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# An Empirical Understanding of the Dialectic Relationship between a Central Governing Body and the Individual Sites in a Multisite Enterprise Resource Planning (ERP) System Implementation

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**An Empirical Understanding of the Dialectic Relationship between a  
Central Governing Body and the Individual Sites in a Multisite  
Enterprise Resource Planning (ERP) System Implementation**

by

**Tedde Taege**

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**Under the Supervision of Professor Fiona Fui-Hoon Nah**

**Lincoln, Nebraska**

**July, 2012**

**An Empirical Understanding of the Dialectic Relationship between a  
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University of Nebraska, 2012

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Multisite enterprise resource planning (ERP) system implementations are a challenge faced by organizations. One of the facets of this challenge is to balance the central control of the multisite implementation with the unique requirements desired by each of the sites. The competing interests of the individual sites against the other sites as well as the total organization are forces at work with respect to the collective interest of the organization's ERP.

The study seeks to gain insights into the dynamics of a multisite organizational ERP implementation by analyzing the motivations and challenges in the interactive relationship. The grounded theory approach is utilized in analyzing the data from this research to gain a deeper understanding of the underpinnings of the organization in relationship to its ERP system.

This research examines the case of a multisite ERP system at the University of Nebraska where four campuses or sites are involved (i.e., University of Nebraska at Kearney, University of Nebraska-Lincoln, University of Nebraska at Omaha, and

University of Nebraska Medical Center). The scenario represented by this organization provides a multi-location example for understanding the ERP relationship challenges. The investigation will provide proposed guidelines and suggestions for organizations facing similar dynamic ERP issues.

Through the search for an understanding of the dialectic relationship between a central governing body and the sites, nine dialectic forces in a multisite ERP system have been identified by this research. Three of them are bureaucracy, goal communication, and leadership by central governing body. The other six forces are goal alignment, solution frustration, size inequivalence among the sites, unique business models of sites, adequacy of communication, and site independence. These dialectic forces create challenges in managing multisite ERP implementations.

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## 1. Introduction

The challenges of managing multisite enterprise resource planning (ERP) system implementations have been acknowledged in the literature (Markus, Tanis & van Fenema, 2000). One of the challenges is to balance the central control of a multisite implementation versus the unique requirements of each of these sites. Organizations as a whole (i.e., as an enterprise) will need to maintain a reasonable amount of structure to successfully execute their mission but yet allow flexibility and innovation to respond to the fluid and dynamic environment around them as well as to the requirements of the individual sites. Sites generally will seek some degree of independence due to unique circumstance which they operate under. The competing needs of individual localities in contrast to the overarching requirements of the total body can set the stage for divergence and discourse.

Part of bringing structure into an organization is to implement guidelines, policies, and business practices. A modern advent of structure is the enterprise resource planning (ERP) software. A common goal of implementing this software is improve the business operations through the imbedded business rules of the software application. ERP software also removes the burden of businesses designing and writing complex business software applications. ERP packages are promoted as a way to expand the functionality and lower the cost through “outsourcing” the creation of a suite of applications built with common business practices which are integrated into the design of the software. ERP is marketed to



business entities as an efficient way to implement expanded data processing and analysis functionality.

Computer system implementations generally grow in complexity over time. With the growth comes an expanse of the implemented business logic, system configuration, and computer program code customization. The complexity demands additional time and attention from system designers and implementers, thus increasing demands on limited human resources and management of the post-implementation project. The complexity is further aggravated in a multisite ERP implementation where dialectic forces exist not only between a central governing body and its sites but also across the sites.

In this research, we examine these associated challenges in a multisite ERP system implementation at a large Midwestern University, the University of Nebraska system, where four campuses or sites are involved in the implementation – i.e., University of Nebraska at Kearney, University of Nebraska-Lincoln, University of Nebraska at Omaha, and University of Nebraska Medical Center. The dynamic relationship between the campuses and central administration is an important association. Central administration provides leadership, policy, and direction for the campuses. The campuses have the flexibility to determine their academic programs and business plans. The central administration is an advocate and not an autocratic central authority. The central administration has affirmed that decentralization allows for decisions to be made quickly at the point of impact (Office of the President, 1975). The campuses have the autonomy to embark on their own initiatives within their mission and finances. The flexibility of the relationship provides for general harmony throughout the organization. However, striking

a balance between flexibility and standardization of policies has always been a challenge to achieve.

In the past, the university has implemented services and software for the benefit of all of the campuses and as a goal of the university system (Office of the President, 1982). The efforts are generally pursued with the input from the campus leadership unless mandated by law. When utilized, the ability to implement common services has been leveraged to generate cost savings. The university system has numerous shared services including some shared computer systems. One of the shared systems is the administrative system which is enterprise resource planning software from the German software vendor SAP.

In the context of the ERP system, a deeper understanding of the dialectic interaction is vital to the continued success in the ongoing implementation of a cooperative computer-based enterprise solution. To gain a better understanding of the challenges underlying multisite enterprise implementations, a study of dynamics between the sites and the governing body is undertaken. This study will pursue a qualitative empirical understanding of the relationships of both the central body as well as the individual sites. This study has the potential to yield results which can be applied to other decentralized organizations with a central governing body as they seek to gain insight into their enterprise's motivations and challenges in the implementation or continued maintenance of an ERP system.

The research sought to collect data from key users and management of a mature ERP implementation. The users were experienced with the ERP software as opposed to casual users and are from multiple sites within the organization. The subjects were

interviewed to understand the phenomenon underlying the management and dialectic relationship between the central governing body and individual sites of a multisite ERP implementation.

## **2. Literature Review**

Chapter two contains a review of the literature accessed for this study. The review will provide a background of information already existing in related research veins. It provides an evaluation of literature associated with ERP, multisite ERP implementations, ERP in governmental institutions, and ERP organizational issues.

### **2.1 Background**

Enterprise resource planning (ERP) systems are evolved computerized software which provides strategic advantages in execution of business processes. ERP software is designed to increase user productivity, provide better planning data, improve business activity, and deliver increased profitability to a business.

ERP systems are becoming a commodity (Hoffman, 2008). They are becoming a condition of organizations (Boersma & Kingma, 2005). These systems are becoming commonplace in all types of business organizations and are bringing business cultural changes with the software implementation. Challenges are faced by organizations implementing and maintaining such complex software, especially mature, multisite ERP implementations.

## **2.2 ERP Studies**

The ERP literature has primarily focused on software installation studies (Sieber et al., 2000; Robey, Ross, & Boudreau, 2002; Yakovlev 2002; Volkoff, Strong, & Elmes 2005; Van Fenema, Koppius, & Van Baalen, 2007; Wagner & Antonucci, 2009; Kang, Jong-Hun, & Hee-Dong, 2008). While potential ERP sites need to understand the implications and issues with the software installation, companies need to look at the continuing maintenance or post-adoption issues of the software and people executing the software. Nicolaou & Bhattacharya (2006) looked at the financial impact of ERP upgrades and Nicolaou (2004) analyzed the organizational impact in a post-implementation review study. In a study of software maintenance, Nah, Faja, & Cata (2001) found declining levels of corrective maintenance throughout the ERP software maintenance lifecycle.

Research into post-adoption issues of ERP is lacking and research to more thoroughly understand the long-term impact of ERP systems is warranted. We need to view business organizations and ERP software as dynamic entities instead of looking at them as static structures (Pollock & Cornford, 2004).

## **2.3 Multisite ERP**

An ERP implementation with multiple sites has the opportunity for challenging dynamics. Each location will have a desire for regionalized customization along with the desire to determine their unique direction. Multisite ERP implementations can be easy and simplistic when the total organization has few sites. More challenging multisite ERP

implementations are geographically dispersed; require high levels of management attention, and present unusual technical challenges (Markus, Tanis, & van Fenema, 2000).

Markus, Tanis, & van Fenema (2000) discuss several ERP implementation strategies including the extremes of total local autonomy and total centralization, as well as hybrid applications where the implementation is a blending of autonomy and centralization. Local autonomy can give rise to a sense of satisfaction and control at the site. The localized autonomy can alleviate conflict between the site and the centralized management. A strong centralized approach provides uniformity and conformity for the organization.

Centralized processes receive extra scrutiny in decentralized organizations. Pressure to cut overhead costs subject centralization efforts to review and challenge (Taylor & Tucker, 1989). Undoubtedly, the sites will challenge efforts to diminish their localized control. While decentralization of training relieved pressures on a centralized site, it was found to lead to fragmentation of the training message (Van Fenema et al., 2007).

## **2.4 Governmental ERP**

In a literature review of 313 ERP articles, Moon (2007) found only 18 articles studying ERP in the university setting. In the review, Moon (2007) called for more attention to expand the knowledge base pertaining to educational ERP implementation.

Like most of the ERP studies, governmental ERP studies primarily look at ERP implementation factors. In 2000, Sieber et al. conducted a case study providing an implementation view of the University of Nebraska which provided a baseline view for the subject of this study. While not specifically identifying the differences, Pollock &

Cornford (2004) noted that the business models for universities and businesses have differences with respect to ERP.

Several multisite government studies have taken place. The best practices of the Canadian Government (Kumar, Maheshwari, & Kumar, 2002) and the ImaginePA Project (Wagner, & Antonucci, 2009) review large scale governmental implementations where organizational change played a role in these projects. While these studies get into the ERP organizational dynamics, the focus is on implementation.

## **2.5 ERP Organizational Issues**

Rainey, Backoff, & Levine (1976) identify key public and private organizational differences. Looking at the issue from a public sector point of view, there are three differences:

- 1) Environmental Factors – limited free market exposure resulting in less efficiency and limited incentive to reduce costs, low incentive to match public preferences, more legal influences, and greater political impact.
- 2) Organization-Environment Transactions – required consumption and activities due to mandatory nature, broader impact of actions, greater public visibility of actions, and greater expectation that everyone will be treated equally.
- 3) Internal Structures and Processes – conflicting diverse vague goals, less decision flexibility, weaker authority over subordinates, less delegation, more formal reviews, greater usage of formal regulations, more cautious, frequent politically-based personnel turnover causing disjointed strategic vision, less

employment incentives, lower employment satisfaction, and reduced commitment to the organization.

Government information system management projects suffer from many of the same issues as government bodies. Projects are found to have issues with comprehensive planning, integration of technologies, red tape which increases proportionately with the project size and flexibility of the software, complicated government practice challenging software design, short term perspective due to political elections (Caudle, Gorr, & Newcomer, 1991).

While many ERP system projects are implemented with the best practices and strive to avoid software customization (Soh et al., 2003), system users may devise their own ways of executing the business processes (Van Stijn & Wensley, 2005; Volkoff, Strong, & Elmes 2005; Robey, Ross, & Boudreau, 2002; Boudreau & Robey, 2005). This process improvisation may contribute to organizational autonomy. Technology implementation has intended results but the system can have a constraining effect over time. Human action after an ERP implementation can negate system constraints (Boudreau & Robey, 2005). Also, misalignments between the ERP software system developers' intention and the organizational assumptions can create frustration (Soh et al., 2003; Pollock & Cornford, 2004). The misalignment can develop through generic reports, vague interpretation of country specific issues, and expansive number of data screens. In general, ERP software is accompanied by tension wherever it is implemented (Pollock & Cornford, 2004).



In a drift from the original system design, Elbanna (2008) studied an organization with departments disputing the value of an ERP system. The project changed implementation course and went from one software implementation to an implementation with many interfaces from other systems. Differing networks attempted to modify the project objectives to their own specialized interests.

Kang, Jong-Hun, & Hee-Dong (2008) found three organizational modes: people-based, standardization-based, and centralization-based. In an ERP implementation, people-based modes diminish through the software handling previously manually processes. Standardization-based modes increase through the use of best practices. Centralization-based modes increase through command, control, and conflict resolution need to be increase for the software implementation to be successful.

## 2.6 Summary of ERP Studies

Table 2.1 summarizes ERP studies in the literature that were reviewed in this research.

**Table 2.1: Previous Research Findings**

Source	Research Question	Key Findings
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Boersma & Kingma, 2005	Develop a framework which the organizational cultural dimension of ERP implementations can be analyzed.	ERP has intended and unintended power consequences. More ERP culture studies are important. Standardization of ERP systems is of concern to identified actors.
Boudreau & Robey, 2005	What organizational transformation occurs when implementing integrated information technology?	Systems have intended results but can have a constraining effect over time. Human action can negate system constraints. Users didn't like system and it took longer to execute processes. Eventually conformed to the new system because old processes didn't yield necessary information.
Caudle, Gorr, & Newcomer, 1991	What are the most important public sector IS issues?	Issues: Comprehensive planning, integration of technologies, red tape impacts technology used and increases as government size grows (more red tape appears as the software flexible increases), complicated government processes limited software offerings, short term perspective due to political whims via elections
Elbanna, 2008	Why does drift occur in ERP projects?	As a horizontal ERP project progresses, different actors in different networks either contribute negative energy or positive energy pushing the project forward or pulling it backward. Negative modalities change the project plan direction and set it on a course of drift.
Kang, Jong-Hun, & Hee-Dong, 2008	Under what conditions will an investment in an ERP system have a positive influence on business performance?	ERP does not always yield a positive effect on business. Calls for studies between ERP and organizational integration modes. Organizational integration modes - people-based, standardization-based, and centralization-based.

<p>Markus, Tanis, &amp; van Fenema, 2000</p>	<p>What issues are inherent with multisite ERP implementations?</p>	<p>Implementation scope - larger projects add risk, strain resources, test management, require additional organizational change, cost more, and tend to fail more often. Five ways to manage multisite ERP. 1) Total local autonomy - doesn't capture ERP's integration. 2) HQ financial control - allows local control beyond financial. Good for unrelated multisite businesses. 3) HQ coordinates operations - local operational autonomy but HQ handles purchasing and inventory. 4) Network of operations - localities have access to each other's operations with limited HQ control. 5) Total centralization - all decisions at HQ and communicated downward. Multisite ERP with a new model for organizing and managing business requires great change management skill. Four software configuration models. 1) Single financial/single operational - common operation, centrally managed material input and outputs, common business processes. 2) Single financial/multiple operational - different processes but consolidates financial information. 3) Multiple line/single operation - single manufacturing but multiple sales offices. 4) Multiple financial/multiple operations - country based multinational structures. Two system rollout options. 1) "Big Bang" deployment - all at once. 2) Phased rollout - controlled implementation at various times.</p>
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Robey, Ross, & Boudreau, 2002	What dialectic forces are promoting or opposing change in large ERP implementations?	<p>"Logic of opposition" could account for the diversity of ERP outcomes. Old versus new knowledge. Performance improvements included greater efficiency within supply chains, improved financial accounting, greater data visibility and analysis capability, and more process-centered thinking.</p> <p>Negative outcomes included problems of data inaccuracy, loss of reporting capabilities, resistance by users, strained relationships with customers, and loss of skilled people.</p>
Soh, Sia, Boh, & Tang, 2002	What are the sources of ERP misalignments?	<p>In this respect Soh et al. (2002) offer an interesting typology of "misalignments in ERP implementation" based on four structural properties of ERP. They argue that the quest for the integration of business units, a process orientation, greater flexibility, and generalized solutions, creates tensions with opposite organizational forces demanding differentiation, a functional orientation, stability and domain-specific – for example nation- or region-specific – solutions.</p>
Van Fenema, Koppius, & Van Baalen, 2007	What is the impact of packaged software on multisite organizations?	<p>Organizational impact on organizational processes, learning, and capability.</p> <p>Implementing packaged software is different from developing custom-built software. Lack of focus on multisite organizations.</p> <p>Impact of packaged software on organizational processes. Final phases of a multisite implementation.</p> <p>Interested in organizational processes triggered and affected by the implementation of ERP.</p>

Van Stijn & Wensley, 2005	How an organizational memory mismatch approach can be used to look at the nature of the changes surrounding this adoption and use of ERP's best practices?	There is a tradeoff between best practice implementation through standardization of processes and being able to allow the business operate in its own special way.
Volkoff, Strong, & Elmes, 2005	What are the effects of enterprise systems?	Three types of business relationships, between similar plants or functions, between different stages in a business process, and between different functional areas within one organizational unit. Difficulties in integration between organizational subunits. Need discipline to limit data errors. Workarounds have negative consequences.
Wagner, & Antonucci, 2009	Is ERP implementation the same in the public sector as it is in the private sector?	Organizational complexity impacts integration. Complex business roles. Competing business goals and leadership. Process owners are difficult to identify. Risk adverse. Complex budget. Contract constraints - must review vendors. Difficulty creating best practices. Should have implemented more of their own custom solutions. Political style and funding changes required strong leadership. Government doesn't understand the concept of customer and a different incentive system was needed for attracting more customers. Process centric organization.

Yakovlev, 2002	What was the implementation experience at a small university site?	Challenged by changes in business practices. New ways of operating. More screens for data entry. More time needed for reports and screens. Better reports. Better look & feel. Instant availability of data. Data accuracy highly important. Frequent patches. Forget the traditional way of doing things. Set a goal to change as many business processes during the initial implementation.
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In summary, the literature seems to point to organizational changes and challenges faced by institutions implementing ERP software. Multiple site implementations can test the organizational structure even further. The dialectic relationship between the organizational bodies can be acute and needs to be better understood. Some of the research is calling for additional studies to understand the organizational impact of ERP systems. A perceived gap in the existing studies is the need for organizational research long after the initial software implementation has occurred and far into the maintenance stages. A serious look at the internal organizational relationships of an ERP is warranted.

### **3. Theoretical Foundation**

Human interactions consist of temporal involvements and engagements (Corbin & Strauss 2008). The significance of the interaction is a function of the parties involved. In an anticipated interaction, those involved enter into an engagement with their own expectations based on any historical reference and future expectations. The perception that each entity takes in a situation feeds the evolving relationship. The independence and interdependence of two or more bodies can dictate current outcomes and set the course of direction for future. Of those interactions and outcomes, the chapter will set out foundational elements for which this research will be based upon.

#### **3.1 Actor Network Theory**

The foundations of actor network theory are concerned with the mechanics of power (Law, 1992). In actor network theory, an analyst should take a fresh perspective on all interactions while viewing the power structure which lies beneath. The interactions of any network are not only human but are also comprised of interactions with non-human objects.

The actor network theory treats all people and all objects the same way. There is no difference in looking at people and objects. They are all actors. As actors, they are also comprised of networks beneath the actor level. All actors are built upon networks. As the network view reverts to higher levels, the sub-networks of an actor become hidden beneath

the actor when the networks act as a single block. At the higher level, the lower networks are not of concern to the analysis at the higher network level.

In a network, resistance is inevitable which could lead to network breakdown or actor secession from the network. Resistance is the combined forces which attempt to keep a network from coming together and staying together. “The object is to explore and describe local processes of patterning, social orchestration, ordering and resistance.” (Law, 1992, page 6) When using the actor-network theory to view a social situation, it looks at how people and organizations are put together, mix together, and stay together.

Translation is the term to describe network formulation and is defined as the method by which actors enroll other actors into a network (Mahring et al., 2004 citing Callon, 1985). Translation is the conduit which one actor gives roles to another (Singleton & Michael, 1993). In network building, translation is a state of continuous evolution where an actor will attempt to channel the objectives of others into different directions (Pollock & Cornford, 2004).

In looking at translation and network resistance, four defining points are considered: time and durability, mobility within space, relational circumstances, and social ordering. In exploring the points, questions about the network are considered. How long does an element last in a network? How well does the organization communicate? How well does the network foresee the future and predict responses and reactions? What is the power structure of an organization?

The social definition and the technical definition of network in actor network theory are quite different (Latour 1987). The theory is not concerned with social networks of an



individual but “non-human, non-individual” entities. Looking at the case being studied for a network example, the University of Nebraska system is a network where the central administration and the campuses form the network which is the University system. The campuses and the central administration are actors in this network. Each campus has internal networks made up of departments and the departments can be broken down further by the roles within the departments. This research study seeks to derive theory from the network level which is comprised of the campuses and the central administration.

Actor network theory treats the social and technical entities as inseparable and should be analyzed the same way (Walsham, 1997). It seeks to derive theory out of networks (Latour 1987). The theory explains the network threads by understanding and describing the layers and ordering within the layers.

Actor-network theory is a basic material resistance definition. It analyzes the weak ties which bound the organization together. It starts out at the lowest level and backs into the higher level by accounting for order and contingencies. A network may be close in proximity but far in context while another network may be far in location but much closer in context.

Networks are not social and are not spatial. They are just associations between the actors. A network is never bigger than another network. The network is just longer and more intricately connected. A network is all boundary without an inside or outside. The actor is something which acts or is acted upon. Actors can be human or collections of humans and may have similar analysis with differing results. Actors are flows exposed to

challenges which test their stability and conformity. The actors have the ability to define their own context in the network through delineation and metalanguage.

In an application of actor network theory, Elbanna (2008) found numerous networks within the studied environment. When actors within these networks disputed a project at various stages, the project could not move forward. Departments disputed the value and functionality of the system and introduced other software solutions. As a result the project drifted from a single implementation to a technical software implementation with various interfaces. Differing networks attempted to modify the objectives into specialized interests and drive the project from its objectives. Varying levels of drift contribute to achievement of different levels of ERP results. Drift can occur in active implementation projects or drift can accumulate over time in a mature software setting.

In an early deployment of a university campus management module, Pollock & Cornford (2004) observed the antagonistic nature of customization. In a pilot setting with multiple early adopters, the achievement of successful customization depended on the similarities and differences of the various actor-networks. The antagonistic nature of customization might account for why similarly configured systems would result in radically different results in different locations due to translation (Walsham, 1997 citing Bloomfield, 1992).

**Table 3.1 Key Concepts in Actor-Network Theory**

<b>Concept</b>	<b>Description</b>
Actor (or “actant”)	Both human beings and nonhuman actors such as

	technological artefacts (sic)
Actor-network	Heterogeneous network of aligned interests, including people, organizations and standards
Enrolment and translation	Creating a body of allies, human and non-human, through a process of translating their interests to be aligned with the actor-network
Delegates and inscription	Delegates are actors who “stand in and speak for” particular viewpoints which have been inscribed in them, e.g., software as frozen organizational discourse
Irreversibility	The degree to which it is subsequently impossible to go back to a point where alternative possibilities exist
Black box	A frozen network element, often with properties of irreversibility
Immutable mobile	Network element with strong properties of irreversibility, and effects which transcend time and place, e.g., software standards

*Source: Actor-Network Theory and IS Research: Current Status and Future Prospects – Walsham, 1997, p. 468*

### 3.2 i\* Framework

Yu & Liu (2000) describes the i\* framework as a “way to model intentional relationships among strategic actors” in information systems. It helps define the boundary in which the actors operate while describing the interdependence between them for goal achievement. Intentional dependencies are described as reliance between the whole and its parts to maintain unity (Yu & Liu, 2000).

Strategic dependency has four types of dependencies: goal, task, resource, and softgoal (Yu & Liu, 2000). Goal dependency is a scenario where one actor relies on another actor to realize a stated goal before the dependent actor can continue. Consider a factory scenario to understand goal dependency where an assembly line is building a multistep product. In automobile production, the frame must be assembled and welded before the windshield can be added. In this way, the windshield assembly process is

dependent on the frame assembly for its goal achievement. In task dependency, a non-stated goal must be achieved by one actor for another to being. A simplified task dependency analogy can be drawn from athletics where a team waiting for a playoff berth must depend on another team to win in a game where the dependent team is not participating. The dependent team needs a specific team to win for their team to continue into the playoff games. With resource dependency, an actor is expected to provide a resource without issue. Using a scenario of product distribution, a manufacturer of a new product wants to put their product on special display for promotional purposes at a retail store. The manufacturer is expected to provide the special display rack for use in the retail store in promoting the product. Softgoal dependency is a variation of goal dependency except that there is no measurement for meeting the goal. Utilizing the new product distribution scenario again, the retailer has a softgoal dependency on the manufacturer to continue to supply the product so that the display rack can be replenished as the product sells.

An identifying factor in social networks is their dependence on “the mutual trust of the networked partners” (Gans et al., 2001). The issue of trust and distrust in organizational networks is a valid extension of the concept. The network has rules which help guide outcomes. Trust can build the relationships between actors and distrust can quickly erode the bonds which hold a network together. Positive network bonding factors are: mutual dependency, reputation, and association benefits. Negative factors are: opportunism, negative interpretation of events, and latency.

Not only are there dependencies which exist in relationships but also reasons for those dependencies. The reasons behind the strategic dependencies are strategic rationales (Mylopoulos, Fuxman, & Paolo, 2000). Strategic rationales are guided by the strategic rationale model (SR) (Yu & Liu, 2000). The SR model describes and supports the reasoning that each actor has concerning the relationships with other actors. It peers inside the relationship motivations of each strategic bond developing an understanding to the rationale for maintaining all strategic associations.

### **3.3 Summary**

In summary, the research goal is to gain an empirical understanding of the dialectic relationship between the central governing body and the individual sites in the ERP system. Actor-network theory will be utilized to assist in the analysis of this relationship between the central governing body and the sites in an effort to draw new meaning from the interaction. This investigation will strive to determine which factors cause discourse in the ERP system relationship between the University system actors. Actor network theory provides a broad framework to examine the interactions between network actors.

i\* framework makes available an information technology perspective for the multisite ERP network relationships in this study. It offers an approach for analyzing the deliberate relationships between actors. The framework does not appear to make any direct connections to actor network theory but displays strong evidence as being an extension of the generic theory and places itself as an application of the theory in

information systems. It provides a more closely aligned protocol for network analysis in realm of ERP analysis.

Why actor-network theory and i\* framework as opposed to some other theory for describing the phenomena being observed? “There is not, and never will be, a best theory. Theory is our chronically inadequate attempt to come to terms with the infinite complexity of the real world. Our quest should be for improved theory, not best theory, and for theory that is relevant to the issues of our time.” (Walsham, 1997, p. 478).

#### **4. Research Methodology**

In order to develop an in-depth understanding of the relationship between individual sites and a central governing body in a multisite ERP implementation, a case study approach was used for this research. The term implementation is referenced here as a mature instance of the software system as opposed to a new deployment of the software. A case study examines a “phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organizations)” (Benbasat, Goldstein, & Mead, 1987, p. 370).

Given the nature of the research question which is to examine the dynamics and dialectic relationships between a central governing body and multiple sites involved in a mature ERP implementation, the case study approach is deemed most appropriate. Using Yin’s (2009) rationale for single-case study research; this setting is a representative case in which commonplace circumstances are to be analyzed. This research will gather data from individuals representing sites within an enterprise as well as from individuals representing the central governing body of the multisite implementation.

The case study is a methodology that combines individual and (sometimes) group interviews with record analysis and observation (Cooper & Schindler, 2008). This study’s author has a deep understanding of the subject matter and the case study approach will help to expand the knowledge beyond a direct observational point of view. Individual ERP participant interviews will be the primary data gathering source.

#### 4.1 Interview Protocol

Interviews will be used to draw out points of view from the participants in an effort to understand perspectives within the ERP community and the impact on organizational relationships. The interviews will be a one-time (Yin, 1993) perspective and be gathered over a relatively short timeframe. The interview consists of ten questions shown in table 4.1. The interviews took place at the individual sites and the central governing body offices at the University of Nebraska.

The interview questions were designed as part of a collaborative effort between the researcher and advisor. A bank of questions were proposed and reviewed. The questions were formulated in a way to allow for open expression of the individual's perspective regarding the relationship between the site and the central governing body in the ERP system. Several questions were culled from the original question bank due to sensitivity and concern for exposing direct relationships between employee and supervisor.

The original interview questions were modified based on pilot interview feedback and on observation (both verbal and non-verbal) to the user responses during questioning. The original questions are in black text. Text with strike-through effects was original text removed from the questions. **Bold, blue text** identifies the text modifications which were added to the original questions. Depending on the perspective of the interviewee, the questions were tailored for campus or central administration questioning with interchangeable question components in parenthesis.



**Table 4.1 Interview Questions**

1. What do you see as the role of (your campus/central administration) in the <b>University's</b> SAP enterprise resource planning (ERP) system?
2. Is (your campus/central administration) fulfilling this role?
3. How do you view (your campus's/central administration's) role with respect to the other campuses in the <del>ERP</del> <b>SAP</b> system?
4. What role should the (central administration/campuses) have in the <del>ERP</del> <b>SAP</b> system?
5. With respect to the <del>ERP</del> <b>SAP</b> governance structure, what factors help maintain the relationship between the campuses and central administration?
6. With respect to the <del>ERP</del> <b>SAP</b> governance structure, what factors may have inhibited maintenance of the relationship between the campuses and central administration?
7. What could be done to improve the relationship between the campuses and central administration?
8. What goals does (your campus/central administration) have for the <del>ERP</del> <b>SAP</b> system?
9. (Are your campus's goals being met by the central administration/Is central administration meeting these goals)?
10. If the goals are not being met, how do <del>they</del> <b>the goals</b> deviate from the (central administration's/campuses') goals?

The interviews were conducted at the offices of the participants in face-to-face interview sessions. Present at each interview was the questioner and the interviewee. After informed consent was provided and audio recording means were identified, the interviews were audio recorded so that the responses could be accurately transcribed at a later time. The reflective nature of audio recording allows for deeper interview analysis to be conducted on the interviews and allows for a more thorough interpretation of the respondent's answers. Each question could elicit multiple responses and all participants were encouraged to provide as much information as they had available.

#### **4.2 Recruitment Procedures**

Potential research participants were identified through campus contact lists and from primary resource group mail lists. The primary resource lists contain representative software users from all business areas who have a greater understanding of the issues with the software usage and needs of each site. Candidate participants were invited to participate through email solicitation and were representative of all sites. Of those who did not respond to the initial contact, direct requests for interviews were made at the prospective interviewee's office location. Most direct requests were met with little hesitation. All potential respondents who were contacted directly ended up participating in research questioning.

### **4.3 Research Context – The University of Nebraska**

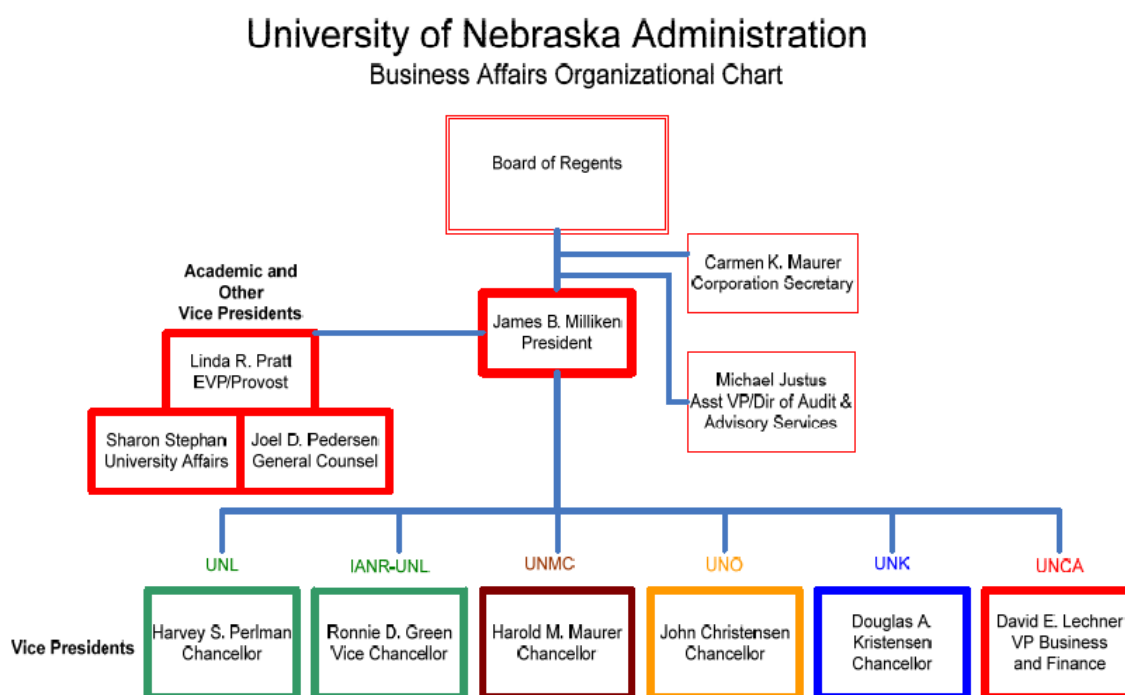
The University of Nebraska was founded on February 15, 1869, shortly after Nebraska became a state. The original goal of this new land-grant university was “To afford the inhabitants of this state with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts.” This goal has stood the test of time, inspiring the University’s dedication to the education of students, research in a broad range of disciplines, and service to the state’s citizens (“History & Mission”, n.d.).

The University of Nebraska is the state’s only public university. It became the first institution west of the Mississippi River to offer graduate education in 1903. Founded in Lincoln, the University included a medical center in Omaha beginning in 1902 (“History & Mission”, n.d.).

The University was reorganized under a 1968 act of the Nebraska Legislature. The legislation provided for the addition of the University of Nebraska at Omaha (UNO) (formerly the municipal University of Omaha) and designated the University of Nebraska-Lincoln (UNL) and the University of Nebraska Medical Center (UNMC) as separate campuses. In 1991, the University of Nebraska at Kearney (UNK) (formerly Kearney State College) became a campus of the University system. (“History & Mission”, n.d.)

The University of Nebraska-Lincoln has somewhat of a dual identity in that it has two campuses – city (or main) campus and the Institute of Natural Resources (IANR or ag campus). The UNL city campus has primarily been involved in traditional academics and research where the UNL ag campus fulfills the land-grant mission by offering agricultural and natural resource based degrees as well as extensive agricultural based research.

The University is governed by a Board of Regents made up of eight voting members elected by district and four non-voting student members, who serve by virtue of being student body president on their respective campus. The board oversees the university general operations, financial control, and direction of all expenditures (“Board of Regents”, n.d.). Figure 4.1 shows the University of Nebraska Administration and Organization Chart for the executive lines of reporting.



Source: “2011 University of Nebraska Comprehensive Annual Financial Report”, 2011

Figure 4.1: University of Nebraska Administration and Organization Chart

The 2010-2011 University of Nebraska operating budget was almost \$1.79 billion with 22.2% of the total funding being Nebraska state appropriations allocated to the University System (“University of Nebraska General Operating Budget Fiscal Year 2011-

2012”, 2011). There are over 500 departments and auxiliary operations in the University of Nebraska system and over 1,700 users currently execute productive work in the administrative system and over 19,000 users access self-service information online (A. Mulligan, internal communication, July 3, 2012). More than 120,000 current and former employee records are stored in the human resource management system.

In a detailed implementation case study of University of Nebraska’s ERP system, Sieber et al. (2000) discuss the factors and motivations behind the software system choice. Further study of the same implementation applying the perspective of knowledge transfer is available from Lee & Lee (2000). Nah, Faja, & Cata (2001) looked at maintenance patterns at three organizations including the subject organization of this study. All of this research can be reviewed for in-depth background information pertaining to the University’s ERP implementation.

The university has enacted many of the SAP business software modules including materials management (MM), project systems (PS), finance (FI), funds management (FM), cost center accounting (CCA), travel management (TM), payroll (PY), human resources (HR), time management (TM), inventory (IN), asset management (AM), project systems (PS), enterprise portal (EP) with employee self-service (ESS) and manager self-service (MSS), data warehousing (DW), business intelligence (BI) with Business Objects (BO), controlling (CO), sales and distribution (SD), public sector industry solution (IS PS), and organizational management (OM).

The SAP software implementation at the University of Nebraska is known as the Administrative Systems Project (ASP). The Administrative Systems Project consists of

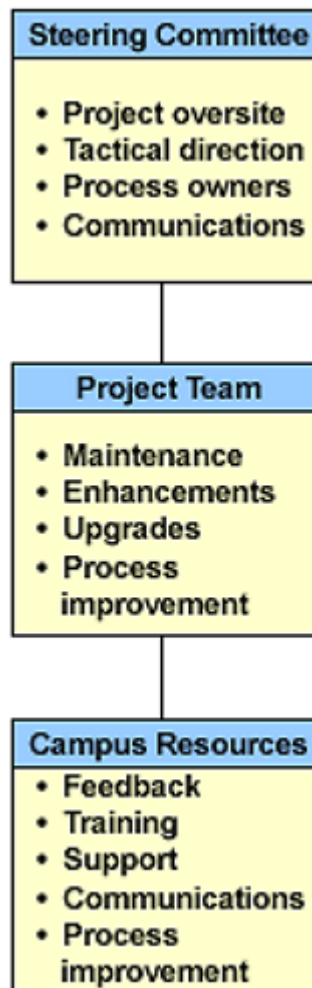
many University-wide groups working together to improve University of Nebraska business processes (“Project Overview”, 2002).

The ASP is governed by the Financial Systems Task Steering Committee Force (FSTF or Steering Committee). The Steering Committee is comprised of business leaders from each campus and Central Administration. Their purpose is to provide oversight and tactical direction for the Administrative Systems Group (ASG or Project Team) which is the operational component of the ASP. The Steering Committee also represents the needs of campus employees and ensures the strategic plans that they develop are communicated and implemented at the campus level (“Project Overview”, 2002). Each business functional area is overseen by an ASG Team Lead. All ASG Team Leads are responsible for business areas and multiple SAP software modules.

Campus resources are categorized in two groups: Primary Resources and Transition Teams. Primary Resources are functional office personnel who work directly with ASG team leads to develop new business processes and systems. Transition Teams are responsible for implementing and maintaining business related projects. Transition Teams subdivide further into coordinators positions that oversee specific tasks:

- Change Management Team - Coordinate change management activities for the campuses including training, documentation and distribution of communication articles.
- Helpdesk Coordinators - Track and answer user help requests.
- Security Coordinators - Oversee ID requests and updates (“Project Overview”, 2002).

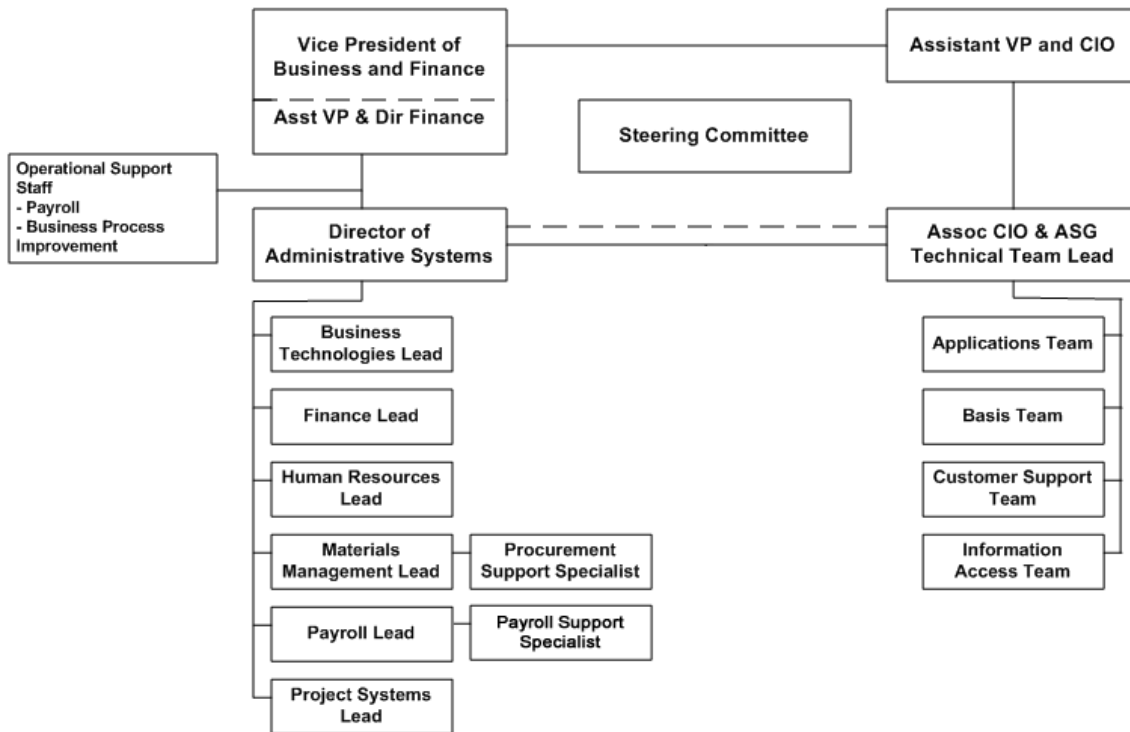
Figure 4.2 depicts the organizational relationship between the FSTF Steering Committee, the ASG Project Team, and the Campus Resources. Figure 4.3 displays the organizational structure and reporting relationships of the ASG team.



Source: "Project Overview", 2002

Figure 4.2: ASP Team Organizational Structure

**University of Nebraska Administrative Systems Group**



Source: "University of Nebraska Administrative Systems Group", 2002

Figure 4.3: University of Nebraska Administrative Systems Group Organizational Chart

An annual prioritization process has been created to assist in the proposing and implementing of new functionality. Over a period of several months, the FSTF prioritization process sets the goals and direction to guide the business and technical staff for the coming year. Early in the process, the campuses and central administration are requested to submit ideas for prioritization in the next fiscal year. The proposals are organized and distributed to the prioritization representatives. After a review period has



passed, each representative is requested to submit their top 10 votes for the projects which best meet their campus objectives. The voting process is democratic with one small twist. Each campus is allowed one top 10 ballot except for the UNL campus. The UNL higher education institution, with its agricultural campus and city campus, is allowed one vote for each of these campuses. The votes are tabulated with a weighted score from 10 down to 1. To move projects forward in the prioritization process, a project must receive a higher weighted score. The results are published to FSTF members for all interested stakeholders to review and disseminate. The prioritization results are broken down into five areas: active/on-going projects, tier one projects, tier two projects, tier three projects, and deferred projects. As a general rule, tier one and some tier two projects get worked on over the course of a fiscal year. Projects which are not worked on get re-injected into the prioritization process in the following year for consideration. Occasionally, federal or state law changes necessitate projects which are not forecast in the prioritization process getting worked on ahead of other projects. These projects receive special consideration due to legal compliance reasons.

#### **4.4 Conclusions**

The University of Nebraska represents an ideal candidate for a qualitative case study. The organizational structure of the campuses and central administration provides the backdrop to look at the harmony and contention within a multisite ERP implementation. The federative relationship without an autocratic central body creates opportunities for disharmony due to the absence of absolute control.

The previous two studies at the University make available a background for continued analysis of the SAP ERP implementation. This study will provide another perspective into the ERP implementation with the added factor of maturity in the system over time.

## 5. Research Findings

The research findings are based on the results of the qualitative case study in which interviews and observation were utilized to acquire data. Out of 118 requests for interviews, 40 interviews were conducted resulting in a 33.9% participation rate. Total interview time was about 450 minutes.

### 5.1 Demographics Information

The 40 participants were demonstrative of the University of Nebraska system. Each campus site and the central administration had participation in the study. Multiple functional areas were represented by the respondents. There were 17 male and 23 female participants. The average age was 52 years. The average tenure with the SAP ERP system was 10.3 years, suggesting that the participants have extensive experience with the system. The ERP system has been available for a maximum of 13 years since the initial implementation.

Table 5.1 Gender	
Male	17
Female	23

Table 5.2 Participant Location	
Central Administration	6
UNK	7
UNL	13

UNMC	5
UNO	9

<b>Table 5.3 Participation by Business Area</b>	
Audit	1
Benefits	5
Budget	3
Compensation	1
Finance	5
Human Resources	10
Materials Management	3
Organizational Management	1
Payroll	6
Reporting	3
Training	1

<b>Table 5.4 Participation by Age Categories</b>	
24 to 34	5
35 to 44	5
45 to 54	9
55 to 64	18
65 and above	3

Participation included members of executive management as well as workers conducting the ERP data collection and input function. Initial plans included limited participation from upper management. After several interviews, the fact that upper management provided greater depth of answers and better perspective of viewpoint was noted and an effort to expand the representation of senior leadership was undertaken. About 20% of the total interviews was conducted with upper management.

## 5.2 Data Analysis

The data analysis utilized different types of interrelated coding strategies suggested by Corbin & Strauss (2008); open, axial, and selective coding. In this study, all data coding was conducted by the primary researcher in an effort to relive issues with coordination and difference resolution.

Open coding is the process of breaking apart, comparing, abstracting, and categorizing data. This coding was achieved by comparing each statement gathered during the interviews for commonality and uniqueness. From the interview transcripts, similar conceptual statements were aligned to form codes. During this coding phase, 137 codes were created. Each code was derived from one or many statements depending on the number of respondents identifying the trait.

Axial coding dictated that the data be put back together in unique ways by making connections between codes. This was done by grouping codes based on their contextual similarity. Through axial coding, the relationships between the previously coded data categories were brought more into focus.

Finally, during selective coding, the most germane of these factors were selected to establish a stronger and more singular approach representing the main phenomenon. Major themes emerged from the reevaluating and reassessing of the data collected. Resulting from this analysis were themes and explanations related to the dialectic relationship between the central governing body and the individual sites in the NU multisite ERP system.

The initial data coding was executed sequentially by question. It became very apparent, very early that the coding would be best if grouped by site location and then by question. The site grouping of data analysis simplified the categorization of results and assisted in finding common themes at individual sites.

### **5.3 Results**

In this section, the results are presented. Figure 5.1 depicts the dialectic forces in the multisite ERP system. Each force will be explored in greater detail throughout the narrative which follows.

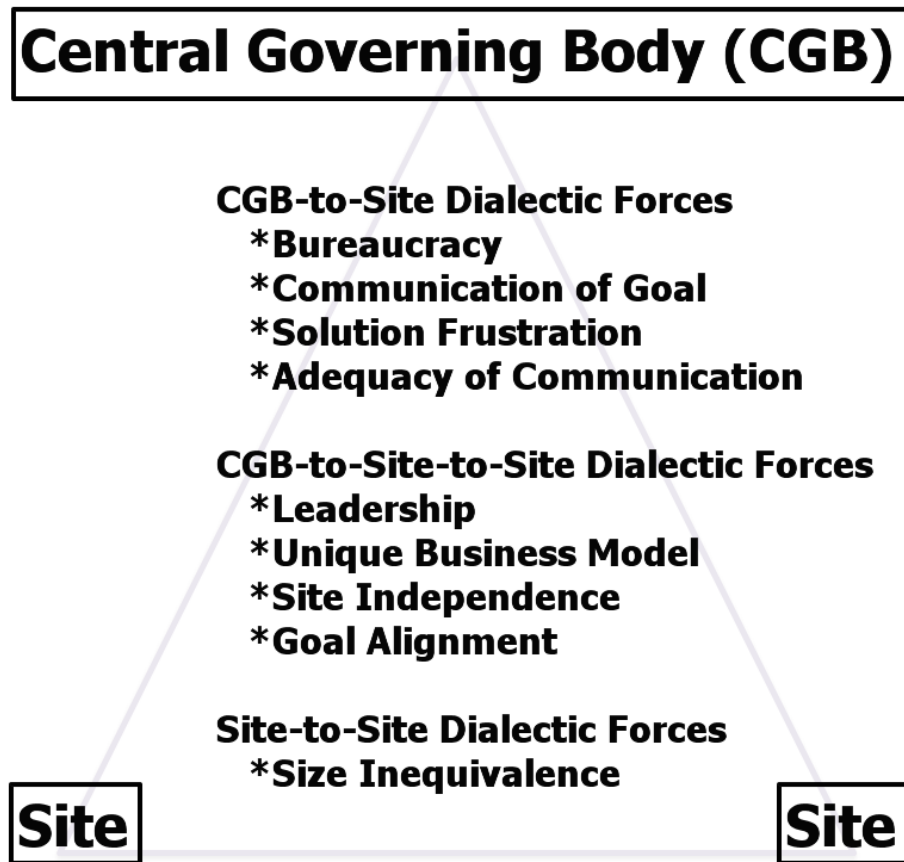


Figure 5.1: Dialectic Forces Impacting the Relationship between the Central Governing Body and the Sites in a Multisite ERP System

### 5.3.1 Bureaucracy

The annual project prioritization process causes frustration within the site business community. It also is viewed as a source of bureaucracy. “*Counterproductive going through all of the hoops.*” ”*Priority pulls resources in ways that we don’t really care about.*” “*To get something done, you have to go through a committee. Why can’t you just*

*do this?” “Everyone feels that they have input into the prioritization process but they may not always get their top priority.”* It was anticipated that this sentiment would be prevalent and a source of conflict. This fact places the central governing body in light that it hinders progress. The friction is caused by individuals (acting for their site) not getting new functionality, system changes, and enhancements in the order or timeframe for which the actor would like them.

### **5.3.2 Communication of Goal**

An interesting fact but not anticipated was the perceived lack of communication. There were several generic mentioning of communication as a concern. There were also very specific comments about not knowing what the central governing body’s goals with respect to the ERP or the sites goals for the ERP. *“I don’t know what my site’s goals are.” “I don’t know what their goals are.” “Not sure that central administration has any goals.” “We do not have a central administration strategic plan around ERP.”* The lack of knowledge could stem from apathy or marginal interest but the prevalence; while not overwhelming, and the pointed nature of the statements indicate a need for deeper concern. In discussions, the annual prioritization process list was an unknown to many. It is not distributed or available to most people. It was viewed as a gap in communication and another source of tension impacting the site’s relationship with the central governing body.



### 5.3.3 Solution Frustration

Frustration at the sites with the existing solution has driven creative solutions, emergence of shadow systems, and some system dislikes. *“We work around it and make it work.” “...that the low level functionality meets our business needs and not just because we own it, put in an inferior product that most of us feel isn’t needed.” “It seems very inflexible and very difficult to make any change.” “SAP is fairly restrictive.” “Screens need enhancements. Better GUIs with other systems.”* The level of disdain for some of the package solutions, screens, and interfaces adds to the tension between the sites and the central governing body.

### 5.3.4 Adequacy of Communication

Another surprising facet of communication was the call for more face-to-face communication. Electronic communication has become the de-facto standard due to its time and money savings. While not perfect, electronic communication (Adobe Connect collaboration display with telephone voice contact) provides sufficient interaction to satisfy the basic meeting needs. There were a noteworthy number of comments citing the need for more face-to-face meetings. *“It is easier to be rash or tougher on another’s ideas if you don’t meet in person.” “We tend to go to the electronic communications and miss out on the face-to-face communication.” “It would be good to get together. We develop stronger connections by meeting face-to-face.”* The lack of personal communication puts a strain on the customer service aspect and chips away at the foundation of the central governing body’s relationship with the sites.

### 5.3.5 Leadership

The sites did not indicate that they were leaders in the implementation. The overwhelming theme around the site role was that they are collaborative members. *“We contribute to make the system better.” “We are a collaborative member in the maintenance, future configuration, and enhancements.”* The most surprising dialectic was the overwhelming sentiment that one site deemed itself to be a leader and that other sites acknowledge frustration with this fact. *“Because of volume, we take a lead in need based changes.” “They follow our lead.” “We pay for 60% but only get 15% of the vote.”* The reverse perception was noted numerous times. *“Some campuses’ may have a preconceived notion that they are top and that their ideas must be implemented.” “... kind of gets what they want because they have the biggest bark and if they’re barking – whatever they want, usually goes first outside of what we want first.”*

As anticipated, the central governing body was viewed within and around as a consensus builder. *“Central Administration is trying to garner consensus around development and strategic direction.”* Consensus building was cited most frequently as a central administration trait in the ERP system. A surprising circumstance was the polarized statements about having a strong central governing entity. *“Needs to be enforcer.” “Lack of strong leadership to mandate a business direction.” “We function best as a loose federation.” “I would like to see more leadership. Push us to more agreement.”* The clash in the leadership trait is that some members are satisfied with the central governing body being a consensus builder but other would like it to be more in charge of groups,

meetings, and system direction. This polarization creates division between the sites and the central governing body due to the role conflict.

### **5.3.6 Unique Business Model**

Another source of tension in the ERP system is the varying business models for each of the sites. The uniqueness is consistent with expectation. *“We have four campuses with distinctly different business needs. I don’t think we have the kind of synergy that we might need to have.”* *“We do things differently.”* *“Individual campuses don’t take the whole university structure into consideration.”* *“We are put down because of our uniqueness.”* *“Campuses have their own set of issues to meet their core mission.”* The varying academic and research missions creates an array of needs. Not all of these system wants can be met in a timely manner giving rise to the necessity for prioritization efforts. Unfortunately, prioritization means that one item will be worked on before others get done. *“Impression is that it takes forever to get anything done.”* *“Simple changes but not high priority or functionality – the little change requests get lost.”* *“It is a slow process.”* *“Everyone has a competing interest in the system.”* Each site has their own “flavor” and they would like this uniqueness to be reflected in solutions tailored to their needs. This raises the strain in relations between sites and the sites to the central governing body.

### **5.3.7 Site Independence**

The results designated little independence from site-to-site. The frequent mentioning of collaboration is a strong gauge of the willingness to be an integral part of the

organization. Most indications displayed a healthy interaction. *“All of the campuses are branches of the tree. We work together to make the tree work. We each have our own branch.”* Others demonstrated a collaborative spirit born out of economic factors and a desire to garner synergy which could be used in the prioritization process. *“We team up with a similar site.”* Several comments asserted campus independence. *“Some campuses think they are self-governed.”* *“Campuses tend to think of themselves as four separate entities.”* The bonding together has created modest challenges. The pooled solutions are not viewed as a problem but the building of a voting block raises management concerns.

### **5.3.8 Goal Alignment**

In the area of goal alignment, it was noted repeatedly that the smaller sites identified their goals with the goals of the central body with respect to the ERP. *“Central administration’s goals are not different.”* *“I don’t see that our goals are any different than central’s. I really feel that we are all working together on projects.”* Frustration between the sites was indicated through this comment – *“The bigger campuses need to buckle under and accept some of these projects that the smaller campuses need.”* With the larger sites pushing their agenda first or not always participating, the frustration grows with the sites as well as with the central governing body due to the lower participation rate.

### **5.3.9 Size Inequivalence**

Each site has its own personality and each personality gives rise to common site themes which were characteristic of most sites. The largest site was depicted by its

magnitude through the descriptions provide by team members. *“We’re a big player.”* *“With our size, we should be at the top – a leader.”* Other sites characterized their size as a positive while others cited their internal challenges as issues. *“The flow of information is closer together than in the other campuses.”* *“We don’t integrate ourselves as well as we should.”* *“We don’t have the resources as some.”* The dialectic forces are putting the bigger sites up against smaller sites. The bigger sites feel that they should have a larger voice in decisions and the smaller sites are frustrated with the perceived catering to the large sites as well as hints of resource envy directed towards the larger sites.

#### **5.4 Discussion of Results**

Being in the field to discuss matters between central bodies and sites in the multisite ERP implementation provided a different perspective on observed dialectics. A wide range of viewpoints were found. Based on the results from this research study, dialectic forces are active in this multisite ERP implementation.

The dialectic tension manifests itself in numerous ways – lack of communication, size, distribution of votes across different sizes, bureaucracy in decision making, leadership void at the top, and system deficiencies leading to frustration. While some of the data represents outliers of single viewpoints, other elements were denoted multiple times which represented a significant enough artifact to report.

As the ERP system has matured, the level of customized solutions has increased which is taking valuable time away from the core team and any plans to implement additional modules and improvements. Time spent maintaining the existing applications

takes time away from reviewing and implementing new functionality. The perceived slow response to individual site's needs seems to add additional complexity to the organizational relationship.

Also, an observed frustration with the lack self-determination coupled with perceived immediate business need and frustration with the mediocre SAP solutions is driving the individual sites to seek their own solutions. An example of this phenomenon is implementation of cloud recruitment solutions from two different vendors which are not integrated into the existing ERP package.

In an effort to become strategic through a change of scale (Law, 1989), several of the sites are network building in an effort to fend off perceived imbalance in the prioritization process. The site-to-site network building has been observed on multiple occasions where sites feel that they are left out or limited by the prioritization process so they bond together as an operating block.

Strategic dependency (Yu & Liu, 2000) was observed throughout the sites. While increasingly displayed at the smaller sites, it manifested its presence across all locations. The interdependency for goal realization was evident. Conversely, the ERP independence was noted in a greater degree at the largest location.

## 6. Conclusion and Implications

### 6.1 Theoretical Contributions and Implications

This research study identified numerous dialectical forces between a central governing body and the sites of a mature multisite enterprise resource planning implementation. In the study, smaller sites repeatedly identified goal alignment with the central governing body. The larger sites identified with common goals very infrequently and exhibited a few signs of independence. The results seem to indicate that a site is more dependent upon the central body for achievement of its mission when the site is smaller. This understanding leads to a preliminary theory that as the size of the sites grows in an ERP organization that the dependence upon the central governing body for goal attainment decreases as depicted in Figure 6.1. Site size and central authority dependence are inversely relational. One reason behind this theory appears to be resource based.

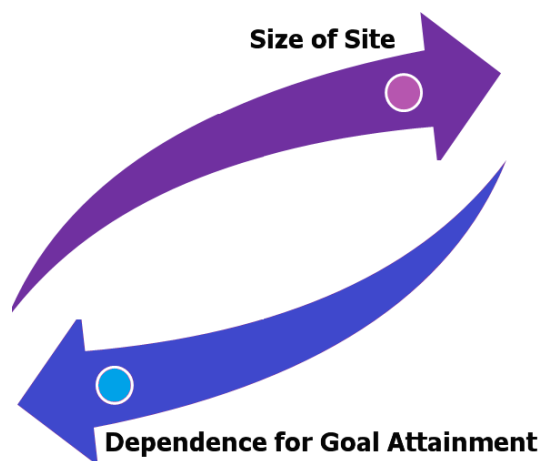


Figure 6.1: Multisite ERP Dependency Theory

In lens of the  $i^*$  framework, actors have liberty of individual action, but function in a network of social relationships. The actors need each other for goals to be attained, tasks to be executed, and resources to be provided. These dependencies are intentional. Actors are strategic in that they evaluate their interaction in terms of opportunities that they offer, and vulnerabilities that they may bring (Yu & Liu, 2000).

Trust, control, and risk are linked in strategic alliances (Das & Teng, 2001). The proposed dependency theory is a strategic alliance. In the thesis study, the strategic alliance is mandated through state law but is necessitated through fiscal needs. Facing limited resources, the smaller sites are willing to forego elements of control in an effort to save funds. Larger sites appear to have discretionary funds with which they can relieve some of the dependency by providing independently for a portion of the services which are already available through their relationship with the central governing body. By providing their own services, the larger sites have control over aspects like design, custom features, timing of project, and timing of maintenance.

Each of the sites and the central governing body are actors in the social network. The boundary for this interaction is the ERP system. As stated in the  $i^*$  framework (Yu, 1995), the strategic dependency between the actors in this system interaction are the forces which bond them together. In this case, the main goal would be successful business operations within the ERP. With a common goal, the actors participate in their efforts. In a social network, trust and distrust factor into the arrangement (Gans et al., 2001). With a healthy trust, the association functions well. As distrust seeps into a strategic alliance, the



actors begin looking for negative interpretation of events. This is where the dialectic forces start to play a part in the continued alliance for attainment of goals. Fear of inability to deliver functionality requested, business applications tailored to unique business models, and timely support cause the sites to distrust the central governing body.

Actor network theory (ANT) takes an abstract look at the relationships in a network. In ANT, everything becomes an actor (Latour, 1987) – not only people, but sites, ERP systems, data input, etc. ANT is concerned with how organizations hold together while having their own inclinations (Law, 1992). The actors attempt to overcome material resistance (Law, 1992). Each actor in the multisite ERP has its own direction while working together to overcome material resistance. The independent direction gives rise to some of the dialectic forces such as: site independence and unique business models. The dialect forces pull away the actors from the overall mission.

## **6.2 Practical Contributions**

This research provides several practical contributions. External organizations, especially governmental ones, can benefit from the findings in their ERP implementations. Critical factors like communications between the sites and the central body; as well as, perceived inequivalence of site treatment are issues highlighted by participants. Often times, simple relationship ideals are overlooked in the quest to build empires bigger, stronger, and faster. Little details can be forgotten about and ‘swept under the rug’.

With businesses and government entities facing budget constrictions, many are looking for ways to cut costs. One of the cost savings measures which have gained in favor

during the last decade is web meetings. Web meetings permit conferences to take place at multiple locations simultaneously allowing participants to avoid travel thus saving time and money. A casualty of this innovation is face-to-face communication. This research study found that face-to-face communication is important to multisite businesses. Occasional face-to-face meetings were suggested as a valuable tool to build camaraderie between sites.

Another area of possible practical interest is goal communication. The data indicated that a number of participants were unaware of their site's ERP goals and the organization's ERP goals. While the goals can be either business goals, project goals for the coming year, or ERP system goals, ERP goal communication is not widely established. Internal observation and in extended probing during the interviews indicates that the ERP project goals are distributed to a group of people but this information isn't universally redistributed at the sites or in user business groups. ERP project goals could be available for review on an internal website so that all sites have an opportunity to understand the direction of their organization.

### **6.3 Limitations of Study**

In an effort to further personal growth, this mission to expand knowledge was embarked upon. While having an amount of familiarity with the practical subject matter, this researcher needed to remove any individual preconceived notions about the subject at hand. It is difficult and challenging to set a topic direction and keep an open mind at the same time.

Being immersed in the structure of the subject matter on a daily basis can result in a smaller view, a localized view, of the larger reality. This diminished view could result in missing out on important observations. In an opposite manner, the immersion can lead to a deeper and richer understanding of the data recorded. Both realities increase the challenges of this research (Williams & Pollock, 2012).

“However, scholars have arguably produced rather partial accounts (in both senses of the word partial) that address only a small fragment of the complex and interconnected relationships that constitute real-world phenomena, by means of studies that remain framed around and restricted to selective arrays of actors and settings, time frames, and issues. This is because particular (sub) disciplines and schools of social scientific analysis will often be associated with characteristic temporal and spatial framings of a phenomenon—motivated the things each seeks to explain and its view of the aetiology of phenomena. To the extent that these framings focus primarily or exclusively on particular moments and settings, they can skew the conduct of research and its findings.” (Williams & Pollock, 2012, p. 14).

Williams & Pollock make a very valid point – that it is easy to skew research due to a limited depth of research location. Further contributing to potential sources of bias are the choice of supporting material, application of research methodology, and personal observations. Their argument is for adequate study of IT artifacts but at times it is overwhelming for a researcher or small team of researchers to study a vast number of ERP

sites. Individual site or multisite studies are valuable for their point in time analysis. Ideally, a common structure would be followed between individual studies so that the results could be aggregated in future studies to present a comprehensive picture and to expand the depth of locations which Williams & Pollock (2012) call for.

#### **6.4 Future Research**

The study provides a foundation for numerous additional studies. This study is the third study of the subject organization. Additional studies of this target organization could continue to provide a lifecycle view of governmental ERP systems.

Another future research opportunity would be to conduct further study with an expanded sample size or additional multisite organizations. The sample size was adequate to draw conclusions from but an expanded sample size might yield extended results and further increase external validity. A study of additional multisite organizations would be valuable as additional studies would test the internal and external validity of the research findings.

The size-to-dependency theory needs to be expanded upon and validated. It identifies a relationship between the size of an organization and its goal dependence. Independent variables need to be identified and validated. Additional factors need to be identified. The level of dependency could also be validated in a quantitative study.

Many unanswered questions still exist concerning ERP software throughout the lifecycle of a system. Questions like: have businesses and government stayed with ERP software? After the initial impact of adopting an ERP system, do organizations continue to

evolve? Do ERP software upgrades force companies to further evolve in their organizational structure? Do ERP systems bond or tear organizations apart? Do “shadow” systems re-appear after an ERP implementation?

In a mature multisite ERP implementation, related future research questions include: How do organizations continue their mission? What phenomena are impacting operations? Does a centralized or de-centralized leadership style promote better results?

## **6.5 Conclusions**

The research was a journey of academic and professional proportions. It provided a comprehensive investigation into a topic which has been observed for a decade. Being the catalyst for an in-depth study, the research expanded the understanding of an organization. This increased awareness builds upon other findings and continues to create a deeper knowledge base. The opportunity to investigate the phenomenon provided a conduit for discussions at all levels of the study client. This level of discussion provided insights which are not always available under normal circumstances.

This research was an empirical qualitative study. It delved into an effort to derive meaning from comments provided by people in the heart of the matter combined with observation of the study client. “An insight, whether borrowed or original, is of no use to the theorist unless he converts it from simply an anecdote to being an element of theory” (Glaser & Strauss, 1967, p. 254). In this way, insight and interrogation have yielded a novel concept regarding interaction in an ERP implementation.

Overall, dialectic forces play a role between the sites and the central governing body in a multisite ERP installation. Positive and negative forces can impact the relationships and the business operation of an organization. The research opens up additional possibilities for further study.

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## APPENDIX

### Detailed literature review of key research papers

Wagner, W., & Antonucci, Y. "The ImaginePA Project: The First Large-Scale, Public Sector ERP Implementation." *Information Systems Management*, 26(3), 2009, pp. 275-284.

In a very large public sector implementation, the ImaginePA Project found it difficult to integrate many departments and identify the appropriate process holders responsible for their respective business areas (Wagner & Antonucci 2009). With the risk adverse nature and constantly changing political structure, the project had difficulties integrating various departments into one ERP system. While accepting a very high rate of "out of the box" best business practices, it was later lamented that the project should have focused more on their own processes and expanded the amount of ERP customization. Presenting additional challenges were the various financial sources which fund government departments. A combination of public funds, private donations, and user fees provided differentiating issues. The many agencies had little in common and separate leadership which challenged the project due to divergent goals. The project ended up transforming the government business into a process centric organization.

Kang, S., Jong-Hun, P., & Hee-Dong, Y. "ERP Alignment for Positive Business Performance: Evidence from Korea's ERP Market." *Journal of Computer Information Systems*, 48(4), 2008, pp. 25-38.

ERP system implementation does not always yield a positive impact on business. Clear goals for an implementation should be established to define the reasons for implantation. ERP alignment, the alignment between the ERP system and organizational integration, is the match between business requirements and organizational modes (Kang, Jong-Hun, & Hee-Dong 2008). ERP alignment increases with well formulated and well communicated goals. Three organizational modes are identified; people-based, standardization-based, and centralization-based. For success, an ERP implementer needs to diminish their usage of people-based integration for control and coordination of work processes – let the software system do the work. The installation needs to increase business standardization through use of best practices. Also, centralization of command, conflict resolution, and control must be maintained increased to achieve best results.

Elbanna, A. R. "Strategic Systems Implementation: Diffusion through Drift," *Journal of Information Technology*, 23(2), 2008, pp. 89-96.

In a case study of a large beverage company, Elbanna (2008) found an organization attempting to replace multiple systems in multiple countries with one ERP system. The company had departments refusing to implement the software and looking to implement alternative software from different vendors in direct contrast to the project's goals.

Departments moved in to implement their own goals for the company-wide system which

caused significant drift from the project's stated goals. A consultant hired to understand differences in the second phase found that the projects stated goals were interpreted differently across the company. While configuring the software for one company-wide implementation, the effort switched to a discussion of where to locate the service center for the project and ended up creating two service centers as a compromise.

In an application of actor network theory, Elbanna (2008) found numerous networks.

When actors within these networks disputed the project at various stages, the project could not move forward. Departments disputed the value and functionality of the system and introduced other software solutions. As a result the project drifted from a single implementation to a technical software implementation with various interfaces. Differing networks attempted to modify the objectives into specialized interests and drive the project from its objectives. Varying levels of drift contribute to achievement of different levels of ERP results.

Van Fenema, P.C., Koppius, O.R., & Van Baalen, P.J. "Implementing Packaged Enterprise Software in Multi-Site Firms: Intensification of Organizing and Learning", *European Journal of Information Systems*, 16(5), 2007, pp. 584-598.

A multisite ERP study in Asia found that organizational processes are impacted by a packaged software implementation (Van Fenema, Koppius, & Van Ballen 2007). While flexibility and freedom were diminished for the individual sites, collaboration and communication were increased as sites sought other sites for solutions to their common problems. The project was communicated and discussions held with key users and



leadership of the individual sites. Individual sites were directed as to how they should implement the software. After key users were extensively trained in the software, the individual sites were left to conduct their own training. The flexible approach to training led to fragmentation due to the localized interpretation that each site placed upon their training. The mandated direction was viewed as a loss of control from the sites' perspective but helped move the project along. Centralized functions were increased due to risk exposure through one software system and the need to control changes implemented into the system. A core team concept was implemented where key users and information technology developers met regularly to review system implementation progress, apply common business practices, and review proposed system changes.

Volkoff O., Strong D.M., Elmes M.B. "Understanding Enterprise Systems-Enabled Integration", *European Journal of Information Systems*, 14(2), 2005, pp. 110–120.

Organizational integration at a single instance of ERP software where previously disparate legacy software processed the data was impacted in multiple ways (Volkoff et al. 2005). Tighter coupling of business processes was found to produce positive and negative results. On the positive side, integrated data allowed for quicker financial processing and closing of the financial books. Conversely, data integration allowed mistakes to surface faster which forced a higher importance on data accuracy. Workarounds were devised by some departments to resolve perceived issues with the software system resulting in information which could not be captured. Unit-to-unit interpretation of data definitions and processes resulted from departmental integration where departments had previously functioned

independently. Some departments were forced to execute tasks which had very little impact on the task at hand. The sequential nature of the software forced a linear processing previously where departments were able to work on different steps of a task at the same time.

Robey, D., Ross, J. W., & Boudreau, M. "Learning to Implement Enterprise Systems: An Exploratory Study of the Dialectics of Change," *Journal of Management Information Systems*, 19(1), 2002, pp. 17-46.

In a comparative case study of 13 multisite businesses, Robey et al. (2002) analyzed the dialectic of organizational learning in an ERP implementation. The study found positive and negative forces present in an implementation. Users with significant amounts of knowledge in the old system ("organizational memory") found that they were placed on the same level with others in new system by the fact that everyone had to learn new ways to execute business processes. Core teams were losing experienced members of the team to other employers willing to remunerate for the knowledge acquired successfully configuring the ERP system. Implementation styles were found to impact the level of learning challenge experienced at a company. The style of implement existing processes first and change business processes later experienced the least resistance to organizational change due to their loose coupling between technical and organizational change. Those organizations implementing concerted change with tight coupling of technical and organizational change created greater learning requirements, pressure to succeed, and noted more attempts to "beat the system".

Markus, M. L., Tanis, C. van Fenema, P. C. "Multisite ERP Implementations,"  
Communications of the ACM. (43:4), 2000, 42-46.

Markus, Tanis, and van Fenema (2000) discuss several ERP implementation strategies including the extremes of total local autonomy and total centralization; as well as, hybrid applications where the implementation is a blending of autonomy and centralization. Local autonomy can give rise to a sense of satisfaction and control at the site. The localized autonomy can alleviate conflict between the site and the centralized management. A strong centralized approach provides uniformity and conformity for the organization.

Taylor, J.R., Tucker, C.C. "Reducing Data Processing Costs through Centralized Procurement," MIS Quarterly, (13:4), 1989, 487-499.

Centralized processes receive extra scrutiny in decentralized organization. Pressure to cut overhead costs subject centralization efforts to review and challenge.

Yakovlev, I.V. "An ERP Implementation and Business Process Reengineering at a Small University," Educause Quarterly, 25(2), 2002, pp. 52-57.

In a comparison/contrast narrative, Yakovlev (2002) analyzed the University of Wisconsin-Superior's SIS ERP implementation. In this implementation, the project was challenged by changing business processes. As a lesson learned, more processes should have been designed for change in the implementation phase as this institution had additional process changes post-implementation. The new system captured more data, needed more screens

to capture the data, required more validation reports, required more time to review the reports, created more challenges when duplicate data was found (due to numerous tables impacted), required continuous training, needed frequent patches, and increased the likelihood of staff turnover. The system had positive impacts including: better reports, better look, web access, and instant access to information across departments.

Soh, C., Sai, S. K., Boh, W. F., Tang, M. "Misalignments in ERP Implementation: A Dialectic Perspective," *International Journal of Human-Computer Interaction*, 16(1), 2003, pp. 81 – 100.

Soh et al. (2003) discusses organizational issues and software mismatch issues with ERP implementations. An important point covered is the notion of implementing "best practices". The concept of best practices sounds very good during the sales pitch of an ERP system but the reality of best practices is not achieved unless the implementer has a willingness to conform to the ERP's ideals of organizational structure and business function.

In analyzing ERP software for implementation, gaps between business processes and software functionality are determined. Decisions must be made to change organization to meet the ERP implementation or develop a customized workaround to the ERP business structure. Customized solutions can result in problems with increased implementation expense, problems with system performance, issues with future software upgrades, and diminished benefits from system integration.

While the promise of an ERP solution is great, occasionally during implementations companies realize that the ERP software's structure is exceedingly far from the organization's process and that this fundamental problem cannot be overcome with reasonable procedure changes or costly enhancements. Misalignments result in implementation projects being abandoned. To implement ERP software in multiple companies, ERP software needs to be built with flexibility. This flexibility can introduce complexity. International variations in data format (name layout) provide an opportunity for ERP failure or increased complexity.

Misalignments can be introduced from opposing forces in ERP implementations.

Developer intentions via assumptions can introduce misalignment. When implementing ERP software, companies must understand structures built into ERP.

A study of meeting minutes and interviews was conducted to look for patterns identifying misalignments.

Integration - muddled data ownership and greater work interdependencies produced organizational tension. Process orientation - location where the functional process execution occurred was changed by the ERP implementation causing conflict. Flexibility - large number of screens and options introduces errors from a staff used to having highly and simplified data entry screens. Domain specific issues - complexities of designing software for multiple countries left processes with holes in a non-native country.

Large number of generic reports instead of targeted reports caused confusion and disillusionment. Limited staff to provide customization caused tension between technical staff and user community.

The organization focused on implementing the software and not as much on changing the organization for the best practices imposed in the ERP package which caused extensive issues during this implementation.

Van Stijn, E., Wensley, A. "ERP's Best Practices and Change: An Organizational Memory Mismatch Approach," ECIS 2005 Proceedings, Paper 69, Retrieved 03 May 2012  
<http://aisel.aisnet.org/ecis2005/69>, 2005.

This paper looks at the notion of best practices and how these best practices fit with the way an operation actually conducts its business. It introduces the idea of organizational memory mismatch – the spread between how the organization has previously solved a problem and how the ERP software attempts to solve a problem.

The study is conducted through interviews of ten users of the software.

Pressure to conform to best practices. ERP argument is to implement best practices to avoid additional costs of system configuration. "Useful practices" – the best way to conduct a task in an organization. Tradeoff between best practice implementation through standardization of processes and being able to allow the business operate in its special way. The uniqueness of operation may contribute to the business's competitive advantage over other businesses. Another interesting point mentioned was that users may develop their own improvisations of the process. The users may find their own way to execute the business procedure. The improvisation may or may not conform to best practices and it may or may not be in the best interest of the company as it could compound a problem further downstream.

The University's has a challenge in that it has college education business uniqueness which is further compounded by the uniqueness of each campus and the desire of each campus to have the system tailored to that uniqueness. UNL is the flagship campus and was the original Nebraska University which meant that it represented the state. It has a split personality in that it has technology and business on the city campus but has an agricultural focus on the IANR campus. UNK is a small campus in a rural setting with its roots in teaching. It has its interest in simplified solution which allows generalized workers to accomplish their tasks with the least amount of specialization required. UNMC has a medical focus and governed by rules and regulations which do not apply to the rest of the University system. They regularly express their uniqueness and deviate from the norm. UNO is a campus which is striving to find an identity. It has always been an urban campus. It is challenged by the organizational memory issue. They have many long term employees who have been in their positions for great periods of time. The result of employees having such longevity without an open attitude for change has resulted in a stagnation of business processes and a lack technological innovative approach to improving their business functionality

Boudreau, M. C., Robey, D. "Enacting Integrated Information Technology: A Human Agency Perspective," *Organization Science*, 16(1), 2005, pp. 3 – 18.

The authors present an interpretive case study of a large state government agency after an ERP implementation. The overarching concept of implementing organizational change with an ERP system can be overcome by technology users utilizing the computer system in

new and unintended ways through improvised actions. Technology implementation has intended results but the system can have a constraining effect over time. Human action after an ERP implementation can negate system constraints.

Data collection for this study came from an insider's point of view being included in the implementation team's training and having access to the implementation team development process and meetings. Additional data collection was gleaned from anonymous one-hour interviews with users. As the interviews progressed in numbers, the user's complaints increased which caused management to resist further interviews from taking place. Users of the system went from excited anticipation to apprehension about changing to the new system to frustration with the system after it was implemented due to the complexity.

Initial results were that users didn't like the system and that the system caused them to take longer to execute work tasks than previously with the legacy system. Eventually, the users started conforming to the new system's way of executing business because the old processes didn't yield necessary information for completing a task.

The University suffers from unintended use as well redevelopment of shadow systems to conduct business. There is also a move to fractured systems. Each campus has started to undertake reviews and some implementation of outside best-of-breed vendors to fill in perceived system gaps. Many campuses are tired of waiting in the priority list for solutions to current business problems. Cloud computing has given rise to new best-of-breed vendors offering solutions for a price but with lower implementation requirements since the software is hosted off-site. Also, SAP solutions to new problems are viewed as not adequate enough to successfully solve business problems. Even though we own the



software licenses, our solution is often voted down. On the other side, SAP suffers from trying to cover too many business functions for too many people. They suffer from trying to apply a generic industry solution and end up providing a solution which is less-than-the-best. To shore up weaker offerings, SAP and other ERP vendors are purchasing cloud computing application vendors to fill in gaps or inadequacies in their product offerings. An example of this type of purchase is SAP purchasing SuccessFactors (for over three billion dollars). SuccessFactors offers an HR solution.

Law, J. "Notes on the Theory of the Actor-Network: Ordering, Strategy, and Heterogeneity," *Systemic Practice and Action Research*, 5(4), 1992, pp. 379 – 393.

Actor-network theory is "concerned with the mechanics of power". Do not assume but take a fresh perspective on all interactions. The interactions of the network are not only human but comprised of interaction with materials and machines. The theory treats people and objects the same. An actor is always a network. Networks of an actor become hidden beneath the actor when the networks act as a single block. Resistance in a network is inevitable which could lead to a network breakdown or secede from the network. "The object is to explore and describe local processes of patterning, social orchestration, ordering and resistance." When using the actor-network theory to view a social situation, it looks at how people and organizations are put together, mix together, and stay together. Translation and overcoming resistance – how long does an element last (time and durability) in a network, how well does the organization communicate (mobility within space), how well

does the network foresee the future and predict responses and reactions (relational circumstances), and what is the power structure of an organization (social ordering).

The University displays some parallels between the theoretical description and the actual actor-network between the campuses and central administration.

Latour, B. "The trouble with actor-network theory," *Philosophia*, 25(3), 1987 pp. 47 – 64.

The trouble with actor-network theory

The author argues that actor-network theory is misunderstood and misused. The social definition and the technical definition of network are quite different. The theory is not concerned with social networks of an individual but "non-human, non-individual" entities.

It seeks to derive theory out of networks. The theory explains the network threads by understanding and describing the layers and ordering within the layers. Actor-network theory is a basic material resistance definition. It analyzes the weak ties which bound the organization together. It starts out at the lowest level and backs into the higher level by accounting for order and contingencies. Near/far – a network may be close in proximity but far in context while another network may be far in location but much closer in context.

Networks are not social and are not spatial. They are just associations. Large/small – a network is never bigger than another. It is just longer and more intricately connected.

Inside/outside – a network is all boundary without an inside or outside. The actor is something which acts or is acted upon. Actors can be human or collections of humans and may have similar analysis with differing results. Actors are flows exposed challenges to

test their stability and conformity with the ability to define their own context through delineation and metalanguage.

The campuses and central administration are loosely bound but those bindings are important to maintaining structure. Each one is capable of defining itself as it sees fit.