Stakeholder Alignment and Effective System Use: Case Study of a Public Sector Information System

Research-in-Progress

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Abstract

This research seeks to understand how improved stakeholder alignment impacts the use of IT systems deployed in support of sustainability. The IT alignment literature is dominated by a focus on strategy formulation within relatively simple organisation forms. In contrast, little is known about how stakeholder alignment is enacted to improve the use of mandated IT systems. To address this gap we: (1) identify the factors that influence the effective use of such systems; (2) investigate how strategic alignment among stakeholders within project related networks impacts on effective use; and (3) propose and test a stakeholder alignment model to explain effective use of a mandated sustainability system within the Australian building industry.

Keywords: Strategic alignment, Public sector, Effectiveness, Sustainability

Introduction

Creating the conditions for sustainable economic growth within a constantly changing environment is a key concern for government. It requires a delicate balance between the need for legislative intervention (e.g., targets for reducing carbon consumption) against the economic cost (both direct and indirect) of compliance. A very visible example of this tension can be found in the Australian building industry. Research reveals that the Australian building industry, comprising the construction and use of all commercial and residential buildings, contributes 23% of emissions to Australia’s greenhouse gas profile, compared to transport (15.4%), agriculture (16.8%), and industrial processes (5.6%) (ASBEC 2007). However, effecting behavioral change in this industry is complex and requires the coordination and engagement of a range of stakeholders including builders, designers, contractors, suppliers, planners and end users (tenants and owners). This task is complicated by the competing priorities of the different stakeholders, varying levels of risk tolerance among stakeholders, and the recognition that stakeholders often have differing levels of philosophical commitment to sustainability.
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The Australian government has responded by establishing programs focused on both demand and supply. Demand-side interventions attempt to stimulate the market for more sustainable buildings through security for investment returns and incentives for end users and developers to improve energy efficiency. Supply-side interventions have promoted compliance through policies and regulations intended to establish appropriate building codes and standards that reduce emissions. In Australia, governments and agencies at various levels have developed a number of policy instruments for reducing environmental impact, such as the Building Code of Australia (BCA), the National Building Environment Rating tool (NaBERs), Green Star Rating Tools, and the subject of this research, the New South Wales Building Sustainability System (BASIX).

Though these interventions have had some impact, they have failed to persuade stakeholders en masse to commit beyond the minimum legislated requirements (Zou 2013). A recent audit undertaken on BASIX highlighted that poor strategic alignment among the key stakeholders involved in the development approval and consent process (those with a compliance monitoring role) has significantly impacted the effective use of the system, and accordingly the reductions of greenhouse gas emissions (Eckstein 2013). At a systems level, these observations could point to a range of possible issues: (i) problems with the system features (content gap), (ii) problems with the system usability (design gap), and (iii) problems with the skill and knowledge of users (capability gap). At a behavioral level, the findings reflect poorly on how BASIX is currently being used, suggesting the potential of the system to educate users (learning) and lead change (adaptation)—two acknowledged drivers of informed action and effective system use (Burton-Jones and Grange 2012)—are being hindered by different priorities and underlying social structures (the commitment gap). Taken together, these gaps should collectively influence the sustainability outcomes achieved (performance gap) from the effective use of the system.

Specifically, in this research we aim to investigate how a better understanding of socio-structural patterns influences alignment, and subsequently how this alignment impacts effective system use and performance outcomes. This is a significant and persistent research issue (Chan and Reich 2007, Chan 2002, Reich and Benbasat 2000) requiring more attention and new methodological tools (Walentowitz et al. 2010, 2011). In our study we propose an innovative combination of methods to undertake one of the first comprehensive empirical examinations of how stakeholder alignment influences the effective use and performance of information systems deployed to manage sustainability.

**Conceptual Framework**

*Toward an integrated, network view of IT alignment*

IT alignment has been defined in the literature as the degree to which higher-order strategies are supported by IT systems and business structures (Henderson and Venkatraman 1993); as the consistency of business and IT priorities (Chan and Reich 2007); and as the complex configuration of strategy, structure, process, IT, and human elements (Rahrovani et al. 2011, Schlosser et al. 2012). As this succinct timeline demonstrates, research has begun to move away from high-level, difficult to measure abstractions of “strategy” toward an examination of the specific capabilities required to align IT with business processes and outcomes (e.g., El Arbi et al. 2012, Rahrovani et al. 2011). This shift reflects the view that organizations use IT systems to create value and reduce exposure to risk through the appropriate application of operational capabilities. In this sense, IT alignment can be viewed as the degree to which the deliverables of an IT system are consistent with an organization’s objectives, which are in turn shaped by the need to balance internal priorities against those of a network of external stakeholders (Jenkin and Chan 2010). As such, we define stakeholder alignment in this study as the extent to which an organization and its external stakeholders share a common understanding of what is strategically important. Understanding how this stakeholder alignment impacts effective system use and IT project outcomes is important to our understanding of the emergent nature of IT alignment and its contribution to sustainability.

We thus propose a stakeholder alignment model (see Figure 1). This model draws on institutional theory and agency theory to explain, respectively, how tactically focused internal alignment (i.e., how the quality of the system allows users to meet their own strategic priorities) and strategically focused external alignment (i.e., how effective system use supports users to resolve differences in strategic priorities among stakeholders) combine to influence system use and performance.
Internal alignment is viewed through the lens of system quality, in which the content and design of the system, along with the capability of users, combine to influence directly the effective use of the sustainability system. The goal of creating a quality system and increasing the effective use of this system is akin to a search for legitimacy, wherein internal stakeholders must sacrifice personal interests and work together in order to create a superior outcome for users. While users with higher capability levels may be able to compensate for deficiencies in either content or design, we emphasize that superior system use occurs when these three factors are aligned. However, there is a fourth factor that may undermine the effective use of the system.

This fourth factor is related to the philosophical commitment of the users to enact what they have learned. Within the context of our study, we conceptualize this additional factor in terms of external alignment between the user and other stakeholders. This operationalization reflects the presence of social normative pressures and the expectation that user adaptation is likely to be driven by the expectations of other stakeholders. Porter and Kramer (2006, 2011) refer to this selective adaptation as strategic corporate social responsibility, arguing it is inefficient for organizations to adopt a sustainability position beyond the expectations of their stakeholders. In the context of our research, we propose to measure the collective expectations of stakeholders in terms of their risk profiles. In particular, we will conceptualise external alignment between stakeholders in terms of how similar they are in their willingness to accept different operational risks. This approach to external alignment is informed by the extant research on agency theory, which has long recognized a strong direct relationship between risk orientation and behavioral compliance within partnering arrangements (Kosnik et al, 1992).

Through our proposed model we aim to deliver a better understanding of how internal and external alignment influence effective use of IT systems within complex multi-stakeholder environments. This is a significant contribution to the IT alignment literature, which has largely focused separately at either the strategic or tactical level, assuming a dyadic rather than a network view of alignment. This effort will also contribute to our understanding of how stakeholders collaborate to co-create value as they seek to realize their individual goals (Grover and Kohli 2012). In line with Schon (1987), we characterize this reflective and evolutionary learning process as a feedback loop within our model.

Based upon preliminary research undertaken with the NSW Department of Planning and Infrastructure, our proposed research will seek to put this model into action through a mixed methodological examination of BASIX, the NSW Government's building sustainability system. In particular, we plan to investigate the conceptualization of external and internal alignment within the context of the building and planning processes. We will also examine the extent to which stakeholder alignment impacts the effective use of BASIX and the achievement of broader sustainability outcomes.
Recently published independent reviews of BASIX (Eckstein 2013, Zou 2013) highlight a number of deficiencies in the use of the present system, including concerns regarding the extent to which socio-structural factors impact the realization of the system’s performance potential. The reviews highlight in particular the poor alignment in the strategic priorities of stakeholders which has exacerbated the effective use of the system. A better understanding of how stakeholder alignment is influenced by individual, organizational, and contextual factors—and how different users learn about sustainability and subsequently adapt their behaviors—will help the NSW government identify strategies for improving the performance of the system and for better engagement of all stakeholders through more targeted demand and supply-side interventions.

Although there is an extensive body of research into IT alignment, there is a recognized need for research integrating strategic and tactical views of alignment (Wolf et al. 2010) and examining the socio-structural aspects of alignment (Walentowitz et al. 2011). With this and the above background in mind, we identify three significant theoretical, methodological and practical contributions relating to the conceptualization, measurement and instantiation of stakeholder alignment.

**Stakeholder view of alignment**

The importance of alignment to the realization of business value from IT is well established in the literature. For two decades, it has persistently ranked as one of the main issues confronting IT executives (Luftman et al. 2012), and is viewed as a critical determinant of IT take up and organizational performance (e.g., Chan and Reich 2007, Teo and Ang 1999). Prior IT alignment research distinguishes between strategic and tactical levels of alignment, regarding both as equally important to the utilization-performance relationship (Chan et al. 1997, Cragg et al. 2002, Henderson and Venkatraman 1993). Strategic IT alignment reflects the extent to which IT supports the realization of business goals (Luftman and Brier 1999), whereas tactical IT alignment is defined as the fit between IT infrastructure and an organisation’s capacity to exploit the proposed technology to meet their pecuniary interests (Henderson and Venkatraman 1993).

Although the importance of integrating the strategic and tactical views of IT alignment has long been recognized (e.g. Henderson and Venkataraman 1993), very few studies have sought to examine the interplay between these two views (Wolf et al., 2010). Consequently, a well-established, integrated framework providing insight into how alignment translates from higher-level strategic support into the operational-level requirements for value creation and successful system use has yet to emerge. Our study addresses this important gap.

Likewise, there has also been a call for alignment research to move beyond simplistic dyadic relationships to a more realistic view of alignment embracing the complex multi-stakeholder environments in which firms operate (Walentowitz et al. 2010, 2011). While prior research has examined the extent to which internal socio-structural conditions influence an organization’s ability to operationalize alignment (Chan and Reich 2007), the literature has been virtually silent on how relationships among a network of inter-related stakeholders influence strategic and tactical alignment. Our study addresses this gap: we consider how the structure of social networks among stakeholders involved in complex building projects influences their effective use of a building sustainability system.

**Measuring alignment**

There is a problem with the measurement of IT alignment. Fundamental deficiencies exist in both the analytical tools used (Chan et al. 1997) and the different approaches adopted to conceptualize alignment (Oh et al. 2007). Prior work, based largely on bivariate fit, has produced inconsistent results and is flawed because it implies that alignment, as a whole, is reducible to a linear combination of parts. In contrast to most studies in the strategic alignment research tradition, we do not attempt here to avoid the difficulty of measuring alignment; instead, we will uncover alignment by examining trade-offs in the different strategic motivations of stakeholders regarding the use of BASIX for different building projects. The use of discrete choice analysis (DCA) to measure alignment in terms of profile deviation (c.f. Bergeron et al. 2001) represents a valuable contribution to the measurement of alignment.

Keating et al. (2010) show that DCA can be highly effective in understanding complex managerial decision making. Their study of RFID adoption reveals managers follow rational rules when developing their strategic priorities, but are far less rational when it comes to “actual” investment choices. It is conceivable similar differences exist in the way risks relating to information systems usage are perceived. We need
methods that can reflect realistic strategic decision making and tease out the subtle differences influencing the way organizations balance the need for internal/tactical alignment and the requirement for external/strategic alignment.

In this research, we propose a novel combination of DCA and Social Network Analysis (SNA). We will use the DCA to investigate how stakeholders evaluate different risks associated with sustainable practices and use of the system. The DCA method allows us to conceptualize individual choices as a process of decision states in which stakeholders compare different combinations of risks impacting the realization of different development goals. The result of this process is a “choice outcome” that can be decomposed based on an underlying experimental design to identify the relative importance of the constituent risks present within a given choice task.

Recent advances in design theory and the mathematical models supporting DCA have resulted in efficient models that minimize the cognitive demands on respondents to obtain robust estimates of preference that are extremely accurate in explaining behavior. While DCA and its related mathematical models have a rich history in the fields of economics, psychology, physics, and chemistry, they are still very new to the IS literature. For instance, a search of the top IS journals (i.e., MISQ, ISR, JMIS, and I&M) identified only three papers utilizing DCA over the past decade.

We will use the relative importance data (i.e., part-worth weightings) from the DCA analysis as inputs for the SNA. We will compute a measure of external (stakeholder) alignment for each respondent based on Heider's structural balance theory (1946) and the Doreian and Mrvar (1996) partition approach. Through this approach we seek to optimize partition structures among groups of stakeholders, with the resulting alignment measure representing a new approach to the measurement of alignment reflecting how well each person aligns with a broader group of stakeholders involved in a particular project based on their underlying risk profiles. The use of SNA also has the added advantage of providing an effective way to visualise alignment, the inter-relationships among the stakeholders involved, and the relative importance (centrality/density) of certain risks. Following the SNA, we will use the derived external alignment measure within a structural equation model to examine the moderating influence of stakeholder alignment on the paths associated with the capability gap, commitment gap, and performance gap shown in Figure 1.

This proposed approach will have important practical implications, including enabling Australian organizations to identify areas for risk mitigation and capability improvement to enhance the use of BASIX. The approach also provides a new set of tools to study more accurately the factors impacting and facilitating alignment in complex multi-stakeholder environments.

**Instantiation within a real-world setting**

Gregor and Jones (2007) argue the inherent practicality of information systems as a discipline, involving the study of technological artifacts embedded within real-world organizational settings. They contend most, if not all, information systems research concerning the design and deployment of systems ought to be instantiated in a real-world setting to improve the practical and theoretical relevance of the findings. Accordingly, in our proposed research we will examine stakeholder alignment in the context of a mandated government information system. In particular, we will focus our research will focus on the application of our stakeholder alignment model to the NSW Building Sustainability System (BASIX). This mandated system has the potential to drive significant behavioral change if embraced by stakeholders, though this potential is not presently being realized. It is also noteworthy that this project brings together an impressive team, including the government authority responsible for the development, deployment and management of the system (NSW Department of Planning and Infrastructure, DPI) and the peak national body representing the stakeholders involved within the Australian building industry (Master Builders Association), which has been working with DPI over the past five years to improve the quality of IT support services for sustainability in the building industry.

Another related advantage of instantiation is it will allow us to address a well-acknowledged criticism with government interventions: they tend to focus too much on the mechanics of bringing about change to processes (and systems), with little, if any, attention to the net impact of these changes (ANAO 2009). Our proposed approach is unique in that it will not only measure the impact of external and internal alignment on system use, but will also examine whether the use of the system leads to improvements in actual performance (sustainability) outcomes. In this way, our project addresses two strategic research priorities in relation to “living in a changing environment”: to enhance the management of risk and the realization of opportunities to transform sustainability; and wellbeing through the use natural and human systems.
Approach and Method

We propose a three-stage sequential explanatory mixed method research design (Cresswell and Plano-Clark 2011) to operationalize and empirically test the stakeholder alignment model (Figure 1). With the exception of the preliminary work (Stage 1), which we undertook to frame the proposed research, we intend Stages 2 and 3 to address the stated research aims and realize the associated contributions. As outlined below, our approach can be described as developmental (Venkatesh et al. 2013) drawing on qualitative techniques to explore the conceptualization of the constructs within our model and quantitative, survey-based techniques to operationalize and test the model among a sample of building industry stakeholders. We present these stages below.

Holistically, this approach will provide a detailed case study of how stakeholder alignment impacts the effective use of a core building and planning information system, BASIX. We identified the proposed multi-stage, mixed-method case approach as the most appropriate, given the complexity of the research setting and the desire to realize the goal of “richness and analytic insight into people, events, and passions as played out in real-life environments” (Yin 2005:xiv). Widely used in power and politics research (Markus 1983), the case study approach is well suited to the study of system use and performance when the competing needs of stakeholders need to be negotiated (Feller et al. 2011).

Preliminary work

Our focus in the preliminary work was on the system requirements and perception of a sample of stakeholders regarding the adequacy of the BASIX system. This research revealed the importance of a multi-stakeholder conceptualization of IT alignment and helped identify a number of factors influencing internal and external alignment. In particular, and consistent with the work of Gutierrez and Serrano (2008), we identified the lack of congruence between the priorities of senior managers responsible for development of the system and the risk tolerance and capabilities of building industry professionals responsible for liaising with stakeholders and using the system as key inhibitors to more effective use of BASIX.

The research detailed in this paper will build on the insights from this preliminary research and the resulting stakeholder alignment model we derived, to examine how socio-structural considerations influence the effective use and performance of the system. By focusing on the delivery of a core government service, the proposed research also directly responds to some of the key recommendations of the Gershon Report (2008), which highlighted the need for the Australian Government to improve IT governance, increase operational efficiency, improve technical skills, interact better with industry, and ensure its IT deployments are sustainable. It is noteworthy that these recommendations were also endorsed by a NSW government enquiry into improving IT outcomes (ICAC 2013). It is also significant that the research proposed is among the first to consider IT alignment as a dynamic, emergent process involving complex trade-offs and concessions. Recent research suggests the ability to align internal and external priorities in response to changes in internal and external environments is essential to successful IT use, and subsequently to realizing improved business process outcomes (Wolf et al. 2010, Chan and Reich 2007).

To provide an informed foundation for the proposed research, the preliminary work included a comprehensive review of the academic literature in the areas of IT and business alignment, institutional theory, agency theory, social network theory, and a review of government and industry reports on sustainability systems and outcomes. This work led to the identification of the model presented in Figure 1, with aspects and details relating to the literature review reported above.

Conceptualizing factors influencing effective use and stakeholder alignment

During recent years, institutional theory has emerged as a theoretical perspective to account for the influence of external forces on organizational decision making (Mizruchi and Fein 1999). Institutional

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1 Detailed results from the preliminary work have not been presented here due to space constraints. However, a detailed report is available to interested persons upon request.
Stakeholder alignment and effective system use

theory posits structural and behavioral changes in a firm are driven by an organization’s need for legitimacy (DiMaggio and Powell 1983). The continuous search for legitimacy facilitates, over time, the process of institutionalization and isomorphism, especially in dynamic and turbulent environments. In these environments, senior management fulfill a boundary-spanning role (Mitchell 2006) and are responsible for aligning external expectations with internal capabilities (Liang et al. 2007). However, operational proficiency is also required to address top management’s priorities through the adaptation of technology and the re-design of business processes (Floyd and Wooldridge 1997). In line with Scott’s (1987) concept of inducements, incentives provided by influential stakeholders (e.g., government) have been shown to shape governance and behavior by senior management.

We will undertake qualitative research to understand and conceptualize the constructs represented in Figure 1, as well as explore how strategic-level support translates into tactical-level capabilities. The qualitative fieldwork will focus on understanding user requirements, system quality (features, usability), effective system use (learning, adaptation), and system performance. Given the scarcity of research on system development in the public setting and questions regarding the applicability of the conceptual model to the focal context, we will need to explore each of the constructs depicted in the conceptual model (see Figure 1) detail during the interviews. The fieldwork will also build on earlier work of Jin and Yang (2012) to identify a comprehensive list of perceived risks involved in responding to sustainability pressures for inclusion in the DCA experiment. We will use semi-structured interviews with senior management from across the building industry, including government planners, builders, contractors, suppliers, designers, and end users. While saturation will dictate the final number of interviews we undertake, our goal is to identify an initial sample of 30 stakeholders in greater Sydney and Southern NSW. We will stratify the sample to ensure it is balanced in terms of stakeholder type, demographics, experience, and geographic location. The data collected during this stage will assist in the operationalization of the constructs during the quantitative phase.

Empirical test of stakeholder alignment model

Following an evaluation of the system quality (internal alignment), it is necessary for respondents to undertake a process of external alignment as a way to balance the needs of external stakeholders and determining the extent of user adaptation. Agency theory (variously known as principal-agent theory and human-agency theory) provides a useful lens through which to examine this external alignment. According to Eisenhardt (1989), agency theory is concerned with resolving problems arising when there is conflict between the desires or goals of the principal and the agent, or when the principal and the agent have different attitudes towards risk and risk sharing. Though much of the focus of agency theory has concerned the use of formal contracts to manage undesirable behavior, within the context of the proposed study, we consider how stakeholders balance their formal obligations to one another against other considerations such as government requirements and broader societal expectations. Social network theory also has a role to play in helping us understand the socio-structural aspects of such relationships. SNA provides a set of methods for analyzing the structure of whole social entities as well as explaining the patterns observed in these structures.

The quantitative fieldwork will involve face-to-face surveys with an estimated 90 sustainability assessors across Sydney and Southern NSW (we will determine the actual sample size based on the statistical requirements of the experimental design). The assessors are the central nodes in their respective networks and act as intermediaries between the building industry and the client. As such, they have a good understanding of the perceived risks, operational capabilities, and performance expectations of planners, builders, contractors, suppliers, designers, and end users. The latest data reveals there are currently 300+ building assessors operating across Sydney and Southern NSW. We expect the assessor interviews to last for approximately 1 hour and involve completion of an electronic survey to capture information on the constructs depicted in our model (Figure 1), information on awareness and impact of related government programs, and other contextual information to help control for differences across respondents. The survey-interview will also involve a DCA experiment to assess the relative importance of a range of risks as they applied to the most recently completed development (within last 12 months) involving a BASIX assessment.

Following completion of the survey, we will ask the assessors to provide contact details for other stakeholders involved in the nominated project. These other stakeholders will be invited to complete a shorter, self-administered online survey. We will analyze and include in the subsequent analysis and modelling only those projects involving three or more stakeholders (i.e., assessor, builder, and end user).
Conclusion

Improved stakeholder alignment is essential for the effective use of information systems deployed within a complex public-private, inter-organizational environment. Our research will investigate the extent to which stakeholder alignment contributes to the effective use of the NSW building sustainability system (BASIX). The building industry makes a significant contribution to Australia’s greenhouse gas emissions. This project will improve our understanding of how the relationships among stakeholders impact the use of information systems deployed to educate and support industry to become more sustainable. Specific anticipated impacts include: (1) reduced greenhouse gas emissions; (2) greater understanding of the socio-structural factors influencing IT use; and (3) improved government IT services to the industry.

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