A Systematic Literature Review of the Enterprise Systems Research in Leading IS Journals (2000-2015)

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ABSTRACT

This paper presents a systematic review of the ES literature in leading IS journals for the period 2000-2015. Major research areas are identified in terms of their research focus and ES lifecycle phases, noting the prevalence of research on the implementation phase. Methodological trends are presented in terms of research philosophy, research approach, research method, and time-orientation of the research, which broadly reflect the trends observed for the IS research in general. These include the primacy of positivist philosophy and quantitative approach, a reliance on case studies and survey method, and an increasing use of longitudinal studies. The paper also notes the implications for ES researchers and the limitations of the study.

Keywords

Enterprise System, ERP, Review, Methodology, Research Trend

INTRODUCTION

Enterprise Systems (ES), also called Enterprise Resource Planning (ERP), are configurable information systems packages that provide seamless integration of information and information-based business processes within and across functional areas in an organization (Davenport, 1998; Kumar, Maheshwari and Kumar, 2002). While the vendors offering ES often present it as an ultimate driver of business success, the literature is filled with evidence related to the failure of ES implementation costing millions to the implementing organization (Amid, Moalagh and Ravasan, 2012; Barker and Frolick, 2003). Therefore, a significant part of the academic research focuses on the ES research across diverse domains such as Information Systems (IS), operations management, accounting, organization theory, among others. This paper presents a systematic review of the ES literature in the leading IS journals for the period 2000-2015.

The next section provides the details of the selection criteria and the papers included in the review basket. As a first step of the review, major research areas are identified in terms of their research focus and their belongingness to particular ES lifecycle phases. The findings are compared with earlier reviews of the ES research. Subsequent section captures the methodological trends in terms of research philosophy, research approach, research method, and time-orientation of the research. Throughout the review, the findings are compared with earlier and similar reviews in order to put the findings in perspective. Finally, the last section notes the limitations and concludes the paper.

REVIEW BASKET

For determining the sources, the 2015 journal list for the 'information management' area from the Association of Business School was consulted. Of these journals, only the four-star and three-star journals were included in the review. Table 1 presents the list of the journals and the number of ES studies in each journal for the period 2000-2015. Although this does not cover the full spectrum of the ES research within the IS domain, it may be considered representative enough to draw conclusions for the overall trends of the ES research. From the identified journals, those papers were downloaded which had 'enterprise system', 'enterprise resource planning', 'ERP', or 'packaged software' in their title or abstract. This resulted in the selection of 262 papers in total for the period 2000-2015. Of these papers, the papers with unrelated research objectives were screened out. Editorials were also excluded from the systematic review. After applying these criteria, 254 papers were considered in the systematic review.

Journal	Number of ES Studies
Information and Management	31
European Journal of Information Systems	28
Journal of Information Technology	22
Information Systems Journal	20
Journal of Strategic Information Systems	19
Expert Systems with Applications	17
Information Systems Frontiers	17
MIS Quarterly	16
Decision Support Systems	15
Computers in Human Behaviour	15
Information Systems Research	13
Information Technology and People	13
Journal of Management Information Systems	10
Information and Organizations	8
Journal of the Association of Information Systems	5
Government Information Quarterly	1
International Journal of Electronic Commerce	1
International Journal of Human-Computer Studies	1
Information Society	1
Journal of the American Society for Information Science and Technology	1
Total	*254*

Table 1 Review Basket and Number of ES Studies

MAJOR RESEARCH AREAS

Table 2 shows the classification of the ES literature based the research themes. The category *ES package* refers to the papers on the design and nature of ES package. Considering the long-standing calls for including the discussion on technology artifact in IS studies (Orlikowski and Iacona, 2001), it is indeed heartening to see ES studies (e.g. Gosain, 2004; Kallinikos, 2004; Wagner, Scott and Galliers, 2006) focusing on the ES artifact.

Primary Research Theme	Number of Papers	Percentage
ES Package	13	5.12%
Adoption	7	2.76%
Acquisition	20	7.87%
Implementation	94	37.01%
Use and Maintenance	57	22.44%
Evolution	6	2.36%
Retirement	0	0.00%
Change Outcomes	47	18.50%
ES Market & Trends	9	3.54%
ES Education	1	0.39%
Total	*254*	*100.00%*

Table 2 Major Research Areas in Enterprise Systems Research

The next six themes refer to the phases of the ES lifecycle framework by Esteves and Pastor (1999, 2001). The six phases considered in this review are – adoption, acquisition, implementation, use and maintenance, evolution, and retirement. The *Adoption* phase includes the set of activities conducted to determine the requirement of a new ES for the organization. The *Acquisition* phase includes selecting and acquiring the product that best fits the need of the organization. This phase also includes the selection and appointment of the vendor, the implementation partner and/or the consultants. The *Implementation* phase deals with the configuration and/or customization of the ES package to fit the organization's needs. *Use and maintenance* involve the continuous use of the system in the organization and regular maintenance/upgrades whenever required. The *Evolution* occurs when additional capabilities are included in the ES. This may include upward evolution (adding more capabilities/applications to ES) and/or outward evolution (including your supply chain partner). Finally, the *Retirement* phase refers to phasing out the system and introducing the new system. Apart from the phase-based classification, the category *change outcomes* refers to the ES research related to operational or economic benefits or organizational change associated with ES. Other categories relate to *ES market and trends*, and *ES education*.

As shown in Table 3, the majority of the ES research is concentrated in the area of ES implementation. This trend is consistent over the years as noted in other reviews (Eden, Sedera and Tan, 2012; Esteves and Bohorquez, 2007; Esteves and Pastor, 2001) as well. Another common trend is the relative absence of studies on the retirement phase. The main reason could be the fact that towards the end of the life-cycle of a system, organizations focus more on the adoption, acquisition, and implementation of the new system rather than systematically retiring the system in use.

	Esteves and Pastor (2001)	Esteves and Bohorquez (2007)	Eden et al. (2012)	Present Review
Duration	1997-2000	2001-2005	2006-2012	2000-2015
Phase-wise Papers	118	374	154	184
Adoption	5.93%	6.68%	8.44%	3.8%
Acquisition	9.32%	4.01%	5.19%	10.9%
Implementation	66.10%	55.35%	49.35%	51.1%
Use and Maintenance	14.41%	18.18%	25.97%	31.0%
Evolution	10.17%	15.78%	10.39%	3.3%
Retirement	0.00%	0.00%	0.65%	0.00%

Table 3 ES Research by ES Lifecycle Phases

METHODOLOGICAL TRENDS

This section notes the methodological trends associated with the ES research in leading IS journals. To understand the trends in perspective, all the tables include the trends for the IS research (Chen and Hirschheim, 2004; Orlikowski and Baroudi, 1991) and earlier trends from a similar review (Dong, Neufeld and Higgins, 2002) of the ES research.

Research Philosophy

As shown in Table 4, both IS and ES research were primarily divided between the positivist and the interpretive philosophy till the end of last century, with the majority of empirical work following positivist assumptions. The major difference between IS and ES research at the time was that the majority of the ES research was descriptive. This is understandable since the enterprise systems were relatively new at the time. With the advent of the new century, empirical work following the interpretive philosophy also started to make its mark in the IS and ES research, as evident from the table. The share of critical studies, focusing on the power struggle and emancipation to uncover historically constituted reality (Myers, 1997), remains low for all the periods considered. However, recent years are marked by the advent of critical realist studies that take an intermediate position between positivism and interpretivism and look for causal mechanisms (Mingers, Mutch and Willcocks, 2013).

Research Philosophy	IS Research		ES Research	
	Orlikowski and Baroudi (1991)	*Chen and Hirschheim (2004)*	*Dong et al. (2002)*	*Present Review*
Research Period Covered	1983 - 1988	1991 - 2001	1998-2001	2000-2015
Positivist: Theoretically Grounded	72.9%	81%	15.91%	50.43%
Positivist: Descriptive	23.9%		79.55%	25.65%
Interpretive	3.2%	19%	2.27%	20.43%
Critical	0	0	2.27%	2.61%
Critical Realist	0	0	0	0.87%

Table 4 Philosophical Trends in IS/ES Research

Research Approach

As shown in Table 5, while the IS research is in general heavily tilted towards quantitative studies, the ES research in the IS domain is rather balanced between quantitative and qualitative approach. Also, it is interesting to note that the mixed method approach is increasingly being employed in both IS and ES research.

Research Approach	IS Research		ES Research	
	Orlikowski and Baroudi (1991)	*Chen and Hirschheim (2004)*	*Dong et al. (2002)*	*Present Review*
Quantitative	N/A	35.9%	N/A	44.88%
Qualitative	N/A	18.0%	N/A	42.91%
Mixed	N/A	5.8%	N/A	2.76%
Conceptual	N/A	40.3%	N/A	9.45%

Table 5 Research Approach in IS/ES Research

Research Method

Table 6 presents the prevalence of different research methods in the IS and ES research. It may be noted that the throughout the years, the case study method has remained the second-most popular method after the survey method in the IS research. However, this trend is reversed in the ES research. Case research has been a primary research strategy in the ES research throughout the years with the survey method being the second-most used method.

Research Method	IS Research		ES Research	
	Orlikowski and Baroudi (1991)	*Chen and Hirschheim (2004)*	*Dong et al. (2002)*	*Present Review*
Action Research	0.6%	3%	-	0.43%
Archival Data Analysis	-	-	-	3.04%
Case Study	13.5%	36%	20.45%	43.91%
Experiment	29.7%	20%	-	0.43%
Mixed Method	3.2%	-	-	4.78%
Survey	49.1%	41%	13.64%	34.78%
Others	3.8%	-	-	13%

Table 6 Research Methods in the IS/ES Research

Time Orientation

Table 7 compares the time-orientation in the IS research to that in the ES research. As can be seen, over the years the ratio of single snapshot cross-sectional studies is comparatively reduced but it is still the most preferred approach in both IS and ES research. Longitudinal orientation remains the second most popular time orientation in the IS and ES research.

Time Orientation	IS Research		ES Research	
	Orlikowski and Baroudi (1991)	*Chen and Hirschheim (2004)*	*Dong et al. (2002)*	*Present Review*
Cross-sectional: Single Snapshot	90.3%	59%	80%	63.5%
Cross-sectional: Multiple Snapshot	3.9%	8%	6.7%	8.2%
Longitudinal (including process traces)	5.8%	33%	13.3%	28.3%

Table 7 Time Orientation in the ES/IS Research

CONCLUSION, RESEARCH IMPLICATIONS AND LIMITATIONS

This paper presents a review of the ES research published in leading IS journals for the period 2000-2015. It notes that the majority of the ES research is associated with the implementation phase. This implies the need to move beyond the implementation phase and to study other phases of the ES lifecycle. Mimicking the trend in broader IS research, the majority of the ES research exhibits a preference for positivism over interpretive philosophy. ES scholars should also consider other philosophies, such as critical philosophy and critical realist philosophy, to provide a distinct perspective on the ES phenomenon. Like the IS research, the ES research also shows somewhat equal preference for two primary research methods (case study and survey) and research approach (quantitative and qualitative). Mixed method studies are on the rise in recent years and should be welcomed. Since the majority of ES studies still exhibit static time-orientation, process-oriented longitudinal research on ES should also be undertaken. The obvious limitations of this paper is the exclusion of other IS journals/conferences and exclusion of the papers from other research domains. However, considering the constraints on researchers' time and resources, we believe this paper identifies the major research trends and highlights the under-researched aspects that need ES researchers' attention.

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