

**Investigating the use of a proprietary methodology for supporting ERP  
implementation in SMEs: A Multi-study Proposal**

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# Investigating the use of a proprietary methodology for supporting ERP implementation in SMEs: A Multi-study Proposal

## Abstract

*It is now widely acknowledged that ERP systems are of significant importance to Small and Medium-sized Enterprises (SMEs). The objective of this paper is outline a multi-study research program investigating, in the context of SMEs, : 1) why/how the proprietary methodology (specifically, Sure Step) is adopted (or not) for guiding ERP (Dynamics NAV) implementation projects by partner organizations of MS Dynamics; 2) what some of the potential impacts of the adoption/utilization of the methodology are; and 3) whether or not, the findings with respect to the first two questions derived from the initial study in the Danish context hold in other countries of interest, such as China and India. Findings from this study will not only add to a deeper academic understanding related to the role of formal methodologies in implementing ERP systems in SMEs but will also provide the MS Dynamics managers insights regarding: 1) how the adoption of the Sure Step methodology can be facilitated, possibly by modifying aspects of the methodology that may be found to be deficient-in-use by partners, or by suggesting specific strategies for utilizing the methodology in implementation projects; 2) if adoption of Sure Step by partners should be a priority at all; and 3) whether Sure Step contents or the framing of the methodology needs to be modified for other national contexts.*

## 1. Introduction

Enterprise Resource Planning (ERP) systems refer to “commercial packages” which consist of a set of inter-related software modules with a shared database (e.g., Markus and Tanis 2000). They promise “seamless integration” (Davenport 1998), potentially facilitating the operations and management of the various functions (e.g., accounting, human resources, sales and distribution, manufacturing, materials management) of an enterprise in a coordinated and integrative fashion (e.g., Sarker and Lee 2003; Babu and Dalal 2006).

### 1.1. Motivation

While information technologies in general and ERP systems in particular cannot by *themselves* guarantee success for organizations, they act as “enablers” allowing “different organizational *options* to be used that would not be [otherwise] practical...” (Bjorn-Andersen and Turner 1994, p. 392); this can lead to significant benefits for many organizations (Sarker and Lee 2003; Nah et al. 2001). Thus, the importance of ERP systems is widely acknowledged by researchers and practitioners, irrespective of the size of the organizations adopting these systems (e.g., Markus and Tanis 2000). Motivation for firms adopting ERP systems include “technical reasons” such as replacing “hard-to-maintain interfaces,” reducing “software maintenance” and IT operating costs, eliminating redundancy, and improving “IT architecture” as well as business reasons such as improving inefficient business processes, standardizing data, reducing “business

operating and administrative expenses,” “accommodating business growth” and developing the capability to handle multiple languages, laws, and currencies (see Markus and Tanis 2000, p. 180). Indeed, empirical studies have found that “ERP adopters are consistently higher in performance across a wide variety of measures than non-adopters” (e.g., Singla 2008, p. 130). However, the implementation process has also been characterized as “far from smooth,” with some organizations experiencing “rocky beginnings” and some outright failure, by not achieving “the hoped-for-financial returns on their ERP investment...” (Markus and Tanis 2000, p. 174). With the large numbers of reported failures in ERP implementation, organizations appear to be increasingly perceiving ERP implementation projects as “risky” (Singla 2008, p. 130). This has prompted several studies on ERP project “risk factors” (e.g., Sumner 2000) and “critical success factors” (Nah et al. 2001), with a number of authors conceptualizing ERP implementation project as a process with multiple phases, each with its own associated factors that must to be systematically addressed (e.g., Holland and Light 1999; Sarker and Lee 2003; Markus and Tanis 2000; Koh et al. 2000).

A broad implication that has emerged from this entire body of work is that ERP implementation presents “a sociotechnical challenge” where an “ON/OFF approach” does not “necessarily yield desired and expected results” (Al-Mudimigh, Zairi, and Al-Mashari 2001); this point has been echoed by Babu and Dalal (2006) based on their “experiences” in implementing the “Microsoft Great Plains” ERP system in an Indian SME. Apart from highlighting the importance of incorporating social and technical considerations during ERP implementation, these studies reveal that the implementation process, which includes business planning and envisioning, effective communication, project management, reengineering, configuration/customization of the system to fit the organizational needs, change management, testing, monitoring and evaluation (Nah et al. 2001), needs to be consciously managed for the initiative to succeed (e.g., Markus and Tanis 2000; Babu and Dalal 2006).

## 1.2 Research questions

In this regard, scholars and practitioners have argued that *the use of an appropriate methodology designed to systematically guide the project team through the “complex and problematic” implementation process* can be invaluable in ensuring the project’s success (Mihailescu et al. 2006; Leem and Kim 2002). On similar lines, Thomas and Jajodia (2004, p. 13), based on their ERP implementation experience in public sector organizations, assert that “A comprehensive.. ERP implementation methodology ... can significantly reduce the number of paper deliverables required in the project, allowing resources to be redirected to value-added activities in the system, such as configuring and testing for results.” In addition, the promise of smooth, on-time, and on budget completion of ERP projects as a result of using proprietary methodologies can be found in several practitioner outlets as well as in vendor websites and promotion material.

Even though the benefits of using methodologies to guide IS (specifically ERP systems) implementation may initially seem obvious, in reality, “methodologies have failed to become an integral part of .. practice,” as evident from the “low rate” of methodology use

or adoption; moreover, where adoption occurs, it tends to in a piecemeal basis rather than as an entire package (Carroll, 2003; Russo and Stolterman 2000). Interestingly, most of the adoption and implementation research focuses on the technology itself, not on the methodology, and thus *there is a paucity of studies and consequently a lack of pointed understanding of the reasons as to why there is limited “utilization of ES [enterprise system] methodologies... developed by [the] vendor”* (Mihailescu et al. 2006, emphasis added).

Conceptualizing the adoption and effective utilization of ERP implementation methodology as a *complex sociotechnical process*, in the proposed study, we hope to address the void in the understanding of adoption and utilization of ERP implementation methodologies. Our specific context of interest is that of *small and medium-sized enterprises* (SMEs), organizations that are acknowledged as substantial contributors to developed as well as developing economies (Zhang et al. 2008), but are considered substantially different from large organizations in terms of the challenges they face during ERP implementation (Fink 1998). Indeed, Richardson and von Wangenheim (2007, p. 19) make the point that “Small companies aren’t just scaled down versions of large firms.” In fact, evidence from past studies suggests that, typically, SMEs tend to: a) have a more “centralized,” “intuitive,” and short-term oriented decision-making, b) face poverty in terms of “human, financial, and material resources,” c) seldom have access in-house IT-related expertise, technical or managerial, 4) rely on “external sources” for technology-related information, and 5) are very “sensitive” about the cost and ease of adaptation of systems compared to large organizations (Bernroider and Koch 2001; Fink 1998; Zhang et al. 2008). Noting the unique characteristics of SMEs, their growing importance in economies across the globe, and the rapidly increasing market for ERP systems in these organizations (Kumar and Van Hillegersberg 2000; Everdingen et al. 2000), we believe that the processes and outcomes associated with ERP methodologies deserve to be investigated with distinct focus on SMEs.

The above discussion leads us to two research questions:

1. *Why and how are the proprietary methodologies adopted and utilized (or not) for guiding ERP implementation projects in SMEs?*
2. *Does the use of a proprietary methodology (specifically the ERP vendor-developed methodology) for guiding the implementation of ERP systems affect the outcome of the implementation project? If yes, what aspects of the outcome are affected?*

Our next question arises from the generally accepted view, that culture, i.e., the “collective programming of the mind” (Hofstede 2001, p. 9) differentiates individuals from different nations, and these differences not only affect people’s general behavior, but it also affects the “functioning of organizations and the people in them” (Hofstede 2001, p. 373). While, the proponents of the “convergence hypothesis” (Kerr, Dunlop, Harbison, and Myers 1960) have contended that due to globalization trends and innovations in technologies, practices, preferences, and styles are becoming uniform

across the world, empirical evidence shows that “global solutions to organizational and management problems do not exist” (Hofstede 2001, p. 373). We thus believe that many of the cross-cultural differences would also affect organizational adoption and utilization of ERP implementation methodologies, and the extent to which such methodologies would lead to benefits. In the ERP implementation context, it is interesting to note that past empirical research shows that while cultural differences between UK and Scandinavia did not lead to significant differences (e.g., Krumboltz and Maiden 2001), the story is different when ERP implementation across Western and (for example) Chinese cultures have been compared (e.g., Davison 2002; He 2004). Specifically, four aspects of Chinese culture are believed to contribute to the differences: Confucianism and the hierarchical nature of the organizational decision-making, guanxi, high-context communication, and the pictographic and other unique characteristics of the Chinese language (Zhang et al. 2008). In addition, the technological complexity associated with ERP systems, limitations in the IT infrastructure, lack of well-trained employees in Chinese SMEs, different cost/economic structures, and organizational procedures/processes different from those in the West (He 2004) can have an impact on the process and outcome of the use of ERP methodologies (developed by Western vendors) to support implementation projects. Clearly, other countries of interest (such as India, Russia, and Brazil) also have unique cultural characteristics, which have the potential to impact the project outcomes or the nature of the processes by which methodologies are adopted and deployed.

This leads to our final research question:

*3. How does culture impact the adoption and utilization of a proprietary ERP implementation methodology, and the outcome of projects guided by the methodology? What aspects of the methodology and its framing must be modified to positively influence its adoption and deployment by partners in other national/cultural contexts?*

In the next section, we briefly outline the empirical studies to address the three questions posed above.

## **2.0 Theoretical and Empirical Approaches**

### *2.1 Investigating the adoption/utilization process (Study 1)*

#### 2.1.1 Theoretical Approach

ERP implementation literature can be characterized as fairly a-theoretical, where with the exception of few studies which use formal social theories (Scott and Wagner 2003; Sia et al. 2002; Soh and Sia 2004), empirical studies in the mainstream IS literature have adopted a "factor" approach, explicitly or implicitly, in order to explain outcome, thereby ignoring the emergent, complex, and often contradictory socio-technical interactions that are fundamental to any ERP implementation project. One potentially useful social theory is Actor-Network Theory (ANT) that can serve as a lens for understanding socio-political phenomena (Walsham 1997), including the adoption and implementation of an ERP

methodology for a project. Sarker et al. (2006) outline two specific advantages of using ANT for investigating business process change projects, which we adapt to the context of methodology implementation.

First, ANT does not *a priori* exclude non-human actors [i.e., ERP systems, infrastructure, methodologies] from the analysis, thereby allowing for a more explicit examination of.. [these elements] in a socio-technical process... Second, ANT does not *a priori* distinguish between micro (e.g., individuals) and macro actors (e.g., organizations, [and methodologies which is a package a variety of methods/techniques]), and it acknowledges the inherently unstable nature of actors. This allows the analyst the flexibility of considering a socio-technical collective as a single actor or as a group of individual actors, depending on the level of analysis desirable.

Further Sarker et al. argue that application of ANT enables the creation of an imaginative account that can bring “to light a number of implications regarding [an implementation] initiative that are not readily apparent through the use of common-sense concepts currently used and touted in much of the.. literature.”

While it is premature to specify *a priori* what insights a network-based processual theory such as ANT would reveal, it may be useful to outline our intended approach to the study.

As debate continues to rage regarding what the term “methodology” actually should mean, there is fair deal of agreement that it refers to a “collection of techniques” (Schach 1996, p. 21). In our conceptualization, methodology (Sure Step), with its different components, is an actor (or actant)<sup>1</sup> introduced by a representative of the vendor to translate the existing actor-network associated with the partner (including the technologies they deal with, their homegrown implementation approaches or alternate methodologies, their consultants, and client networks). This translation unfolds in three stages, *problematization*, *interessement*, and *enrollment* (Callon 1986). To breathe life into the methodology, consistent with the spirit of ANT, which views non-human actors as potentially active (not necessarily passive) actors, we will remain open to identifying different socially-constructed roles (Askenas and Westelius 2003) of the methodology within the network, such as “bureaucrat,” “administrative assistant,” “coordinator,” “competitor” (with respect to the established approach within the organization), or maybe a “façade.”

A successful implementation/utilization occurs when the Sure Step actant is able to redefine and subsequently align the interests of the various relevant actors to its own interests, and solidify its own position as a central actor within the network it has penetrated. A rejection or failed adoption occurs when: a) the methodology is not able to align the existing network to its own interests, or b) the methodology is able to penetrate the network and establish a central position for itself initially by forming relevant alliances, but in the course of the project, the entire actor-network (i.e., the set of new alliances among the different elements) disintegrates.

Of course, we expect several “factors” influencing the process at different points to emerge, and intend to weave them into the ANT-informed narrative.

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<sup>1</sup> Please refer to authoritative works on ANT for a review of key concepts (e.g., Latour 1992, 1996, 2005; Law 1994; Walsham 1997 in the IS discipline).

### 2.1.2 Empirical Approach

We propose to adopt an “interpretive case study” methodology (e.g., Walsham 1995), and our approach described in this paragraph is adapted closely from Sarker et al. (2006).

*Data will be collected primarily through multiple semi-structured interviews with different relevant human actors at the vendor organization, partner organization, and client organization. Non-human actors will be interrogated through their human representatives or based on documentation available about them. The specific issues discussed in any interview will depend on the role of the individual, the stage of the project, information learned from other stakeholders, and the extent of rapport that develops between the interviewer and the particular interviewee. In developing our work, consistent with the views of ANT proponents, we will not adopt a position of realism ontologically, i.e., we will see our data not as objective evidence supporting or falsifying an assertion, but as texts and text analogues, whose meanings, when read hermeneutically, can go beyond the original intentions and meanings attributed by their sources (Hirsch 1967). ANT, serving as a “device of mind,” will enable us to retrospectively make sense of the texts from our field, highlighting subtle aspects of the phenomenon that may not have been captured through a-theoretical data-intensive inductive methods.*

We propose to intensively study four ERP implementation projects. These would be of “typical” (non-trivial) complexity in terms of requirements, stakeholder groups diversity, etc., where a systematic methodology may be expected to be helpful. The sampling strategy would include selecting the four ERP systems implementation projects can be depicted using the 2 X 2 matrix below (TABLE 1). The bottom two rows represent the outcome with respect to methodology adoption, while the two columns on the right capture whether or not the ERP vendor’s partner was already using a different methodology in prior projects.

**TABLE 1: SAMPLING STRATEGY**

	<i>Partner tied to a pre-existing methodology</i>	<i>Partner not tied to a pre-existing methodology</i>
<i>New Methodology Adopted</i>	Project 1	Project 2
<i>New Methodology Rejected</i>	Project 3	Project 4

Naturally, an important consideration in selecting the projects would be “control” (i.e., to hold constant to the extent possible) other characteristics of the projects being investigated. If resources do not permit the study of 4 organizations, we could limit the study to *Projects 1 and 3*, since the study of the process of displacement of a pre-existing approach/methodology would be more interesting and relevant, and possibly lead to more

valuable insights in terms of managing the adoption process and revising (if applicable) the methodology being introduced.

## 2.2 *Investigating the outcome of adopting and utilizing the new proprietary methodology (Study 2)*

### 2.2.1 Theoretical Considerations

A methodology is often viewed as a “technology” in that inscribed in it are formal set of assumptions and instructions for implementers and other key stakeholders; it “shows how to reach the solution and represents an instrument to communicate and help an organization to understand the complexity of the environment and the solution...” (Mihailescu et al. 2006).

Drawing on the *resource utilization theory*, we can argue that the application of a technology (i.e., an ERP implementation methodology) will lead to a superior outcome (i.e., ERP implementation project success); this theory also suggests that a technology with superior features (compared to those of another technology) would lead more superior outcome (Zigurs et al. 1991). Studies (e.g., Leem and Kim 2002) provide useful basis for comparing features of competing ERP implementation methodologies, which can be utilized to hypothesize the relative impact of adopting and utilizing different methodologies on the outcomes.

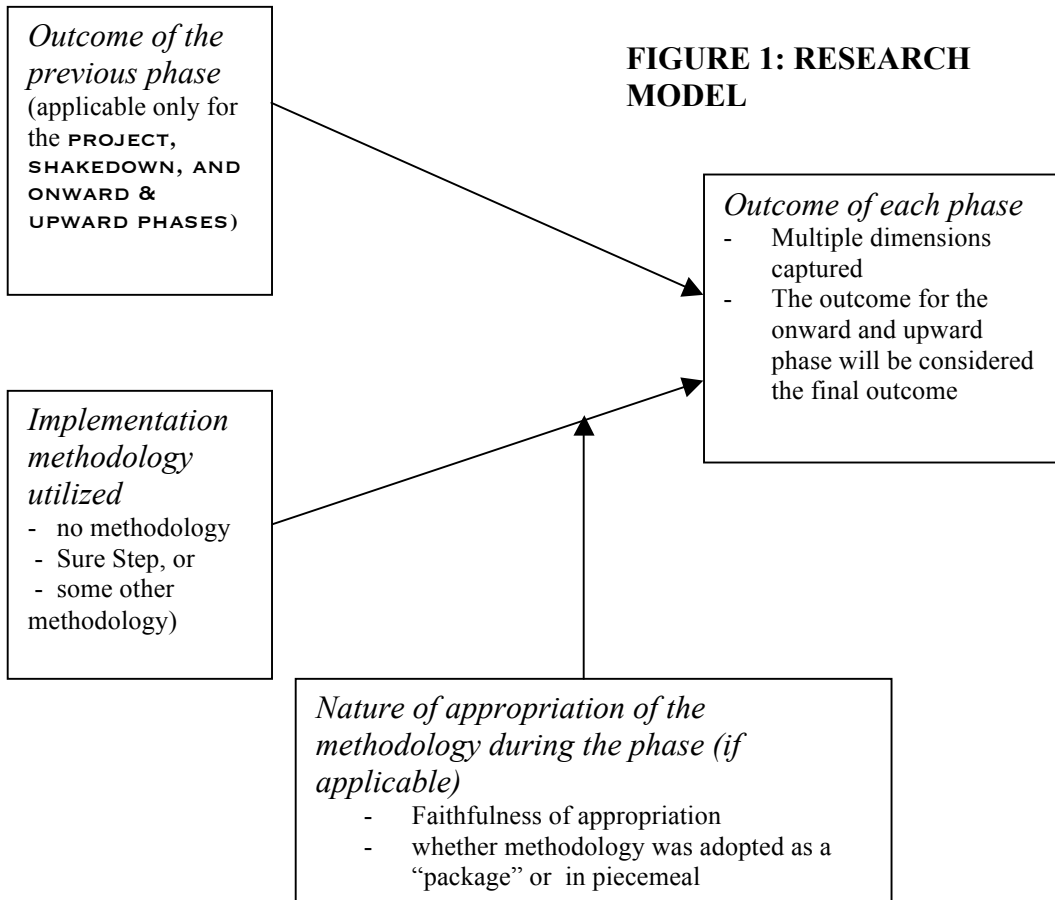
With respect to outcome variables, two critical points will be kept in mind. First, ERP implementation is a complex process involving and impacting multiple stakeholders, and thus, project outcome is necessarily multi-dimensional, and success and failure are difficult to adjudge. Here, the guidelines of DeLone and McLean (2001) and Lyytinen and Hirschheim (1987) can be particularly valuable in defining the relevant outcome variables. Second, ERP implementation unfolds in different phases, which tend to have different dynamics (Markus and Tanis 2000), and thus, following Sarker and Lee (2003), we assess not only the final outcome of the implementation initiative, but also intermediate outcomes in the various phases. We adopt the phases proposed by Markus and Tanis (2000) in this study: chartering, project, shakedown, and onward & upward.

Also, noting the “situational aspect” of methodologies which refers to “how implementers enact the methodology in practice” (Mihailescu 2006), we propose to capture the “faithfulness of appropriation” (DeSanctis and Poole 1994) of the methodology (ies) at each stage of implementation.

### 2.2.2 Empirical Approach

We propose to adopt an objectivist deductive case study approach (Yin 1994; Lee 1989), wherein the case data will be used to validate or falsify the set of propositions represented in Figure 1 (for each phase).





Sarker and Lee (2003, p. 187) explain that such case studies reflect a confluence of the following traditions:

... i) the *empiricist* tradition, which views “the indubitable experience of the external world” as being the “the foundation of human knowledge,” and thus relies on “publicly verifiable, observable sensory data, systematically collected and collated, as the route to knowledge” [1]; ii) the *rationalist* tradition, which argues that “the route to indubitable knowledge is ... through logical, that is rational principles which are beyond doubt” [1]; and iii) the *critical rationalist tradition*, which holds that it is not “positive evidence” or “confirmation” but rather “negative evidence” or “falsification” through deduction that is at the “core” of science [35]. The three traditions together form the basis of *hypothetico-deductive* logic that we use in our case research approach. The empiricist influence is reflected in the procedures for ensuring systematic documentation and the rigor of the research process [21,43]. Our underlying premise is that by following the recommended procedures, the study will satisfy the following positivist criteria for rigor: construct validity, internal validity, external validity, and reliability. In addition to the four criteria mentioned above, and consistent with the empiricist ideal of eliminating “speculative assumptions not founded on observation” [35], we [will] adopt a “realist” ontology ... focusing on what organizational participants [*say or do*], rather than on what [we think] they [mean] through our interpretation of symbols.

In terms of sampling, we hope to gain access to *at least three projects* of “typical” complexity, the first, where no formal methodology is utilized, the second, where the focal proprietary methodology (Sure Step) is used, and the third, where some other competing methodology is utilized. In the interest of ruling out alternate explanations, the projects selected should be similar in as many dimensions as feasible. Table 2 shows the design schematically.

	<b>Outcomes for each phase</b> (in the form of multiple dependent variables)			
<b>Phases (Markus &amp; Tanis 2000) -----&gt;</b>	Chartering	Project	Shakedown	Onward & Upward
<b>Projects with...</b>				
No formal methodology used				
Focal Proprietary Methodology (i.e., Sure Step) used				
Some other (competing) formal methodology used				

### 2.3 Investigating the two earlier questions in other cultural contexts (Study 3)

We propose that this part of the investigation be undertaken after some progress has been made on Study 1 and Study 2. (We note that it is possible to reuse parts of Study 1 data in Study 2, and vice versa; also parts of these two studies can be undertaken in parallel).

The design for Study 3 would be directly derived from Studies 1 & 2, though some cultural adaptation would be required with respect to data collection and interpretation.

### 3.0 Conclusion

Large growth rates in ERP implementation, especially among mid-sized and small-sized companies, are in evidence worldwide; yet the success rates of ERP implementation projects remain less than impressive. The academic and practitioner literature suggests that the adoption and utilization of a suitable implementation methodology can lead to success of ERP implementation initiatives in SMEs. In our proposed study, we seek to rigorously investigate if and in what sense, this belief holds true.

Also, despite the presumed benefits of methodologies, the literature indicates that methodologies are seldom adopted faithfully; thus, our study seeks to uncover the process by which implementation methodologies tend to be adopted or rejected. Finally, given the demand for ERP systems globally, it useful for ERP vendors to develop a perspective on the process of adoption and the outcome of adoption of their methodology *in different cultural settings*. Our proposed study aspires to contribute on this front as well.

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