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# The Role of A Decentralized Organizational Structure on KM Infrastructure Capability during the Implementation of ERP Systems in Kenya

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**Abstract**
It is a well-established fact that most Enterprise Resource Planning Systems (ERP) fail due to a myriad of implementation problems. This study was motivated by the high failure rate of ERP systems around the world during the implementation stage. Most studies report failure rates of between 65% and 75%. Many developed countries have adapted flexible organizational structures as a technique of minimizing ERP implementation problems. This paper investigated the influence of organizational structure on KM infrastructure capabilities during the implementation of ERP systems in organizations listed in the Nairobi Securities Exchange (NSE) in Kenya, with the aim of establishing whether these organizations have embraced organizational structures which enhance knowledge sharing. Three hundred and six (306) questionnaires were distributed to senior managers and users of ERP systems in the companies listed in the NSE. One hundred and eighty four (184) responses were received representing a 60% response rate. The study employed factor analysis, correlation analysis, univariate analysis, multivariate regression analysis and Structural Equation Modeling (SEM) to investigate the relationship among variables and measure the strength and direction of the relationships between constructs. Data was cleaned and analyzed using SPSS version 20 and AMOS version 21. The research found out that organizational structure is not considered a significant component of KM infrastructure in the companies listed in the NSE. The findings imply that most companies listed in the NSE in Kenya still practice silo behavior where individual divisions, units, or functional areas operate as silos or independent agents within the organization. This study leads to the conclusion that the organizational structures in Kenya are not flexible enough to enhance ERP implementation success and recommends that organizations should embrace decentralized structures, which provide the flexibility required for knowledge sharing in ERP implementation projects.
**Keywords:** ERP implementation, organizational structure, KM infrastructure capability, Social Capital Theory, Dynamic Capability View, Resource based theory

## 1. Introduction

Many organizations today are looking for ways in which they can improve their businesses in response to the growing global competition. One approach that has been used is the deployment of information systems such as Enterprise Resource Planning (ERP) systems (Annamalai & Ramayah, 2011). Businesses of all sizes are using these (ERP) systems in order to improve their efficiency, profitability and business performance (Kilic et al., 2015).

During the ERP implementation process, vast amounts of knowledge about the existing organizational processes and knowledge contained in legacy systems is required and the environment to do this exhausts a great part of the implementation team effort (Vandaie, 2008). The challenge therefore becomes that of creating an environment that enables the sharing of the various forms of knowledge during the ERP implementation.

Knowledge Management (KM) is one way through which organizations can minimize knowledge sharing difficulties, especially during implementation of ERP systems. In an ERP environment, knowledge management makes the knowledge transfer between consultants, IT staff, business process engineers, and management possible (Guo et al., 2006). Firms often ignore knowledge sharing until it is too late, as people do not easily or willingly share what they know (Brown & Vessey, 1999). The act of knowledge sharing by those involved in ERP implementations does not come automatically but must be facilitated (Jones & Price, 2005). To facilitate the sharing process, organizations must develop linkages to the source of knowledge that can act as facilitators for knowledge transfer, and mechanisms through which the knowledge can be shared or transferred. Such mechanisms include configuring organizational structures in order to enhance knowledge sharing.

In an ERP environment, knowledge management makes the knowledge transfer between consultants, IT staff, business process engineers, and management possible. Such transfer is characterized by multi-dimensionality and diversity of sources (Guo et al., 2006). The active sharing of organizational members' knowledge is linked to a firm's ability to alter its core knowledge competencies (Jones & Price, 2005), which involves sharing of knowledge across the organization in a way that preserves existing knowledge competencies and at the same time absorbs new knowledge that expands and strengthens those competencies.

Individuals' knowledge does not transform easily into organizational knowledge even with the

 

implementation of knowledge repositories due to individual knowledge hoarding predispositions (Bock et al., 2005). The ERP implementation knowledge, which is both explicit and tacit, embodies those activities associated with configuring and testing ERP modules, installing software, and training client employees in preparation for ongoing operation, maintenance, and support of a vendor-supplied system (Ko et al., 2005). Consultants hold technical knowledge, whereas client organizations hold business knowledge and an exchange of this knowledge is necessary to enable adoption of ERP systems. The knowledge initially possessed by the consultant must be integrated and embodied both in the ERP systems and also in the knowledge of the client employees (Soh et al., 2000; Ko et al., 2005).

Sun (2008) posited that knowledge sharing techniques in an ERP environment provide a way for ERP users to communicate with each other freely and enables the exchange of ideas, feelings and queries amongst individuals. One such technique involves the use of decentralized organizational structures in which the decision-making authority is dispersed throughout the organization (Daft, 1986). Dispersion of power promotes spontaneity, experimentation, and freedom of expression which is important for knowledge creation and sharing (Teece, 1999) because it encourages organizational members to be autonomous in their decision-making (Jones et al., 2006) and facilitates learning and communication leading to a successful exchange of innovative ideas (Willcocks & Smith, 1995).

Little has been done on the influence of organizational structure on KM infrastructure capability in ERP implementation particularly in Kenya. The purpose of this research was to investigate the influence of organizational structure on KM infrastructure capability during implementation of ERP systems. The study conceptualized the role of decentralized organizational structures on KM infrastructure capability in Enterprise Resource Planning Implementation and hypothesized that:

***Ho:*** *There is no significant relationship between organizational structure and KM infrastructure capability during ERP implementation.*

## 2.0 Literature review

This section explains the views and the theories that were used as theoretical foundations of this research. The theories are the Social Capital Theory (SCT), Dynamic Capability View (DCV) and the Resource-Based Theory (RBT). Several research studies that relate to organizational structure, KM infrastructure capability and Enterprise Resource Planning (ERP) are also examined.

### 2.1 Social Capital Theory

The social capital theory (SCT) emphasizes the central importance of networks of personal relations developed over time that provide the basis for trust (Nahapiet & Ghoshal, 1998). Social capital enables societies to function properly by encouraging individual and collective action. Encouraging connections amongst the individuals of an organization through interaction is important for building trust as it leads to a mutually beneficial social corporation (Putnam (1993).

### 2.2 Dynamic Capability View of the firm

The Dynamic Capability View (DCV) of the firm states that in a highly competitive market, firms constantly renew their organizational capabilities in order to remain relevant (Winter, 2003; Teece, Pisano & Shuen, 1997). Organizations must create the capacity to anticipate market changes in order to survive in the dynamic market (Teece, Pisano & Shuen, 1997), which requires organizations to adapt through the development of new knowledge to generate new skills and capabilities (Hamel & Prahalad, 1994).

### 2.3 Knowledge-based View of the firm

Emergent from the RBV, the knowledge-based view defines firms as bodies that generate, integrate, and distribute knowledge (McEvily & Chakravarthy, 2002; Nguyen, 2010). Knowledge is considered a strategic asset and firms gain competitive advantage through its acquisition, transfer and subsequent use (Nonaka, 1991; Prahalad & Hamel, 1990). It has been argued that in any competitive landscape, especially in the new economy, intangible assets are more important and likely to produce a competitive advantage because they often are state unobservable, truly rare and can be more difficult for competitors to imitate (Jackson, Hitt & DeNisi, 2003; Nguyen, 2010).

### 2.4 Resource based theory

The RBV of the firm enables organizations to use resources such as top management support together with KM process capabilities of creation, retention, transfer and application to transform organizational knowledge into a valuable, rare, inimitable and un-substitutable (Barney, 1991) resource for competitive advantage. The theory underpinning this study is therefore the resource based view theory (RBV), which posits that firm-specific factors are as important as industry forces in determining competitive advantage over time.

 

### 2.5 Organizational Structure as an antecedent of KM infrastructure capability for ERP implementation success

Organizations vary in the degree to which the structure of decision-making is concentrated or shared, with sharing and use of knowledge depending on the level of centralization or decentralization. Decentralization connotes the extent to which the decision-making authority is dispersed throughout the organization (Daft, 1986) while centralization signifies the degree to which the decision-making authority is concentrated at the senior management level (Caruana et al., 1998). The rules of a few individuals guide the behavior and actions of the majority where decision-making is concentrated at management level. Conversely, in organizations where decision-making is decentralized, organizational members are encouraged to be autonomous in their decision-making. Many organizations still operate in and engage in silo behavior where individual divisions, units, or functional areas operate as silos or independent agents within the organization (Jones et al., 2006). Organizational structure is important in leveraging technological architecture and should be designed for flexibility (as opposed to rigidity) in order to encourage sharing of knowledge by way of collaboration across boundaries within an organization (Gold et al., 2001). Some firms fail to realize ERP potential because they ignore their organizational structure when planning to implement an ERP software package (Brown & Vessey 1999). Highly centralized, hierarchical structures tend to inhibit the type of knowledge sharing required for organizational learning during periods of extensive knowledge exchange (Jones & Price, 2001), whereas more decentralized structures facilitate learning and communication leading to a successful exchange of innovative ideas (Willcocks & Smith, 1995). Distributed power in organizations gives employees freedom to experiment and discuss possible solutions to organizational problems. Concentration of authority for decision making at the senior management level limits employee knowledge creation abilities (Graham & Pizzo, 1996; Stonehouse & Pemberton, 1999; Teece, 1999; Lee et al., 2012).

The degree of centralization or decentralization impacts the sharing and use of knowledge in firms. Kasper et al. (2008), while quoting Macharzina et al. (2001), asserted that: “organizations that decentralize decision-making may be more adaptive, more innovative and are more capable to deal with complex environments than those organizations that maintain centralized decision-making and coordination”. In addition, they stated that social networks play a crucial role in organizational knowledge sharing and tacit knowledge is transformed into explicit knowledge through such social gatherings. An extension of this study into a Kenyan context would enhance tacit knowledge sharing capabilities in the organizations listed in the NSE.

Organizational structure supports KM activities where the organizational structure is centralized, less formalized and more integrated (Mahmoudsalehi et al., 2012). In order to leverage knowledge for improved performance, organizations need to have key capabilities one of them being KM infrastructure capability which comprises technology, structure and culture (Gold et al., 2001). It is acknowledged that the efficient and effective application of KM requires a strong and appropriate KM infrastructure (Tiwana, 2000) in which organizational structure is essential. Where organizational structure encourages flexibility, there are high chances that KM infrastructure will support organizational initiatives such as ERP implementations.

Organizational structures should be flexible where managers focus more on the synchronization of organizational processes and less on the control and the direct command of their subordinates. This enhances employee ability to exercise control in providing solutions to dynamic environments (Hasgall & Shoham, 2008) which require the sharing of tacit knowledge. During ERP implementations, consultants are required to transfer relevant knowledge to the client organization. Companies that adopt flexible and increasingly flat organizational forms encourage communication and teamwork among staff members which is necessary for knowledge sharing (Wang et al., 2007). A study by Jeng and Dunk (2013) revealed that decentralized organizational structures support knowledge creation and positively influences the success of ERP systems.

No such study had been carried out in Kenya and this necessitated the inclusion of organizational structure as part of KM infrastructure in this research based on Gold et al. (2001) and the results of Organizational structure can therefore be said to play an important role in the early days of the ERP implementation process. The anticipated changes involving an ERP implementation should be aligned with the structure by understanding changes the system may bring about from an organizational perspective. It is important to ensure that the structural constraints of the implementation and the business’s strategic organizational plan are aligned (Françoise, Bourgault, & Pellerin, 2009)

## 3.0 Methodology

The study adopted a positivist approach because the goal of the research was to describe phenomena that one can only directly observe and objectively measure. Positivism advocates the application of the methods of the natural sciences to the study of social reality and beyond. The study adopted the descriptive and causal designs because the objective was to find out whether there existed an appropriate organizational structure to support KM infrastructure capability during the implementation of ERP systems in the organizations listed in the NSE.

The total population was three hundred and fifteen (315), comprising CEOs/general managers,

 

marketing managers, human resource managers, IT managers and finance managers each of the 63 companies listed in the NSE. Only one representative of the five categories was to be selected from each organization. Following on the determination by Gold et al. (2001), these categories were chosen because they are the ones that deal directly with KM infrastructural and process capability.

The study used simple random sampling to select 306 from 315 of TMT of listed firms in the NSE. The Taro Yamane's sample size selection formula for a finite population given as

$$n = \frac{315}{1 + 315 * 0.01^2} = 306$$

was applied (Umoren et al., 2009). Purposive sampling was used to select five top management team members from each firm.

### 3.1 Measuring organizational structure

Measuring structural infrastructure considers elements such as centralization and decentralization. This study focused on decentralization in organizations, which refers to the extent to which the decision-making authority is dispersed throughout the organization (Daft, 1986). The dispersion of power promotes spontaneity, experimentation, and freedom of expression. On the other hand, the concentration of authority hinders creativity among employees, which is critical for knowledge creation (Graham & Pizzo, 1996). In centralized organizations, communication can become a time consuming process hindering inter-departmental communication and idea sharing (Bennett & Gabriel, 1999). This leads to distortion of ideas and at the same time reduces the rate at which new ideas are created in an organization (Stonehouse & Pemberton, 1999). Decentralization is preferred to centralization in a knowledge-based environment because it promotes the moderation of the decision-making authority in knowledge based organization (Szulanski, 1996). Sharing and collaborating across boundaries within the organization and across the supply chain can be facilitated if the organizational structures are designed for flexibility (Gold et al., 2001). Lee and Choi (2003) developed a five-item measure of this construct and this was adopted by the researcher to measure the level of decentralization of the decision making authority in the organizations. These items of measure are listed in Table 3.1.

Table 3.1

*Items of Measure for Structural Infrastructure*

| Item Code | Item Wording |
|---|---|
| | **In my organization employees….** |
| STR1 | can take action without a supervisor |
| STR2 | are encouraged to make their own decisions |
| STR3 | do not need to refer to someone else |
| STR4 | do not need to ask their supervisor before action |
| SRT5 | can make decisions without approval |

The items of measure were adopted in order to test the degree of decentralization in organizations listed in the NSE.

Cronbach Alpha was used to assess the reliability of the data. The test also was used to determine the questions that would be dropped in order to enhance the reliability of the instrument. The test revealed that a number of items in the constructs were reduced as they brought down the alpha value to below the cut- off point of 0.7. This reduced the number of questions from 128 to 92.

In this study, convergent validity of constructs was investigated by examining the correlation coeficient between measures of the same constructs to find out whether they were measuring the same construct. Positive and significant correlations below 0.8 among pairs of item measures indicate converge validity. Three hundred and six (306) structured questionnaires were distributed to respondents by personal delivery. Permission to distribute the questionnaires in the targeted firms was sought from relevant officials in those firms.

In this study, all of these requirements were met. First, no risk or harm was involved in participating in the survey. Second, the respondents' participation was completely voluntary and they were also free to withdraw their consent or discontinue participation at any time during the process without any consequence. Moreover, any information provided by respondents was protected and kept strictly anonymous, confidential, and private.

### 3.2 Data Analysis

Exploratory data analysis was conducted to provide results about the general properties of the data collected. The IT support construct was refined by utilizing principal component analysis on the initial items comprising each construct. Each principal component analysis extracted factors, and factor loadings greater than 0.5 were retained for each principal component extracted (Hair et al., 2010). To assess the factorability of items, the researcher examined this indicator (i.e. Kaiser Meyer-Olin Measure of Sampling Adequacy). For every EFA, it

 

was found that manifest variable had a KMO Measures of Sampling Adequacy above 0.78, which is above the threshold of 0.6 (Kaiser, 1974). When applying EFA, the results showed a clear factor structure with an acceptable level of cross loadings.

SEM was applied to obtain the path coefficients of the final research model. Parameter estimates and their associated 95% confidence intervals were reported to provide point and interval estimations of the SEM estimate. A p-value of less than 0.05 was considered statistically significant for the structural path. SEM was performed using AMOS version 21.0 and the path coefficients between variables and their corresponding constructs and between constructs were interpreted in terms of magnitude, direction and significance. The results of the model were reported and relevant hypothesis accepted or rejected as appropriate depending on the path coefficient.

## 4.0 Results

The results indicated that overall, respondents disagreed that there existed a structural infrastructure in the organizations listed in the NSE (Agree and Strongly Agree STR1, 28%; STR2, 37%; STR3, 23%; STR4, 32% and STR5, 22%). This means that management structures in the organizations listed in the NSE are ridged and do not allow for flexibility in decision making. Control is concentrated at the senior managing level.

**Table 4.1**
**Summary Statistics of the Organizational Structure Construct**

| Organizational Structure | Strongly Disagree (%) | Disagree (%) | Neutral (%) | Agree (%) | Strongly Agree (%) | Mean | Std. Deviation |
|---|---|---|---|---|---|---|---|
| STR1 | 8 | 31 | 33 | 23 | 5 | 2.85 | 1.030 |
| STR2 | 7 | 24 | 32 | 30 | 7 | 3.06 | 1.062 |
| STR3 | 10 | 23 | 44 | 17 | 6 | 2.86 | 1.021 |
| STR4 | 12 | 25 | 31 | 24 | 8 | 2.90 | 1.139 |
| STR5 | 12 | 28 | 37 | 14 | 8 | 2.79 | 1.102 |

### 4.1 Reliability, Validity and Confirmatory Factor Analysis

The organizational structure construct was reviewed for reliability and convergent validity prior to SEM analysis. Organizational structure had a KMO measure of sampling adequacy of 0.905, which was above the threshold of 0.6. Exploratory factor analysis using PCA with promax rotation revealed that all the factor loadings were above the acceptable threshold of 0.5. Item total correlations measuring the internal consistency of the structure construct for the sub-scales STR1, STR2, STR3, STR4 and STR5 were 0.847, 0.790, 0.822, 0.867 and 0.804 respectively, which was above the 0.3 threshold. STR1, STR2, STR3, STR4 and STR5 were therefore maintained for measurement model estimation as they achieved the required thresholds for reliability and convergent validity. Additionally, the items of measure STR1, STR2, STR3, STR4 and STR5 had factor loadings of 0.905, 0.866, 0.888, 0.919 and 0.875 respectively, which accounted for 79.32% of the variability in organizational structure. A Cronbach's coefficient alpha of 0.934 for organizational structure indicated that the measuring scale was reliable.

The composite reliability value of the organizational structure construct exceeded the cut-off value of 0.7 and the values of average variance extracted (AVEs) was more than 0.5 (Bagozzi et al., 1991; Hair et al., 2010).

Confirmatory Factor Analysis (CFA) was performed on organizational structure as a dimension of KMIC in order to provide a confirmatory test of the measurement theory. When a CFA model exhibits goodness-of-fit and displays construct validity, the validity of the measurement theory is supported. This is the prerequisite for the structural theory testing, the second step in SEM (Hair et al., 2006). The fit statistics of the overall structural model were then assessed and the individual parameter estimates examined to test the hypothesized theoretical relationships. The results of the CFA for the organizational structure construct are also presented in Table 4.2

*Table 4.2 Summary for Organizational Structure construct*

| **First order constructs** | **Cronbach's alpha** | **Item** | **EFA** | | CFA | | |
|---|---|---|---|---|---|---|---|
| | | | **Item total correlation** | **KMO** | **PCA component loading** | **Standardized Regression Weights (λ)** | **T-values** |
| **Structure** | 0.934 | STR1 | 0.847 | 0.905 | 0.905 | **0.889** | **14.539** |
| | | STR3 | 0.822 | | 0.888 | **0.854** | **15.548** |
| | | STR4 | 0.867 | | 0.919 | **0.906** | **17.541** |
| | | STR5 | 0.804 | | 0.875 | **0.838** | **14.992** |
| Variance extracted | | | **79.32%** | | | | |
| Items deleted | | | **STR2** | | | | |
| Composite reliability | | | 0.935 | | | | |
| Average variance extracted (AVE) | | | **0.743** | | | | |

 

### 4.2 Testing of the Hypothesis

Organizational structure was found to have an insignificant relationship with KM infrastructure. The path coefficient was 0.005 with a t-value of 0.061 and a p-value of 0.952. In this regard, the researcher failed to reject the hypothesis **Ho** that there is no significant relationship between organizational structure and KM infrastruture capability. This is shown in Table 4.3.

Table 4.3:*Regression weights of IT support and KM infrastructure capabilityduring ERP implementation*

| | | | Standardized Estimate | Estimate | S.E. | T-value | P |
|---|---|---|---|---|---|---|---|
| STR | <--- | KMIC | 0.005 | 0.010 | 0.171 | 0.061 | 0.952 |

### 5.0 Discussion

The research found out that organizational structure is not considered a significant component of KM infrastructure in the companies listed in the NSE. Organization structure has a coefficient value of 0.005 with a p-value of 0.952 hence the study fails to reject the null hypothesis. This finding implies that organizational structure is not a statistically insignificant indicator of KM infrastructure capability in the companies listed in the NSE. These results contradict earlier studies which posited that sharing and collaborating across boundaries within the organization and across the supply chain can be facilitated if the organizational structures are designed for flexibility for example (Gold et al., 2001). The findings imply that most companies listed in the NSE in Kenya still practice silo behavior where individual divisions, units, or functional areas operate as silos or independent agents within the organization (Jones et al., 2006). Highly centralized, hierarchical structures tend to inhibit the type of knowledge sharing required for organizational learning during periods of extensive change (Jones & Price, 2001). Decentralised structures are said to support KM infrastructure and IT innovations through flexibility. In the case of the companies studied, the structures appear to be mechanistic and centralized. This finding contradicts assertions that a decentralized structure indicates the extent to which the decision-making authority is dispersed throughout the organization (Daft, 1986); and also contradicts the assertion that the dispersion of power promotes spontaneity, experimentation, and freedom of expression; the concentration of authority hinders creative solutions which can be critical for knowledge creation (Graham & Pizzo, 1996). Based on structural equation modeling results, organizational structural effect on KM infrastructure also contradicts the arguments of prior studies e.g. (Zheng et al., 2010, Liao et al., 2011).

### 5.1 Conclusion

This study leads to the conclusion that the organizational structures in the companies listed in the NSE are not flexible enough to enhance ERP implementation success. This poses a problem, as these organizations might not have the flexibility required for ERP implementations during which extensive knowledge exchange takes place between the consultants, the internal implementation team and the other employees in the organization.

### 5.2 Recommendations

Centralized organizations hinder inter-departmental communication and idea sharing. Our recommendation is that organizations should relax the concentration of the decision-making authority. This can be done by organizations increasingly moving towards decentralized structures, which provide the flexibility required for knowledge sharing in ERP implementation projects. Organizations should allow employees to interact freely and management should empower members of an implementation team to some basic decisions without necessarily having to refer to senior supervisors. This will improve on the speed of execution of key activities during implementation of projects such as ERP systems.

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