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Original Research

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Local Governments: Outcomes of Enterprise Resource Planning System on Organizational Productivity

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Abstract

Leaders within local government organizations do not understand how to achieve expected and desired benefits from the implementation of enterprise resource planning (ERP) systems. The lack of alignment between social and technical elements in ERP implementation continues to depress organizational productivity. The prime objective of our quantitative correlational study was to examine whether social and technical elements increase use and productivity in ERP implementation. Sociotechnical systems theory provided the theoretical basis for our study. We examined six dimensional variables relating to ERP implementation. Our key findings indicated positive significant relationships between ERP and information sharing, between ERP system quality and ease of ERP use, and between ERP system quality and organizational productivity. Further studies could examine other dimensions that could ensure ERP sustainability in other government organizations.

Keywords: *enterprise resource planning systems, organizational productivity, systems, applications, and products in data processing, sociotechnical systems theory, organizational alignment, Go-live information technology ERP post implementation.*

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Introduction and Background

The desire to meet stakeholder demands and increase productivity is compelling leaders of local government institutions to replace outdated technologies with enterprise resource planning (ERP) systems. Rosenbloom (2014) stated that there are more than 90,000 local governments in the United States, which include approximately 3,000 counties, 19,500 municipalities, 16,300 towns or townships, 38,250 special districts, and 12,900 school districts. Research on ERP implementation in the public sector is limited, although many local government institutions are implementing ERP systems with the goal of improving their business processes to better serve citizens. Coelho et al. (2016) examined how dynamic cooperation between a client and an external information technology (IT) consultant aided an ERP project launch in the state government of Minas, Brazil. Coelho et al. (2016) contended that enterprise systems empower and transform the ways citizens interact with their governments, yet there is a lack of research on ERP in public organizations. Our study examined the outcomes between ERP implementation and organizational productivity within local governments an under-researched area.

Although investments in enterprise applications are plausible, they are also cumbersome due to complexities in ERP system implementation. Goeun (2013) argued that not all ERP implementations are successful despite the systems' perceived ease of use and usefulness. The alignment of both the social and technical functionalities in an organization, as highlighted by sociotechnical systems (STS) theory, may be critical to increasing ERP successes. Our study examines the following attributes of the systems, applications, and products (SAP) in data-processing ERP system implementation in local government institutions; how system implementation fosters information sharing and cross-functional communication; how aligning STS factors in ERP implementation may increase efficiency and productivity; and the ease of use and usefulness of the system compared to a legacy IT system.

Advanced technology does not improve organizational productivity unless contributing factors, such as people, facilitate the implementation of the technology. STS theory highlights how the optimization of social and technical subsystems in organizations foster better alignment and a higher quality work life for employees (Bélanger et al., 2013). Organizational leaders often overlook the interaction among social and technical elements that may be inevitable in improving organizational productivity. Mayeh et al. (2016) posited that ERP users' acceptance of the technology is one of the salient factors when implementing an ERP system. Given the technical complexities involved in ERP implementation, some stakeholders may be skeptical about learning new processes without a prescribed strategy (Ramburn et al., 2013). Government administrators may use the findings of our study to make better use of their resources and avoid costly ERP failures. Our social impetus was to provide information that supports the assertion that ERP systems may increase organizational productivity to bridge the academic gap identified in the problem statement.

Statement of the Problem

Local government institution leaders still do not understand how to achieve the expected and desired benefits from the implementation of ERP. Stanciu and Tinca (2013) posited that 48% of ERP projects realized less than 50% of the expected benefits in 2010. The specific problem we addressed was that lack of alignment between social and technical elements when implementing ERP systems reduces organizational productivity. The lack of social and technical alignment makes it even more challenging for organizational leaders to direct people to support technology. Schoenherr et al. (2010) contended that the failure to address social and technical considerations during ERP implementation may not foster information sharing, knowledge, and organizational learning. We examined five dimension variables related to ERP implementation and STS theory, namely (1) cross-functional communication, (2) information sharing, (3) organizational efficiency, (4) ease of use, and (5) usefulness. The five dimension variables were tested to answer the research questions.

Our study differs from others on the same theme because it examines organizational productivity from the alignment of social and technical elements and adds to the existing body of knowledge about outcomes in ERP implementation.

Purpose of the Study

The purpose of our quantitative correlational study was to examine particular social and technical elements (independent variables) that may increase organizational productivity (dependent variable) in local government institutions during ERP implementations. Tian and Sean (2015) found that ERP can reduce a firm's risk in uncertain circumstances after ERP systems go live. We examined whether social factors may foster and support technical factors to increase productivity when implementing and using an ERP system. Our study was grounded in the STS theory by Trist and Bamforth (1951). Other researchers have discussed the notion that integrating the social and technical perspectives in ERP implementation helps to address complexities in people, processes, and technology. Sedmark and Longhurst (2010) noted that the end of an ERP implementation, which is the product launch, is merely an end of the beginning because problems of integration extend beyond technology launch. Our study helps fill the gap in scholarly research on ERP implementation within local government institutions.

Definition of Terms

Enterprise resource planning (ERP): ERP is business-integrated information system software that attracts the attention of business organization leaders to improve their business processes and achieve the company goals (Al-Ghamdi, 2013).

ERP post implementation: The post-implementation phase occurs when an institution implements an ERP system and begins normal operations (Morris & Venkatesh, 2010).

Go-live: Go-live "marks the beginning of the post-implementation stage where the organization comes to terms with the new system" (Maheshwari et al., 2010, p. 752) and adapts to using the new system.

Information technology (IT): IT involves the development, maintenance, and use of computer systems, software, and networks for processing and distribution of data (*Merriam Webster's Online Dictionary*, 2009).

Organizational alignment: Organizational alignment reflects management's effort to measure organizational performance and systems to ensure sustainability (Parisi, 2013).

Organizational productivity: Organizational productivity refers to the quantity of goods and services that a workforce produces in each time period to bring about economic growth, improvements in standard of living, and profit maximization (Oludele et al., 2016).

Sociotechnical systems (STS) theory: STS theory was introduced by Bamforth (Trist & Bamforth, 1951), Emery, and Trist (Emery & Trist, 1965) of the Tavistock Institute of Human Relations in London. The social system represents people and task performance, processes, roles, and management structures. The technical system represents data structures, software, technology design, and infrastructure.

User satisfaction: User satisfaction refers to a user's response to the use of the output of an ERP software application (Morris & Venkatesh, 2010).

Assumptions and Limitations

Because the identification of the five dimensions related to ERP and STS is extensive research and analysis of prior research, it was assumed that the dimensions were consistent with STS theory and with the migration from a legacy system to an ERP system. It was also assumed that most local government institutions would experience ERP challenges if senior management failed to address specific STS factors. Additional assumptions about the study included the following:

1. Stakeholders would collaborate to ensure a seamless implementation because new applications require support from every member of the team.
2. Survey participants would be willing to provide honest and complete responses and would examine the effects of ERP on organizational productivity.

Our study included government institutions in the United States, which limited the generalizability of the findings to private and other government institutions that do not share a similar organizational culture. A potential risk of obtaining biased responses exists when using a survey instrument to collect information from stakeholders online. To minimize that risk, the respondents were asked probing and direct questions. The five dimensions measured in our study were not in the same order as used in the SAP ERP implementations prescribed by previous researchers, but this did not limit the dimensions' applicability.

Literature Review

ERP systems are a type of business software that may improve an institution's business processes with proper implementation. Tambovcevs (2012) noted that ERP systems evolved in the early 1960s as a type of inventory control and material requirement planning software used to account for customer orders, purchases, production, and the management of supply chains. Material requirement planning's inability to coordinate processes and integrate functional units and subsystems forced organizational leaders to design ERPs. Due to the complexity inherent in ERP implementation, several companies continue to encounter challenges (Seo, 2013), while others do not realize the benefits after implementing ERP systems. The challenges may be a reason for the high implementation failure rates of the systems within organizations. FoxMeyer lost $100 million and filed for bankruptcy as a result of an ERP implementation failure (Lyytinen & Newman, 2015). Stakeholders in organizations may resist the implementation of the systems or may not fully collaborate toward the smooth functioning of the system if they feel pressured by ERP-initiated changes.

Sociotechnical Alignment in ERP Implementation

An alignment of the system and the business and social requirements may improve ERP performance as highlighted in STS theory. Pishdad and Haider (2013) argued that, compared with the implementation of small technologies, ERP implementation causes significant changes with broader effects on technology, people, and the organization. Government administrators may be in a better position to monitor the implementation process and realize increasing efficiency and productivity if they view ERP systems through a sociotechnical prism. Matende and Ogao (2013) defined "people" in the ERP context as key users who participate in the system development and implementation and argued that human resource and management issues should be at the center of technology. ERP systems are a coveted undertaking in organizations where too many factors are at play during system implementations. User involvement enables users to stay engaged and positive while minimizing the potential to resist system-initiated challenges.

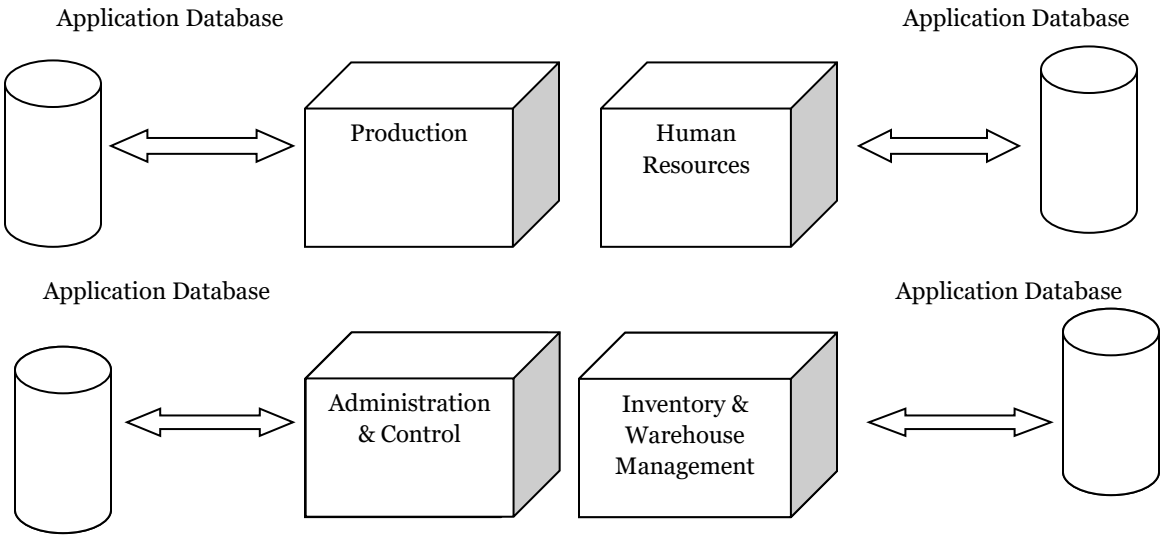
Business Process Reengineering and ERP

Business process reengineering (BPR) is an enterprise-wide effort to transform an organization in new ways that increase efficiency and productivity. Pishdad et al. (2013) maintained that ERP capabilities enable organizational leaders to reengineer key business processes and develop new ones to support business operations. Like BPR, ERP is an effort to redesign business operations. The difference is that ERP is a technology-centric system with more user flexibility to process and access data in real time for quick decision making. The concept of BPR led organizational leaders to develop enterprise software systems (Özkarabacaka et al., 2014) that could affect positive organization-wide changes. Both BPR and ERP foster active user interaction in improving cross-functional communication and streamlining the length of time it may take to process business transactions between departments. Our study examines how ERP goes beyond the objective of BPR in increasing organizational efficiency and productivity.

Technological Change in Organizations

The leaders of most organizations are replacing legacy information systems with enterprise systems. Lyytinen and Newman (2015) opined that legacy systems lack the integrated functionality to provide a cradle-to-grave design for the different functional areas in the organization. ERP systems are often preferable because they synchronize information between different functional units in the implementing organization, unlike legacy systems that operate in silos. Figure 1 shows an example of a legacy system with stand-alone applications and databases. The absence of collaborative features in legacy systems prompts senior management to advocate for integrated systems.

Figure 1. *Stand-Alone Legacy System Architecture*

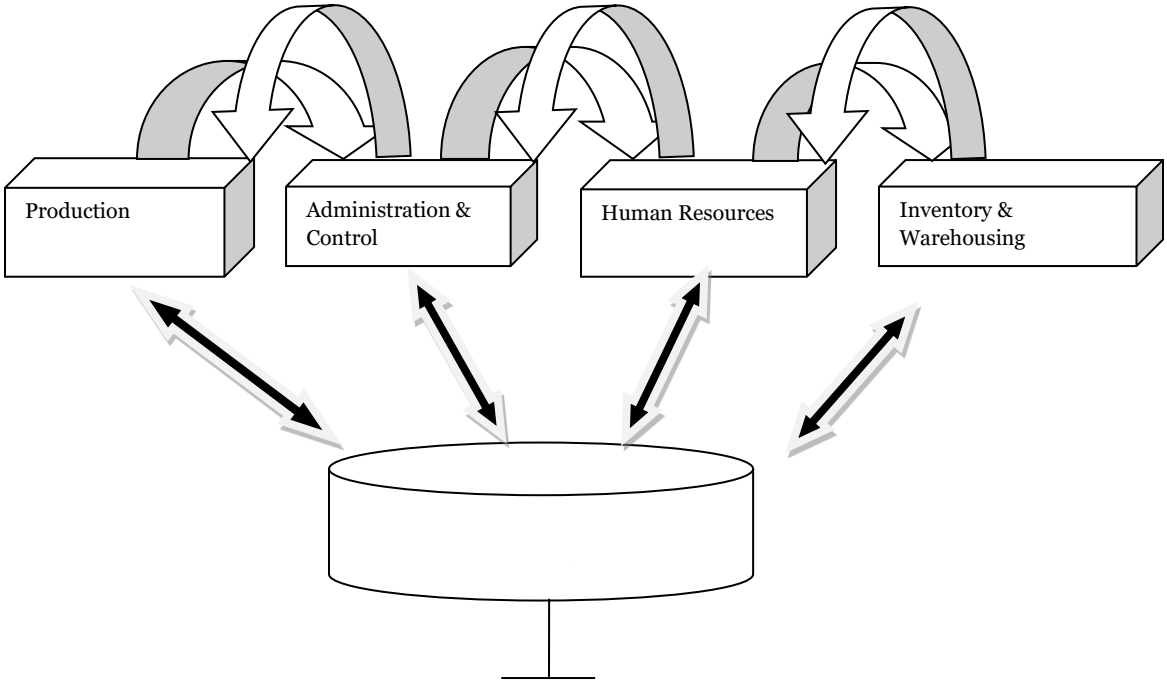


Note: From Loh, T. C., & Loh, S. C. (2004). Critical elements for a successful enterprise resource planning implementation in small and medium sized enterprises. *International Journal of Production Research*, *42*, 3434. Copyright 2004 by Emerald Group. Adapted with permission.

Developing a unifying technological system constitutes a push for technology change in organizations. Hakemi et al. (2014) concurred that migrating legacy systems to new environments improves an organization's IT infrastructure. The implementation of these systems highlights improvements in organizational business processes. Tarhini et al. (2015) maintained that ERP provides organizations with an integrated software application and a unifying database to collaborate, share data, and streamline processes in key functional

departments, such as supply chain, procurement, human resources, and payroll administration. Figure 2 shows how the ERP system can integrate and share information with the different functional areas of an organization in real time. The ability of ERP systems to foster collaboration between functional areas expedites decision making and increases efficiency, which is appealing to organizational leaders.

Figure 2. *The Integrated Nature of an ERP System*.



Note: From Loh, T. C., & Loh, S. C. (2004). Critical elements for a successful enterprise resource planning implementation in small and medium sized enterprises. *International Journal of Production Research*, *42*, 3434. Copyright 2004 by Emerald Group. Adapted with permission.

Organizational Development and ERP

Organizations have successfully implemented ERP systems. Cisco tremendously cut costs and experienced a substantial increase in revenues while Chevron Texaco improved its supply chain and achieved an annual profit of $100 million (Shatat, 2015, p. 39). ERP systems have become an infrastructural landscape that support day-to-day operations of organizations. The systems are effective for knowledge sharing and improving decision making because of their ability to integrate other systems and processing real-time data. Özkarabacaka et al. (2014) posited that business areas, such as finance, human resources, procurement, manufacturing, and logistics, use ERPs to automate core processes across the enterprise to facilitate service delivery. For this reason, our study examined how ERPs may improve productivity in local government institutions.

Methodology

Research Design

The quantitative design in our study involved using a questionnaire to collect answers to research questions from participants and testing how study variables correlated with one another to determine the relationship

between ERP and organizational productivity. The objective approach was used because it is synonymous with post-positivist inquiry that involves testing hypotheses with well-established methods from empirical sciences (Lenzholzer & Brown, 2016). The qualitative method was not suitable for us because our study involved gathering direct evidence from participants rather than their subjective opinions.

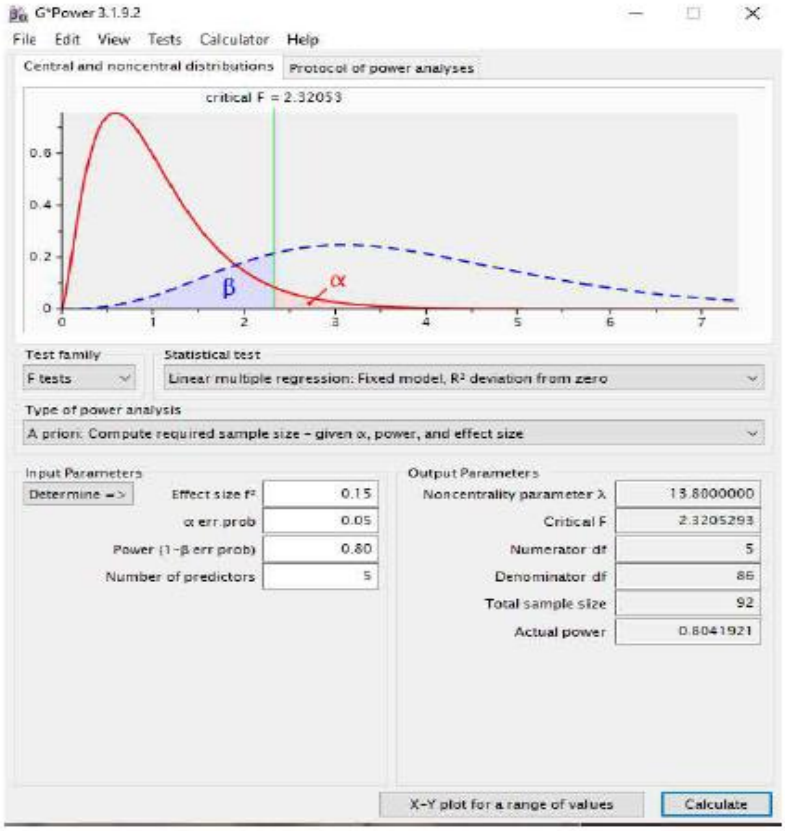
The use of technology, such as Survey Monkey and Quest Mindshare, to access sampled SAP users in local government institutions aligned with modern research procedures. Kılınç and Fırat (2017) posited that conducting online surveys has advantages, such as facilitating data processing, quicker data collection from more participants, reduced data loss, increased voluntary participation, and the ability to conduct research on sensitive and confidential matters. The information gathered from study participants online was to determine whether the variables under study increased organizational productivity.

Sampling Methods and Procedures

The strategy was to define the target audience and solicit responses from SAP users in local government institutions who understood the social and technical aspects of ERP implementation. Using the Survey Monkey platform and Quest Mindshare was suitable for implementing a nonprobability sampling procedure. Nonprobability sampling does not give all members of a population a chance of being in the sample, but professional online panels often provide results that rarely differ from the corresponding benchmarks (Callegaro et al., 2014). Study participants included individuals who met the following criteria: (a) were 18 years of age or older, (b) performed work for a local government institution on a full- or part-time basis or as consultants for a minimum of 1 year, (c) were either managerial staff or subordinate staff, and (d) were using SAP.

The mix of participants was appropriate given that managers and subordinate employees use legacy systems extensively and may notice if SAP has any effect on the daily performance of their work. Sample size usually includes the alpha function, effect size, statistical power, variability of the population, confidence level, and margin of error or precision level a researcher is willing to accept. The G*power 3.1.9.2 software tool was used to calculate sample size for the Spearman rho correlation. The a priori option was selected and a medium effect size alpha of .15, a margin of error of .05, and an increased power of .80 to reach a sample size of 92 participants (see Figure 3). Every individual listed as an SAP user in Quest Mindshare was sent a link to an anonymous survey. Potential participants were informed that participation would be voluntary, and authorization to quit the survey at any time was not necessary.

Figure 3. *G*power calculation*



Instrumentation

Our research included the use of a Likert-type scale survey instrument to obtain responses from participants. The survey involved closed-ended multiple-choice questionnaires to solicit evidence from participants and answer the research questions. All possible answer choices to the questions were included to ensure that higher numbers in the Likert-type scale structure (i.e., *strongly agree, moderately agree, slightly agree, neither agree nor disagree, slightly disagree, moderately disagree,* and *strongly disagree*) represented a more favorable response, as suggested by Simon and Goes (2013). Obvious answers to the questions were eliminated, and difficult or sensitive questions appeared near the end of the survey so that if participants quit at any point, earlier responses were still beneficial. The survey scale items are adaptations from previous studies on organizational relationships in IT with established reliability and validity. The dimension variables were cross-functional communication, organizational exchange of information, perceived usefulness, perceived ease of use, and organizational efficiency.

Our study involved measuring each dimension variable separately. For example, Hypothesis 1 was suitable for examining the significance of ERP and cross-functional communication. The developers of the cross-functional communication survey scale were Roberts and O'Reilly (1974), the developers of the perceived usefulness survey were Davis and Venkatesh (1996), the developers of the perceived ease-of-use survey were Venkatesh and Davis (2000), and the developers of the organizational efficiency survey were Karr-Wisniewski and Lu (2010). The developers of these instruments attempted to determine whether cross-functional communication, information sharing, ease of use, and usefulness positively affect an organization in large-scale IT-system implementations. The instruments were appropriate to determine whether productivity

increased in the organization if employees communicate better, share information, find the system easy to use, and use the system efficiently. The outcome of our study can be generalized to other local government institutions in the United States because of the composition of participants.

Data Collection and Analysis

Electronic surveys were administered to respondents to understand the outcome of ERP in local government institutions. Participants received the surveys electronically in Quest Mindshare and responded at their convenience. The use of electronic surveys precluded disrupting participants' normal operations. The instruments included closed-ended questions from a Likert-type scale survey to rate participants' responses from *strongly agree* to *strongly disagree,* as suggested by Srivastava and Hopwood (2009). The design of the survey was simple to avoid any difficulties in interpretation. The rationale for a closed-ended questionnaire was to prevent or reduce irrelevant responses, as the questionnaire consisted of STS dimensions and their scale descriptions, as shown in Table 1 below.

Table 1. *Factors of the Electronic Survey*

Factor	Description
Cross-functional communication	Organizational communication scale
Information sharing	Exchange of information scale
ERP usefulness	Perceive of usefulness scale
Ease of use	Ease-of-use scale
ERP adoption	Organizational efficiency scale

After data collection, we entered the information into Statistics Solutions Pro Version 1.14.12.16 and analyzed it using a series of Spearman's rho correlations to determine if a statistically significant relationship existed between the dimension variables and ERP productivity. Wilcoxon matched pairs tests were also used to address the research questions and hypotheses. Wilcoxon tests were more appropriate than the more common paired *t*-tests due to the ordinal nature of the rating scale (1 = *much better with legacy*, 2 = *somewhat better with legacy*, 3 = *legacy and ERP are the same quality*, 4 = *ERP somewhat better*, 5 = *ERP much better*). Significant Wilcoxon tests lend support to the idea that the ERP application has higher quality in increasing organizational productivity. The analysis involved comparing respondents' rating for each dimension (cross-functional communication, information sharing, etc.) against a standard of 3 for the 5-point Likert-type scales and 4 for the 7-point Likert-type scale (legacy and ERP are the same quality). The dimension variables were measured as hypotheses. For example, Hypothesis 1 indicated the significance of an ERP application in creating organizational alignment that improves cross-functional communication and information sharing in comparison with a legacy application. Hypothesis 2 indicated the relationship between ERP system quality and ease of use and usefulness by stakeholders. Hypothesis 3 indicated the relationship between ERP adoption and organizational efficiency in comparison with a legacy system. As a supplemental exploratory analysis, the five ERP dimensions (cross-functional communication, information sharing, organizational efficiency, ease of ERP use, and ERP usefulness) were aggregated into an overall ERP quality scale. The new scale served as the dependent or criterion variable in a multiple regression model with the independent or predictor variables being the respondent's demographic characteristics, such as age, education, job function, and professional level. The hypotheses related to each question were as follows:

Research Question 1: Compared to the previous legacy application, how significant is an ERP application in creating organizational alignment that improves cross-functional communication and information sharing?

$H1_o$: Compared with the previous legacy application, an ERP application does not significantly and positively create organizational alignment that results in improved cross-functional communication.

$H1_a$: Compared with the previous legacy application, an ERP application significantly and positively creates organizational alignment that results in improved cross-functional communication.

$H2_o$: Compared with the previous legacy application, an ERP application does not significantly and positively create organizational alignment that improves information sharing.

$H2_a$: Compared with the previous legacy application, an ERP application significantly and positively creates organizational alignment that improves information sharing.

Research Question 2: Compared with the previous legacy system how significantly does ERP system quality foster ease of use, usefulness, and organizational productivity?

$H3_o$: There is no statistically significant relationship between ERP system quality and ease of use.

$H3_a$: There is a statistically significant relationship between ERP system quality and ease of use.

$H4_o$: There is no statistically significant relationship between ERP system quality and ERP usefulness.

$H4_a$: There is a statistically significant relationship between ERP system quality and ERP usefulness.

$H5_o$: There is no statistically significant relationship between ERP system quality and organizational productivity.

$H5_a$: There is a statistically significant relationship between ERP system quality and organizational productivity.

Research Question 3: Compared with the previous legacy application, what is the relationship, if any, between ERP adoption and organizational efficiency?

$H6_o$: Compared with the previous legacy application, there is no statistically significant relationship between ERP adoption and organizational efficiency.

$H6_a$: Compared with the previous legacy application, there is a statistically significant relationship between ERP adoption and organizational efficiency.

Reliability and Validity

We used instruments that previous researchers had addressed reliability concerns with a high Cronbach alpha score. Reliability requires a measurement instrument that provides the same results repeatedly (Clow & James, 2014). The need did not exist to test the survey instruments again. Coghlan and Brydon-Miller (2014) maintained that validity is where research adequately depicts what it was intended to measure. For our study to be consistent with internal validity, adequate information needed to show that a relationship exists between ERP SAP and organizational productivity, and it was necessary to rule out the possibilities of extraneous variables. Similarly, external validity provides the ability to generalize the findings to the entire population under study, based on the sample, or to another local government agency whose leaders deployed a large-scale enterprise IT system with similar characteristics. The data analysis showed that three of the dimension variables had a strong correlation. The participants met all the criteria to participate in the study, such as age, end-users of SAP in a local government institution, and were either a managerial staff or a subordinate staff.

Findings

Evaluation of Research Data

Our study involved measuring each dimension variable separately. Wilcoxon matched pairs tests were used to address the research questions and hypotheses. Table 2 displays the Wilcoxon matched pairs test comparing the mean rating (M = 2.87) with the test standard (3 = *legacy and ERP are the same quality*) to test $H10$, cross-functional communication. The Wilcoxon statistic was not significant, $z(60) = 0.93$, $p = .35$. This finding provided support to retain $H10$.

The Wilcoxon matched pairs test comparing the mean rating (M = 5.64) with the test standard (4 = *neither agree nor disagree*) to test *H20,* information sharing was significant, $z(60) = 6.07$, $p = .001$. This finding provided support to reject $H20$.

Table 2. *Wilcoxon Matched Pairs Statistics to Test the Hypotheses (*N = *61)*

Variable and rating	*M*	SD	z	*p*
24. Improved cross-functional communication			0.93	.350
Mean rating	2.87	1.07		
Test standard[a]	3.00	0.00		
11. Information sharing			6.07	.001
Mean rating	5.64	1.17		
Test standard[b]	4.00	0.00		
17. Ease of use			6.06	.001
Mean rating	5.61	1.20		
Test standard[b]	4.00	0.00		
25. ERP usefulness			0.20	.840
Mean rating	3.02	1.13		
Test standard[a]	3.00	0.00		
13. Organizational productivity			6.57	.001
Mean rating	5.89	0.93		
Test standard[b]	4.00	0.00		
26. Organizational efficiency			0.14	.890
Mean rating	2.98	1.10		
Test standard[a]	3.00	0.00		

Note: [a]Test standard rating: 3 = *Legacy and ERP are the same quality.*

[b]Test standard rating: 4 = *Neither agree nor disagree.*

The Wilcoxon matched pairs test comparing the mean rating (M = 5.61) with the test standard (4 = *neither agree nor disagree*) to test $H3_0$, ERP ease of use was significant, $z(60) = 6.06$, $p = .001$. This finding provided support to reject $H3_0$.

The Wilcoxon matched pairs test comparing the mean rating (M = 3.02) with the test standard (3 = *legacy and ERP are the same quality*) to test $H4_0$, ERP usefulness was not significant, $z(60) = 0.20$, $p = .84$. This

finding provided support to retain $H4_0$. The Wilcoxon matched pairs test comparing the mean rating (M = 5.89) with the test standard (4 = *neither agree nor disagree*) to test $H5_0$, organizational productivity was significant, $z(60) = 6.57$, $p = .001$. This finding provided support to reject $H5_0$.

Table 3 displays the Spearman correlations for ERP adoption with 12 selected variables to test $H6_0$. Out of the 12 Spearman correlations performed, only one was statistically significant. The written communication percentage was negatively correlated with ERP adoption ($rs = -.36$, $p = .005$). These findings provided limited support to reject $H6_0$.

Table 3. *Spearman Correlations for Select Variable and ERP Adoption*

Variable	ERP adoption
4a. Written communication percentage	-.36*
4b. Face-to-face communication percentage	.18
4c. Telephone communication percentage	-.05
27. Which of the following best describe your role in this organization?	.05
28. What is the highest level of education you have completed?	-.04
29. How long have you worked in this organization?	-.08
30. How long have you been using SAP in this organization?	.00
31. Indicate your frequency percentage of working with SAP in this organization?	.07
32. Are you performing similar task responsibilities with SAP as the prior legacy application?	-.12
33. If you responded yes to the previous question, how long were you performing similar task responsibilities on the non-SAP system (legacy) prior to SAP implementation?	-.15
34. What is your age?	.06
35. What is your gender?[a]	.00

Note: *$p < .005$
[a]Gender: 1 = *male* 2 = *female*.

Analysis of Relevant Research Data

Interpretation of Research Questions

Respondents were ERP users in local government institutions. Demographic data were collected from participants to understand whether qualities and characteristics, such as age, gender, and education, influenced participants' responses and the relationship between ERP adoption and organizational efficiency. The findings provided no correlation between respondent demographics and ERP adoption. To conduct the study, research questions were designed and transformed into statistical hypotheses for testing. An alternative hypothesis reflects the outcome expected and is the opposite of the null hypothesis. The null hypothesis could be rejected only when the p value was lower than the significance value of .05.

Of the six alternative hypotheses in this study, three were supported and three were not supported. The first hypothesis supported was Hypothesis 2, which addressed ERPs' ability to create organizational alignment that improves information sharing significantly and positively. This result was consistent with Tambovcevs' (2012) finding that because ERP systems have the capability to synchronize all information systems in an

organization, communication and information sharing will improve. Sharing information in the organization is helpful to keep stakeholders abreast of changes and to reduce miscommunication. Tarhini et al. (2015) maintained that ERP provides organizational leaders with an integrated software application and a unifying database to collaborate, share data, and streamline processes in key functional departments. Also supported was Hypothesis 3, which addressed the significance of ERP system quality in fostering ease of use. The results of the study were consistent with those of Youngberg et al. (2009) that users' acceptance in using the ERP system is critical because, without acceptance and the ease of using the system, the full potential of ERP will not be realized. Hypothesis 5, which addressed the significance of ERP system quality in fostering organizational productivity, was supported.

The first hypothesis not supported was Hypothesis 1, which addressed the significance of ERP applications in creating organizational alignment that improves cross-functional communication. This result contrasted to the finding of Mbohwa and Madanhire (2016) that leaders can accomplish operational efficiency in the organization with an ERP by improving effective communication among departments. Another hypothesis not supported was Hypothesis 4, which addressed the significance of ERP system quality in fostering ERP usefulness, although Venkatesh et al. (2000) argued that using a system would enhance a person's job performance. Hypothesis 6, which addressed the relationship between ERP adoption and organizational efficiency, was not supported. This finding contrasted to those of Joshi et al. (2007), which indicated that because information system development often requires constant communication and negotiation, the desired form of communication, such as emails, face-to-face meetings, and verbal and nonverbal gestures, will generate a more gratifying relationship among the related parties and foster the transfer of knowledge.

Summary

Our objective in this study was to add to the growing body of knowledge on the combined efforts of people, processes, and technology to improve productivity in ERP implementation and use. Our focus was on local government institutions because previous studies had not addressed ERP challenges in the public sector. The general problem is that leaders of local government institutions do not understand how to achieve the expected and desired benefits from ERP implementation. Our purpose was to examine particular social and technical variables that may increase productivity in ERP implementation and use. ERP systems are process centered (Haddara & Moen, 2017) and can synchronize other subsystems, but they are more resourceful to harness optimal potential and functionality with social capabilities. Social capabilities involve human attributes that are often overlooked in large IT projects but have evolved into an important theoretical lens. Haddara and Moen (2017) contended that, after implementing an ERP system, organizational leaders experience social and technological changes that may cause resistance in users using the system. User participation and use of the system are critical to ERP adoption and success (Mayeh et al., 2016; Sternad & Bobek, 2013), which is why STS theory was used as the theoretical framework in our study. We collected demographic data from participants to answer the research questions. Our findings demonstrated a positive significant relationship between ERP and information sharing, positive significant relationship between ERP system quality and ease of use, and positive significance relationship between ERP system quality and productivity.

Implications for Social Change

Our study contains several contributions for academics and practitioners who are interested in understanding the outcomes of ERP systems on organizational productivity. Prior research has focused on ERP implementations in the private sector and not on a combination of state, county, municipal, or city governments. Our study revealed an opportunity for local government administrators to understand other aspects of ERP relating to system optimization and performance and not costs. We found different dimensions for improving people and technical challenges in organizations during and after large-scale IT systems implementation. Such dimensions include, but are not limited to, user involvement, information sharing, cross-functional communication, stakeholder satisfaction, ease of use, and product efficacy. A significant positive correlation emerged among ERP systems and information sharing, ease of use, and organizational productivity. The implication for positive social change includes providing information for technology managers and chief information officers to minimize high rates of ERP project failures (Stanciu & Tinca, 2013) and to ensure ERP sustainability.

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