ARCHIVAL ANALYSIS OF ENTERPRISE RESOURCE PLANNING SYSTEMS: THE CURRENT STATE AND FUTURE DIRECTIONS

Research-in-Progress

Rebekah Eden  
Queensland University of Technology,  
Brisbane, Australia  
RG.Eden@qut.edu.au

Darshana Sedera  
Queensland University of Technology,  
Brisbane, Australia  
d.sedera@qut.edu.au

Felix Ter Chian Tan  
The Australian School of Business,  
University of New South Wales,  
Australia  
f.tan@unsw.edu.au

Abstract

Research on Enterprise Resource Planning (ERP) Systems is becoming a well-established research theme in Information Systems (IS) research. Enterprise Resource Planning Systems, given its unique differentiations with other IS applications, have provided an interesting backdrop to test and re-test some of the key and fundamental concepts in IS. While some researchers have tested well-established concepts of technology acceptance, system usage and system success in the context of ERP Systems, others have researched how new paradigms like cloud computing and social media integrate with ERP Systems. Moreover, ERP Systems provided the context for cross disciplinary research such as knowledge management, project management and business process management research. Almost after two-decades since its inception in IS research, this paper provides a critique of 198 papers published on ERP Systems since 2006-2012. We observe patterns on ES research, provide comparisons to past studies and provide future research directions.

Keywords: Enterprise Resource Planning Systems, ERP, ES, archival analysis
Introduction

Enterprise Resource Planning (ERP) Systems are a widely researched topic within the Information Systems (IS) discipline. In 2000, scholars Esteves and Pastor completed an archival analysis\(^1\) of Enterprise Resource Planning (ERP) Systems research, published in the journal of Communications of the Association for Information Systems (CAIS). The objective of the authors was to establish “an annotated bibliography of the ERP publications published in the main Information Systems conferences and journals and to review the state of art in this area” (Esteves and Pastor 2001, p1). In the study, the authors categorized journal articles according to the lifecycle phases of ERP Systems and further studied the articles within granular topics of interest. Six years later in 2006, using the same classification system and analytical approach, Esteves and Bohorquez produced an updated annotated bibliography (Esteves and Bohorquez 2007), focusing on the period 2001-2005. For this, the scholars eliminated incongruities in the first paper and added a “significant number of new publications in all the categories” (Esteves and Bohorquez 2007, p1). Building on Esteves and Pastor and in the spirit of building cumulative knowledge on ERP Systems we build an archival analysis of ERP Systems studies from 2006-2012 to comment on the current state of ERP Systems studies and to direct future research on this important phenomena.

This study is timely, not simply due to years elapsed since the last published archival analysis on ERP Systems. But, such an archival analysis will lead researchers and practitioners to understand the current status and future directions of a complex system. Contemporary organizations continue to devote substantial resources to acquire, maintain and upgrade ERP systems, yet with some degree of uncertainty of the benefits. In contributing to the conjectural discussion of the evolution of ERP Systems as a domain, it could be revealing to understand the future of ES research, and also to seek to answer why scholars rarely move beyond the established tracks of research.

For the novice ERP Systems researcher, our analysis provides a summary of published research areas and identifies gaps to develop their study focus. For established researchers, the archival analysis captures insights on areas of research that have reached theoretical saturation. In conducting the archival analysis, our overarching research questions are: “What are the trends and patterns of ERP Systems research established between 2006-2012?” “What areas and topics must be researched to develop a better understanding of ERP systems phenomena?” To address the above questions, our approach consists of three prongs: consult an exhaustive list of ERP systems literature to trace the top researched areas, organized through the widely adopted ERP Systems performance lifecycle (c.f. Ross et al. 2003) \(^2\) within identified areas of interest (later identified as implementation), conduct an extended analysis of the nature of research and (3) identify topics that stagger through a periodic analysis from 2006-2012. Therefore, our study seeks to extend the work of Esteves and co. in at least these three ways.

Archival Method

We perform an archival analysis on ERP Systems published in the top Information Systems (IS) journals from the years 2006 to 2012. As earlier mentioned, this study is underpinned by published annotated bibliographies by Esteves and Pastor (2001) and Esteves and Bohorquez (2007). It extends the past work by analyzing a different time period (2006-2012), (2) consolidating its nature; we examine for a body of literature, the stakeholders perspective sought, the country the research originated in and the mode of analysis utilized and, (3) comparing across three analysis 2001, 2007 and now 2012.

This archival analysis is both a continuation and an extension of work performed by Esteves and Bohorquez (2007) hence the same journals were used in the analysis, with the exception of the exclusion of the Data Base Journal and the addition of the Journal of the Association of Information Systems (JAIS)

---

\(^1\) We employ Klaus et al. (2000) definition of ERP systems as “comprehensive, packaged software solutions that seek to integrate the complete range of a businesses process’s and functions in order to present a holistic view of the business from a single information and IT architecture” (Klaus et al. 2000).

\(^2\) An archival analysis extends the concepts of a literature review by identifying the patterns of literature, possible future trends and identifying gaps for studies to focus in future research.
which has been included as it has been identified in the AIS Senior Scholars’ Basket. To retrieve the articles from the aforementioned sources a search was performed for articles that contain but are not limited to the following terms in the title, abstract or keywords: ERP, ES, enterprise-wide systems, packaged software, and several ERP vendors: SAP, Oracle, Baan, JD Edwards, Microsoft Dynamics and PeopleSoft. Each of the articles returned by the search was read in full and the relevance of the articles was determined. Irrelevant articles were discarded and relevant articles were classified according to an extension of the classification scheme performed by Esteves and Bohorquez (2007). Appendix 1 depicts the articles read. Although several ERP vendors were used in the search string it is not the authors’ intention to determine which software vendor most of the research has been performed about, the intent is to uncover the topics and trends that have been discussed in the ERP systems literature. The inclusion of the software vendors was to ensure that relevant articles were not left out simply because they did not specify ERP but specified the vendor name.

When determining the classification method to be used in this archival analysis the important consideration was consistency with the past work performed by Esteves and Co in 2001 and 2007 to allow for comparisons to be made. Hence to perform a cross comparison analysis, the same classification framework was used. Esteves and Co’s framework was based on the enterprise systems lifecycle that was developed by Esteves and Pastor in 1999 which consists of 6 phases (1999). Several other enterprise systems lifecycle have been developed since then such as Markus and Tanis lifecycle developed in 2000 (Markus and Tanis) which consisted of four phases or the lifecycle by Somers and Nelson in 2004 which consisted of 6 phases. The enterprise systems lifecycle developed by Esteves and Pastor (1999) consists of 6 phases: adoption decision, acquisition, implementation, use and maintenance, evolution and retirement. The adoption decision phase consists of the decision of the organization to implement an ERP system. Once an organization has decided to adopt an ERP system the vendor needs to be selected, this is known as the acquisition phase. After vendor selection the implementation process commences, which is the configuration and customization of the system. After the system has been implemented, the lifecycle focuses on the use and maintenance of the ERP system with the objective of maximizing the benefits. Evolution phase focuses on the integration of new and existing technology to achieve greater benefits. The enterprise system lifecycle concludes with the retirement phase, which is when the organization decides to abandon the ERP system (Esteves and Pastor 1999).

We argue that the use of Esteves and Pastor’s model is necessary for cross comparison as its phases are distinct from the other lifecycles mentioned. The four phases in Markus and Tanis lifecycle are project chartering, configuration and rollout, shake down and onwards and upwards are apparent in Esteves and Pastors lifecycle with the main distinction being that Esteves and Pastors segments the adoption decision and system selection into two steps, whereas Markus and Tanis combine them into the project chartering phase of their lifecycle. Furthermore neither Markus and Tanis’s model or the Somers and Nelson’s model addresses the retirement phase of the ERP system. Therefore to allow a more meaningful cross comparison that consists of distinct phases Esteves and Pastor’s lifecycle model was decided upon.

Furthermore, in the classification scheme used by Esteves and Pastor, they accounted for topics that did not fit into the ERP systems lifecycle and classified them into educational or general topics. As part of the classification scheme used by Esteves and Pastor they segmented the lifecycle phases into a number of subtopics. The adoption decision consisted of adoption impact, adoption approach, challengers and enablers. Acquisition phase consisted of acquisition approach, and acquisition evaluation. Implementation was segmented into: implementation approach, success or failure, organizational issues, knowledge management issues and all other issues. Usage consisted of use benefits and success and

---

maintenance subtopics. Evolution consisted of emerging technologies and integration issues. Due to the lack of research performed in the Retirement phase it was not segmented into different categories. General topics is perhaps the most broad topic covered and is separated into general research, business modeling and ERP product development issues. Education has been segmented into usage, ERP courses, and the Information Systems curricula. The same segmentation of categories has been used in this archival analysis as it provides more meaning to the data obtained.

**Analysis, Findings and Discussion**

This section summarizes the results of the archival analysis of ERP systems literature from 2006 to 2012. A total of 198 relevant articles were analysed (refer to table 1). To identify research trends we compare our results to the results obtained from Esteves and Pastor (2001) and Esteves and Bohorquez (2007). A granular analysis of the topics will ensue, followed by a periodic analysis.

<table>
<thead>
<tr>
<th>Journal</th>
<th>Total Retrieved</th>
<th>Total Eliminated</th>
<th>Total Relevant</th>
<th>Journal</th>
<th>Total Retrieved</th>
<th>Total Eliminated</th>
<th>Total Relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMR</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>ISM</td>
<td>11</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>BPMJ</td>
<td>40</td>
<td>2</td>
<td>38</td>
<td>ISR</td>
<td>16</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>CACM</td>
<td>10</td>
<td>1</td>
<td>9</td>
<td>JAIS</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>CAIS</td>
<td>12</td>
<td>0</td>
<td>12</td>
<td>JGIM</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>DS</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>JIT</td>
<td>19</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>DSS</td>
<td>19</td>
<td>5</td>
<td>14</td>
<td>JMIS</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>EJIS</td>
<td>14</td>
<td>2</td>
<td>12</td>
<td>JSIS</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>HBR</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>MISQ</td>
<td>9</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>IEEEEC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>OM</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IM</td>
<td>22</td>
<td>0</td>
<td>22</td>
<td>OS</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>ISF</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>SMR</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>ISJ</td>
<td>17</td>
<td>2</td>
<td>15</td>
<td>Total</td>
<td>225</td>
<td>27</td>
<td>198</td>
</tr>
</tbody>
</table>

**Across Lifecycle Analysis: An Account of Popular Topics**

In figure 1, we highlight the results obtained from surveying the relevant articles from 2006 to 2012 and subsequently categorizing them in accordance to the enterprise systems lifecycle phases, general research topics and education. Preliminary observations in figure 1 shows that the major ERP topic studied was implementation followed by usage and maintenance. Retirement was the least study phase in the ERP lifecycle and education related to ERP was the second lowest research area.

The adoption phase of the lifecycle focuses on the impact, approach, challenges and enablers for deciding whether an ERP system is necessary for the organization (Esteves and Pastor 1999). The main topics include: explorations of factors that influence adoption decisions (Chang et al. 2010; Wang and Ramiller 2009), the adoption process (Poba-Nzaou et al. 2008), and risk management during adoption in SMEs.
Eden et. al. / Archival Analysis of Enterprise Resource Planning (ERP) Systems

(Poba-Nzaou and Raymond 2011). Also studied was a comparison of ERP systems to proprietary software (Benlian and Hess 2011; Olsen and Saetre 2007a), analysis of the reasons for adoption (Lorca and de Andrés 2011) and how the adoption decision effects the share market in the US (Ranganathan and Brown 2006). The acquisition phase focused on the approach and evaluations of choosing a particular ERP software product (Esteves and Pastor 1999). The research focused on the selection criteria for packaged software (Keil and Tiwana 2006; Tsai et al. 2012), application of the power relations framework and the influence of actors on the acquisition framework (Howcroft and Light 2006; Howcroft and Light 2010). A list of principles to guide an organization in their decision making process was developed (Damsgaard and Karlsbjerg 2010) and a methodology was developed to determine the ERP system that best meets the requirements (Wu et al. 2007). The implementation phase consists of the initial configuration and customization of an ERP system. This was the most published topic in the lifecycle and requires an in depth analysis which is discussed in the ‘within topic analysis’ section of the report.

The usage of the system focuses on utilizing the system to achieve benefits and includes system maintenance (Esteves and Pastor 1999). The research performed into the usage of the system focused on the factors that influence use (Klaus and Blanton 2010; Liu et al. 2011; Sun et al. 2009), evaluation models to assess if benefits are reached (Hakkinen and Hilmola 2008; Uwizeyemungu and Raymond 2009; Uwizeyemungu and Raymond 2010) and comparisons of non-implementing organizations to implementing organizations in the one industry (Goekke and Faley 2009; Romero et al. 2010). Publications also pertained to ERP system maintenance, which included techniques for encouraging users to upgrade (Khoo et al. 2011a), impact upgrades have on stakeholders (Khoo et al. 2011b), and forces that influence the upgrade decision (Khoo and Robey 2007).

The evolution phase focuses on the integration of emerging technologies with the ERP system to achieve greater benefits (Esteves and Pastor 1999). Several articles examined the integration of new technologies with ERP systems, these included ERP and SCM system integration (Bose et al. 2008), integrating vehicle routing tools with ERP systems (Mendoza et al. 2009) and frameworks developed to express the facilitators and inhibitors of enterprise application integration (EAI) technology (Bahli and Ji 2007). Other studies pertained to the coordination strategies of Software as a Service (SaaS) and the need for contracts between ASPs and end users (Demirkan et al. 2010; Susarla et al. 2009). Furthermore the issues of enterprise content management was investigated (Nordheim and Paivarinta 2006) as well as the critical success factors, drivers and barriers of ERP II implementation (Koh et al. 2011). Most analysis was only performed in the one country per article, and the countries included, China, Germany, US, UK, Norway. No article compared and contrasted the use of the evolution in developed countries with developing countries, or with transition economies.

Finally, the retirement phase of the ERP lifecycle is when managers decide to abandon their ERP system (Esteves and Pastor 1999). Only one article reviewed was categorized as part of the retirement phase. The study developed a model to explain the factors that cause IS discontinuance, which included system shortcomings and reduced support availability (Furneaux and Wade 2011). It is concerning that the retirement of ERP systems has received so little attention. Potentially this could be because the decision to abandon an ERP system could be linked to the reason for organisations adopting or selecting different ERP systems software. However in saying this, there needs to be more studies into the factors that influence the abandonment decision. The category of education encompasses courses and curricula that universities offer students (Esteves and Pastor 1999). Only two articles were analyzed that pertained to education. Scott and Walczak (2009) analyzed whether a person’s judgment on their ability to use a system impacts the acceptance of technology. Wilson and Tulu (2010) focused on courses that utilized both information systems and health at tertiary education.

General Topics

The general category contains articles pertaining to research issues, business models and ERP product development issues. Figure 2 shows the segmentation of articles into the categories that comprise the general topic. Articles that were categorized as research issues include literature reviews and annotated bibliographies on ERP Systems and IS (Dietrich 2006; Esteves and Bohorquez 2007; Mignerat and Rivard 2009), development and testing of models for the determination of whether the implementation will be successful, (Kweku-Muata et al. 2008) and the economic potential of Service Oriented Architecture (Mueller et al. 2010). Furthermore comparisons were performed on the ERP systems lifecycle in
transition to developed economies (Themistocleous et al. 2011). Studies of business modeling include enhancing the alignment between ERP Systems and the business processes of an organization (Sousa et al. 2011), utilization of event logs in process mining applications (Ingvaldsen and Gulla 2006) and analyzing whether the process defined by the ERP system is being used in the organization (Aalst 2006).

Studies involving product development issues include the utilization of model-driven component-based software development to implement ERP systems (Subramanyam et al. 2011), the use of collaborative technology in globally distributed teams (Oshri et al. 2007) and a comparison of prototype validation of packaged software (Klein and Herskovitz 2007).

**Within Topic Analysis: An Account of Implementation**

The implementation phase of the ERP lifecycle focused on the approach, success and failure, organizational issues, knowledge management issues and other issues pertaining to the implementation of an ERP product (Esteves and Pastor 1999). The segmentation of articles into the various implementation categories can be seen in figure 3. Implementation success and failure was the most widely studied phenomena, followed by organizational issues, knowledge management issues, other issues and the least researched topic was approach. Other issues pertain to issues that arise in the implementation process that do not fit within the previously mentioned implementation categories.

Implementation success and failure was the most studied area of the implementation phase. The critical success factors (CSFs) that were studied in detail were top management support, consultant quality, organizational culture, governance, risk management, business process reengineering, communication and change management. Furthermore research was performed into linking the implementation critical success factors to the expected organizational benefits (Doherty et al. 2012; Liu and Seddon 2009; Schubert and Williams 2011), analysis of actions that project managers can perform in relation to CSFs (Francoise et al. 2009) and reasons for ERP implementation failure (Momoh et al. 2010). A literature review was performed to identify a list of CSFs in ERP implementation (Finney and Corbett 2007). CSFs studies were also undertaken in China (Lin and Rohm 2009), Egypt (Sawah et al. 2008) and Iran (Dezdar and Ainin 2011). Comparisons were also performed with regards to CSFs in public and private sector companies (Wagner and Antonucci 2009). A significant amount of research has been performed on CSFs in ERP implementation, with developing nations, developed nations, developed economies and transition economies all being analyzed by various methods of analysis, such as case studies, interviews and surveys.

Implementation approach was the least researched topic in the implementation phase of the ERP lifecycle. Studies into this area include comparisons of the benefits and risks associated with an ASP hosted ERP system to a self-hosted ERP system (Solis et al. 2006), the approach taken by project
management to handle multiple project implementation at the one time (Elbanna 2010) and configuration patterns were developed through the utilization of EPC and petrinets (Dreiling et al. 2006). Most of this research was performed in European countries and the USA, no cross country analysis was performed, and the results received cannot be generalizable to developing nations.

Organizational issues that have been researched include the factors that influence organizational performance (Amrani et al. 2006; Dhillon et al. 2011; Ignatiadis and Nandhakumar 2007; Law and Ngai 2007), learning and training of the system (Davis and Hikmet 2008; Gravill and Compeau 2008), the importance of trust and communication in ERP implementation (Rose and Schlichter 2012; Thomas et al. 2007), and strategies to handle organizational groups (Klaus et al. 2010).

Knowledge management is a critical factor in ERP implementation success. The research has been focused on the identification of factors that impact the transferal of knowledge (Hung et al. 2012; Xu and Ma 2008), the mechanism of knowledge flow (Kotlarsky et al. 2008; McGinnis and Huang 2007) and propositions to explain the factors that knowledge transfer influences (Srivardhana and Pawlowski 2007).

**Periodic Analysis**

The comparison of our results with the annotated bibliographies of Esteves and Pastor (2001) and Esteves and Bohorquez (2007) can be seen in figure 4. As observed, ERP implementation has been the most extensively studied phase of the ERP lifecycle, with the retirement phase receiving little to no focus. This is concerning as with time the research topics popularity should be shifting. As stated by Esteves and Pastor (2001, p21) “critical success factors are quite well studied, however their operationalization is not”. Yet further studies have continued to try to define the critical success factors (CSFs) and their importance. Several articles have since attempted to explain the operationalization of CSFs to fulfill this gap.

![Figure 4: Comparison of research performed in the year 1996-2000, 2001-2005, 2006-2012](image)

The retirement phase is a critical aspect of the ERP lifecycle, it marks the abandonment of particular software. The reasons for the abandonment need to be studied further as if the reasons are known improvements and evolutionary technologies can be integrated with the system to provide further functionality. Therefore research needs to be performed into the following: determining why organization are abandoning ERP systems, (2) which members of the team arrive at the decision to discontinue use of the ERP and (3) determining if the impact on the organization due to the retirement of the ERP system.

This research needs to be performed from all stakeholders perspectives and in developed and developing nations and developed and transition economies as it has been shown that different cultures have different expected benefits and it may be the lack of these benefits that cause ERP system abandonment.

Interestingly the topic of education of ERP systems in the research has been decreasing. This could be due to ERP being considered a mature technology and have assimilated well into the Information Systems curricula. Many universities today have enterprise systems majors and compulsory units, making them a focal point in teaching. However, amidst university retention measures to counter attrition rates and the emergence of software vendor-assisted academic alliances, graduate ERP System teaching is at an important crossroads. For this universities face a massive task of balancing investments into programs with the need to meet industry demand, which can potentially be offset through appropriate pedagogy. Whilst academics are forging new methods of enriching ERP System education through simulation games (Leger 2006) and seeking vendor assistance (Corbitt and Mensching 2000; Rosemann and Maurizio
would result in relevant findings and allow for successful cross comparison and analysis of trends. Not all benchmark against more established research undertaking.

Research Methods

business and health. It is also important to note that although literature has reported a substantial number of ERP research around the same topics, several studies (Santamaria-Sanchez, 2010) have identified unique areas in established research domains to make substantial contributions.

Future Work

In conclusion, this study has identified the established and emerging areas in the ERP Systems discipline, and identified gaps in the literature for future research. Ongoing research focuses on analyzing how important the gaps in the literature are, through the interviewing of vendors, consultants, researchers and users. Several limitations are apparent in our study. Firstly, only the articles in the journal list specified above were studied and that conferences were not studied. The obvious criticism is directed towards the transferability, dependability and generalizability of the analysis. With another criticism being that conferences should be studied as the predominately are concerned with new “hot topics”, this could potentially cause a potential bias as those trends are not accounted for. However we argue that due to the substantial number of the articles sampled and the systematic, rigorous classification approach used would result in relevant findings and allow for successful cross comparison and analysis of trends. Not all ERP Systems papers are accounted for and made it through our sieve although we argue that examining 198 articles is useful as they provide the first instance for rigor to the archival method. Currently two of the journals (Communications of the Association for Information Systems, and Data Base) that were studied by Esteves and Pastor (2001) and Esteves and Bohorquez (2007) have not been analyzed as access to the journals are still under negotiation. Secondly, to claim that a certain nature of ERP Systems research is rapidly emerging or one type is preferred over another is premature and not the authors’ intent. But at this stage preliminary findings inform several new and general topics and how they benchmark against more established research undertaking.

Our study opens up various opportunities for adding cumulative knowledge to the discipline. Future research can be directed towards replication across more studies and across different periods and/or phases of ERP systems development, a longitudinal design and further statistical validation, to establish a consolidated view of the direction of the field. There is an evident lack of research into the retirement phase of the ERP systems lifecycle and questions need to be asked in regards to the reasons why organizations abandon ERP systems, the factors/stakeholders that influence the abandonment decision and the repercussions that this decision has on the organization. Furthermore the analysis of the articles show a lack of research performed into cloud computing and mobile technologies. Thus future work needs to be performed into how ERP will be utilized on the cloud, for instance the use of SAP Business ByDesign and the benefits and issues that companies are faced with when transitioning there ERP software to the cloud. Furthermore research should be performed into the use of smart phones with applications that can communicate with ERP software and the impact that this has on organizations. Furthermore it is clearly evident that the amount of research in the tertiary education realm has been decreasing, more research should be performed into the potential setup of ERP system courses in multiple disciplines, such as business and health. It is also important to note that although literature has reported a substantial amount of information into updating and upgrading decision it is necessary that more research be performed into the actual maintenance of the ERP system. In fact in the 2006 to 2012 period, only one article detailed the maintenance process, which was within Australian organizations only. Thus more work needs to be performed to document: 1) the maintenance process, 2) comparisons of maintenance process in different industry sectors, 3) comparisons of the maintenance process within different cultures and economic climates, 4) issues that arise within the maintenance process, 5) the factors and inhibitors in the maintenance process, and 6) the risk management strategies that can be used when performing system maintenance. The implication of extended analysis for the novice ES researcher is that it provides a summary of published research areas and identifies gaps to identify and develop their study focus. For
established researchers, the archival analysis captures insights on areas of research that have reached theoretical saturation and subsequently identify emergent topics.

<table>
<thead>
<tr>
<th>Year</th>
<th>Reference</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>(Aalst 2006; Amrani et al. 2006; Beatty and Williams 2006; Benders et al. 2006; Bernroider and Stix 2006; Boontaree et al. 2006; Chang 2006; Cottleeleer and Bendoly 2006; Dietrich 2006; Dreiling et al. 2006; Elbanna 2006; Howcroft and Light 2006; Huq and Martin 2006; Ingvaldsen and Gulla 2006; Jones et al. 2006; Ke and Wei 2006; Keil and Tiwana 2006; Mahato et al. 2006; Nordheim and Paivarinta 2006; Ranganathan and Brown 2006; Solis et al. 2006; Strong et al. 2006; Topi et al. 2006; Wang and Chen 2006a; Wang and Chen 2006b; Wang et al. 2006; Ward and Zhou 2006)</td>
<td>27</td>
</tr>
<tr>
<td>2010</td>
<td>(Berente et al. 2010a; Berente et al. 2010b; Chang et al. 2010; Chellappa et al. 2010; Damsgaard and Karlsbjerg 2010; Demirkan et al. 2010; Dey et al. 2010; Downing 2010; Elbanna 2010; Howcroft and Light 2010; Klaus and Blanton 2010; Klaus et al. 2010; Kourouthanassis et al. 2010; Kumar et al. 2010; Lai et al. 2010; Maheshwari et al. 2010; Meissonier and Houzé 2010; Momoh et al. 2010; Morris and Venkatesh 2010; Mueller et al. 2010; Ng and Gable 2010; Romero et al. 2010; Saeed et al. 2010; Sammon and Adam 2010; Santamaria-Sanchez et al. 2010; Seddon et al. 2010; Sedma and Gable 2010; Sedmak and Longhurst 2010; Siorova and Isk 2010; Staehr 2010; Strong and Volkoff 2010; Teoh et al. 2010; Uwizeyemungu and Raymond 2010; Velcu 2010; Wagner et al. 2010; Wilson and Tulu 2010; Yeh and Yang 2010)</td>
<td>38</td>
</tr>
</tbody>
</table>
References


Krotov, V. S., Boukhonine, an Ives. 2011 "ERP Implementation Gone Terribly Wrong: The Case of Natural Springs" Communication of the Association for Information Systems, (8:1).


Research Methods


