



**HAL**  
open science

# Understanding the Emergent Structure of Competency Centers in Post-implementation Enterprise Systems

Arun Aryal, Redouane El Amrani, Duane P. Truex

► **To cite this version:**

Arun Aryal, Redouane El Amrani, Duane P. Truex. Understanding the Emergent Structure of Competency Centers in Post-implementation Enterprise Systems. 5th Working Conference on Information Systems and Organizations (ISO), Dec 2014, Auckland, New Zealand. pp.95-114, 10.1007/978-3-662-45708-5\_7. hal-01331819

**HAL Id: hal-01331819**

**<https://inria.hal.science/hal-01331819>**

Submitted on 14 Jun 2016

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

# Understanding the Emergent Structure of Competency Centers in Post-Implementation Enterprise Systems: An Assemblage Theory Approach

Arun Aryal<sup>1</sup>, Redouane EL Amrani<sup>2</sup>, and Duane P. Truex<sup>1</sup>

<sup>1</sup> Georgia State University, Atlanta, USA  
aaryal1@mysu.onmicrosoft.com, dtruex@gsu.edu

<sup>2</sup> NEOMA Business School, Reims, France  
redouane.elamrani@neoma-bs.fr

**Abstract.** Prior research provides conflicting insights about the link between investment in enterprise systems and firm value and in the ES governance mechanisms. The literature generally suggests that management should cultivate its technical and organizational expertise to derive value from currently deployed Enterprise Systems (ES) [8]. In the realm of practice, ERP vendors and configuration/integration partners strongly recommend the creation of an organizational structure to govern the ERP implementation and post-implementation process to improve project success and extract greater value from the ES investment. The ES literature, while unclear on the formation, and functioning of ES governance units, suggests the need for formal and fixed governance structures. This research utilizes Deleuze’s assemblage theory and emergence theory to explain the genesis and evolution of the governing ‘structure’ known as the Competency Center (CC). Our results illustrate the business needs driving the structuring processes behind the CC, are also those that lead to unintended and destabilizing outcomes. Whether the CC ‘assemblage’ survives to provide value depends on how the emergent issues are handled and how the assemblages are “positioned”. This research suggests effective ES governance is not derived from a prescribed step-wise process yielding formal structures, but rather form an organic process of assemblage.

**Keywords:** assemblage theory · competency centers · enterprise systems · post-implementation

## 1 Introduction

Leveraging Enterprise System (ES), to achieve true long-term business value is problematic because direct causal links between ERP implementation and firm value have never been clearly established [3]. In traditional ERP implementations, these systems are essentially well integrated transactional systems whose potential is never fully realized [21]. Making the next step, wherein firms relying on integrated systems can capitalize on current and context-rich organizational competency, requires two things. First, continual development of the knowledge and governance frameworks born of the

ERP implementation process. Second, linking the transactional data arising from successful ERP implementation to Business Intelligence (BI).

The task of governance enabling the linkage between ERP data and BI requires far more than simply upgrading to new versions, implementing new modules, or customizing the existing system. Prior research suggests cultivating technical and organizational expertise to leverage and derive increased value from currently deployed ES [8]. In practice, both ERP vendors and implementation partners strongly recommend the creation of an organizational structure to guide and govern the ERP implementation process. Often this requirement is built into the service level agreements and contracts. These structures are typically called ‘competency centers’<sup>1</sup>.

Unfortunately the IS literature offers no generally agreed definition for the term Competency Center [11, 13, 14, 17]. Accordingly, for the purposes of this research, we define the Competency Center (CC) as:

*the governance structures and processes that are responsible for implementation as well as the ongoing training, support, use, upgrades to ESs.*

IS research literature also offers little practical understanding of how these structures work, how they are maintained and how they evolve over time. For instance, few IS studies deal with the notion of the competence center at all and none consider the post-implementation evolution of a CC, specifically their role in optimizing the ERP Implementation and the convergence with BI capabilities. Nor are there studies comparing the post-implementation experience comparing different organizational logics and contexts across firms. ES implementation has been the focus of many research, but, the interaction between IT expertise and organizational competencies during the post-implementation phase continues to perplex the IS management community and challenges IS researchers.

Extant IS literature suggests that successful ES implementations and utilizations achieve both tactical and strategic goals [16]. The literature is also replete with stories of how flawed ES may bring organizations to their knees [2, 22, 30]; but some firms have had spectacular success in implementing ERP systems and using these systems to fuel the analytical and decision making capabilities e.g. Business Intelligence (BI). We look to such firms to learn how they have managed to achieve these successes. In contrast, other firms have struggled and sometimes abandoned the goal by either decommissioning the ERP or simply using these resources as powerful transaction processing systems, never realizing their full potential. We also look to some of these firms to understand why and learn what factors led to abandonment or selecting alternative paths. Our research questions are: What are the roles and responsibilities for different stakeholders in CC? How do CC’s form and evolve? As the CCs evolve, how do they form and maintain relationships between various business units? Are these relationships formal or informal? Are there organizational factors that suggest one path vs. another?

---

<sup>1</sup> Competency Center is a SAP specific term to describe a ‘structure’ that is responsible for implementation, stabilization and post implementation support of applications and business processes in organizations. ‘Center of Excellence’ is also used as a synonym to the term ‘competency center’.

This research is grounded in assemblage theory and brings a complementary view from ‘emergent theory’ [18] to support our theoretical background. Assemblage is a more recent social theory that examines the phenomenon more holistically, i.e. analyzes a ‘whole’ as well as the ‘parts’ that make the ‘whole’. This ability to analyze different levels makes assemblage theory useful in its application to examine Information Systems more thoroughly. To date, there have been only a limited number papers published that explicitly engage with this lens. Research phenomenon that is emergent, more recursive than dialectical, and characterize more by interactions among the “constructs” and the systems as a whole, are particularly suited to investigate through assemblage theory [25]. Assemblage theory offers a particularly evocative way of examining the emergent properties and evolution about CCs for the following three reasons. First, CC as a ‘system’ is comprised of many heterogeneous ‘subsystems’ such as ‘subject matter experts’, ‘business users’, ‘IT experts’, and various managers. Second, emergence of CC is the result of interaction between and among these sub-systems. Assemblage theory helps to conceptualize the contingent interactions of different components (ERP, BI, structure, process, business unites, parameters, customization, etc.) in a more continuity dynamic perspective. Third, the constant dynamic interaction continuously shapes and re-shapes the CC structure. Assemblage theory allows for the possibility of open configuration, continuous connections, not in an inextricable combination of interrelated parts, incessantly transforming organization and its IS.

The paper is organized as follows. We begin with an explanation of our theoretical background and a review of literature on ES post-implementation. Although the literature does not deal directly with competency center, this literature provides background for our investigation. We then outline the research method adopted for the empirical part of this study and summarize the key findings. In the Discussion section, we will analyze results from the cross-case analysis. In the conclusion section, we offer implications of our findings for research and practice.

## 2 Theoretical Background and Literature Review

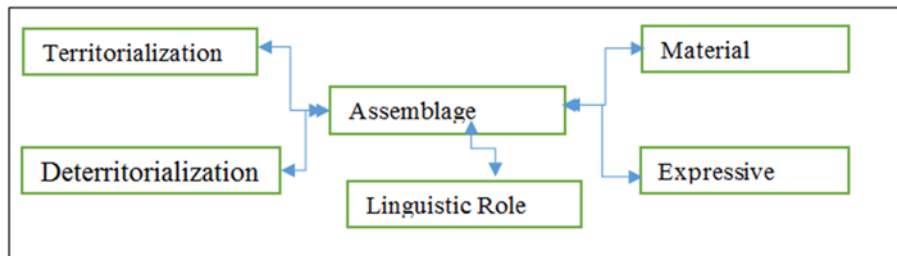
An innate property of an assemblage is its heterogeneous character. Assemblage, first proposed by Gilles Deleuze and Felix Guattari [10], is derived from the French word *agencement* referring to the ongoing processes of arranging, organizing, and congealing of heterogeneous bodies of concepts in connecting to each other. Assemblage emphasizes that “parts” that make the “whole” are fluid, exchangeable, and can have multiple functions. These components can be “pulled” out of one system, “plugged” into another. As DeLanda [9, pp. 10-11] describes,

these relations imply, first of all, that a component part of an assemblage may be detached from it and plugged into a different assemblage in which its interactions are different. In other words, the exteriority of relations implies certain autonomy for the terms they relate.

In Deleuzian ontology, a priori fixed notion of structures is not possible. Deleuze, in his later (post-Guattari collaborative) work, equates being as univocally, difference, and thus rejects any possible ‘fixed’ structures. We interpret this as meaning, purpose and its realization in ‘structuring’ forms (to borrow from Paul Hopper’s [19] theory of

Emergent Grammars) is always not fully determined and always in process. It is an emergent regularity [19] vs. a fixed structure. The ‘structure’ we describe are various snapshots of ‘organizational forms’ captured in moments in time. In that way, it gives us the possibility of analyzing contingent interactions between IT (supported here by ERP and BI systems), organization and actors as well as the emergent properties of the complex whole. ERP and BI applications were implemented in interaction with processes and actors, and developed during many phases. This position take us away from a static way of managing those interactions and emphasis fundamentally the idea of formation of complex configurations that eliminate the idea of a fixed and stable ontology for the organization evolution (or transformation).

An assemblage arises from the interplay of five primary constructs, four of which are members of two continua. The first is the material–expressive continuum, and the second is the territorialization– deterritorialization continuum (c.f., Figure 1).



**Fig. 1.** Different components of assemblage

*The material-expressive continuum.* Material constructs are physical objects or logical constructs, things with which people interact, such as information system (ERP modules, e-business platform, Supply Chain Management (SCM) applications, BI analytics), a department (Marketing, Finance, IT department), a legal system and the like. Expressive constructs are the responses that people have to material constructs. A driver sees a stop light and stops, sees a police car when driving and reduces speed. In an ES scenario, if an ERP software displays an error message, an expert user might be able to interpret it and take an appropriate action, whereas if a novice user might exit out the current screen or click ‘buttons’ at random. Closing out the current screen or interpreting an error message is a reaction to a material (error message in the system). Both the material constructs and many of the expressive behaviors are described in formal and informal linguistics artifacts, e.g., laws, employment manuals, and social norms transmitted by word of mouth.

*The territorializing–deterritorializing continuum.* Territorializing refers to actions that are oriented towards maintaining and reifying existing structures; making structures more rigid and concrete. In the realm of IS, the term ‘electronic concrete’ refers to how some systems lock users into one way of doing things. De-territorializing references forces and actions that are oriented to maintaining flexibility and fluidity in extant structures. They are transactional dynamic forces that take place in everyday activity and sensemaking. Alter’s “Theory of Workarounds” deals with precisely this concept [1]. In the ERP governance, formation of a core team can be an example of territoriali-

zation. However, if that team is not given any 'real' authority, the team could not function very well and could dissolve, thus deterritorializing. Deterritorialization should not automatically be equated to a negative element. In many cases, deterritorialization is helpful to transform the use of an ERP system from a local specialization to a cross-functional integration. For example, an organization may employ some key 'core groups' to manage ERP integration issues, but, if the group structure (territorialization component) is too rigid or unsupportive from the perspective of the different stakeholders, these key users might by-pass the established core-group and seek assistance from their coworkers or other sources. This is an example of deterritorialization since it destabilizes the 'assemblage' of the core groups. But, this deterritorialization, a kind of 'workaround', is not an 'undesired' outcome.

*Linguistic elements.* It is through linguistic mechanisms, speech and writing, that the interplay of these continua is expressed and the way social negotiation occurs. Linguistic elements can be sales report, requests for proposals, employee handbooks, and stories told within a shared organizational context. It is through language that assemblages are manifest. They are realizations of the interplay among the constructs. For example, the announcement of a sales competition (linguistic element) wherein only the top sales person will win the prize, will have an effect on how a sales team organizes itself and influences how members treat each other. "The Assemblage", as an emergent property, formed by interactions among the components. Once formed, assemblages have the reciprocal ability to affect and alter their own organizing constructs. However, the "consistency" or the "coherence" of its different components doesn't necessarily predetermine the form of the assemblage. In Deleuze's approach, consistency and coherence are not qualities that precede assemblages, rather they are emergent properties that do or do not arise from assemblage. In assemblage theory, the concept of emergence is referenced but is not a well-developed construct. So we turn to other sources for help in making this construct clear.

A fuller Theory of Emergence was initially proposed by Paul Hopper [18, 20] and has been further developed in the domain of IS by Truex et al. [32], Truex & Baskeville [31], Chae & Poole [6]. In this body of work, the notion of emergence takes the adjective 'emergent' seriously as a continual movement towards structure, a postponement or 'deferral' of structure, a view of structure as always provisional, always negotiable, and as epiphenomenal, that is, at least as much an effect as a cause.

Structure that is emergent is not an overarching set of abstract principles, but more a question of a spreading of systematicity, never fully formed always 'in-process', hence 'emergent'. An emergent structure or emergent system is like a story that is in the process of being told, being embellished and reinterpreted with each telling. It is a living artifact, never finished and never full structured, hence in emergence theory 'structures' are referred to as emergent regularities vs. finished structures.

Emergent systems are not abstract entities, but structuring in process taking place in real time, encountering and solving real life interactive problems. They are products of transactional interaction, sensemaking and negotiation of the meanings of other assemblages. Emergent theory tries to describe this process in terms that reflect its transitoriness and lack of intrinsic stability. A priori views of structure often go hand in hand in with exclusively cognitive perspectives that attribute structure to individual mental faculties without reference to the social and pragmatic conditions that enable these faculties in the first place. In other words, the world as it is encountered must fit these pre-

existent models, in contrast to emergent perspectives according to which the model is adjusted constantly in real time.

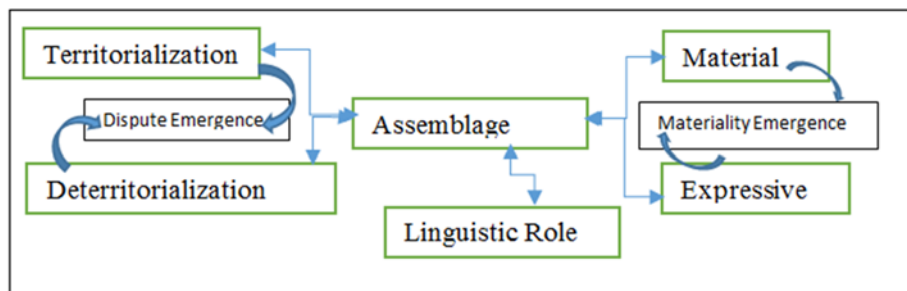
The emergence theoretical perspective does not actively seek fixed units of analysis rather it seeks recurrent patterns that create movement toward structure. Emergence seeks to offer a fuller exploration of the role of materiality and contextual constraints within the organizing process.

Emergence theory does not view organizational emergence as a primarily rational and consensual process but as occasions of discourse understood to be power laden, disputed and subject to unpredictable outcomes. With these essential properties, an emergence theoretic perspective can be useful in describing how two axes, the territorialization and deterritorialization, and material and expressive. Carter et al. [5] further classify emergence into discourse emergence and materiality emergence.

*Materiality emergence.* Information systems and organizations are continually adapting and responding to perceived changes in material conditions. Moreover, in their discussion of emergence and information systems, Truex and Klein [33] suggested a mutually constitutive relationship between information systems and social systems that is both power laden and disputed. The ability to better address material conditions of organizing in the information systems arena is an important strength of emergence theory.

*Dispute negotiation emergence.* The discourse is always self-referential and in process. Systematicity (i.e., organizing) spreads through loose coupling of organizational conversations that result in a host of complex intra- and inter-relationships. Each conversation is laden with material and contextual constraints, power/knowledge issues, and temporal irregularities and precludes the notion of organizations evolving either rationally, or meaningfully. Conflict need not be resolved rationally for organizations to work.

When synthesizing the concepts from dispute negotiation (discourse) emergence and materiality emergence, we propose a research model as described in Figure 2.



**Fig. 2.** Research framework

Applying assemblage and emergence theories to our research helps us understand how a CC configuration is the outcome of interaction among the constructs of the two continua. In the current ES literature [11, 14, 17]; the manner and processes by which CCs acquire their emergent structure is unclear. The way organizations adjust to the ES and the way the ES is adapted to improve organizational fit, a critical condition to real-

izing benefits from firm's ES investment, is also unclear [34]. Large firms having already finished their ERP implementation [16] typically find themselves dealing with usage and evolution issues. The uncertainties associated with ES use often relate to the way firms try to exploit the convergence of ERP and Business Intelligence (BI). There is considerable disagreement as to how post-implementation support should be structured and the roles that the business community and IT should play in this structure [35].

Taking an assemblage approach helps explain the existence the many adoption contexts and their dynamics and helps identify the shifting boundary conditions for the creation of the CC between business and IT units.

Turning once again to the literature we find general agreement that exploiting the significant investment in ERP and BI applications requires developing organizational capabilities to enhance fit between system functionality and business needs [12]. There is also general agreement in the literature that achieving organizational capability is predicated on effectively leveraging multiple knowledge and expertise sources throughout the organization [4]. The key resource is organizational knowledge and how this knowledge is distributed throughout the organization. Newell et al. [27] have noted the primary challenge for project teams is how to coordinate and integrate such distributed knowledge in dynamically changing environments. During the post-implementation phase, the challenges are even more pronounced because the support mechanisms established for the project implementation phase (consultants, leadership, project managers, project teams, subject matter specialists, etc.) has typically dispersed. Then, how should the organizational knowledge and competencies assets brought to bear during the ERP implementation be coordinated and integrated during the post-implementation phase?

Practitioner and academic literature propose the creation of a structure often called "competency center" manage and leverage organizational knowledge and expertise. The positioning and organization of this structure are decisive as to its ability to energize the ES and ensure consistency. Centralizing a firm's know-how around a duality of professional and technical expertise and plays a key role in keeping experts in a firm and in increasing their functional and technical skills which significantly reduces the need of external consultants. However, it is yet unclear under which conditions, decentralized or centralized, formal or informal, virtual or traditional approach a CC is more efficient.

### **3 Methodology**

This paper reports findings from the first stage of an ongoing project in which the unit of analysis is the organization. These data were captured from three, in-depth case studies conducted at three different large organizations in three different industries. To understand how the CCs are formed and evolved, we sought to understand the viewpoint of the key stakeholders that are important decision makers in forming and shaping CC. Since case studies allow the researcher to become familiar with the data in its natural setting and the context [23] and allows for a deeper understanding of a particular phenomenon [24], we chose this research approach to maximize the richness and accuracy



of data, transferability of the findings and to identify candidate constructs and variables for follow on study.

### **3.1 Sample Selection and Data Collection**

Our sample selection began with the requirement that the study sites needed to include firms that were relatively mature in their use of ERP systems and were not ones just completing or recovering from the implementation of a new ERP. Accordingly we limited the sample to firms having had active ERPs for more than five years and which were dealing with post-implementation and BI integrations issues or firms that had made a transition to more comprehensive use of these systems. The sample has been opportunistic in the sense that we reached out to firms in France, the US Southeastern region, and Korea where we have close business contacts and where we were connected to ERP user support groups. As we made connections with ERP manager-users many of whom are in ERP user groups and industry related associations, other potential sites were suggested by those interviewed, hence the ‘snowballing’ aspect of the sampling approach. For this paper, we selected three large distinct institutions in South East USA to explore and investigate the emergent conditions and evolution of governance structure. Interviewing, snowball sampling and coding were done simultaneously as is the practice in qualitative research where data collection and analysis is intertwined [26]. Our data collection has involved on-site observation, structured and semi-structured interviews, document collection, and follows up interviews after initial data coding. We conducted semi-structured interviews based on an interview template developed beforehand and approved by our university’s Institutional Review Board (IRB) human subjects research protocols by the study team and pre-reviewed with key informants who were experienced project leaders for ERP and BI implementations projects as well as ongoing support efforts.

In selected instances we reviewed the transcribed interviews and our interview notes with the informants to probe, check accuracy and extend our understanding of observations. These interviews were held with stakeholders involved in managing ERP and BI CC as well as managers holding different levels of responsibility and roles within the firm.

The organizations we chose to collect data all had at least four modules of SAP installed for at least five years. Data collection began in April 2012 and ended in May 2014. Interviews were conducted with multiple members of the CC team in each organization as well as people involved for year but who were working elsewhere. This gave us a solid multi-perspective historical view of the ES setting. The people we interviewed can be classified into two broad categories, the first, key decision makers in CC such as director of IT, and second, team members who were middle managers or team leaders. Interviews were recorded and transcribed. During coding fields notes and other data were compared to the transcriptions.

The semi-structured interview questions were designed to solicit the participant’s recollection of the formation of CC and evolution of CC in their own words without “guiding” them through it. In each instance at least two of the study investigators were present. The protocol involved having one of the researchers responsible for capturing

field notes and monitoring the trajectory of the interview. When offered additional evidence in the form of diagrams, policy documents, organograms and the like were also collected. Where possible these data were augmented by publicly available documents. The transcriptions have been annotated and enriched by reference to these additional data. The annotated notes and transcripts are being refined through the further discussions with study informants.

**Table 1.** Study firms and informants

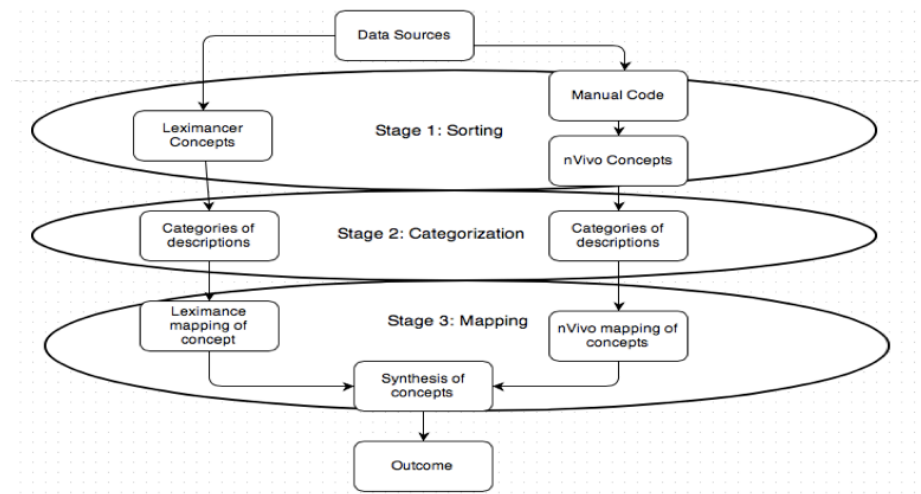
Organization	Informants	1 <sup>st</sup> round	2 <sup>nd</sup> round
<i>Case 1 Home Goods (HG):</i> Global Producer and marketer of consumer and commercial portfolio of products. HG has successfully implemented SAP modules and performing BI and Analytics functions via SAP HANA. HG was established more than 75 years ago. Through many acquisitions, HG has seen significant growth in the last 25 years.	Director of IT, Division Finance VP	April 2012	April 2013
<i>Case 2 Regional Southern University (RSU):</i> Major southeastern university with student population of more than 24,000. While established more than 100 years ago, student population has increased from 18000 to 24,000 in the last 20 years.	CIO, Director of ES	April 2012	March 2013
<i>Case 3 Material Supply (MS):</i> Established in 1970s, MS started out as a small store. Now MS has more than 2,500 locations in North America and is larger still with its international operations. It was an SAP 'Lighthouse Partner' and its implementation project was one of the largest and celebrated successful SAP projects worldwide in this business sector, having implemented SAP in more than 300 stores in one non-US setting.	Director of IT Senior Project Manager	April 2012	April 2013

As is typical in intensive qualitative studies, the researchers are immersed in the data. Analysis and sensemaking is a continuous versus a discrete process that arises from the continuing engagement with the data. Two formal approaches are being used to further interrogate the textual data. Researchers used independent methods for coding the transcripts and later exchanged notes with one another and the informants to check for face validity and consistency. One of them used NVivo and the other MS Word. In both instances open coding techniques described by Strauss and Corbin [29] were applied, where textual data were converted into codes that expressed or described specific categories, sub categories, or concepts. A third approach has been to use latent semantic analysis, and the tool Leximancer, to identify common themes and idioms arising in the respondent's narratives.

### 3.2 Data Analysis

The interview data were transcribed and data processing was divided into three sections, coding procedures (sorting), data reduction techniques (categorizing), and drawing conclusions (mapping).

Coding procedures deal with strategies to handle the semi structured interview data, as well as the document analysis. The intent of “Open Coding” refers to an encoding method developed by Glaser and Strauss [15], which enables the examination, comparison, conceptualization and categorization of data. Analysis was done in parallel using latent semantic text analyzer, Leximancer, and NVivo. Leximancer provides further insights into the content analysis: “Leximancer provided a means for generating and recognising themes, including themes which might otherwise have been missed” [7, p. 188]. Our findings are derived from the analysis of third level of coding.



**Fig. 3.** Overall data analysis process utilizing Leximancer and NVivo (Adapted from Penn-Edwards [28])

**Stage 1: Our Starting Point - Leximancer Analysis.** Leximancer, a latent semantic analysis software tool, converts text to bit patterns and then presents a complete concordance of terms in the text(s) under study. Researchers can choose to remove, exclude and combine terms for further analysis. The tool then conducts various analyses on these patterns identifying measures such as frequency of occurrence, frequency of co-occurrence with other words (bit patterns) thus identifying idioms that are also coded for frequency of occurrence and co-occurrence and other measures of interconnectedness. These are presented in tables, including frequencies and linking concepts to the actual underlying text and as concept maps displaying the relative strength of its existence and relationship measures along different thresholds. The map illustrates the concepts present in the texts and certain aspects of relationships among concepts.

This approach provides an unbiased and transparent conceptual analysis of the text. However that does not mean the researcher accepts these raw concepts as a final result. Rather they provide beginning point and foundation for further analysis. When synthesized with other forms of coding (e.g, NVivo and manual coding) the technique provides a more complete view of the data and its meaning. Just like with other traditional Content Analysis tools, using Leximancer the researcher can modify settings to reduce

the noise in the data. For example, one can remove ‘filler’ terms, identify synonyms and combine similar concepts as part of a data refinement and filtering process [7].

**Stage 2 & 3: Open coding in NVivo and Synthesis with Leximancer concepts.** As is typical in intensive qualitative studies, the researchers are immersed in the data. Analysis and sensemaking is a continuous versus a discrete process that arises from the continuing engagement with the data. Two formal approaches are being used to further interrogate the textual data. Researchers used independent methods for coding the transcripts and later exchanged notes to check for intercoder reliability with NVivo and the other MS Word as organizing and coding tools. In both instances open coding techniques described by Strauss and Corbin [29] were applied, where textual data were converted into codes that expressed or described specific categories, sub categories, or concepts. This allow us to further explore and develop the concepts initially identifies in the Leximancer analysis.

## 4 Case Analyses, Findings and Discussion

In this section we proceed in a linear case-by-case basis. We first describe the CC structure for each of our cases, paying attention to how they are situated (‘becoming’) within in each organization as well as the links the CC has to various business units. We then apply our assemblage framework to each case in order to analyze the interplay of four constructs, the material–expressive continuum, and the territorialization–deteritorialization continuum.

**Table 2.** Organization and CC structure

Organization	ERP and BI systems	CC Structure
RSU	Banner, Oracle-PeopleSoft, ADP SAS business analysis Executive Management have no direct ERP to BI analytics	Informal structure
MS	SAP R/3 to ECC 6; exploring for CRM SAP BI throughout the organization	Formal “Center of Excellence” reporting to the CIO
HG	All SAP modules SAP BW throughout the organization	Formal Structure “Business Process Champions” Under the authority of CIO

### 4.1 Case 1 HG

HG operates in a formal CC environment where CC has clear vision and there are established positions and career path within CC for employees. The CC was created through formal chartering process initiated by the CIO and CEO. The founding principle behind the CC was that CC would govern deployment, development and support.

The clear goal for HG's CC is to consolidate to a single instance of SAP throughout organization and achieve a team composition within the CC including more business people than IT. In this organization membership in the CC is seen to be career enhancer and is a sought-over posting. In choosing CC members there exists a formal application and interviews process aimed at recruiting talented people having business savvy.

While some department or even countries are in development mode, others are in post-implementation use mode, CC manages both environments. Our goal from the get goes was to get business on SAP. Get people into one common platform. (KR – Director of IT)

Once the people are recruited into CC, they are referred to as “business process champions” and these employees go back to their respective departments and carry out the agenda for CC and represent their unit to the CC. It is like being in dual Ambassadorial roles.

Prospective members are nominated from the departments, interviewed and selected based on the fit. There are separate career paths for the employees. These employees are crucial to the success of CC, essentially they are the “bridge” between the department and CC. In our CC, we have mostly business and some IT people in CC: between 300-500 members.” (KR – Director of IT)

The CC established clear guidelines for applications integration as well. Once the decision was made to have single instance of SAP running across the organizations, employees were encouraged to not to deviate from SAP.

KR (director of CC) has some very good disciplines and his Boss and the organization says we are going SAP and anything which deviates from SAP is not necessarily a rogue application, but needs to be very well vetted. (MM – Finance VP)

Even in this formal structure where goals of the CC were clear, there are established roles and responsibilities for employees. The successes of the CC were not merely from the structure but the interaction between different BU and informal relationship employees' form. For example according to MM, the Finance VP, “We rely on relationship these business process champions have within their department to promote the cause for CC, which is one of the reasons, we insisted on having more business people in CC than IT people.” “For the big job, we do have to go through formal process. However RJ has established enough credential to get many things done just by having gentleman's agreement.”

#### **4.2 Case 2 RSU**

RSU operates in a semi-formal CC environment where there are established positions within CC; however, the interactions among different actors are not clearly defined or regulated. The governance body was intentionally created and is based on upper management's philosophy that a too formalized process stifles creativity and innovation.

Because when we were looking at trying to get a formal governance structure, we got a pushback from all over the campus. That's exactly the reason we had those informal structures are in place and people felt threatened because we were trying to formalize. (DW – Director of ES)

Each of the IT departments in the organization is entrusted to collaborate and form partnerships as needed to facilitate effective and efficient operations and find appropriate resolutions as issues arise. These relationships are recognized, even called 'committees' locally but are temporal coming and going, as circumstances demand. As the CIO of RSU explains this phenomenon:

Because we built informal relationships one to another within the organization, I don't feel like I need an SLA with DW (Director of ES) to get the things done and I hope DW feels the same way about me. (DE – CIO)

This semi-formal environment permits dynamic CCs to be created, evolve, and/or disbanded as necessary. An example is the relationship established between Enterprise Systems & Services (ESS) and Enterprise Information Management (EIM). ESS is the IT department responsible for supporting the ERP and other administrative systems within the organization. EIM is responsible for BI system and fulfilling the reporting requirements from the various systems. As technology emerged within the organization, a need to collaborate was recognized which afforded the opportunity for ESS and EIM to engage the management teams from both areas in an open forum to discuss ideas, upcoming changes, and new initiatives. Meetings are tentatively scheduled each month but the decision to meet depends upon the current situation or projects underway.

Beginning of each year we call a meeting called Management by Objectives for all our employees and one of the things that I wanted to implement is that all assistant directors regularly meet and exchange ideas. (DE – CIO)

While this initiative is an example of a formal approach arising from a high level meeting, but how initiative is finally implemented is not formal at all.

One of the assistant directors, Assistant Director of the Web group reaches out to all the different people that are involved in the web development across the campus and pull out those people together as a group. He has taken a pretty unique approach, he calls it is Donuts and Development. Quite simply, it is a meeting to discuss issues while eating donuts. He pulls those people together on a regular basis and gets into a collaborative project or...pull together or works with us (CC). (DW – Director of ES)

Another example of a semi-formal CC is the establishment of a Project Management (PM) office within ESS. There are three other IT groups within the organization in addition to ESS. Each of these IT groups has differing responsibilities ranging from supporting the campus network and infrastructure to assisting with the research computing needs of the academic departments. This semi-formal CC was formed to provide

project management planning and services across the IT division through the ESS department.

This center functions in lieu of a formal Project Management Office (PMO) for the organization and provides support for major IT division projects. This center also facilitates project manager meetings across departments to aid in sharing IT project-related information throughout the organization.

The advantage of having the flexibility to have informal CC without having to seek formal governance approval greatly enhances the organization's ability to distribute information more readily and respond to issues more rapidly. The semi-formal competency center structure is well suited to our organizational culture and works well in our environment. (DW – Director of ES)

### **4.3 Case 3: MS**

This project was slated to be SAP's single biggest retailing implementation in the world in domain in which SAP was not dominant. Hence SAP had a vested interest in making this a clear success. In fact they named this firm a 'Lighthouse Partner' and provided unprecedented support from SAP AG and SAP US. This relationship and the vendor contract virtually required that MS operated in a formal and canonical CC environment.

SAP led the initial structure and ideas were how to move beyond project team and be sustainable as a support structure. In that structure we had few people from SAP and we also had consultants. (DT – Director of IT)

Given the sheer scope of the project MS did not have enough internal expertise, thus it relied on SAP and consultants to fill many roles within the CC, numbering over 600 people during the height of the implementation. While project team implemented the ERP, during post-implementations, most of the CC employees went back to their previous positions and the CC team shrunk to fewer than 50 people responsible for all ERP support, bug fixes, updates and new initiatives.

Once MS was familiar with the governing concept of the CC, MS tried to recruit more people from within the organizations and reduce the reliance on consultants. The size and composition of the CC kept fluctuating for other reasons as well. At the same time some consultants were offered jobs and brought into the firm, which created very dynamic environment, in some measure because these hires did not know the business from the inside out. Not only was the structure of the CC emerging, the relationship between players was quite dynamic as well.

When the implementation project was complete, employees went back to their business units or left to work on other ERP implementation projects. The result was a breaking of the desired "link" between the CC and the business units.

Key individuals were taken out of the business verticals. These people were well trained, usually came from consultancies and knew how to work with finance and end users. When this project moved into

post production and they (cc employees) disseminated back out to their verticals and reported in. (HC – Senior PM)

#### **4.4 Discussion—A Synthesis Understanding in Light of Assemblage and Emergence Theories**

*The territorialization–deterritorialization continuum.* HG falls in the middle of the continuum; it reflects a more balanced relationship between rigidity and fluidity. For instance, roles and responsibilities are clear, people are vetted for CC membership and IS applications are also carefully vetted as to how they will interact with extant enterprise systems yet, Such tight boundary conditions would suggest rigidity. But business process champions / dual ambassadors serve a bridging function and create strong CC to BU bi-lateral linkages.

When CC first introduces the initial configuration plan for the ERP and BI, these plan and framework are an example of territorialization process. These configuration have specific requirements and management procedures. These procedures solidify assemblage. However, as the organizations start the process of re-configuration and customization, the initial assemblage is destabilized. In response, CC initiate territorialization process by helping to create new culture and re-stabilizing the identity of the assemblage. For example, in RSU, the CC has connected the entire business units and, in a sense, created a cross-functional culture that assistance and collaboration to everyone who has access to ERP and BI applications. CC provides mechanism for enabling dialogue among people, groups, functions and business units to easily collaborate, thus, helping managers to organize their post-implementation use. This collaborative optimization of ERP and BI becomes a catalyst of the process of territorialization.

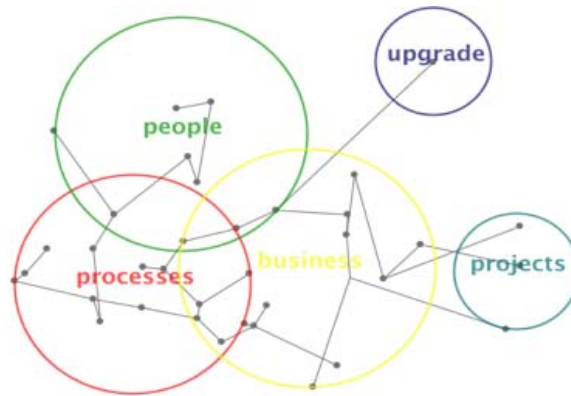
In the three cases, CC is acting as hub between IT and business sides. The linking of IT and business is the result of recognizing that technical integration and organizational integration are the faces of the same piece and need to be managed as an assemblage. This assemblage process allows certain flexibility and preparing and rendering ES and organization process for more cross-functional integration.

*The material–expressive continuum.* The material aspects in all three cases are represented by the people, roles and their evolving relationships. The expressive aspect is represented differently in each case. In HG the expressive is manifest as the direct interaction with the material. For instance people identified for or promoted to the CC are rewarded by recognition or other tangible benefits. RSU is closer to the expressive end of the continuum because relies more on symbolic gestures vs. formal recognitions and rewards. At MS, the expressive is not an outcome of the material. Being in a CC at MS does not garner recognition or direct career enhancement. As such the expressive is less tangible than in HG, and is closer to the material end of the continuum.

We are confident that the ‘Big Picture’ model (Figure 4 below) sufficiently conveys the social-interactive aspects of the governing structuring process. It is important to note that in all settings the primary focus is on Business, processes, and people followed by upgrades and projects. The technical aspects of ERP systems, such as modules, reference models, data bases and models, configuration plans and the like, are not nearly as prominent and do not take the same weight as the business function oriented concepts. The CC ensures the robustness and reliability of the information infrastructure



but, at the same time, enables heterogeneous groups of information consumers to use information in a coordinated way to achieve organizational goals.



**Fig. 4.** Big picture concepts

Even within the major concepts the ERP system itself is not a major component. For instance examining the underlying sub-components we find that 'data', 'load', 'systems', and 'solutions' are all related to concept of 'processes'. The concept 'business' is comprised of sub-components 'management', 'project', 'organizations' and 'veterans'. Veterans refer to experienced employees in the organization. Tools and sales are related to people. While upgrade and projects are part of CC, they are not as important as people, processes, and business.

**Emergence: CC structuring elements in the cases.** Table 3 presents instances of emergence observed in the case data. In MS, candidate members were sought out from different BU into the CC to devote time in dealing with development and deployment issues. This newly created structure forced the new members to quickly acclimate and assimilate into this new environment. Since there were no formal recognitions or rewards, some people simply went back to their BU. This turnover rate prevented from creating a strong link between the CC and BU. People either identified with their CC role or BU role, but not the dual role they were expected to play. Thus, the CC was always structuring and never achieved the status of an emergent regularity.

When RSU wanted to implement a formal structure, it got pushback from the organization and had to abandon the idea of forming a permanent clear structure. However, RSU adapted and employed a different approach from which an informal governing structure emerged. For example, a "Project Management informal group" meets regularly with other groups to discuss important issues. This informal approach which emerged as response to the opposition of formal structure, gave inspiration to other groups to organize the informal meetings as well.

**Table 3.** Elements of assemblage

<b>Assemblage Concepts</b>	<b>HG</b>	<b>RSU</b>	<b>MS</b>
<b>Territorialization</b> Elements that make assemblage rigid	Boundaries are formed. Formal roles and responsibilities. Even the IS applications were “vetted”.	Fluid boundaries, key people invited to CC but no permanent residency in CC, relied on informal relationship	Clear boundaries. People were nominated from the BUs to be in the CC. People were either in CC or BU. Not enough strong “links” between the CC and BU.
<b>Deterritorialization</b> Elements that make assemblages fluid	Dual ambassador role: even in the CC, people maintain their BU roles (and vice versa) creating strong and flexible links between the CC and BU	“Overlapping interactions”	Established relationship in the department
<b>Materials</b> (e.g., ERP, BI, Resources, proximity relationships among resources)	Nominated from department, then interviewed to be in CC CIO, CEO	People who were “Overlap in interaction” CIO, CEO, CTO	Key individuals from different BU and Outsourced partner – SAP, Latin America Group, Canada Group
<b>Expressions</b> (e.g., Symbolic and non-symbolic, agendas, goals, mission)	A single instance of SAP, provide common platform, clear career incentives	Manage competencies in different BU, camaraderie	Original intent of ERP financial system replacement

In HG, recruitment process, employee’s roles and employee rewards were planned and clearly structured. Even in this structured settings, HG realized that informal links were emerging where people interacting with their old BUs. Responding to this emergent issue, the CC established a policy that people will not be “taken out” of BU rather they will act as “business process champions” creating a de-facto dual ambassador role wherein the CC members still resided in their respective BU.

This instance of emergence exerts a “positioning” force that keeps the newly formed assemblage in play never being fixed in a relative position in either the material-expressive or territorialization–deterritorialization continua. In the case of MS, emergent issues kept the assemblage from achieving its deterritorialization properties. As a result, the CC in MS was not able to establish a clear “link” between the CC and BU.

While MS did not deal with the emerging issue which was preventing MS from achieving a balance positioning in territorialization–de-territorialization continuum, HG quickly realized that along with clear structure and employee roles and reward structure, the informal links and collaborations are important for establishing a successful CC.

## 5 Contributions and Limitations

This study was motivated to fill a void in the literature regarding the existence and the configuration of the CC unit during post-implementation phase. Given the growing importance of ES software and the ubiquity ERP in Fortune 500, Fortune 100 and most mid-size firms worldwide and the inevitability of maintaining these systems and trying to extract increasing value from the investment in them, it is increasingly necessary to understand the role of post-implementation governance structures on the improvement of these ES investments. For instance, the findings in RSU suggest that informal liaison mechanisms are more critical to knowledge integration than are formal structural arrangements such as those deployed at MS. In all three cases the business need was found to be one of the key internal requirements driving the structuring processes behind the CC that led to unintended and destabilizing outcomes. It appears that organizational reliance on ES creates dependence on those systems that in turn gives the CCs more apparent power over the organization. But this power has impact of destabilizing the former more permanent system. Thus CCs are an example not of structure but rather assemblages.

Whether this assemblage survives to provide value to an organization or not depends on how the emergent issues are handled and how the assemblages are “positioned”. IT applications serve business users, as such it is understandable that demands from business unit can motivate the creation of a CC along a particular trajectory intended to support the integration and the use of the ES. However, we found that not all business needs are equally influential and often do not traverse the intended path.

## 6 Conclusion

The research reported in this paper is one of few empirical studies focused on ES competency center during post-implementation phase. It offers evidence of emergent processes shaping CC organizational structuring and it is a step examining the role of this new structure. As such it helps gain a better understanding of the CC unit, how it is configured and structured and the role and mechanisms mitigating the relationship between business units and IT departments.

The assemblage theory and emergence approach provide a strong background to study how the organizational and IT resources and competencies supported the key actions within different ES CC configuration. It also provides a theoretical framework to understand why and how the actions and decisions were executed in each specific context. It highlights to focus research attention on dynamic and emergent issues rather than structures and rigid frameworks that are the focal point of much of the ES literature and canonical consulting wisdom.

## References

1. Alter, S.: Theory of Workarounds. Communications of the Association for Information Systems 34, 1041-1066 (2014)

2. Barker, T., Frolick, M.N.: ERP Implementation Failure: A Case Study. *Information Systems Management* 20(4), 43-49 (2003)
3. Benitez-Amado, J., Walczuch, R.M.: Information Technology, the Organizational Capability of Proactive Corporate Environmental Strategy and Firm Performance: A Resource-Based Analysis. *European Journal of Information Systems* 21(6), 664-679 (2012)
4. Bhatt, G.D., Grover, V.: Types of Information Technology Capabilities and Their Role in Competitive Advantage: An Empirical Study. *Journal of Management Information Systems* 22(2), 253-277 (2005)
5. Carter, M., Takeda, H., Truex, D.: An Epistemology of Organizational Emergence: The Tripartite Domains of Organizational Discourse and the Servitization of IBM. In: *Information Technology in the Service Economy: Challenges and Possibilities for the 21st Century*. IFIP, vol. 267, pp. 367-370. Springer, Heidelberg (2008)
6. Chae, B., Poole, M.S.: The Surface of Emergence in Systems Development: Agency, Institutions, and Large-Scale Information Systems. *European Journal of Information Systems* 14(1), 19-36 (2005)
7. Crofts, K., Bisman, J.: Interrogating Accountability: An Illustration of the Use of Leximancer Software for Qualitative Data Analysis. *Qualitative Research in Accounting & Management* 7(2), 180-207 (2010)
8. Davis J.M., Kettinger W.J., Kunev, D. When Users Are IT Experts Too: The Effects of Joint IT Competence and Partnership On Satisfaction With Enterprise-Level Systems Implementation. *European Journal of Information Systems* 18, 26-37 (2009)
9. DeLanda, M.: *A New Philosophy of Society: Assemblage Theory and Social Complexity*. Continuum (2006)
10. Deleuze, G., Guattari, F.: *A Thousand Plateaus: Capitalism and Schizophrenia*. University of Minneapolis Press, Minneapolis (1987)
11. EL Amrani, R., Aryal, A., Sarkar, S., Truex, D. The Key Determinants of a Successful Competency Center: It Depends! *Proceedings of the SIG-Enterprise Systems Pre-ICIS Conference* (2012)
12. Elbashir, M.Z., Collier, P.A., Davern, M.J.: Measuring the Effects of Business Intelligence Systems: The Relationship Between Business Process and Organizational Performance. *International Journal of Accounting Information Systems* 9(3), 135-153 (2008)
13. Eriksen, L.-B., Axline, S., Markus, M.L., Drucker, P.: What Happens After "Going Live" With ERP Systems? Competence Centers Can Support Effective Institutionalization. *AMCIS 1999 Proceedings*, Paper 268 (1999) <http://aisel.aisnet.org/amcis1999/268>
14. Gallagher K.P, Worrell, J.L, Mason, R.M.: The Negotiation and Selection of Horizontal Mechanisms to Support Post-Implementation ERP Organizations. *Information Technology & People* 25(1), 4-30 (2012)
15. Glaser, B.G., Strauss, A.L.: *The Discovery of Grounded Theory; Strategies for Qualitative Research*. Aldine, Chicago, IL (1967)
16. Grabski, S.V., Leech, S.A., Schmidt, P.J.: A Review of ERP Research: A Future Agenda for Accounting Information Systems. *Journal of Information Systems* 25(1), 37-78 (2011)
17. Granebring, A., Révay, P.: Enterprise Resource Planning Competence Centres: A Case Study. *Kybernetes* 34(9/10), 1551-1562 (2005)
18. Hopper, P.J.: Emergent Grammar. *Berkeley Linguistics Society* 13, 139-157 (1987)
19. Hopper, P.J.: Some Recent Trends in Grammaticalization. *Annual Review of Anthropology* 25, 217-236 (1996)
20. Hopper, P.J.: Emergent Grammar. In: Tomasello, M. (ed.) *The New Psychology of Language: Cognitive and Functional Approaches to Language Structure*, vol. 1, pp. 155-75. Lawrence Erlbaum, Mahwah, NJ and London (1998)

21. Kallinikos, J.: Deconstructing Information Packages: Organizational and Behavioural Implications of ERP Systems. *Information Technology and People* 17(1), 8-30 (2004)
22. Kholeif, A.O., Abdel-Kader, M., Sherer, M.: ERP Customization Failure: Institutionalized Accounting Practices, Power Relations and Market Forces. *Journal of Accounting & Organizational Change* 3(3), 250-269 (2007)
23. Lee, A.S.: A Scientific Methodology for MIS Case Studies. *MIS Quarterly* 13(1), 33-50 (1989)
24. Lee, A.S., Baskerville, R.L. Generalizing Generalizability in Information Systems Research. *Information Systems Research* 14(3), 221-243 (2003)
25. Marcus, G.E., Saka, E.: *Assemblage. Theory, Culture & Society* 23, 101-106 (2006)
26. Miles, M.B., Huberman, A.M.: *Qualitative Data Analysis: An Expanded Sourcebook*. Sage, (1994)
27. Newell, S., Tansley, C., Huang, J.: Social Capital and Knowledge Integration in an ERP Project Team: The Importance of Bridging and Bonding. *British Journal of Management* 15(S1), S43-S57 (2004)
28. Penn-Edwards, S.: Computer Aided Phenomenography: The Role of Leximancer Computer Software in Phenomenographic Investigation. *Qualitative Report* 15(2), 252-267 (2010)
29. Strauss, A., Corbin, J.: *Basics of Qualitative Research*. Sage, Thousand Oaks, CA (1998)
30. Truex, D.: ERP Systems as Facilitating and Confounding Factors in Corporate Mergers: The Case of Two Canadian Telecommunications Companies. *Systemes d'Information et Management* 1(6), 7-21 (2001)
31. Truex, D.P., Baskerville, R.: Deep Structure or Emergence Theory: Contrasting Theoretical Foundations for Information Systems Development. *Information Systems Journal* 8(2), 99-118 (1998)
32. Truex, D.P., Baskerville, R., Klein, H.: Growing Systems in Emergent Organizations. *Communications of the ACM* 42(8), 117-123 (1999)
33. Truex, D.P., Klein, H.K.: A Rejection of Structure as a Basis for Information Systems Development. In: Stamper, R.K., Kerola, P., Lee, R., Lyytinen, K. (eds.) *Collaborative Work, Social Communications and Information Systems*, pp. 213-236. Elsevier, Amsterdam (1991)
34. Volkoff, O., Elmes, M.B., Strong, D.M.: Enterprise Systems, Knowledge Transfer and Power Users. *Journal of Strategic Information Systems* 13(4), 279-304 (2004)
35. Worrell, J., Gallagher, K., Mason, R.: Understanding the Structure of Post-Implementation ERP Teams. *AMCIS 2006 Proceedings*, Paper 307 (2006)  
<http://aisel.aisnet.org/amcis2006/307>