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Organizing for post-implementation ERP

A contingency theory perspective

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Abstract

Purpose – The importance of involving subject matter experts (SMEs) in ERP implementations is well established. SMEs' knowledge of business and system processes are critical to conducting gap analyses and configuring enterprise systems. But what happens to SMEs on completion of the implementation phase? Prior qualitative research found that some organizations return SMEs to their old department, which can contribute to knowledge transfer; while other organizations retain the services of SMEs, to assist in ongoing efforts with support and enhancement of the systems. The purpose of this study is to understand post-implementation organizational choices – when SMEs are retained and returned. The aim is to understand these choices relative to the goals of their project. Theoretically, organizations that return SMEs move toward a distributed or hybrid model, while organizations that retain SMEs employ a centralized functional-support structure. In accordance with contingency theory, these structural choices should align with an organization's goals and measures of success.

Design/methodology/approach – This research conceptually builds on prior qualitative research, but is still exploratory in nature. The authors report on findings from an online survey conducted with 65 organizations. The sample included small, medium and large firms. Respondents were key decision-makers in their organization's ERP initiatives (directors and managers) recruited from two user-group associations (higher education and health care), primarily from the USA and Canada. Descriptive statistics and *t*-tests (when appropriate) were utilized to analyze and report the findings.

Findings – The hybrid structure (neither completely centralized nor decentralized) was utilized most often (66 percent of the organizations in the sample). The organization's original goals and measures of success did not seem to dictate the final organizational structure, as would be predicted by contingency theory. The authors interpret this as an indication that the choice of structural form is not easily explained based on goals and objectives. They conjecture that devising a structural approach to supporting such a complex inter-functional system such as ERP requires solving many complex simultaneous organizational problems.

Research limitations/implications – This research involves a small sample of 65 organizations and is exploratory in nature; hence, it may not be projectable to a larger population. Future research should supplement this study with more industry user groups, expand the sample size, and utilize more advanced statistical methods.

Originality/value – Previous research has focused on successfully implementing ERP, neglecting post-implementation design. This study contributes to a growing body of work with regard to post-implementation design, taking into consideration SMEs and reporting structure, goals, and measures of success utilizing contingency theory as the backdrop.

Keywords Enterprise resource planning (ERP), Post-implementation, Contingency theory, Organizational structures, Subject matter expert (SME), Manufacturing resource planning, Contingency planning

Paper type Research paper

1. Introduction

How best to organize the IT function is a long-standing question for researchers and practitioners alike (King, 1983; von Simson, 1990). For ERP projects, and for post-implementation support, this issue is critically important, especially with regard to the use of subject matter experts (Worrell *et al.*, 2006). However, until recently (e.g. Worrell *et al.*, 2006; Zhu *et al.*, 2010), research has primarily focused on implementation efforts rather than post-implementation.

Subject matter experts (SME) are invaluable contributors to the success of ERP installations, whose knowledge of business practices and system processes are critical to configuring enterprise systems (Volkoff *et al.*, 2004). As a result, project managers often plan carefully and petition strongly to secure the best and the brightest employees from each of the functional business units that will be impacted by an implementation project (Gallagher and Gallagher, 2006). SMEs then become key members of the implementation team. However, as the project moves into post-implementation, organizations must determine how the SMEs will be utilized and managed once the project ends. In this research, we view this question as one of organizational structure, being either centralized, decentralized or a hybrid form. For example, the retention of SMEs in an ongoing support organization is a centralized form, while their working from various functional departments to support ongoing ERP efforts defines a distributed, or hybrid organizational form.

Given the critical role SMEs play as members of an implementation team and their potential ability to contribute to post-implementation efforts, a number of steps can take place to secure this talent. First, they can become permanent members of a centralized post-implementation support organization. Or, they can be returned to their functional roles, thereby becoming part of a distributed or hybrid form of the organization. In either situation, SMEs could contribute to future efforts, but the resulting structure could offer differing advantages and disadvantages for both the organizations and the individuals. For example, some suggest that returning SMEs to their original roles and responsibilities, presumably in their original department, would be most favorable to facilitate knowledge transfer (Volkoff *et al.*, 2004) (i.e. a decentralized or hybrid model). Alternatively, retaining SMEs in a formal capacity to work on ERP related projects would facilitate coordination efforts related to system enhancements and reengineering (Worrell *et al.*, 2006) (i.e. a centralized model).

To explore these choices, we undertook a study to investigate the types of organizational forms chosen once they moved into the post-implementation phase, and the reasons for these choices. We adopted a contingency theory approach (Brown and Magill, 1994). Contingency theory would predict that post-implementation design would be based on the organization's goals and objectives (Sambamurthy and Zmud, 1999). For example, if organizations view the goals of ERP as simply an update to technology, or alternatively as an opportunity for process improvements or business process reengineering, then those differing goals may yield different design choices for the support organization.

This research reports on findings from survey research conducted with 65 organizations concerning their decisions regarding post-implementation support. We also investigate the implications that various pre- and post-implementation goals and tactics hold for creating a post-implementation structure. First we provide some theoretical background on the role that organizational structure plays in the ongoing

management and staffing of the information systems function. The utilization of SMEs in ongoing post-implementation efforts is an important consideration. Next, we outline the research method and sampling, followed by its findings, analysis and discussion. The conclusions, limitations and opportunities for future research are then discussed.

2. Theoretical background

The research we undertake is exploratory, given that our research seeks to understand what firms are doing (and is not meant to be predictive in nature). We chose to undertake an organizational structure approach in this research. This approach is well established in the IT literature (King, 1983; Brown and Magill, 1994; Simon *et al.*, 1954; Sambamurthy and Zmud, 1999) and easily comprehended by IT practitioners for who we hope to inform with this research (Boynton *et al.*, 1993). We apply the concepts of structural contingency theory to understand how ERP organizations are structured in terms of their positioning of human resources (e.g. SMEs). Thus, we build on a well-established organization theory in order to explore how support functions for ERP systems are organized post-implementation. We also build on existing work in other functional areas, such as accounting (Simon *et al.*, 1954) and preliminary work in this emerging research area (Worrell *et al.*, 2006).

The staffing of cross-functional activities, such as information systems implementations, often relies on personnel from various functional or operational departments who serve as SMEs and act as horizontal mechanisms in organizations (Brown, 1999; Galbraith, 1994). These arrangements commonly occur during the configuration and implementation of ERP systems (Brown and Vessey, 2003) such that SMEs come together (either permanently or temporarily) to inform and guide the design of the system. That is, these and other information systems efforts rely on structural mechanisms, such as cross-functional teams and liaisons, to support the multi-functional nature of the work processes they are automating (Markus *et al.*, 2000). This allows the implementation project to benefit from the knowledge and experience of personnel who understand the existing design and function of the systems that the ERP software is intended to replace. These SMEs are also in a position to inform the configuration of the new system being implemented.

Not surprisingly, many ERP efforts try to recruit the most knowledgeable and talented SMEs they can (Gallagher and Gallagher, 2006; Worrell *et al.*, 2006). Organizations also try to retain these personnel, sometimes on a full time basis, for the duration of the project. Furthermore, projects often try to co-locate or centralize the personnel working on an implementation project, and may offer incentives to SMEs to work on the project. They also may provide funding to their functional departments to back-fill for the personnel on-loan so that work can be completed while the SME is committed to the ERP project (Worrell *et al.*, 2006). As an ERP project concludes, and the post-implementation structure is contemplated, the ongoing role of the SMEs also becomes an issue.

2.1 Organizing IT

Organizational designs within the IS function is a well-established area of research (Boynton *et al.*, 1993; Brown and Magill, 1994; King, 1983). The question is motivated by the desire for organizations to align the IT function with overarching organizational goals (Brown and Magill, 1994). From a contingency theory approach, different ways of

organizing promote different organizational capabilities (Brown and Magill, 1994; Galbraith, 1994). A department that manages and supports information systems can more effectively support the organization if it is structured in a way that aligns with the overall organization's priorities (Brown and Magill, 1994).

Structural theories identify three general models; centralized, decentralized, and the hybrid design (Brown and Magill, 1994; Sambamurthy and Zmud, 1999). Each of these offer advantages and disadvantages for an IS function, or in this case, an ERP support organization. The literature defines each of these structures according to the degree of control over the management of resources (Sambamurthy and Zmud, 1999). While in the centralized model an IT department controls all aspects of the system, the decentralized model generally allocates a significant amount of control over IT resources to different functional or operational units in a business. The hybrid approach tries to gain benefits of both models by sharing control of resources, for example allocating control of software functionality to various departments where needs may differ (Brown and Magill, 1994; Sambamurthy and Zmud, 1999).

For each of these structural models and reporting relationships, we see an application to the role of SMEs in a post-implementation support organization. In a centralized model we find the retention of personnel (including but not limited to SMEs) within a post-implementation organization. As contingency theory would predict, this option will offer the advantages of increased economies of scale (von Simson, 1990), the ability to minimize conflicts between organizational and departmental goals (King, 1983), increased organizational learning (von Simson, 1990), and the ability to establish and promote career paths for personnel (von Simson, 1990).

Alternatively, a decentralized model would distribute both technical and subject matter personnel across their respective functional or operational departments. The advantages of a decentralized structure are that it puts decision-making authority directly in the hands of line managers (Brown and Magill, 1994), thereby aligning system design and departmental needs (von Simson, 1990). It also increases absorptive capacity, given that those who work on ERP solutions continue to acquire and retain knowledge of their respective department's requirements (Sambamurthy and Zmud, 2000). However, this decentralized structure undermines many benefits inherent in the centralized design of an ERP system (Markus and Tanis, 2000). It may also undermine the strong sense of unity and identity developed during the implementation project that can foster productivity (Gallagher and Gallagher, 2006). Thus, we would not expect to find the occurrence of the decentralized structure in many ERP organizations, with the exception of very large organizations that share a common system across multiple sites (Markus *et al.*, 2000).

We would expect to find many organizations with hybrid structures. Such structures are found in ERP organizations when an organization retains only a small technical team of personnel, but then continues to depend on SMEs positioned in various functional or operational departments. The benefits of this structure are increased alignment of technology and business (Brown and Magill, 1994) and greater opportunities to exploit the advantages of centralization without losing the flexibility of decentralization (von Simson, 1990). The advantage of a hybrid or distributed model is that these structures generally place greater control and thus greater decision-making authority in the business units (Sambamurthy and Zmud, 2000).

As a result, this model can help to align departmental needs with IT efforts. Working more closely with users in a functional department, SMEs in a distributed model can promote IT-business innovation, identify new opportunities, and enable knowledge transfer (Volkoff *et al.*, 2004). Research has shown that SMEs facilitate knowledge transfer by taking ideas from the initial implementation (and subsequent enhancement projects) back to the business units through both formal and informal mechanisms (Jones *et al.*, 2008). In essence, they become project liaisons and advocates given that they were representatives and the "voice" of the functional department.

We assume that post-implementation design decisions are made rationally with the expectation of achieving intended performance outcomes. Ultimately, we expect many of the benefits of various structural models to also apply to the structures we define for post-implementation ERP organizations. Since this research is exploratory, we do not formulate hypothesis for the purpose of testing relationships, but instead examine the existence of relationships between organizational goals and organization design to understand if relationships exist and how they may be related (Brown and Magill, 1994).

3. Method

Initial qualitative research was conducted to explore the question of how ERP projects organized for post-implementation and how they positioned the role of SMEs within their organizing structures, as explained previously (Worrell *et al.*, 2006). In that study a review of the literature was conducted to identify relevant content areas and to determine a theoretical framework for examining these questions. Justification for a second more quantitative study was based on the nature of the findings in the initial qualitative research, as that research found that managers had extensively examined the questions of post-implementation structure and had arrived at different decisions. Approximately half the organizations in the initial qualitative study choose a centralized structure and half choose a distributed structure. Examination of the initial goals of the ERP implementation showed some promise as an explanation for the different choices made by the organizations.

The current follow-up study using survey methods offered the ability to examine a larger population of organizations and to understand structural choices and the relationship of project goals to post-implementation structure. Construct development was based on both the earlier qualitative research and on an ongoing review of pertinent literature. The preliminary design of the survey was piloted with both academic experts and key informants who were experienced project leaders for ERP implementations and ongoing support efforts. The final validated survey was structured around eight different areas of inquiry as follows:

(1) Organizational demographics (organization size, industry, region, etc.).
(2) Modules purchased and implemented (phases of implementation).
(3) Original goals and measures of success on a 1-7 scale.
(4) Incentives and promises made to achieve goals.
(5) Implementation staffing and structure.
(6) Post-implementation staffing and structure.
(7) Current goals (after implementation phase) on a 1-7 scale.
(8) Individual demographics (education, degree, etc.).

Specific details about the wording of each question, and the scales and anchors used, are addressed in the detailed findings, which follow.

Participation in the survey was facilitated by relationships with two ERP software user groups. These relationships were established after the findings from the initial qualitative research (Worrell *et al.*, 2006) were presented at one of the user group's national meeting. The lead author was solicited to conduct a quantitative study. After this initial contact, another organization also requested that the data collection be replicated among their user group. As such, two user group associations were utilized in order to recruit key decision makers to respond to the survey. The organizations in the user groups were from higher education organizations and health care organizations. Within the education user group, a total of the 544 invitations to participate were emailed to members designated as "key contacts". The invitation was sent via the president and a link to the survey was provided to the main contacts from 520 member organizations. A total of 49 organizations participated from the higher education user group (e.g. having complete data for purposes of this paper) for a response rate of 9.4 percent.

Among the health care user group members, all 2,785 individual members were emailed and invited by the president to participate. However, they were screened and asked to forward the survey link on to a "key decision maker". A total of 17 responded with complete data out of the 184 member organizations, for a response rate of 9.2 percent (Note that among the health care user group respondents, participants were asked to provide their contact information – so that we could screen for duplicate organizations. However, of the four cases that were missing this information, the data were sorted to determine if perhaps someone else from their organization had also answered the survey. None of the key demographics was similar and all four cases were retained.)

Respondents were involved at high levels within their organizations such that 9.7 percent were project executives or sponsors of the ERP system, 72.6 percent were project directors or managers, and 17.7 percent stated themselves as "Other" (e.g. business systems analysts, functional experts, specialists, etc.).

A mix of organizations responded. For example, 66 percent were public and 34 percent were private. By region, the largest representation was from the Northeast (22.6 percent) and the West (22.6 percent), followed by the Midwest (17.7 percent), the Southwest (12.9 percent), and the Southeast (9.7 percent). A small portion were international (6.5 percent Canada, 3.2 percent Africa, 3.2 percent Asia, and 1.6 percent Western Europe), actually representing nine out of the total number respondents who reported their institution's primary location.

Respondents were also asked to report on the number of employees at their institution (as measured in full-time equivalents – FTEs). Again, our sample includes a mix, with 18.5 percent having fewer than 1,000 employees, 18.5 percent with 1,000 to 2,499 employees, 21.5 percent with 2,500 to 4,999, 20.0 percent with 5,000 to 9,999, and 21.5 percent with 10,000 or more employees.

Institutions were primarily using PeopleSoft (87.3 percent), yet a few others were using Oracle (4.8 percent), SAP (4.8 percent) and Siebel (3.2 percent). As highlighted in Figure 1, the phases of their implementation were varied by module; however, the majority had gone live with their financial management modules (46 institutions) and their human capital management modules (44 institutions). (Note that campus

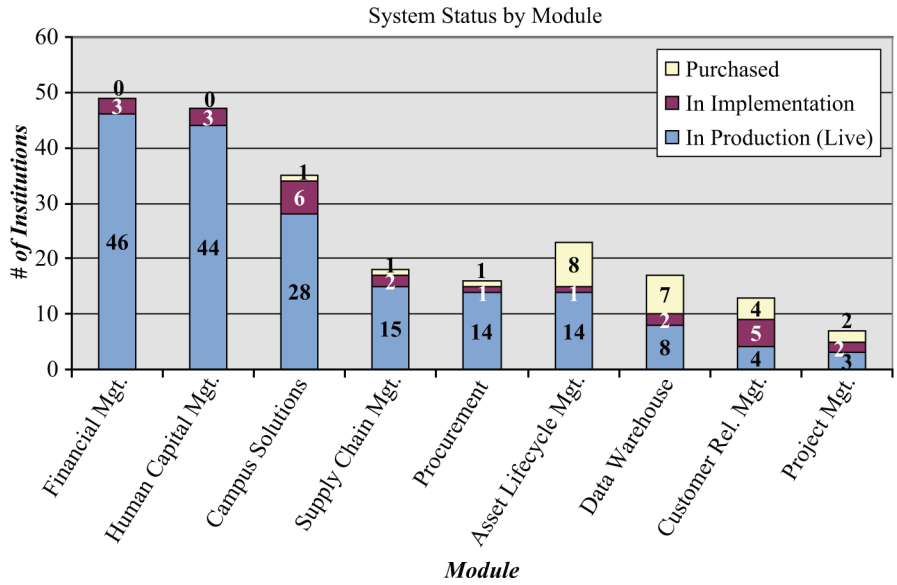

Figure 1.
Status of ERP system models organizations

solutions did not apply to health care institutions yet it has been implemented by a large part of our sample, which is, as noted previously, skewed toward educational institutions).

Data were downloaded from the on-line survey software and analyzed in Excel and SPSS when relevant.

4. Findings

Our survey included questions regarding the structure and goals of each of the ERP post-implementation support organizations. The first section discusses findings related to structure of the post-implementation organization. The next section examines the goals and measures of success for each project, both for the organization's initial implementation project and its ongoing post-implementation support efforts. In the final section, we analyze the relationship between the various goals and measures of success relative to the structural forms chosen for post-implementation.

4.1 Structure of the post-implementation organization

We found that the post-implementation support structures fell primarily into two dominant forms: a centralized cross-functional team structure (27 percent) and a distributed ad hoc/hybrid structure (66 percent). Only 5 percent described their organization as decentralized.

Specifically, we asked "How would you generally describe the organizational structure for Post-Implementation ERP?" Our data included completed questions by 62 of our 65 respondents (see Table I).

When analyzing organizational structure within industry, we find that educational institutions from our sample tend to be more centralized, whereas health care institutions tend to be hybrid compared to education. Yet, the structure in both

industry sectors skews toward a Hybrid model. (see Table II for breakdown by industry sample).

In addition, we analyzed organizational structure by the overall size of the organization. Company size did not appear to be related to organizational structure (table available on request).

We also asked the question of structure in another way, using a scale of 1 = centralized to 7 = decentralized, intended to understand the degree of centralization. This format acknowledges that structure, especially in the hybrid form, is often viewed along a continuum between centralization and decentralization. Specifically, we asked, "In reference to your previous answer, please indicate the degree to which control of ERP in your organization is centralized or decentralized". In addition, we asked, "In your opinion, what would be the most effective Post-Implementation design for your organization?". We call the later the respondent's "most effective" or ideal structure versus their "current". Figure 2 shows the results from these two questions. Results for each response are shown side by side.

In general, the results indicate that our respondents see a centralized structure as ideal. However, there also appears to be a "grass is always greener" mentality. Although the general trend is towards preference for a more centralized model, there also appears to be a preference for less ambiguity in the middle of the 1-7 scale and a tendency to want more in terms of centralization if they skew centralized, and prefer more decentralized if they are only somewhat decentralized. We also asked respondents to identify who had executive responsibility for the ERP project. Interestingly, when structure is cross-tabulated by titles of those with overall executive responsibility for the ERP project, even those describing their institution as a "hybrid" show that the VP of Information Technology or the CIO is primarily responsible

Table I. Structure for post-implementation ERP

Organizational structure	*n*	Percent
Centralized – application, development, support controlled by ERP department	17	27.4
Decentralized – application, development, support controlled by functional BU's	3	4.8
Hybrid – application, development, and support controlled and shared by both the ERP dept. and functional BU's	41	66.1
Other	1	1.6
Total	62	100.0

Table II. Structure by industry sector

Structure	Healthcare ($n = 16$) (%)	Education ($n = 46$) (%)	Total ($n = 62$) (%)
Centralized	12.5	32.6	27.4
Decentralized	6.3	4.3	4.8
Hybrid	81.3	60.9	66.1
Other	0.0	2.2	1.6
Total	100.0	100.0	100.0

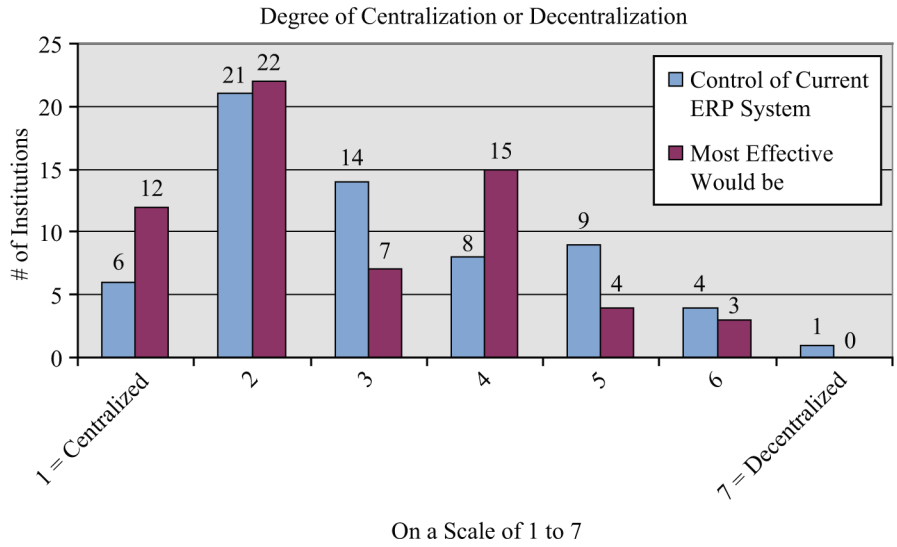

Figure 2.
Current versus most effective structure

(as shown in Table III). This would seem to indicate that a hybrid model still relies primarily on control by IT management, despite its reliance on resources distributed across many other functional areas.

4.2 Project goals and measures of success

Respondents were asked to identify their original goals for the ERP project based on six pre-determined criteria, allowing room for "other" goals, if necessary. Specifically, they were asked, "Thinking about your original goals for the ERP project, please rate the following with regard to importance". Respondents used a scale of 1 to 7, with 1 representing "not at all important", 7 representing "very important", and 4 anchored as "neutral". Mean calculations for the responses are shown in Table IV. Replacement of old technology was the most important original goal, followed by process improvement and business process reengineering. All three are reported with a mean of above 4 (a neutral response) on the 1 to 7 scale. Alternatively, cost and staff

Table III.
Structure by overall executive responsibility for ERP in organization

Structure by overall executive responsibility for ERP in organization	Centralized ($n = 17$) (%)	Decentralized ($n = 3$) (%)	Hybrid ($n = 41$) (%)	Total ($n = 61$) (%)
President/Chancellor/CEO	5.9	0.0	4.9	4.8
Provost/VP Academic Affairs/COO	17.6	0.0	7.3	9.7
VP Finance/VP Administration/CFO	23.5	33.3	26.8	27.4
VP Information Technology/CIO	52.9	66.7	56.1	54.8
Other	0.0	0.0	4.9	3.2
Total	100.0	100.0	100.0	100.0

reduction, reorganization or change, and Y2K all averaged below the "neutral" point of 4 on the scale.

In addition, thinking about their original ERP project in the implementation phase, respondents were asked to rate six variables on a 1-7 scale with regard to importance to their project's measurement of success. Specifically, we asked, "Please rate the following with regard to importance to your measurement of success in the original ERP project". Mean scores are outlined in Table V. In this question, all the items outlined in the following have mean scores above the "neutral" point of 4 on the scale.

Time, cost, quality and perceived performance (user satisfaction) are well-established measures of success in the IS literature (Atkinson, 1999). Since many ERP projects focus on minimizing customization to stay on time and within budget, and to lower long-term maintenance costs, we also included this as an option (i.e. often referred to "vanilla" in ERP). We also included automation of processes, since a new system would offer new opportunities for applying information technology. As shown in Table V, completion within budget and on time were rated the highest in importance on a 1-7 scale.

Next, we shifted focus slightly and asked respondents to consider their ongoing post-implementation support of the modules currently in production. A total of four variables were rated with regard to their current goals. Specifically, we asked, "Now thinking about those modules that are implemented, please rate the following in order of importance of current goals". Respondents used a scale of 1 to 7, with 1 representing "not at all important" and 7 representing "very important" to their current goals. Process improvements had the highest mean. Means are outlined in Table VI.

Next, we asked respondents to report about the measures of success and again rate them on a scale of 1 to 7, as reported in Table VII. Specifically, we asked, "Thinking about the Post Implementation project, please rate the following in order of importance with regard to measures of success of your ERP project". In this question, timely

Original goals for ERP Project	*n*	Mean	SD
Replace old technology	63	6.17	1.144
Process improvement	64	5.77	1.231
Business process reengineering	63	5.27	1.405
Cost reduction/staff reduction	61	3.79	1.450
Structural reorganization/change (merger, acquisition, etc.)	62	3.03	1.967
Resolve Y2K	60	2.83	2.395

Table IV. Original goals for ERP project – during/ pre-implementation

Measurement of success	*n*	Mean	SD
Complete within budget	64	6.09	1.137
Complete on-time	64	5.91	1.050
Maximize user satisfaction	64	5.42	1.257
Maximize quality assurance	64	5.31	1.489
Minimize customization	64	5.27	1.417
Automation of processes	63	5.25	1.379

Table V. Measurement of success – during/ pre-implementation

response to support issues was the most important measure of success. Budgeting issues had the lowest mean score.

The change in goals and measures of success are notable. Improvements in business processes and reporting become important goals as organizations enter a post-implementation phase (whereas completing on time and within budget were most important during implementation). In addition, user needs become more important measures for success in post-implementation, while budget and customization issues become less important.

4.3 Structure by project goals and measures of success

In addition, we conducted *t*-tests to determine if the importance of goals were different for those respondents who identified their organization as primarily centralized versus hybrid. Although the rank order of original goals are the same for centralized and hybrid organizations, it appears that Business Process Reengineering and Resolving Y2K were rated as somewhat more important in Hybrid organizations (e.g. see *t*-tests in Table VIII).

When considering current goals (post-implementation), process improvements are most important for both centralized and hybrid organizations. (Note that *t*-tests were

Table VI.
Current goals for the ERP project – post-implementation

Current goals for the ERP Project	*n*	Mean	SD
Process improvements	64	5.98	1.000
Improve reporting	64	5.78	1.201
Business process reengineering	64	5.16	1.405
Cost reduction	64	4.92	1.384

Table VII.
Measures of success – post-implementation

Measures of success	*n*	Mean	SD
Timely response to support issues	64	6.16	0.912
User satisfaction	64	6.08	0.948
Automation of processes	64	5.81	1.067
Manage to a fixed budget	64	5.44	1.207

Table VIII.
T-test – mean differences in original goals for ERP project – during/pre-implementation (centralized vs hybrid)

Original goals for ERP Project – during/pre-implementation	Centralized (n = 16-17)	Hybrid (n = 39-40)
Replace old technology	6.29	6.18
Process improvement	5.47	5.73
Business process reengineering	4.94*	5.42*
Cost reduction/staff reduction	3.56	3.90
Structural reorganization/change (merger, acquisition, etc.)	3.53	2.95
Resolve Y2K	2.25**	3.10**

Notes: $^{*}p < 0.05$; $^{**}p < 0.01$

conducted and there were no differences between means for hybrid versus centralized on the goals listed in Table IX).

Mean scores of original (pre-implementation) measures of success (for those describing their company as centralized versus hybrid) are listed in Table X. *T*-tests did not indicate significant differences between mean scores based on type of organizing structure. However, please note that the rank is very similar for both types of organizations.

In addition, we examined mean scores of current (post-implementation) measures of success (by centralized versus hybrid organizations). *T*-tests did not indicate differences in means based on type of organization and the rank order of mean scores is virtually the same for both types of organizing structures (as highlighted in Table XI).

5. Analysis and discussion

The implementation of an ERP project is a costly, complex task (Saatcioglu, 2009) riddled with high failure rates. Despite the challenges, the allure of the benefits have left the ERP market nearly saturated. Hence, researchers have recently begun to explore the post-implementation design, structure, and relevant measures of success (e.g. Worrell *et al.*, 2006; Zhu *et al.*, 2010).

The objectives of this research were exploratory in nature. We set out to understand how post-implementation ERP support organizations are structured. We approached

Table IX. Rank order – mean scores of current goals for the ERP project – post-implementation (centralized vs hybrid)

Current goals for the ERP Project – post-implementation	Centralized ($n = 17$)	Rank order	Hybrid ($n = 41$)	Rank order
Process improvements	6.06	1	5.95	1
Improve reporting	5.88	2	5.71	2
Business process reengineering	5.06	3	5.27	3
Cost reduction	5.06	3	4.80	4

Table X. Rank order – means scores of original measurements of success – during/pre-implementation (centralized vs hybrid)

Measurement of success project – during/pre-implementation	Centralized ($n = 16$-17)	Rank order	Hybrid ($n = 41$)	Rank order
Complete within budget	5.88	1	6.17	1
Complete on-time	5.71	2	6.05	2
Maximize user satisfaction	5.18	3	5.49	3
Maximize quality assurance	5.06	4	5.39	5
Minimize customization	4.88	5	5.41	4
Automation of processes	4.88	5	5.34	6

Table XI. Rank order – means scores of current measurements of success – post-implementation (centralized vs hybrid)

Current measurement of success – post-implementation	Centralized ($n = 16$-17)	Rank order	Hybrid ($n = 41$)	Rank order
Timely response to support issues	6.18	1	6.17	1
User satisfaction	5.82	2	6.12	2
Automation of processes	5.76	3	5.78	3
Manage to a fixed budget	5.41	4	5.44	4

this topic applying guidance from prior IS literature and a well-established theoretical framework. Using structural contingency framework, we asked respondents to identify the original goals and measures of success for their organization's ERP project, as well as their current goals and measures for success (now that they had moved into the post-implementation phase). First we examined the question of structure by asking respondents to indicate if their support organization was centralized, decentralized, or a hybrid form. As expected, we found few instances of decentralization. Given the nature of ERP as a highly integrated system with a centralized database design, it would seem likely that we would only see a decentralized organizing form in the largest of organizations.

We found that the hybrid structure was utilized most often among the organizations in our sample. We did not presuppose any expectations, given that prior research in this area revealed no dominant form, although that study sample was quite small (Sambamurthy and Zmud, 1999). In fact, the nature of ERP as a technology that integrates work processes across functional areas of the organization offers arguments for both the centralized and distributed forms. We believe that finding greater than 66 percent with hybrid structures emphasizes that involvement of users (e.g. SMEs) and their subsequent knowledge of the business contributes greatly to the alignment of ERP with an organization's objectives. However, once recruited onto an ERP project, retention of SMEs at the end of a project can also offer the ability to align goals, while simultaneously coordinating efforts to become more highly effective. Thus, the centralized form was found in 27 percent of organizations. The results found some differences across the two industries, with healthcare organizations in our sample employing the hybrid form more often than educational institutions. Nevertheless, both industries in our sample skewed toward the hybrid form. This finding demonstrates opportunities for future research to examine the relationship between industry and IT structures.

On average, organizations in our sample would like to be more centralized, but a surprising number indicated they would also like to be more decentralized. This raises questions as to a general desire in ERP organizations to be structured differently, which may not be too surprising given the existing benefits of both forms and the inevitable compromise that either choice presents. In our sample, the executive who was responsible for ERP had no relationship to the structural form adopted, although we did find that IT managers were in control of the projects in decentralized organizations (i.e. took charge in these complex situations).

In examining how organizations prioritized goals, we found that goals did not change much as organizations moved from implementation into the post-implementation phase; however, the measures of success were reordered to emphasis responsiveness and user needs. Specifically, with regard to goals, we found that process improvements ranked highest among original goals and cost reductions ranked lowest. Again, these findings did not change much from pre- to post-implementation.

We also examined the relationship between goals and structure and found that only "business process reengineering" and "resolving Y2K issues" showed statistically significant differences between those adopting different organizing forms. Those with the hybrid form gave a higher prioritization to these two issues. On one hand, this finding is in line with what one might expect, such that resolving Y2K, for example is a

temporary condition. Once this issue is resolved, SMEs can be returned to their functional roles or to that of a hybrid design rather than a centralized design. On the other hand, a reengineering effort would potentially benefit from creating a dedicated (centralized) organization to focus on continued efforts with process redesign, independent of the varying priorities of the different functional areas. However, our findings indicate that organizations still resulted in a hybrid even when reengineering was a priority.

When considering their original measures of success, we found that project management issues were at the top of the list in priorities (e.g. being on-time and within budget). User issues and quality assurance were not as high in importance. However, post-implementation success measures were somewhat different, such that responding to users and user satisfaction topped the list of success measures. The changes in success measures seemingly fits with the urgency in organizations to make sure the implementation is a success as measured in terms of time and cost. However, quality becomes the higher priority as the organization begins to utilize the system daily.

Perhaps of primary importance, particularly in light of contingency theory, is the fact that the organization's original goals and measures of success did not seem to dictate the final organizational structure. We interpret this finding as an indication that the choice of structural form is not easily explained based on goals and objectives, as contingency theory might predict. We conjecture that devising a structural approach to supporting such a complex inter-functional system such as ERP is one that requires solving many complex simultaneous organizational problems.

6. Limitations, conclusions and future research

This research undertook an exploratory methodology to understand the objectives, structure and staffing of post-implementation ERP organizations. We surveyed key contacts in 65 organizations (contacted through the software user group). The sample represents two industry sectors, higher education and healthcare. This study has several limitations. Only two industries were examined and the responses of just 65 organizations were reported on in this paper. This limitation affected our ability to apply more advanced statistical methods in our analysis, and perhaps our ability to find statistical significance in some of the methods we did apply.

The findings reported in this paper do, however, establish the basis for additional analysis and help to set an agenda for future research in this important area. The question of what influences the choice of organizational structure in post-implementation remains open, as too does the question of what form offers the best performance given the goals of the organization. Each of the organizational design models discussed has inherent strengths and weaknesses for an ERP support organization. By retaining key functional personnel, the centralized model leverages organizational knowledge developed during the implementation, improving the organization's capabilities to undertake future initiatives, such as upgrades, business process improvements and other enhancements. This model can also aid perceptions of legitimacy of the ERP unit and provide enhanced access to organizational resources. One might have expected that original goals of reengineering and reorganizing would lead to a more centralized model; however, our data does not support this notion.

Alternatively, the distributed model returned functional SMEs to the home units after the implementation. However, the SMEs may still be expected to be involved in

future initiatives on an ad hoc basis. This lower cost approach offers the advantage of designating a liaison between the ERP project and a functional unit, thus enhancing knowledge transfer. Additionally, this model ensures that business process knowledge remains current. It also provides functional units with a greater ability to influence future decisions in enhancements and process improvements. While the majority of the organizations we surveyed described their post-implementation ERP support organization structure as hybrid, they were, when reported along a continuum, more centralized than decentralized. Furthermore, respondents reported on average that the ideal structure for their organization would be more centralized than the current structure.

We also found that the organizations we surveyed reported a shift in both goals and how they measure success as they moved from their implementation projects into the post-implementation phase. Further analysis will be required to see if a relationship exists between an organization's response and support for user needs and automation of processes and the existence and desire for more centralized structures. Furthermore, future research should explore other contingencies, as well as how the degree of customization and degree of centralization may or may not contribute to success factors. Although one may assume that strategic goals would dictate structural design, driving forces are indeed more complicated. As is the case with knowledge management systems, post-implementation designs are likely influenced by other factors such as culture, market characteristics, size of the institution (Supyuenyong *et al.*, 2009) and political dynamics within the institution. Future research should continue to explore the mechanisms that determine post-implementation organizational design, beyond educational and health care institutions, to also include a spectrum of sizes of organizations including small, medium (Esteves, 2009) as well as large institutions. Researchers are just beginning to scratch the surface with this topic (e.g. Worrell *et al.*, 2006; Zhu *et al.*, 2010) and our research contributes to this growing body of work.

References

Atkinson, R. (1999), "Project management: time, cost and quality, two best guesses and a phenomenon, it's time to accept other success criteria", *International Journal of Project Management*, Vol. 17 No. 6, pp. 377-82.

Boynton, A.C., Victor, B. and Pine, J.B. (1993), "New competitive strategies: challenges to organizations and information technologies", *IBM Systems Journal*, Vol. 32 No. 1, pp. 40-60.

Brown, C. (1999), "Horizontal mechanisms under differing IS organization contexts", *MIS Quarterly*, Vol. 23 No. 3, pp. 421-54.

Brown, C.V. and Magill, S.L. (1994), "Alignment of the IS functions with the enterprise: toward a model of antecedents", *MIS Quarterly*, Vol. 18 No. 4, pp. 371-403.

Brown, C. and Vessey, I. (2003), "Managing the next wave of enterprise systems: leveraging lessons from ERP", *MIS Quarterly Executive*, Vol. 2 No. 1, pp. 65-77.

Esteves, J. (2009), "A benefits realization road-map framework for ERP usage in small and medium-sized enterprises", *Journal of Enterprise Information Management*, Vol. 22 Nos 1-2, pp. 25-35.

Galbraith, J.R. (1994), *Competing with Flexible Lateral Organizations*, Addison-Wesley Publishing Company, Reading, MA.

Gallagher, V.C. and Gallagher, K.P. (2006), "Employee perceptions of role changes in ERP projects", *paper presented at the Annual Meeting of the Academy of Management, August, Atlanta, GA*.

Jones, M.C., Zmud, R.W. and Clark, T.D. Jr (2008), "ERP in practice: a snapshot of post-installation perception and behaviors", *Communications of the Association of Information Systems*, Vol. 23 No. 25, pp. 427-62.

King, J. (1983), "Centralized versus decentralized computing: organizational considerations and management options", *Computing Surveys*, Vol. 15 No. 4, pp. 319-49.

Markus, L.M. and Tanis, C. (2000), "The enterprise systems experience – from adoption to success", in Zmud, R.W. (Ed.), *Framing the Domains of IT Research: Glimpsing the Future Through the Past*, Pinnaflex Educational Resources, Cincinnati, OH, pp. 173-207.

Markus, L.M., Tanis, C. and van Fenema, P.C. (2000), "Multisite ERP implementations", *Communication of the ACM*, Vol. 43 No. 4, pp. 42-6.

Saatcioglu, O.Y. (2009), "What determines user satisfaction in ERP projects: benefits, barriers or risks?", *Journal of Enterprise Information Management*, Vol. 22 No. 6, pp. 690-708.

Sambamurthy, V. and Zmud, R.W. (1999), "Arrangements for information technology governance: a theory of multiple contingencies", *MIS Quarterly*, Vol. 23 No. 2, pp. 261-91.

Sambamurthy, V. and Zmud, R.W. (2000), "Research commentary: the organizing logic for an enterprise's IT activities in the digital era – a prognosis of practice and a call for research", *Information Systems Research*, Vol. 11 No. 2, pp. 105-14.

Simon, H.A., Kozmetsky, G., Guetzkow, H. and Tyndall, G. (1954), *Centralization vs Decentralization in Organizing the Controller's Department*, Scholars Book Co., Houston, TX.

Supyuenyong, V., Islam, N. and Kulkarni, U. (2009), "Influence of SME characteristics on knowledge management processes: the case study of enterprise resource planning service providers", *Journal of Enterprise Information Management*, Vol. 22 Nos 1-2, pp. 63-80.

Volkoff, O., Elmes, M. and Strong, D. (2004), "Enterprise systems, knowledge transfer and power users", *Journal of Strategic Information Systems*, Vol. 13 No. 4, pp. 279-304.

von Simson, E. (1990), "The 'centrally decentralized' IS organization", *Harvard Business Review*, July-August, pp. 2-7.

Worrell, J., Gallagher, K. and Mason, R. (2006), "Explaining the structure of post-implementation ERP teams", *Proceedings of the 12th Annual Americas Conference on Information Systems, Acapulco*.

Zhu, Y., Li, Y., Wang, W. and Chen, J. (2010), "What leads to post-implementation success of ERP? An empirical study of the Chinese retail industry", *International Journal of Information Management*, Vol. 30 No. 3, pp. 265-76.

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