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ERP stakeholders' perceptions of data quality and utility

Introduction

A substantial body of literature exists identifying factors contributing to under-performing Enterprise Resource Planning systems (ERPs), including poor communication, lack of executive support and user dissatisfaction (Calisir et al., 2009). Of particular interest is Momoh et al.'s (2010) recent review identifying poor data quality (DQ) as one of nine critical factors associated with ERP failure. DQ is central to ERP operating processes, ERP facilitated decision-making and inter-organizational cooperation (Batini et al., 2009). Crucial in ERP contexts is that the integrated, automated, process driven nature of ERP data flows can amplify DQ issues, compounding minor errors as they flow through the system (Haug et al., 2009; Xu et al., 2002). However, the growing appreciation of the importance of DQ in determining ERP success lacks research addressing the relationship between stakeholders' requirements and perceptions of ERP DQ, perceived data utility and the impact of users' treatment of data on ERP outcomes.

Anecdotal evidence suggests that many organizational Information System (IS) projects lauded as "successes" have produced sub-optimal results, and in some cases premature declaration of success allows poorly performing projects to move out of organizational scrutiny (Lorenzo et al., 2009). These partial successes are evident in IS development projects when one group views a project as a success while operational staff perceive it to be a failure (Standing, 1998). One potential explanation for this is differences between the perceptions of those accountable for the implementation and end users: for example, managers perceive success as the provision of required integrated data solutions, whereas end users are mainly concerned about how an ERP system facilitates their daily jobs (Amoako-Gyampah, 2004). As ERP performance is

perceptually based, it is heavily dependent on the stakeholders performing the assessment and the changing nature of those perceptions, the issue of performance measurement is not trivial (Middleton, 1995; Myers, 1994). When implementing ERPs managers need to be aware of the difficult to change deep-rooted views, attitudes and behaviors of many stakeholders (Hussain and Hafeez, 2009). Consequently, managers must be aware that stakeholders do not necessarily share a common view of the perceived benefits of new technology (Amoako-Gyampah, 2004).

Although the critical nature of DQ in ensuring ERP success is acknowledged, less attention to adequately understanding the dynamics of perceptions of DQ between ERP stakeholders exists (Giannoccaro et al., 1999; Haug et al., 2009). Therefore, this paper addresses the question:

“Does applying stakeholder theory to the problem of DQ and ERP performance provide insights and explanations into the complex interplay between users in an organizational context that impact ERP performance?”

We posit that by failing to fully understand the complex relationships present between ERP stakeholders and their divergent data needs, organizations jeopardize full value realization of data captured in ERPs. Furthermore reducing stakeholders' ability to effectively utilize the data they depend on and potentially inciting dysfunctional behaviors stakeholder groups will attempt to take control of data pertinent to their needs (Smith and McKeen, 2008). This hampers the ERP's ability to facilitate value-adding activities within the firm, further reducing the ERPs capacity to provide an optimum return on investment. Using stakeholder theory, we extend Amoako-Gyampah's (2004) observations of differing perceptions among organizational stakeholders regarding the role and value of ERPs to provide greater insight into why ERPs often fail to realize optimal potential. We argue that for multiple technical and structural reasons,

ERPs configured to data requirements consistent with the needs of a single stakeholder group neglect the divergent data requirements of other stakeholder groups. Using the stakeholder and information systems literatures we consider the implications of whether data captured, stored and reported in a form with limited utility to the majority of stakeholders is a key driver of perceptions of poor ERP performance — despite the ERP legitimately performing to specification. We further suggest that effective maintenance and value extraction of ERPs requires a deep understanding of the differential ways stakeholders treat ERP data and the base origins of those attitudes, perceptions and behaviors. Applying stakeholder theory to the problem of DQ and ERP performance, we present a framework and model articulating the fundamental differences in the way users distinguish between ERP data utility and data quality. Importantly our framework provides guidance on managing data flows between stakeholder groups and offers insight into each stakeholder groups' specific data requirements.

Who or what are ERP stakeholders?

Large contemporary organizations typically present ERPs and business managers with complex social, economic and environmental contexts (Gal and Berente, 2008). Within these settings are numerous individuals and groups, with varied backgrounds and perspectives, intent on achieving numerous operational and strategic outcomes. This leads to a complex set of stakeholders holding various positions with respect to the problem itself, the principal problem owner, and other stakeholders. This dynamic context complicates significantly the analysis, classification and categorization of stakeholders (Achterkamp and Vos, 2007; Ashworth and Skelcher, 2005; Greenwood, 2007). Previous discussions concerning invested parties in the IS/IT user space have adopted a pragmatic, functional approach to categorization. For example, Sedera et al.

(2006) limited their differentiation to strategic, user and technical groups, which has similarities to Shang and Sneddon's (2002) consideration of strategic, management and operational groups, and Rai et al.'s (2002) strategic, operational and tactical users typology. The extent of the usefulness of this level of differentiation is debatable when drawing conclusions about how various organizational users interpret an ERP's impact on their work environment. On one hand, the categorizations are arguably too broad to capture the specific interests and concerns of distinct user groups. On the other, the essential characteristics comprising a “strategic” vs “tactical” vs “operational” user can be highly contextualized, limiting generalizability.

One framework capable of providing a finer granular identification and categorization of relevant stakeholders in an ERP context is Freeman's (1984) stakeholder theory. A stakeholder is defined as “any group or individual who can affect or is affected by the achievement of the organization's objectives” (Freeman, 1984, p. 46). Originally framed in an organizational perspective to improve strategic management, “stakeholding” has increasingly gained traction in academic texts, media, and government publications. A significant increase in attention to the application of stakeholder theory to social issues in business and management indicates theory maturation (Friedman and Miles, 2002; Laplume et al., 2008; Noland and Phillips, 2010). Adopting a stakeholder approach allows a broader and more considered examination of those with a relevant interest in the issue at hand, particularly those with a strategic importance (Ayusco et al., 2011). Two key stakeholder theory components provide a mechanism to determine the actions of stakeholders in any particular context— the “frame of reference” held and the degree of salience possessed. These two components as they relate to ERP stakeholders are discussed in detail below.

Stakeholders' frames of reference

Personal experiences, education, culture, and familial relationships shape an internal frame of reference: how a stakeholder views the world (Butts, 2008; de Bruijn and ten Heuvelhof, 2000; Ryan et al., 2006; van de Riet, 2003). Though individually unique, a frame of reference can overlap with, and be strongly influenced by, others within the same organization or social grouping. Within an organization then, multiple groups may share similar frames of reference (Barry and Proops, 1999; Gasper and Apthorpe, 1996). These intra-organizational groups develop and share commonalities based on organizational experiences, and overlapping frame of reference components become a stakeholder's policy discourse.

Policy discourses are highly context specific, describing how individuals as a group perceive a topic, behave towards that topic, and interact with others around that same topic (Kroesen and Broer, 2009; Skelcher et al., 2005). Stakeholder theory argues this is how departments and functional teams develop largely idiosyncratic views of organizational issues, such as ERP utility and performance. Stakeholder groups not sharing policy discourses often experience miscommunication and confusion as a consequence of using different language, jargon, and attaching differing meanings to similar words and phrases (van Eeten et al., 2002). Therefore, identifying or de-coding policy discourses within stakeholder groups is critical, as policy discourses provide contextual insight and expose the underlying reasons for stakeholders' objectives and reactions to organizational events. That is, different stakeholders can have similar goals, yet be driven by different motives and have alternate approaches to dealing with the issue.

Conversely, stakeholders might share similar motives but aim for different objectives.

Understanding ERP stakeholder groups in relation to their policy discourse and classifying them accordingly can enhance effective communication and, as a consequence, clarify organizational expectations of ERP performance (Gasper and Apthorpe, 1996; McLaughlin, 2005). Therefore understanding individuals' frames of reference and stakeholder groups' policy discourse is fundamental to understanding how individuals treat and use ERP data.

Applying stakeholder theory to the ERP data utilization problem requires consideration of stakeholder groups' expectations of an ERP in the context of their organizational role and the policy discourse present between groups in relation to ERP data, particularly its quality and utility . How each stakeholder group treats and uses data can result in a misalignment between data production, capture, manipulation, storage, transference, and perceptions, which in turn has implications for the communication and actioning of data issues (Momoh et al., 2010). A starting point to explore ERP stakeholders' frame of reference is Lee and Strong's (2003) data roles. Equating the flow of data throughout an organization to a production line, Lee and Strong (2003) applied an input–process–output model to DQ, identifying three primary roles undertaken in relation to the treatment of data within organizations. In their model, data traverses an information supply chain: moving from raw data input (completed by data collectors) on to data curation and report generation (executed by data analyzers/custodians) through to report interpretation and action (enacted by data consumers). Applying stakeholder theory along with Lee and Strong's data roles within an ERP context allows us to postulate behavioural drivers associated with each data role in relation to role driven ERP data needs.

Consistent with previous work in the IT/IS literature (e.g. Rai et al., 2002; Sedera et al., 2006; Shang and Seddon, 2002) we identify associations between: (1) operator/user stakeholder groups and data collectors; (2) IT/IS engineering stakeholder groups and data custodians; and (3) executive/managerial stakeholder groups and data consumers. Table 1 outlines each role associated characteristics, articulating each primary stakeholder groups' frame of reference.

[Insert Table 1 about here]

Operators / Data Collectors: Typically located at the operational level of the organization, data collectors often interact with technology in any production process and input ERP data as a by-product of their day-to-day activities (Lee and Strong, 2003). In an ERP context, this primarily encompasses those frequently interacting with the system, such as human resources assistants inputting personnel records (e.g. Benders et al., 2008). The task requirements of this group leads to a shared perception that human interaction, communication, trust, teamwork and innovation are essential for problem solving and completing tasks efficiently (Schien, 1996). Consequently those bound by a data collector's policy discourse therefore are principally interested in whether the technology helps operational goal achievement and employee centric outcome improvement. Key drivers of data collector stakeholder groups' base priorities are the structural and institutional elements incentivizing behavior, which directly influences ERP data perceptions and treatment.

IT/IS Engineers / Data custodians: In an ERP context, the data analyzer/custodian stakeholder group is likely to be located within the IT/IS and engineering fraternities (Xu et al., 2002).

Accordingly, the data analyzer/custodian stakeholder group is predominantly responsible for the

ERPs ongoing maintenance and functioning, providing technical advice and acting as the primary point of contact with system vendors. Consistent with their frame of reference, the data analyzer/custodian stakeholder group's immediate priorities lie with ensuring the system is performing to specification while responding to technically orientated incentivized targets, typically prioritizing system availability and accessibility. Their high level of system and domain specific knowledge often results in a perception of them being system experts, frequently making them the first point of contact for ERP related advice (Willcocks and Sykes, 2000). This is both a source of power and pressure, as they attempt to balance their technical frame of reference with the often misaligned frame of reference of other stakeholder groups.

Executives / Data consumers: The data consumer stakeholder group is associated with those having a vested interest in maintaining or improving organizational financial well-being, achieving a return on investment and reducing the risk of operations (Boonstra and Govers, 2009; Wang and Strong, 1996). The reasoning articulated by data consumers reflects a frame of reference orientated around efficiency, cost reductions, responsiveness and control; the representations of which are manifested in changes to work processes, job design, information and data flows, thereby meeting organizational strategic and operational aims (Koch, 2001; O'Mahoney and Barley, 1999). The knowledge management capacity of ERP technology (Davenport, 1998) assists the data consumer stakeholder groups' management of internal and external organizational affairs, elements resonating strongly with a data consumer stakeholder group that is incentivized to minimize labor costs, maximize profits and reduce operational risk to ensure organizational survival.

In summary, the data ERP “production process” involves complex processes and workflows, including: (a) the input of data associated with data collectors who are responsible for data capture and entry; (b) the processing of data which is the responsibility of data custodians overseeing information systems; and (c) data output, which ideally is utilized by data consumers to achieve positive organizational outcomes (Gertz et al., 2004; Lee and Strong, 2003). The quality of the data product produced is determined by the inter-linkage between the three phases in the process and can be improved through appropriate changes to individual factors in the system (Ballou et al., 1998; Gertz et al., 2004). Considering the multiple roles associated with data production we argue that both data quality and utility can be improved by understanding the Frame of Reference (FoR) held by each group and further, the salience of these groups as to the legitimacy, urgency and power associated with their data requirements. Having clearly located and articulated the frame of reference and primary policy discourse of ERP stakeholders, we now consider the salience possessed by each stakeholder and the implications of salience for ERP utilization.

Stakeholder Salience

Learning, communication, and decision implementation problems are evident when the assumptions, values and behaviors of each stakeholder group within an organization are misaligned (Schien, 1996). When applying stakeholder theory to an ERP context it is important to evaluate stakeholders in terms of their “stake” in the issue or event under consideration, i.e., to what extent will the stakeholder be able to affect, or be affected by, the issue (Agle et al., 1999). The fundamental question thus becomes whose claims will be accepted and whose claims will be denied. The predominant stakeholder classification method is based on a determination of

stakeholder salience (Mitchell et al., 1997). Stakeholder salience, the degree to which managers give priority to competing stakeholder claims, is a combination of three factors: power, legitimacy and urgency (Mitchell et al., 1997). When coercive, utilitarian, or normative means of power are accessible, stakeholders are able to impose their principles onto a relationship. Access to, and exertion of, power are variable and in constant flux, with power gained and lost over time (Parent and Deephouse, 2007).

Legitimacy derives from organizational members' acceptance of, and/or expectations from other stakeholders (Mitchell et al., 1997). These intricate social structures are important with regard to the acceptance of a person or group as a stakeholder. Suchman (1995) defines legitimacy as "a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions". Legitimacy is more than a mere self-perception; rather, it is socially desirable and acceptable within a broader social context. At the same time, however, legitimacy may be redefined and negotiated as a function of organizational level.

Jones (1993) introduced urgency as a determinant of stakeholder salience as a two-dimensional construct consisting of i) the degree to which managerial delay in attending to the claim or relationship is unacceptable to the stakeholder, and ii) the claim or relationships importance to the stakeholder. Mitchell et al. (1997) call these two dimensions "temporality" and "criticality", arguing that due to a low level of distinction as independent variables they lack sufficient importance; their interaction, however, creates a sense of urgency. In the context of stakeholder

salience, urgency determines the degree of importance attached to attending to stakeholders' claims.

Mitchell et al. (1997) identify seven possible positions occupied by any one stakeholder group based on the available permutations of the three salience components (see Figure 1).

Stakeholders are delineated into three layers, with latent stakeholders (Dormant, Discretionary or Demanding) comprising the outer layer. With only one salience factor at their disposal, latent stakeholders typically lack the time, resources, energy and commitment to significantly impact issue outcomes. At the second layer, stakeholders may exhibit two of the three salience factors, becoming expectant stakeholders (Dangerous, Dominant or Dependent). Their increased salience level raises the expectations and desire of the group to enact change, but they may not always achieve desired outcomes due to the third components absence. Given the dynamic nature of stakeholders relations, expectant stakeholders are most likely to become definitive stakeholders (the third and deepest layer) possessing all three salience factors if the appropriate contextual factors present themselves.

Insert Figure 1 about here

Stakeholder Salience, Data Quality and Data Utilization

Applying stakeholder salience to ERP data utilization problems requires multiple considerations, notably evaluating legitimacy, power and urgency levels in relation to the organizational flow of data. To do this requires a determination of each stakeholder group's perception of DQ and data utility present within an ERP system, by referring to each group's frame of reference and policy

discourse as it relates to ERP data. A novel approach useful for determining ERP stakeholders' perceptions of data utility is to apply DeLone and McLean's (2003) revised IS success dimensions, a well recognized measure of data and data use within organizations, that is broad enough to capture the interests of all three stakeholder groups. DeLone and McLean's revised model includes six interrelated IS success dimensions : information quality, system quality, service quality, intention to use, user satisfaction, and organizational impact. These dimensions can be used as a proxy measure of data utility, and based on an evaluation of each stakeholder group's policy discourse we identify varied levels of importance placed on each of these six dimensions as a function of stakeholder affiliation and resultant data role and data needs.

[Insert Table 2 about here]

Data Collector Stakeholders: Driving the success of ERPs are individuals that generate and/or collect the data ERP systems require (Momoh et al., 2010). Data collectors are knowledgeable about processes in relation to collecting accurate and complete data, consider why people need these data, and appreciate the inter-dependent nature of organizational operations and awareness of the implications of breakdowns in cross-functional cooperation (Lee and Strong, 2003; Schein, 1996). However, those associated with an data collector stakeholder group place a premium on data directly impacting their actions and daily performance requirements and will consider an ERP system to be successful if it improves job performance or convenience (Wenrich and Ahmad, 2009). Therefore, the data collector stakeholder group is proposed to have a data quality orientation aligned with DeLone and McLean's (2003) Individual impact: use and user satisfaction and (micro) information quality. The micro-information quality orientation

refers to operators being largely interested in data that is of immediate use to them in their work tasks. They have no vested interest in macro information quality as required by executives as in most cases they have little knowledge or understanding of how data is used outside their own occupational boundary (Lee and Strong, 2003).

In the context of ERPs, the behaviors of those tasked with collecting and entering data are particularly critical due to the sequential and highly integrated nature of the system (Xu et al., 2002). However, despite the potentially significant role played by data collectors, we identify their default position as that of a discretionary stakeholder. Though data collectors possess some degree of agency as to whether data is input as mandated, their ability to exercise power or urgency in relation to how data is acquired, stored, manipulated and used is limited (Koch, 2001). This lack of ability to influence enterprise level data processes reinforces collectors' tendencies to focus on localized data requirements suiting their own needs at the expense of enterprise data mandated by those tasked with a data custodian role and deemed a requisite need for those identified as data consumers. It is unlikely that data collectors would often be considered definitive stakeholders in the DQ problem, but there are reported cases of ERP failure attributed to operational level users effectively foreclosing the project through inaction, sabotage and other means (e.g., Cavaye and Christiansen, 1996).

Proposition 1: Individuals identified as data collectors will evaluate the quality of the data they are exposed to consistent with the extent to which it satisfies their immediate operational requirements and expectations.

Proposition 1b: *Data collectors are likely to be discretionary stakeholders due to their legitimacy as the initial point in the data cycle but are prevented from dominant, dependent or definitive stake holders due to a lack of ability to exercise power or generate urgency to any of their ERP related claims.*

Data Analyzer/Custodian Stakeholders: As discussed, data analyzers/custodians are responsible for data storage, maintenance and distribution, primarily concerned with what data should be stored and ensuring required fields are completely filled (Lee and Strong, 2003). They may also be knowledgeable about data accessibility. These behaviours are consistent with the characteristics of those who possess a “technical rationality” and are primarily concerned with system effectiveness, are pragmatic perfectionists and prefer linear, rational solutions to problems (Boonstra and Govers, 2009; Heeks, 2006). However, we suggest that the term data custodian is limiting, failing to account for several critical functions carried out in this categorization, including enabling functions that provide the necessary technological infrastructure for the rest of the organization. As enablers their orientation considers systems quality, service quality and DQ, highlighting their propensity to manipulate and cleanse data to improve DQ. From an ERP data perspective the data custodian stakeholder group—as data enablers—are systems and data driven demonstrating a need for highly structured data rather than text based contextual data. Consistent with their primary frame of reference, data custodians strongly associate DQ with accuracy, considering anything below 100% accuracy to be poor quality (Klein and Callahan, 2007). The narrow focus on DQ rather than data utility, as preferred by the operator and executive stakeholder groups, may trigger conflict and become the genesis for poor DQ perceptions.

Custodians are primarily dormant stakeholders in that their expert power enables them to claim to their “stake” in the DQ debate. However their intermediary and facilitating roles reduces their ability to escalate the urgency of their DQ requirements, and in some instances custodians may act against other groups’ claims for urgency, fearing potential repercussions at a system and procedural level if decisions are made using data perceived as below optimal quality. However in situations such as implementation or significant upgrade of an ERP data custodians may find all three factors aligning, resulting in them being perceived as definitive stakeholders for the period of a project. Definitive status is a double-edged sword with responsibility for the project’s success associated with a group that in many respects has little if any control over organizational factors and stakeholders critical for ERP implementation success (Willcocks and Sykes, 2000).

Proposition 2: Data custodians will evaluate the quality of the data they are exposed to consistent with the extent to which it satisfies a standard set to specification, with a focus on accuracy and completeness.

Proposition 2b: Data custodians are likely to be dormant stakeholders due to their expert power but their intermediary role may result in a lack of legitimacy or power to elevate their claim to that of a Dominant, Dangerous or Definitive stakeholder.

Data Consumer Stakeholders: As the final link in the data flow process, data consumers are interested specifically in data utilization, focusing on making data relevant to their tasks (Lee and Strong, 2003). To reiterate, the characteristics of those categorized as a data consumer resonate strongly with executive and managerial roles. As such, those associated with data consumption

are more concerned with macro-organizational information, viewing data utility in terms of organizational impact, information quality, and user satisfaction levels. Executives are concerned with aggregate measures of data, such as enterprise level Key Performance Indicators, and require data to meet a level of accuracy allowing decision-making with some degree of confidence, rather than an absolute level of accuracy. Therefore, data consumed by the executive stakeholder group is harder to package and evaluate because this group views information as holistic, complex, imprecise and dynamic, whereas engineering stakeholder groups categorize DQ in a multitude of ways and view data as discrete and packagable (Wang and Strong, 1996). As Pijpers and van Monfort (2006) point out, executives are indifferent to ERP tools; as long as individual executives receive the information needed to make decisions they are not concerned with data collection and manipulation.

The consumers' place in the organizational data cycle means that at the most fundamental level consumers are regarded as predominantly dependent stakeholders in their ability to ascribe some degree of urgency to the problem of DQ. Their role and function within the organization allows them to impart a degree of both temporality and criticality to their claim for data utility.

However, the ability of consumers to achieve a satisfactory outcome is tempered by the lack of power to directly address DQ issues (Mitchell et al., 1997). While they may possess legitimate and potentially coercive power to effect change, consumers are dependent on the other two stakeholder groups to achieve any significant gains associated with interventions aimed at improving ERP data utility. Only in situations when data consumers have power, legitimacy and authority can they achieve definitive stakeholder status.

Proposition 3: *Data consumers will evaluate the quality of the data they are exposed to consistent with the extent to which it satisfies their need for aggregate reporting and timely decision making.*

Proposition 3b: *Data consumers are likely to be demanding or dependent stakeholders due to their ability to generate urgency but their dependence on data custodians for report production and data collectors for capturing appropriate raw data limits their ability to elevate their claim to that of a Dangerous or Definitive stakeholder.*

Wang and Strong (1996, p. 5) define data quality as “data fit for use by data consumers”. While in principle we agree with the “fit for purpose” sentiment, we also consider it too limited in focus, particularly given the role of DQ in contributing to poor performance outcomes associated with many ERP implementations (Momoh et al., 2010). DQ is an issue dealt with by all organizational roles; defining DQ only in relation to consumers fails to recognize other organizational groups responsible for the production and management of data, and that groups within an organization can perform multiple roles in the DQ process simultaneously. Each stakeholder group has differing data needs at a localized level, while also being responsible for producing data for other stakeholders—data for which often they have no vested interest in, have little understanding of and see little value in. We argue that the IS/IT stakeholder group responsible for the ERP system is one of the few stakeholder groups to regard DQ in absolute and technically specific terms, a result of their custodian role in the organization. We also acknowledge however that other stakeholders have a similarly narrow DQ focus, determined primarily by their job role. Further, we assert that these stakeholders demonstrate a keener

interest in how useful the data is to their function, rather than absolute measures of DQ typically adopted by those tasked with maintaining the system. These divergent interests and competing values in relation to data capture, evaluation, and utilization is at the core of DQ and ERP performance issues.

In summary, applying DeLone and McLean's (2003) IS/IT success measures as data utility measures, we can argue in operational terms that DQ is not absolute, and attribute specific measures to each user role depending on data needs, base assumptions and stakeholder affiliation. We further postulate that within organizations, only the data custodian stakeholder group is interested in absolute DQ; data collectors and consumers are merely interested in relative DQ providing varying degrees of utility, with quality in of itself having little meaning. Consistent with the overall theme of our proposed framework we suggest that users place importance on different dimensions of data utility depending on their stakeholder affiliation and data role. Consequently, our framework provides one clear explanation for the failure of effective ERP data utilization in organizations, demonstrating that these failures primarily stem from conflicting stakeholder groups perspectives of ERP data treatment and use.

Proposition 4: *ERP configurations where one particular group has the ability to determine the nature and form of ERP data is likely to give rise to claims of poor data quality by other stakeholder groups due the misalignment between their policy discourse and perceived data utility.*

The real value, however, is in the insight provided by the framework into the complex interplay between users in an organizational context and explanation as to why many systems that are built to specification and functioning correctly from a technical standpoint fail to produce the expected positive organizational outcomes. In cases where human factors are the cause of poor ERP system performance, a consideration of the stakeholder dynamics within the organization will identify that in many cases the elements of power and legitimacy can be altered in ways leading to improved performance by repositioning stakeholders.

Discussion

This paper addresses the role of DQ perceptions in the context of ERP success or failure.

Building a framework around Freeman's (1984) stakeholder classification and Lee and Strong's (2003) data roles we have argued that ERPs' failures to produce significant organizational outcomes commensurate with its investment can be potentially attributed to conflict among diverse stakeholder groups over whether the data contained within an ERP is "quality". Our framework suggests that operators prefer collecting data that is often not in a format valued or useable by an ERP system and of little relevance to executives due to its localized nature.

Conversely the IT/IS stakeholder group aims to produce data that is accurate and complete, neither of which are highly valued or readily consumed by the executive stakeholder group.

Finally, data consumers value data with high perceived utility to facilitate decision-making, but are dependent on both data collectors and custodians to provide the requisite aggregate data.

Unfortunately, stakeholder groups, bound by their frame of reference and reinforced by structural and institutional roles, work at cross-purposes, all the while talking about "data quality", but with different expectations and perceptions of data utility. We consider our theoretically derived

framework a more accurate reflection of the relationship between ERPs, the data used to populate them and the individuals interacting with them.

Adopting stakeholder salience and frame of reference concepts, we extend discussions surrounding organizational management and utilization of data. The framework presented in Table 2 explains, in part, why ERPs do not achieve their full performance potential despite technological improvements and organizational change processes. The current theme in the literature suggests that DQ treatment and perceptions reflect context dependent differing needs. We have advanced this theme by providing insight through: a) clearly identifying the relevant stakeholder groups in an ERP context; b) detailing how each stakeholder group perceives the data flow process and attributes importance to different data types; and c) identifying how stakeholder groups respond to the generation, flow and use of data in an ERP system. We articulate the relationship between DQ, data utility and organizational outcomes relating to the use of ERP data and demonstrate the issues needing addressed to optimize ERP use and improve data utility.

By effectively combining the work from the stakeholder, and DQ literatures this paper contributes significantly to both the DQ and ERP literatures. First, we help move beyond the basic categorization of Wang and Strong's (1996) data roles by clearly articulating the frame of reference and policy discourse as it relates to the data quality expectations of each data role and we consider the implications of these differing perspectives on ERP success. For example, given the values of the data custodian stakeholder group and the manner in which they are incentivized within organizations it is reasonable to predict that they value DQ dimensions such as accuracy

and completeness. Following our argument, it is likely that data consumers are more likely to value accessibility and relevance over elements such as accuracy and completeness. Again Lee and Strong's (2003) data supports our assertion, with data consumers prioritizing relevance above the other four measures of DQ (accessibility, timeliness, accuracy, and completeness).

Our second major contribution is our unpacking the distinction and relationship between data quality and data utility. Ballou et al. (2003) acknowledge that defining DQ as fitness for use is largely determined by the end user rather than any particular property of the data itself and, further, that "perfect data" is likely an unattainable goal. Our work extends this idea two-fold. First, we broaden and deepen the discussion to distinguish clearly between quality and utility by determining population differences in the treatment process. Second, our insight via the work of Schien (1996) suggests that not only is "perfect" data incredibly difficult to achieve (Ballou et al., 2003) it is likely irrelevant to most organizational populations other than the engineering stakeholder group. As such, our work demonstrates that the ultimate goal is understanding, and communicating, the divergent ERP data views and needs, not striving for increasingly better "quality" data. Finally our work extends the already valuable work of DeLone and McLean (2003), applying it in a DQ context to demonstrate the varying orientations that each stakeholder group has in relation to evaluating data utility and quality.

Directions for Future Research

Our analysis provides a number of potentially profitable areas of research to be undertaken. For example, the limited exploration of Lee and Strong's (2003) data roles has a number of significant consequences for those interested in improving the use of ERP data within

organizations. First, in the existing literature, consideration of the underlying values, attitudes and beliefs that drive data related behaviors in each data role is minimal. Second, despite DQ research gains over the last decade a limited understanding of the divergent data requirements of organizational stakeholders' remains. Failing to understand the inter-relationships between drivers of data behavior and other factors has the potential consequence of failing to recognize the root cause of poor ERP data utilization. Model testing is required to validate our model of behavioral drivers and extend our framework to consider other potential drivers of data needs and data related behavior. Additional work is also required to enhance understanding of organizational enactments of Lee and Strong's (2003) data roles. At a practical level, practitioners and academics may wish to invest resources into identifying interventions best suited to overcoming the disparate views reflected by each organizational stakeholder group. Finally, what will allow an organization to overcome the dissonance in data needs and quality orientation evident between data roles and stakeholders? Practitioners and researchers would benefit from the identification of individuals, mechanisms, events or tools that act as "boundary spanners"—bridges to a common ground/common understanding that groups base their data interactions around (Bechky, 2003). Our considerations further highlight the need to move beyond technological solutions to DQ "problems" to increase focus on organizational, structural and cultural interventions addressing each stakeholder groups' differing needs and perspectives.

Conclusion

Fundamentally, our treatment of DQ issues in the ERP context takes the position that in many instances ERP failure after implementation stems from poor data utilization, resulting from people's data perceptions. We have presented a theoretically derived explanation as to why ERPs

often fail to deliver anticipated outcomes and we maintain that organizational stakeholder groups vary in their approach to data issues. Our framework provides support for the idea that stakeholder affiliation dictates individually held assumptions and core values, driving their data needs and their perceptions of data quality and utility. These divergent perspectives lie at the heart of suboptimal ERP use that eventually leads to failure. This insight is a significant contribution in our ability to understand how to better utilize ERPs within organizations and how managers in organizations must begin addressing underlying concerns with poorly performing ERPs. The data intensive nature of ERPs means that any data-related conflict limits the system's ability to produce optimal outcomes. In drawing together different literatures relating to stakeholder groups, DQ and IT/IS success we provide deep insight into the origins of data-related conflict and a theoretically supported explanation as to why many stakeholders consistently perceive ERPs as failing to deliver on their full potential.

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