored and controlled, or how it was integrated into the performance evaluation and reward functions of the project or organization. In particular, attention has not focused on the tightness of budgetary control over ISD projects, which is somewhat surprising given the prevalence of unacceptable budgetary performance throughout the field.

This paper sought to investigate and explain the factors explaining the tightness of budgetary control in a case of extreme ISD failure *en masse*, where all but two of the 22 projects in a business unit went over budget. The study focused on the two best and worst performing of these projects. Using a framework drawn from control systems theory, the study examined the 'tightness' of budgetary control exerted over each project. The emerging factors affecting tight budgetary control found in this study were complexity of the business/development context, organizational culture, project culture, customer type, the familiarity of accounting staff with ISD, developer involvement in the budgeting process, transparency of the budget process, length of development iteration, and customer involvement. As far as the researcher is aware, this is the first study that focuses on the tightness of budgetary control in ISD, and the first

to identify a set of ISD-specific factors that can hinder such control. Organizations can use the list of factors to determine if their projects are amenable to tight budgetary control, to identify potential shortcomings, and to determine mechanisms to overcome these shortcomings. Future researchers could use this exploratory study of one set of projects as a basis for explanatory research

involving a much broader set of organizations and teams. They could also examine how the factors identified in this study affect other types of control in ISD environments. This paper also provides a starting point, studying budgetary issues in ISD; future researchers could identify and apply other theories and frameworks from accounting literature to further develop interesting insights.

About the author

Kieran Conboy is a lecturer in information systems at the National University of Ireland Galway. His research focuses on agile systems development approaches as well as agility across other disciplines. Kieran is currently involved in numerous national and international projects in this area, and has worked with many companies on their agile initiatives including Intel, Microsoft, Accenture, HP, and Fidelity Investments. Kieran has chaired related conferences including the European Conference in Information Systems (Galway, 2008), the XP and Agile Development Conference (Limerick, 2008) and also has chairing roles at XP2009 and XP2010.

Some of his research has been published in various leading journals and conferences such as *Information Systems Research*, the *European Journal of Information Systems*, the International Conference in Information Systems (ICIS), the European Conference in Information Systems (ECIS), IFIP 8.6 and the XP200n conference series. He is also associate editor of the *European Journal of Information Systems*. Prior to joining NUI Galway, Kieran was a management consultant with Accenture, where he worked on a variety of projects across Europe and the U.S. Kieran can be reached at kieran.conboy@nuigalway.ie.

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Appendix A

See Table A1.

Table A1 Examples of open coding

Quote	Key codes
'Going over budget is never a problem at all here'.	Budget_Emphasis/Loose_Control
'New opportunities we always chased. The budget was only an afterthought'.	Budget_Emphasis/Loose_Control
'I expected to get great feedback from these executives, with point-by-point recommendations drawn on their vast experiences of projects across the globe. Maybe it was just me but I didn't take anything away from this meeting'.	Intensity_of_Communication/Loose_Control
'I knew there was a comfort factor and that missing the budget wasn't a problem'.	Budget_Emphasis/Loose_Control

Appendix B

See Table B1.

Table B1 Examples of axial coding (emerging factors)

Quote	Key codes
<i>'There was no opportunity for developers to hide delays. They would have to tell us at the 4pm stand up meeting, and if not the developer they were paired with would soon say something. If not we can also tell if their post-its are not moving across the storyboard'.</i>	Emerging_Factors/Method_Factors/Transparency
<i>'Each 2 week iteration highlighted any deviations incredibly quickly'.</i>	Emerging_Factors/Method_Factors/Length_of_I- teration
<i>'HQ accountants don't really understand what we do here'</i>	Emerging_Factors/Decelopment_Context_Factors/ Lack_of_ISD_Familiarity
<i>'Every developer estimate was discussed by the team. Nobody would give bloated or overly safe estimates of their own work in front of their peers'.</i>	Emerging_Factors/Method_Factors/Transparency
<i>'I don't think anybody else even knows whether my project is over or under'</i>	Emerging_Factors/Decelopment_Context_Factors/ Culture