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# Predominantly electronic or personal service delivery? a case in the wealth management context

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# THE EFFECTS OF REGULATORY PRESSURE ON INFORMATION SYSTEM ADOPTION SUCCESS: AN INSTITUTIONAL THEORY PERSPECTIVE

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## Abstract

*In today's economy, firms are affected by various government regulations that have implications for their information systems (IS). Regulatory pressure has become a major driver behind IS adoption. Nevertheless, it is currently unknown how regulatory pressure affects adoption success. Using an institutional theory lens, this research proposes that regulatory pressure affects some well established success factors of IS adoption. In particular, we hypothesise that regulatory pressure has a positive effect on top management support, project champion and formal project management; but a negative effect on project team competence. Hypotheses will be tested using a survey approach.*

*Keywords: Regulatory Pressure, Compliance, Adoption, Success.*

# 1 INTRODUCTION

Experience from practice shows that the success rate of information system (IS) adoption is generally low, with estimations ranging from 16 % (Lee, 2003) to 40 % (Liang et al., 2007). Motivated by the need to increase the success rate, much research has been conducted into IS adoption (Wixom & Watson, 2001; Premkumar et al., 1997; Lam, 2005). Prior studies suggest that adoption success is influenced by a range of success factors such as top management support (Akkermans & van Helden, 2002; Wixom & Watson, 2001) and formal project management (Aladwani, 2002). Nevertheless, because success factors appear mainly as independent variables in prior studies, there is a lack of knowledge about parameters that influence these success factors. For example, it is not clear why top management support varies across projects (Akkermans & van Helden, 2002). Understanding what affects the success factors can provide a much-needed new perspective on adoption success.

This paper proposes regulatory pressure as one of the parameters that influence success factors of IS adoption. Regulatory pressure occurs when governmental agencies directly or indirectly force firms to change their IS. In today's economy, firms are affected by various government regulations that have implications for their IS (Krell & Matook, 2007; Braganza & Franken, 2007). For example, many firms in Europe and the US have recently been affected by new auditing regulations based on the Sarbanes-Oxley Act (SOX) (Marnet, 2007). Numerous firms found that their current IS were insufficient to achieve SOX compliance, for instance because of low security standards or a lack of financial monitoring systems. Thus, firms needed to alter their IS to ensure compliance (Sipior & Ward, 2007). Indeed, compliance affects varies IS projects in firms – examples reach from changes to spreadsheet software to the adoption of ERP systems (Gartner, 2008a). Many firms have started to appoint information technology (IT) compliance managers (Gartner, 2008b), and it is estimated that firms spend up to 15% of their IS budgets on regulatory compliance (Gartner, 2006).

IS adoption projects that are affected by regulatory pressure are different from other adoption projects because they are influenced by requirements defined in government regulations. For example, government regulations influence the schedule of adoption projects. Most government regulations define compulsory due dates by which compliance must be achieved (Haworth & Pietron, 2006). As a result, firms are forced to bring forward adoption projects that were actually planned for a later time, or even initiate unplanned adoption projects (Garcia, 2004). Consequently, it is reasonable to assume that regulatory pressure should affect adoption success factors. For example, if a government regulation influences the adoption schedule, and imposes penalties if the adoption is not completed on time, a firm might apply formal project management to ensure that the schedule is adhered to. Understanding how regulatory pressure affects success factors is important, particularly in a time like now when many industry sectors face increasing levels of governmental regulation. Nevertheless, there are currently no studies investigating how regulatory influences affect success factors.

Our paper applies an institutional theory perspective to address this gap. Using DiMaggio's and Powell's (1983) work on institutional pressures, we propose that regulatory pressure affects adoption success factors established in prior research. In particular, we hypothesise that regulatory pressure has a positive effect on top management support, project champion and formal project management; but a negative effect on project team competence. The mostly positive effects of regulatory pressure might surprise practitioners, but can be explained through our lens of institutional theory.

This research is expected to contribute to the IS literature in two ways. First, it is an initial attempt to investigate the effects of regulatory pressure on adoption success and provides a new perspective on success. This new perspective is important because in the information age, more and more regulations require firms to make changes to IS. Further, the recent economic and political development in many countries suggests that in the near future, some industries like banking or stock trading will face higher levels of government regulation. Against this backdrop, understanding the effects of regulatory pressure on IS adoption success is useful to increase the currently low success rate of IS adoption. Second, this paper contributes to IS research because it identifies regulatory pressure as a parameter influencing success factors of IS adoption. Future research can use our study as a starting point to identify other parameters, analyse how and why success factors of IS adoption occur in firms, and

examine interactions between parameters. This work will help firms to deliberately model the success factors and increase IS adoption success. The remainder of this paper is organised as follows. Next, we outline how we use institutional theory as a theoretical lens to study regulatory pressure. Then, the hypotheses are developed, and the methodology is described. Finally, we discuss the current stage of the research.

## **2 AN INSTITUTIONAL THEORY PERSPECTIVE ON REGULATORY PRESSURE**

In contrast to other theories on macro organisational behaviour like the resource-based view (Teece et al., 1997; Barney, 2002) and transaction cost economics (Williamson, 1981), institutional theory assumes that changes in structures and behaviours of firms are less driven by the desire to increase efficiency or create competitive advantage, but rather by a need of legitimacy (Meyer & Rowan, 1977). According to institutional theory, firms constantly aim to maintain and increase legitimacy through complying with pressures that arise from their institutional environment (Mizruchi & Fein, 1999). Three types of pressure exist: mimetic pressure, normative pressure, and coercive pressure (DiMaggio & Powell, 1983). Mimetic pressure arises from uncertainty. In situations when firms possess insufficient knowledge to evaluate alternative behaviours, the mere fact that another institution pursues a particular behaviour increases the legitimacy of this behaviour and hence, the firm mimics this behaviour (Haveman, 1993). Normative pressure, by contrast, results from norms defined by institutions such as professional or industrial associations. Once a firm has internalised a norm and decision makers identify with the norm, behaviours that comply with the norm legitimize the firm (Palmer et al., 1993). Coercive pressure, finally, stems from institutions in a firm's environment that are powerful enough to reward or sanction a firm's behaviour, for example large customers, suppliers of scarce resources, or governmental agencies (Guler et al., 2002). Complying with requests from these institutions enables the firm to benefit from rewards and avoid negative sanctions (DiMaggio & Powell, 1983). The focus on legitimacy makes institutional theory an ideal theoretical lens to study regulatory pressure because the main motive behind regulatory compliance is legal legitimacy (Liang et al., 2007).

Regulatory pressure is a special form of coercive pressure (Hu et al., 2007). It arises exclusively from the requirements forced upon a firm by governmental agencies (Braganza & Franken, 2007). There are two reasons why regulatory pressure tends to affect firms stronger than other institutional pressures. First, the regulatory environment in most countries is constantly changing due to ongoing changes in the national and international political development (Damianides, 2005). In contrast to other pressures, one particular change in government regulations affects a tremendous number of firms in a market or country at the same time (Haworth & Pietron, 2006). As a result, regulatory pressure affects firms more frequently than other pressures. Second, it lies in the nature of governmental agencies that they are powerful and impose strong negative sanctions on non-complying firms. For example, the retail multinational TJX failed to comply with US data security regulations and was convicted by a US court to pay compensations of several million US dollars after customer's credit card details were stolen from the TJX customer relationship management system (DataBreaches, 2008). Firms are highly motivated to comply with regulatory pressures because they aim to avoid the negative sanctions which are associated with non-compliance (Abrahami, 2005).

In the information age, regulatory compliance often requires changes to IS. In most cases, firms do not initiate adoption projects solely for the purpose of compliance. Rather, firms review previously planned adoption projects and make changes to these projects to ensure that compliance is achieved (Hu et al., 2007). Think, for example, of a firm that needs to adopt a financial monitoring system to comply with a regulation. If this firm had planned to adopt a new accounting system in the next time anyway, managers might decide to modify the accounting systems to ensure that the system can be used for financial monitoring as required for compliance. Only if this is not possible the firm will consider initiating a completely new adoption project (Ghandforoush et al., 1999). Regulatory pressure is mostly not the sole driver behind adoption projects, but one of many drivers; and the strength of regulatory pressure as an adoption driver varies across adoption projects.

### **3 EFFECTS OF REGULATORY PRESSURE ON ADOPTION SUCCESS**

For the purpose of this research, IS adoption is defined as the process during which a firm becomes capable of using an IS (Iacovou et al., 1995). Adoption includes, for example, the installation of technical system components, and the revision of firm processes. Adoption is completed when all technical components have been implemented, processes have been revised, and the firm possesses the necessary knowledge to use the IS. The actual usage of the IS is not part of the adoption, rather, it happens directly after the adoption (Iacovou et al., 1995). Iacovou's definition was selected for this research because it enables the identification of a point of time when the adoption process is completed, and adoption success can be measured.

Commonly, adoption is considered to be successful if the new IS is implemented within budget, if all critical deadlines are met, and if all pre-defined technical requirements are implemented (Wixom & Watson, 2001). Success according to these criteria has been labelled differently in the literature and is referred to as "project implementation success" in this paper. Although prior research agrees that project implementation success is vital for adoption success as a whole, it is possible that an adoption is unsuccessful even if budget, schedule, and technical specifications are completely adhered to (Debrabander & Edstroem, 1977). This can happen, for example, if the pre-defined technical requirements are insufficient to support the firm's business processes. In this case, managers might consider the adoption unsuccessful because they feel that the usability of the adopted system is low. To account for this possibility, we build on Hong and Kim's work on organisational fit (Hong & Kim, 2002) to expand on our definition of adoption success. Organisational fit is defined as the congruence between the IS and the business context in which it is adopted. The business context includes the business processes that an IS facilitates or supports. Many practitioners argue that IS adoption can only be successful if the IS is adequate for a firm's processes (Gattiker & Goodhue, 2004) and hence, organisational fit is an important component of adoption success. For the purpose of this paper, it is therefore defined that adoption success is comprised of two components: project implementation success and organisational fit success, i.e. the level of organisational fit achieved during the adoption project.

Adoption projects that are initiated because of regulatory pressure differ from other adoption projects. The timing of the project and the technical characteristics of the adopted system are determined externally because they are strongly affected by a government regulation (Braganza & Franken, 2007; Haworth & Pietron, 2006). The stronger regulatory pressure becomes as a driver, the stronger will the adoption project be determined by these externally defined characteristics. By nature, government regulations are composed without special attention to the situation of a particular firm. Hence, timing and technical characteristics are affected by decisions made without consideration of a firm's strategy, technical infrastructure, or usual IS adoption procedures. For example, a firm might normally go live with new ISs at a time of the year when key IT staff can be expected to be present. However, because of a particular law, the firm could be forced to go live on January 1st, which might conflict with the vacation roster. If the firm has other reasons than compliance to go live with this system on January 1, and compliance is a weak driver behind a particular adoption project, it can be expected that measures will be taken long in advance to ensure that key staff is available. Hence, the government regulation does not require much additional effort. However, if regulatory pressure is a strong driver behind the adoption, and there are no other reasons why the firm would go live on January 1, the additional effort due to the government regulation is tremendous, and ensuring that all key staff are available is a challenge. In this paper, we argue that challenges like this affect some of the adoption success factors identified in prior research. Next, we hypothesise which success factors we propose will be affected.

### **3.1 The Effect of Regulatory Pressure on Top Management Support**

Many studies have demonstrated that adoption success is affected by top management support for an adoption project (Caldeira & Ward, 2003; Wixom & Watson, 2001; Akkermans & van Helden, 2002). Institutional theory suggests that top management support is affected by regulatory pressure. According to institutional theory, institutional pressures affect a firm if powerful agents within the firm recognize the pressure, and perceive that compliance is important and will increase legitimacy (DiMaggio & Powell, 1983). Hence, regulatory pressure will only affect macro organisational behaviour if top executives are aware of a change in government regulations, and of rewards and sanctions associated with compliance and non-compliance (Haworth & Pietron, 2006). Because non-compliance is associated with strong negative sanctions, compliance is considered a top management issue (Garcia, 2004). Even though related decisions can be delegated to a lower management level, top management supervises compliance-related actions and has a strong interest in the successful completion of these activities (Braganza & Franken, 2007). Thus, if regulatory pressure is a strong driver behind an IS adoption project, and the completion of the project is important for compliance, top management will be strongly interested in the adoption project. Hence, top management will strongly support the project. The stronger the regulatory pressure behind an IS adoption, the more will top managers be interested in the project and support the project. Hence, it is hypothesised:

**H1:** *The strength of regulatory pressure has a positive effect on top management support.*

### **3.2 The Effect of Regulatory Pressure on Project Champion Commitment**

A project champion is a person who actively promotes his vision of an adoption project in a firm with the goal to ensure project success. The level of champion commitment varies across adoption projects. While in some cases project champions are formally appointed but do not engage in any particular activities to promote the project, other project champions frequently and vigorously communicate the benefits of the project (Orlikowski et al., 1995; Lai, 1997). Prior studies have shown that adoption is more likely if a project champion strongly commits to an adoption project (Orlikowski et al., 1995; Akkermans & van Helden, 2002; Lai, 1997; Wixom & Watson, 2001; Premkumar & Ramamurthy, 1995).

The project champion is either a senior manager himself, or he is appointed and supervised by a senior manager (Teo et al., 2003). As discussed before, institutional theory suggests that if regulatory pressure is a strong driver behind an adoption project, senior managers will be highly aware of sanctions associated with compliance, and will commit to avoiding sanctions. Therefore, it can be expected that the project champion will also be committed to avoiding sanctions, either because of his position in the firm, or through the supervision of the manager who appoints him. Consequently, the champion will be highly motivated to engage in actions to promote the project and hence ensure adoption success. Therefore, it is hypothesised

**H2:** *The strength of regulatory pressure has a positive affect on project champion commitment.*

### **3.3 The Effects of Regulatory Pressure on Formal Project Management**

Formal project management is defined as the degree to which formal methods are used to plan, organise, and monitor an adoption project (PMI, 2004). Various studies showed a positive relation between formal project management and adoption success (Akkermans & van Helden, 2002; Umble et al., 2003; Aladwani, 2002). In the context of regulatory compliance, formal project management is important because as discussed before, adoption projects are affected by externally determined requirements defined through government regulations, for example requirements that refer to the adoption schedule or to technical specifications. The stronger regulatory pressure becomes as an adoption driver, the more is the adoption project defined by externally determined requirements. Typically, such requirements occur within short periods of time and cannot be planned in advance (Garcia, 2004). Nevertheless, according to institutional theory, firms will attempt to comply with all governmental requirements even if the time frame is unusually short to ensure legal legitimacy

(Mizuchi & Fein, 1999). Thus, firms are challenged to complete adoption projects within a short period of time even if these projects conflict with their usual practices. We argue that firms will opt for highly formal project management to meet such challenges. For example, in case the adoption schedule forced upon a firm through a regulation conflicts with the firm's usual adoption practices, the firm might use a formal project staff plan to ensure that all required staff are available for the adoption. The more dominating regulatory pressure becomes as an adoption driver, the more challenges will arise, and the more will firms attempt to ensure adoption success through formal project management. Hence, it is hypothesised:

**H3:** *The strength of regulatory pressure has a positive effect on formal project management.*

### 3.4 The Effects of Regulatory Pressure on Project Team Competence

IT competence is defined as “the set of IT-related knowledge and experience” of a person (Bassellier et al., 2003). Consequently, project team competence is the set of knowledge and experience of the project team related to a particular adoption project. The required set of knowledge and experience is different for each adoption project (Aladwani, 2002). In times of rapid technology changes, team members need to learn and redevelop their skills for each project (Stratman & Roth, 2002). Hence, firms often regroup project teams, form new teams for particular adoption projects, and retrain team members formally or on-the-job.

In cases when regulatory pressure is a strong driver behind IS adoption and technical requirements are largely determined by government regulations, it is particularly important to retrain team members to ensure that the team possesses the necessary competences to implement the technical requirements. Hence, it is necessary to define formal training measures, expose team members to similar adoption projects where they can get informal training “on the job”, or even hire new team members who possess the necessary qualifications (Walz et al., 1993; Newell et al., 2004). However, most measures to increase team competence require a certain period of time, at least several months, before they yield results (Biros et al., 2002). This is problematic because of the low predictability of changes in the regulatory environment (Garcia, 2004) and the externally defined due-date for compliance (Haworth & Pietron, 2006). According to institutional theory, achieving compliance at the required time will be more important for the firm than completing all competence-increasing measures because of the immense importance of legitimacy (Hu et al., 2007). Hence, it can be expected that in situations when regulatory pressure is a strong driver of IS adoption, the firm will have insufficient time to develop project team competence, and hence it is hypothesised

**H4:** *The strength of regulatory pressure has a negative effect on project team competence.*

### 3.5 The Effects of the Success Factors in the Context of regulatory Compliance

As discussed before, top management support, project champion, formal project management, and team competence are well established success factors in the literature. An overview over prior research on these success factors is provided in Table 1.

Success Factor	Supporting Studies
Top management support	(Caldeira & Ward, 2003; Wixom & Watson, 2001; Akkermans & van Helden, 2002)
Project champion	(Orlikowski et al., 1995; Akkermans & van Helden, 2002; Lai, 1997; Wixom & Watson, 2001; Premkumar & Ramamurthy, 1995)
Formal project management	(Akkermans & van Helden, 2002; Umble et al., 2003; Aladwani, 2002)
Project team competence	(Akkermans & van Helden, 2002; Aladwani, 2002; Caldeira & Ward, 2003; Cox et al., 1981; Dewar & Dutton, 1986; Pennings & Harianto, 1992; Slevin et al., 1991; Sharma & Yetton, 2007)

Table 1. *Success factors of IS adoption.*

Due to the lack of prior studies on IS adoption success in the context of regulatory pressure we need to re-confirm that these factors are positively associated with adoption success in our special case. There are no hints in institutional theory why any of the success factors would be negatively associated with success, or not associated with success at all, when regulatory pressure is an adoption driver. Hence, in accordance with prior literature, it is hypothesised:

**H5a:** *Top management support has a positive effect on adoption success.*

**H5b:** *Project champion commitment has a positive effect on adoption success.*

**H5c:** *Formal project management has a positive effect on adoption success.*

**H5d:** *Project team competence has a positive effect on adoption success.*

### 3.6 Control Variables

While we believe we developed sound hypotheses and use a valid approach to test them, we still acknowledge that adoption success is affected by a range other variables that are not accounted for in our research model. We therefore introduced control variables in our research design which are summarised in Table 2. The research model with all hypotheses and controls is presented in Figure 1.

Control Variable	Definition	Rationale
Firm size	Size of a firm in terms of number of employees and sales in the last financial year	Firms of different sizes might be affected by different government regulations. Further, firms might struggle to successfully adopt IS due to a lack of resources.
Industry	Industry in which the firm primarily operates	Firms of different industries might be affected by different government regulations. Further, firms might use industry-specific systems that are easier or more difficult to adopt than systems used in other industries, hence success might vary across industries.
System complexity	Complexity of the adopted system in terms of technology and required integration with other systems	Complex systems might be more difficult to adopt successfully than less complex systems.
Project size	Size of the adoption project in terms of number of team members, duration of the project, and project budget	Large projects might exceed budgets and schedules more often than smaller projects because they are more difficult to plan.
Time elapsed since adoption	Time elapsed since users started to use the adopted system for their regular work tasks	The respondent's recall of the adoption project might fade or change in the time after the adoption.

Table 2. Control variables.

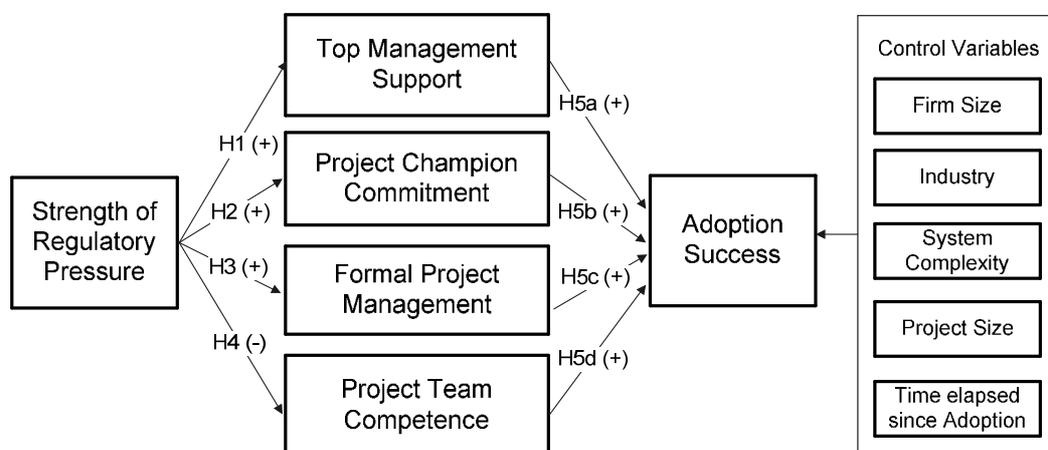


Figure 1. Research Model.

## 4 METHODOLOGY AND CURRENT STAGE OF THE RESEARCH

This research applies a survey approach because it provides statistical power and is an appropriate basis for generalisation (Hair, 2006).

### 4.1 Research Instrument Development

The survey instrument was developed in a four-step procedure as follows. First, we conducted a literature review to find previous survey instruments for our constructs (Singleton & Straits, 2005). For each construct, several instruments existed in prior research.

Second, we built on prior survey instruments to design the first version of the survey instrument for this research. Because none of the selected instruments had been used in a regulatory pressure context before, we slightly adjusted the wording of some items to make them adequate for the purpose of this research. With the exemption of adoption success, all constructs were identified as reflective. Adoption success was modelled as a formative second-order construct because prior research showed that the two dimensions, project implementation success and organisational fit success, do not necessarily correlate (Hong & Kim, 2002).

In a third step, we evaluated the survey instrument using an academics panel and a practitioner panel. The academics panel comprised five experienced IS academics who were presented with a list of items for each construct. Using a 7-point scale, the academics were asked to evaluate how well each list of items represented the related construct. Further, the academics were also asked to provide comments on the items and constructs. The practitioner panel comprised four IT managers who represented our target participants. Again, participants were shown a list of items for each construct in our questionnaire. On a scale from 1 to 7, the participants indicated how easily answerable the items were. Further, the managers were also asked to provide comments. The average score of the constructs awarded by the academic panel was 5.8, and the average score awarded by the practitioner panel was 5.7. Given the mostly positive feedback from the academic panel, these scores were deemed acceptable. Some changes to the item wordings were made based on comments provided by the panels.

The fourth and final step was the pilot study. The research instrument was electronically distributed to IT managers in Australian firms. 30 usable responses were received. Construct reliability was evaluated using Cronbach's Alpha. Generally, values above 0.7 are acceptable (Hwang, 2008). All calculated Alphas were above this threshold (see Table 3). Thus, no further changes were made to the research instrument. The final survey instrument is summarised in Table 3. All items are measured on a 7-point Likert scale.

Construct		# of Items	Adapted from	Cronbach's Alpha
Strength of regulatory pressure		3	(Teo et al., 2003; Liang et al., 2007)	0.78
Top management support		5	(Teo & Pian, 2003)	0.95
Project champion		4	(Teo et al., 2003; Wixom & Watson, 2001)	0.97
Formal project management		6	(Henry et al., 2007; PMI, 2004)	0.92
Project team competence		7	(Stratman & Roth, 2002; Aladwani, 2002)	0.90
Adoption Success	Dimension 1: Project implementation success	6	(Wixom & Watson, 2001)	0.91
	Dimension 2: Organisational fit success	7	(Hong & Kim, 2002)	0.92

Table 3. Survey instrument (control variables omitted).

## 4.2 Data Collection and Analysis

Data will be collected through a survey amongst IT managers, IT directors and CIOs. This target group was chosen because prior research has shown that IT managers and IT executives are able to evaluate the success factors investigated in this research and the level of adoption success (Cragg et al., 2002; Harland et al., 2007; Wixom & Watson, 2001). Further, they are also aware of compliance-related IS decisions (Garcia, 2004) and thus, they are able to evaluate the strengths of regulatory pressure as a driver behind IS adoption.

Originally, we aimed to apply an online survey approach. However, an analysis of comments from companies that had been invited to participate in the pilot study and had replied that they felt unable to do so showed that in response to recent social engineering attacks, when IT managers were deceived in fraudulent surveys to reveal confidential IT information that would later be used for hacking attacks, many companies have implemented policies that restrained IT managers from participating in online surveys. Therefore, we will apply a mixed electronic and paper survey approach in the main study to increase the response rate. We aim at 200 usable responses.

Data will be analysed using structural equation modelling (SEM)/Partial Least Squares (PLS). PLS is a latent SEM technique that utilises a principal-component based approach to estimation. It can handle formative constructs (Chin & Newsted, 1999) and is robust to small sample sizes (Majchrzak et al., 2005).

## 5 CURRENT STAGE OF THE RESEARCH

Data was collected in March 2009. A total of 210 responses from eligible respondents were received. At the time of writing the camera-ready version of this paper, the SEM analysis is in progress.

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