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Enterprise Resource Planning: A Systematic Literature Review and the 6P Classification

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ABSTRACT

In this article, the authors put forth a methodological framework for identifying high quality articles and publications in the area of Enterprise Resource Planning. Based on this framework a systematic literature review is carried out to identify the trends in ERP related research and also lists out high quality journals in ERP area. This review assesses and ascertains the multi-disciplinary aspect of the subject ERP by grouping journals based on their subject area.

The article goes on to classify the research field ERP into 6Ps, which depicts the multi-disciplinary nature of ERP and establishes that new classification covers 93% of ERP related articles. The new classification will be guide for both researchers and practitioner alike to focus on relevant areas of interest, by clearly proposing and demarcating the functional areas. The authors conclude by bringing forth the sparsely covered research areas related to ERP, and igniting thoughts for future research

1. Introduction

The term Enterprise Resource Planning (ERP) was first coined by the Gartner Group in 1990, as extension of Manufacturing Business System and Manufacturing Resource Planning software. From this earlier definition, ERP has evolved as an integral part of any successful running businesses across verticals. Today's ERP system is an integrated configurable business software, covering end to end business processes across the organization inducing the

best practices in the industry. The ERP is now an industry-driven concept and system, which is universally accepted by businesses, organizations and industries as a practical solution to achieve an integrated enterprise information system solution. During the initial years, ERP products were used mostly by large enterprises to manage their processes efficiently. As ERPs attained certain product maturity and market maturity, medium and smaller companies also began adopting it. Now ERPs form a backbone for many businesses managing their core central functions.

The academic community started showing interest in ERP topic in the late 1990's. During these years the volume of published articles showed a steady positive uptrend. There are a few authors who argue that the academic research on this field has now reached maturity and that most of the topics in ERP are well explored. In this review, we would quantitatively verify the authenticity of these arguments.

There are a handful of a comprehensive and respected literature reviews by various authors starting from 2001. Most of these reviews cover the literature for a specific period. A few of them classify the literature based on author's viewpoints. Even though many authors have classified ERP literatures, they are mostly mere extensions of the fundamental (original) classifications proposed by

(Esteves, 2001): General, Adoption, Acquisition, Implementation, Usage, Evolution, Retire, and Education

(Botta-Genoulaz, Millet, & Grabot, 2005) : Implementation, Optimization, Management, ERP software, ERP & SCM, Case Study

(Moon, 2007): Implementation, Using ERP, Trends and Perspectives

(Xu, Rahmati, & Lee, 2008): Technology Perspective, Business perspective, Functionality perspective, Communication Perspective, Others

(Addo-Tenkorang & Helo, 2012): Implementation, Exploration, Extension, Value, Trends & Perspectives and Education

Researchers and authors agree with little doubt that ERP is not only a subject related to software systems but a multi-disciplinary topic with close integration with operations managements, finance management, human resources, logistics etc. Our analysis based on literatures published, which is discussed later in this article, also points in this direction.

(Marnewick & Labuschagne, 2005) views ERP as management software system that allows autonomous organization automate and integrate the majority of its business processes, share data and common practices across the enterprise and produce and access to information in a real-time environment. The ultimate goal of an ERP system is that information must be entered only once. That means, an ERP system has to be viewed from a larger frame than as a product or a software.

Even when there is a general agreement on the multi-disciplinary aspect of the subject ERP, the available literatures are not analyzed from these dimensions.

As it can be seen from classifications mentioned earlier, the authors view articles only through the lens of various phases of project management in software systems. There are also some authors who have proposed new models that are minor extensions of the above-mentioned models, which are based on project management.

In this paper, a new classification is proposed which protects the multi-disciplinary nature of the subject ERP and quantitatively analyses the selected literatures published. To keep the multi-disciplinary aspects of ERP, the literature is classified as 6Ps namely Project, Product, Process, People, Performance, Perspectives. This new classification of ERP literature, helps the researchers to identify articles from a different dimension more from the functional standpoint, which is more aligned to various disciplines of research. Also for practitioners and organizations this classification is much more well defined and aligned to the business functions, such that teams and groups can easily set up concentrating on each P.

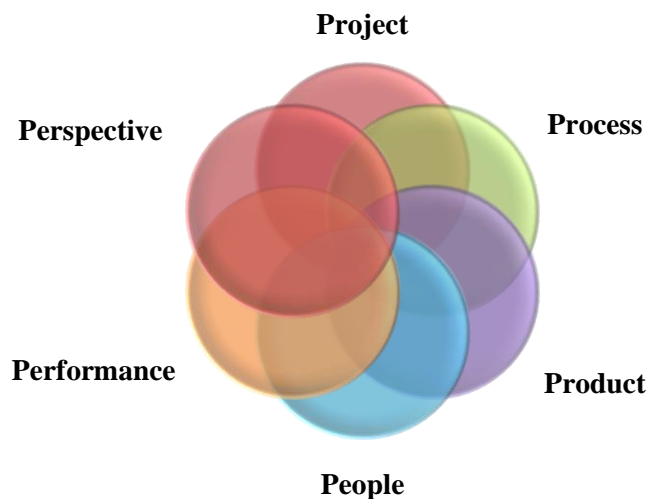


Figure 1. The 6P classification in ERP related literature

Project: This group project covers all aspects of an ERP implementation, rollout and upgrade project. The various aspects of project starting from program plan, selection, acquisition, adoption, planning, realization, control & monitoring and maintenance are covered in this group. The factors that affect the project and project management practices are also included in the group.

Process: ERPs are not just software that are installed in an organization. ERPs have a huge impact on the processes followed by the organization. ERPs bring with them a whole new set of processes which the vendors call ‘best practices’ and the organizations needs to alter their processes to fall in line with the best

practices brought in by ERP products. This categorization of processes includes all literatures that discuss the impact of processes on ERPs and vice-versa. In this grouping we have included the organization practices as well, which are not inclined towards people.

Product: The literatures that study various aspects of ERP from a software products point of view is included in this group. This includes various ERP product comparisons, feature analysis of ERP product, security aspects of the products as well. The studies on cloud ERPs like usability, limitations, benefits are also part of this group.

People: The classification people, groups together all the literatures that deals with the people centric factors that are influenced by an ERP. This classification also covers impact of people aspects on the ERP, like the impact of various stakeholders in the success of an ERP project or in performance of the ERP system. Training, people empowerment, people centric processes & modules are also covered by the classification 'People'.

Performance: This categorization covers all literatures, which discusses the performance of ERPs as well as the effect of ERPs on the performance of the organization. All the literatures that discusses the benefits brought in by ERPs as well as those speak about the impacts of ERP to an organization are also covered in this categorization. This categorization covers limitations of ERPs as well. The literatures that deal the performance of projects are not covered in this section and are covered in the project classification.

Perspectives: The literatures that view ERPs from various perspectives are covered in this group. All literatures that bring in a perspective of particular community be it based on technology, their functional association, organizational position etc. are covered in this section. Those literatures which just extends the general findings to a specialized section/context is excluded from this grouping.

Thus the main objectives of this paper is to

1. Classify the articles published based on their inclination into project, product, people, process, perspective & performance, so as to help both researchers and practitioners alike to be more filtered, organized and effective in their work.
2. Apart from the main objective, the present review presents current state of research in ERP field
 - a. By analyzing the research interest shown by scholars in the field of ERP and its trend.
 - b. By identifying the leading Journals who are publishing high quality ERP articles
 - c. By identifying the subject area of journals that have contributed most to ERP research.

2. Methodology

The focus of this study is to review the quality articles published till 2020. Only journal papers and the conference proceeding are considered. Working papers, white papers and doctoral dissertations are excluded. As there are enormously huge amount of literatures published related to ERP, a very well-structured framework is necessary to evaluate and shortlist them. A three-phased approach was used to identify the papers to be evaluated.

Phase 1: Groundwork- Newer and newer articles related to ERP are published every day. As the literatures available/published regarding ERP is not static in the knowledge world, a cut-off date of 01/09/2020 is fixed, while selecting the articles, that is, only articles prior to 01/09/2020 is considered for the study. Google Scholar is extensively used in this review to capture various facts on the published journal papers. All published journal articles written in English that meets any of the following search criteria are selected.

1. “Enterprise resource planning” in the title
2. ERP in title and “Enterprise resource planning” in keywords

Based on the above criteria, 5490 such journal articles were chosen as the base of later analysis.

Phase 2: Selection of journal and databases - Selection of journals are an important factor in determining the quality of paper published. To weed out low quality papers, it was decided to include only papers published in journals found in quality databases. Among 5490 papers previously selected, all databases, which contributed more than 30 journal papers, were shortlisted. The below table provides information about the shortlisted databases, which we identified as ‘quality databases for ERP research’.

Table 1. Databases that contain journals, publishing quality articles related to ERP.

Database	Description
Elsevier	Elsevier was established in 1880 as a publishing company. Its products include journals such the Science Direct collection of electronic journals, the Trends and Current Opinion series of journals, the online citation database Scopus.
ACM Digital Library	The Association for Computing Machinery (ACM) is an international learned society for computing. It was founded in 1947, and is the world's largest scientific and educational computing society. It is a not-for-profit professional membership group.
IEEE	The Institute of Electrical and Electronics Engineers (IEEE) is a professional association was formed in 1963 from the amalgamation of the American Institute of Electrical Engineers and the Institute of Radio Engineers. Today, it is the world's largest association of technical professionals with more than 420,000 members in over 160 countries

	around the world.
Taylor & Francis	Taylor & Francis Group is an international company originating in England that publishes books and academic journals. It is a division of Informa plc., a United Kingdom-based publisher and conference company.
ProQuest	ProQuest LLC is an Ann Arbor, Michigan-based global information-content and technology company founded in 1938 as University Microfilms by Eugene B. Power. From its founding as a producer of microfilm products it has grown as an electronic publisher, provider of solutions, applications, and products for libraries.
Association for Information Systems	The Association for Information Systems (AIS) is an international, not-for-profit, professional association with the stated mission to serve society through the advancement of knowledge and the promotion of excellence in the practice and study of information systems. Membership is made up primarily of academic educators, researchers, and institutions that specialize in information systems (IS) development, implementation, and evaluation.
Emerald Insight	Emerald Publishing Limited is a scholarly publisher of academic journals and books in the fields of management, business, education, library studies, health care, and engineering. It was founded in the United Kingdom in 1967 and has its headquarters in Bingley. The company manages a portfolio of more than 290 journals and over 2650 books and book series volumes.
Wiley Online Library	Wiley Online Library is a subscription-based library of John Wiley & Sons that launched on August 7, 2010, replacing Wiley InterScience. It is a collection of online resources covering life, health, and physical sciences as well as social science and the humanities. To its members, Wiley Online Library delivers access to over 4 million articles from 1,500 journals, more than 14,000 books, and hundreds of reference works, laboratory protocols, and databases.
Inderscience Online	Inderscience Publishers is an academic publisher based in Geneva, Switzerland with editorial offices in Olney, UK. It publishes approximately 428 peer-reviewed journals in the fields of science, engineering and technology; management, public and business administration; environment, ecological economics and sustainable development; computing, ICT and internet/web services.
Springer	Springer Publishing is an American publishing company of academic journals and books, focusing on the fields of nursing, gerontology, psychology, social work, counseling, public health, and rehabilitation (neuropsychology). Bernhard Springer established it in 1950.

IGI Global	IGI Global is a leading international academic publisher facilitating the discovery of pioneering research that enhances and expands the body of knowledge available to the research community. Working in close collaboration with expert researchers and professionals worldwide, IGI Global disseminates vetted, quality content within 11 core subject areas.
Research Gate	ResearchGate is a social networking site for scientists and researchers to share papers, ask and answer questions, and find collaborators. ResearchGate was founded in 2008 by virologist and computer scientist Dr. IjadMadisch

Source: (Respective Websites, 1st November,2020)

Phase 3: Selection of journal papers: Selection of papers were done from the shortlisted databases based on the no: of citations. Those articles, which have 25 or more citations, were taken into consideration for the study. As citations normally increases with age of articles, there are chances that recent high quality articles might get missed out from our shortlisted articles. To include recent high quality articles the citation criteria was relaxed for articles published in last 4years(2016 -2020). Those articles published between 2016 and 2020, which have 5 or more citations were taken into consideration for the study.

Applying these exclusion criteria the number of articles in our population got reduced to 471 and these were shortlisted as quality articles for the further study

3. Observations & Findings

Trends in ERP research

Research Interest: The 471articles that were selected were categorized on a bi-annual scale to see if any trend can be identified about research interest in ERP area. Some authors have claimed that ERP research is matured and research interest in this area has gone down.(Moon, 2007)

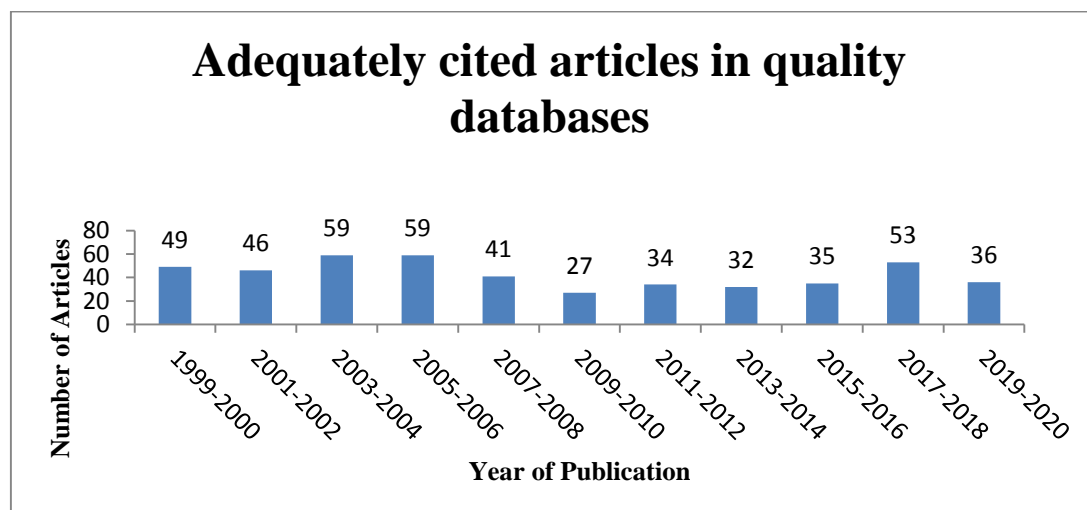


Figure 2. Trend of adequately cited articles that are published in journal belonging to quality databases

The Figure 2, shows that quality articles related to ERP started to appear in journals from 1999. The no: of articles published were mostly steady with slight upward trend till 2006. After 2006 there is no identifiable pattern.

This lack of pattern might be due to the fact that exclusion criteria were a bit skewed favorably towards older articles. Older the articles there are more chances for it to be cited. This skewing would impact analysis especially when an analysis is done based on a period. Hence it was decided to relax the exclusion criteria for the period analysis. Thus for this particular analysis exclusion criteria based on quality of database and citation index is removed to get a fairer picture.

The total no of published articles were analyzed period wise to see the interest of researchers in the field.

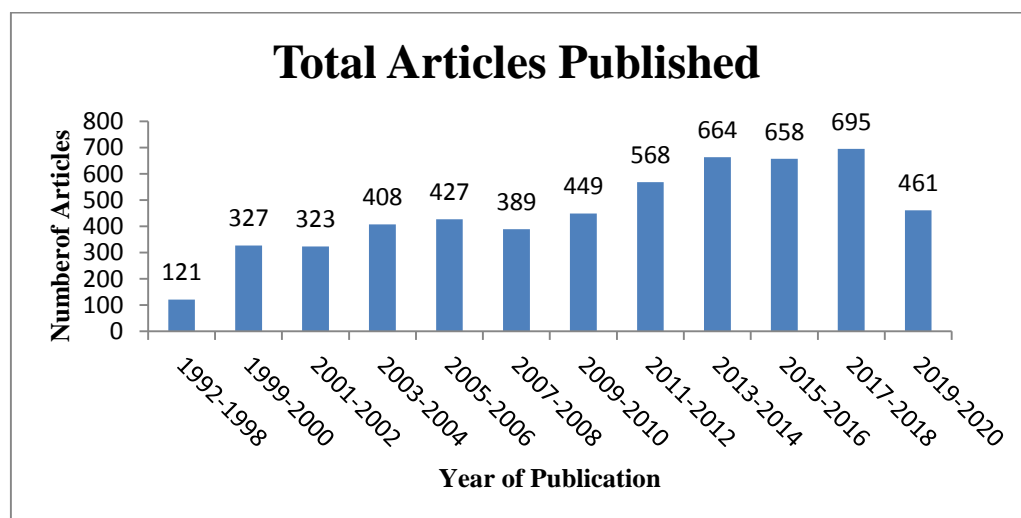


Figure 3. Total number of ERP related articles published

The data showed a steady increase in the articles published. The most recent years might be showing a slight dip in no of articles as all articles might not be available online or might not indexed by search engines.

A growth in published articles would indicate research interest, but this would not be an indicator for the quality research.

Therefore a new selection criterion was formulated to identify the quality articles, which is not skewed, based on year. Citation based selection was hence not considered. Instead the articles published in quality databases were re-introduced. This method was still emphasizing on quality but less restrictive than citation based exclusion.

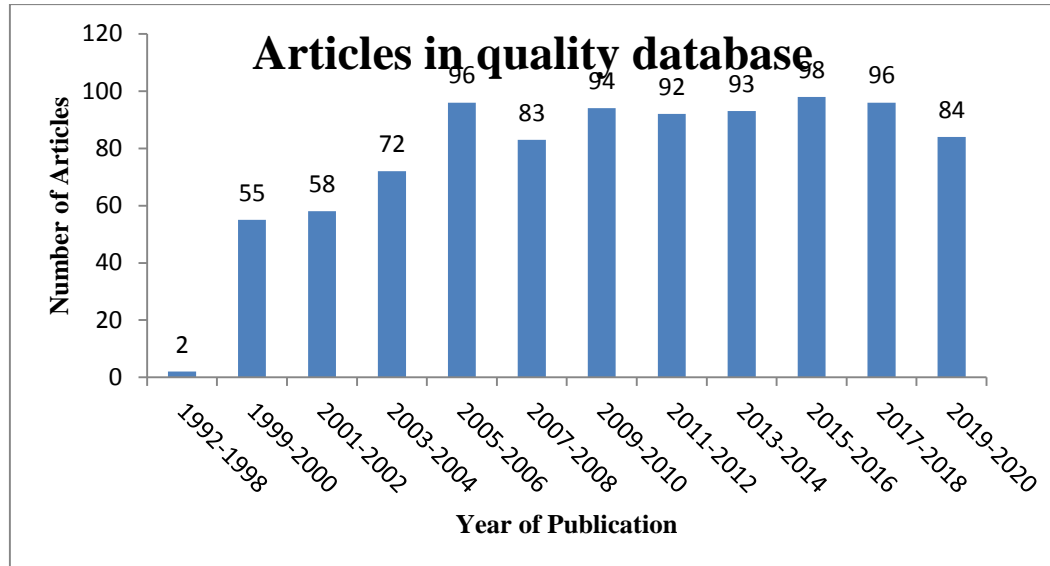


Figure 4. Trend of published articles in quality databases

The articles in quality database also indicate that there is no decline in articles published. But the growth story is also not quite as strong as seen from total published articles.

Leading journals in ERP area

The 439 articles shortlisted based on quality were analyzed from the dimension of journals in which they were published. These 439 articles were published in 154 different journals. 49 journals have published more than one quality article related to ERP. The list of journals that have published more than five quality articles are listed below.

Table 2. Journals that have published more than five quality articles

Journals	Interest Area	No of Articles
International Journal of Enterprise Information Systems (IJEIS)	The International Journal of Enterprise Information Systems (IJEIS) provides comprehensive coverage and understanding of the organizational, people, and technological issues of EIS	12
Industrial Management & Data Systems	Industrial Management & Data Systems (IMDS) focuses on topics treating the interface between operations management and information systems.	12
Business Process Management Journal	Business Process Management Journal (BPMJ) examines how a variety of business processes intrinsic to organizational efficiency and effectiveness are integrated and managed for competitive success	11
International Journal of Production Research	The International Journal of Production Research (IJPR) is a successful and leading journal reporting manufacturing, production and operations management research.	9

Communications of the ACM	Communications of the ACM is the leading print and online publication for the computing and information technology fields.	8
European journal of operational research	The European Journal of Operational Research (EJOR) publishes high quality, original papers that contribute to the methodology of operational research (OR) and to the practice of decision-making.	9
International journal of accounting information Systems	The International Journal of Accounting Information Systems publishes thoughtful, well-developed articles that examine the rapidly evolving relationship between accounting and information technology.	8
Computers in Industry	The Computers in Industry publishes original, high-quality, application-oriented research papers useful to industry related to Information and Communication technology	6
Computers in Human Behavior	Computers in Human Behavior are a scholarly journal dedicated to examining the use of computers from a psychological perspective.	5

Source of Interest Area: (Journal Websites, 1st November 2020)

Multidisciplinary nature of the subject ERP

Previous authors have mentioned that ERP is a multi-disciplinary subject. The journals, which published the 308 shortlisted articles, were analyzed to see if this holds true for quality articles as well. The journal focus area were categorized as below

- Information Systems
- Operations Management
- Information Technology
- Business Management
- Engineering & Technology
- Finance & Accounting
- Human resource management
- Others

In case of journals that had affinity to multiple categories listed above, the strongest affinity shown by the journal was considered as the journal category.

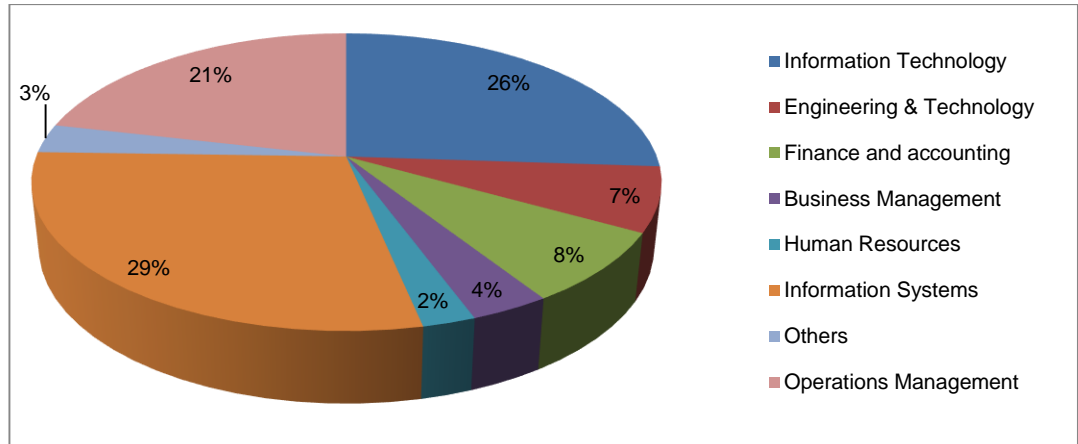


Figure 5. Focus area of journals publishing ERP related articles

Figure 5 indicates that even the quality articles are distributed among journals belonging to different disciplines. Information Systems and Information technology journals contribute most to the quality articles in ERP field closely followed by Operations Management.

New Proposed Classifications based on 6Ps

Even though ERP is a multi-disciplinary topic, the classifications proposed till-date do not capture the multi-disciplinary aspect of ERP. Hence in the present review, attempt has been made to classify literature available, preserving the multi-dimensional characteristics of ERP. Thus the shortlisted articles were grouped based on their inclination as follows.

- Project
- Product
- Process
- People
- Performance
- Perspective

This multi-disciplinary nature of ERPs also brings out a more complexity in grouping literatures. Hence in case of an article which has multiple aspects among the 6Ps, that article is grouped under the top two categories. In case if an article is not related to any of the 6P categories, then those articles are grouped under others. Based on the number of articles in each category, the percentage wise distribution is shown below.

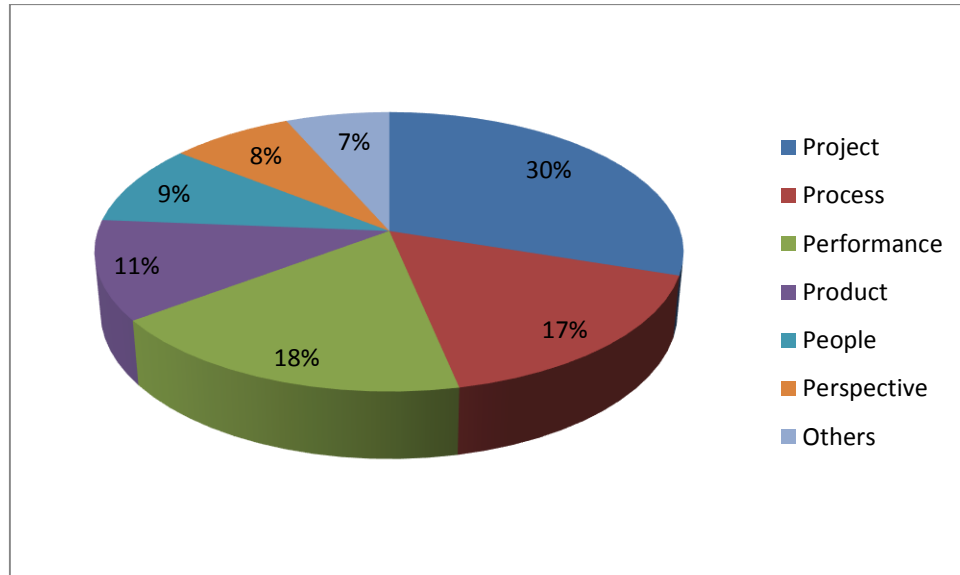


Figure 5. Distribution of quality articles across the proposed 6P classification
 Its clear from the figure that the 6P classification was able to cover 93% of all quality articles published in ERP subject area. The figure 5 also emphasizes the point that researchers and authors have been concentrating on aspects related to ERP projects more than any other area.

The articles in each category are reviewed and the collective summary is discussed below. The intentions is not to review each article in detail, but to give provide an aggregate summary. The most influenced articles in each subject area is listed in below table.

Table 3. Journals that are referred for providing the collective summary

Subject Area	Reference
Project	(Bueno & Salmeron, 2008; Chofreh, Goni, & Jofreh, 2011; Ehie & Madsen, 2005; Fryling, 2010; Ghosh & Skibniewski, 2010; Holland, Light, & Gibson, 1999; Kumar, Maheshwari, & Kumar, 2002; Lall & Teyarachakul, 2006; Mabert, Soni, & Venkataramanan, 2003; Ngai, Law, & Wat, 2008; Stefanou, 2000; Tasevska, Damij, & Damij, 2014; W. H. Tsai, Lee, Shen, & Lin, 2012; Umble, Haft, & Umble, 2003; van Everdingen, van Hillegersberg, & Waarts, 2000; Yajun Zeng, 2010)
Product	(Galeta, Kljajin, & Karakašić, 2006; Hamza, Martinez, & Carmen Alonso, 2010; Hestermann, Pang, & Montgomery, 2012; Naciri, Pouly, Binggeli, & Glardon, 2009; Orkun Özen, Supervisor, & Zhang, 2011; Usmanij, Khosla, & Chu, 2013; Uzoka, Abiola, & Nyangeresi, 2008; Van Gurp, Brinkkemper, & Bosch, 2005; Zanoni, Perin, Fontana, & Viscusi, 2014; Zhao, Zhao, Wang, & Zhang, 2017)
Process	(Al-Mashari, 2001; Nandhakumar, Rossi, & Talvinen, 2002; Newman & Zhao, 2008; Park & Kusiak, 2005; Quiescenti, Bruccoleri, La Commare, Noto La Diega, & Perrone, 2006; Schniederjans & Kim, 2003; Tarafdar & Roy, 2003;

	Wang, Chia-Lin Lin, Jiang, & Klein, 2007; Yan Huang, Huang, Wu, & Lin, 2009)
Performance	(Abugabah & Sanzogni, 2009; Anderson, Banker, Menon, & Romero, 2011; Beheshti & Beheshti, 2010; Chen & Lin, 2008; Feng & Chen, 2006; Ha & Ahn, 2014; Hunton, Lippincott, & Reck, 2003; Jalal, 2011; Kallunki, Laitinen, & Silvola, 2011; Murphy & Simon, 2001; Papamichail & West, 2010; Shen, Chen, & Wang, 2016; Skibniewski & Ghosh, 2009; W.-H. Tsai, Lee, Liu, Lin, & Chou, 2012; Zare Mehrjerdi, 2010)
People	(Bandad & Hozouri, 2014; Bansal & Narula, 2003; Bedell, Floyd, Nicols, & Ellis, 2007; Jackson, 2010; Kleiner, Bishu, Drury, Nair, & Getty, 1999; Motwani & Sharma, 2016; Muthafer, 2007; Newlin, 2009; Tadinen, 2005; Wickramasinghe & Gunawardena, 2010)
Perspective	(Altamony, Tarhini, Al-Salti, Gharaibeh, & Elyas, 2016; Chofreh, Goni, Shahraroun, & Ismail, 2014; Gao et al., 2015; Jack & Kholeif, 2008; Lotfy, 2015; Mcadam & Galloway, 2004; Nair, Reddy, & Samuel, 2014; See & Ng, 2001; Shepherd, 2006; Tarhini, Ammar, Tarhini, & Masa'deh, 2015)

Project

Many a time ERP projects are the largest projects ever undertaken by organization in terms of cost, resources and business impact. A project starts from the initial phase where the organization decides on the necessity of ERP solution. Once the organization decides to go ahead with the ERP implementation, other phases like selection of ERP product, planning, implementation, verification and validation, go-live and project closure follows. A project can also be for the upgrade of existing version of an ERP project as well as for rolling out the existing solution to other territories.

The success of ERP projects is of huge importance, as failure might bring huge losses to the organization where the project is implemented. At times it can be huge enough to bring down the organization itself. It might be because of this importance 30% of literatures reviewed talks about the ERP project.

The most common topic that is discussed in ERP project related literatures are the critical success factors for an ERP project. Literatures identify the below mentioned ones as the critical success factors (CSF) for the ERP projects

- Clear Understanding of strategic goals
- Commitment by top management
- Good project management & implementation team
- Accurate data
- Business process re-engineering
- Organizational culture
- Monitoring & Control
- Training and continuous learning
- Multi location issues
- Power user and end user attitude

There are also a good no: of articles, which discusses on the reasons of the failure of the project. But it can be seen that most of the reasons the ones mentioned in CSFs.

Other articles discusses mainly on risk factors in the implementation, selection of ERP vendors and various planning phase of the ERP project.

Process

Unlike normal IT adoption, processes play a vital role in the success of ERP in an organization. The very concept of ERP is based on the fact that underlying processes across all verticals and geographies are similar and efficiently managing these processes benefits the organization. The ERP vendors claim that they have vast experience in analyzing the business processes of best in class organizations and their ERP products are built on these best practices.

Hence an ERP project is often associated with a BPR project as well. The organizational processes are thus affected by the ERP project. Many a time, the ERP vendors and consultants have a tendency to suggest modifications in organizational processes to be in line with ERP processes. The organizational users on the other hand, often are reluctant to change the processes they have been following for years just to meet demands of ERP software.

There are literatures, which supports both these arguments. Literatures in favor of the vendors and consultants claim that, the benefit of ERP implementation is greater for organizations, which were not following processes similar to ERP best practices prior to implementation. They also note that for those organizations, which were following the best practices even before ERP, implementation, failed to reap much benefits. This clearly indicates that process standardization play a vital role the benefit brought in by ERP.

There are also a lot of literatures like, (Yen, T. S., Idrus, R., & Yusof, 2011), which question the benefit of standardizations of processes. They believe that standardization would have negative impact, as that would destroy the uniqueness of the processes that might be strength of the organization. According to those authors, process standardization can bring benefit only for organizations that have standard routine tasks and standardization will be disadvantage for dynamic agile organizations.

Even though ERP vendors pitch in for process standardization, they provide options to customize their software to meet the demands of organizations implementing ERP. The degree of customisation usually depends on the state of processes followed by the organisation prior to ERP implementation But literatures point out that more the customizing, more would be cost of maintaining the software and for upgrade the solution.

Product

The nature of the product is what differentiates ERP implementations from other IT projects. The ERP vendors claim that their product contains the so-

called ‘best practices’ based features and attributes. There are literatures, which discuss about the designs and features of various ERP software products in depth along with their suitability in various verticals and market. There are few others that compares the various ERP products available in market. The various ERP systems can be categorized as challengers, leaders, visionaries and niche players based on their maturity and strengths.(Hestermann et al., 2012).

The failure of an ERP system, because of the various misfits between the ERP product and other factors are discussed in detail in some articles like (Yen, T. S., Idrus, R., & Yusof, 2011) According to those authors, misfits arose either from company-specific, public sector-specific, or country-specific requirements that did not match the capabilities of the ERP package. They point out that these misfits are lower in those modules where there is a globally accepted standard in carrying out a business processes like Finance.

The history and evolution of ERP products are discussed in certain papers. They explain in depth the evolution from initial MRP I to ERP II system. They also discuss in detail the dilemma faced by ERP vendors after the revenue showed a decline and many stalwarts predicting their demise as many believed that the organizations implemented ERP to solve the Y2K problem. But 2000s saw a reversal of trend with more and more organizations moving towards ERP(Robert Jacobs & “Ted” Weston, 2007). Some authors attribute this trend to change in the strategy of ERP vendors. Earlier they were concentrating on large enterprise and beginning of 2000 saw many of them targeting medium and small-scale industries as well.

There are wide ranges of literature, which compare the on-premise ERP as well as cloud ERP. Most of them agree to the claim of cloud vendors that the cost of ownership is drastically reduced in case of cloud ERP. The security concerns are the most important roadblocks raised by antagonist of cloud. Lack of the customizing ability is also one of the factors deter the organizations from adopting cloud ERP.

Future ERP products also saw a good research interest time to time.

Performance

Authors unilaterally agree to the fact that many ERPs implementations are failures. The percentage of failures varies from a low value to as high as 50%. This wide variation might be due to the fact that authors use differing evaluation criteria for performance. Again performance can be the performance of ERP in the organizational setup or the benefit brought in by ERP to the organization.

Some authors discuss about the cost benefit models, which compare the benefits brought in by ERP systems compared to the costs. CBAs provide allows managers to view the future economic benefits and the cost involved at each step in a relatively easy way.

Articles like that of (Murphy and Simon, 2001), compares performance of firms who have implemented ERP solutions and similar organizations that haven't implemented ERP. The firms that have implemented ERP solutions seem to exhibit better performance than the ones that have not. But this may be due to the fact that the ERP implementation by itself forces the organization to focus on best practices and these best practices would be adding to the performance. This view supports those articles that suggest organizations with processes similar to those prescribed by ERP don't attain as much benefit as that of organizations with wayward processes.

There are studies, which have observed that there is no significant performance in terms of revenue due to the implementation of ERP solution. But this might be due to the fact that businesses may be passing on performance improvement brought in by the ERP to end customer by lowering the prices.

Some authors hold the view that the size of the organization plays a major role in determining the performance improvement brought in by ERP. The argument is that smaller firms with fewer resources may not be able to fund for the huge initial cost that is required for the implementation of ERP. Due to the lack of resources they would compromise on the business processes brought under ERP, thus undermining the quality of ERP implementation.

There are very less no: of articles that deal with the extent of usage of an ERP solution. Such studies are important and critical in understanding the performance of the ERP solution in an organizational context.

Perspectives

There are a variety of articles that view the ERP solution for different standpoints.

There are a few articles, which discuss how the end user perceives the benefit of an ERP solution in terms of cost, time and the legacy software that it replaced. They analyze various technological, organizational and environmental factors influence the perceived benefit from an individual end user perspective. Some common factors identified are job relevance, ERP system quality, shared beliefs and training imparted.

How change management associated with an ERP implementation has to be handled and organizational issue associated with it from the management perspective is discussed in (Mcadam & Galloway, 2004). Senior managements feel that the ERP implementation need to be complemented by wider change programmes that should be aimed at cultural changes, people management practices along with process change.

The article,(Altamony et al., 2016) ,discusses how the national and corporate culture impact an ERP solution implementation and benefit realization. The result emphasizes the fact that corporate culture influences the problems faced during the implementation and a small set of core values might be causing diverse issues.

The success of the projects from the viewpoint of financial executive is discussed in one of the paper. The study results points that fiancé executes believe there is strong relation between the success of an ERP solution to cost and time consumed by the project.

People

The impact of people on the ERP success and the impact of ERP on the people matters are a highly researched area.

Majority of people-centric articles related to ERP, focuses on the importance of people attributes on the successful implementation of a project. The major people factors identified as a critical for the ERP implementation success are the project team composition, trust among team members, adaptability and flexibility of employees, communication strategy and implementation, managing resistance, taking employees into confidence and managing expectations(Wickramasinghe & Gunawardena, 2010).

Another group of articles like brings forth how the people view an ERP adoption. The managers and senior executives are generally optimistic, but the lower level employees are less supportive for ERPs.This difference in viewpoints can be attributed to a better holistic view for managers and potential job threat to lower cadre employees. Authors generally agree to the fact that personal traits and social factors also influence people view. Some people see ERP experience adding to their career prospects whereas some see it changing ones job style.

There are articles that discuss how ERPs affect their job activities.Since ERPs typically brings with them a whole lot of process changes to provide standardized business system, people who were considered knowledge house for organizational information before ERPs, feel that their importance has gone down. Some studies have shown that business departments do feel that ERPs system has brought down their importance and some times dictates to them. At the same time some studies point to the fact that after ERPs, departments feel more empowered to take decision with better data availability.

The ERP also brings about a lot of changes in the regular HR processes of an organization that are also studied. Various authors have identified the major HR processes that get streamlined by ERP implementation. These include recruitment, time booking and leave management, employee profile,, learning and development, compensation and payroll management,performance evaluation and management and self-service portals.

4. Conclusion & POSSibilities for FUTURE RESEARCH

We set out for this literature review to comprehend quality literatures published so far. Careful analysis enabled to identify various trends in ERP related research over the last two and a half decades. We were able to identify the journals that are publishing quality articles in ERP. Using a methodological framework of identifying focus area of ERP related journals; we could establish that general viewpoint that ERP is multi-disciplinary subject.

Then we went on to check the possibility of grouping these literatures based on 6Ps (Project, Process, Product, Performance, People & Perspectives). A meticulous approach was taken to develop a methodological framework, initially for identifying quality articles and later for classifying the articles to the 6Ps. The 6P approach ensured that the multi-disciplinary nature of ERP was brought in literature classification as well. The 6P classification exhibited excellent coverage as well and we were able to classify 93% of all quality articles to one or more of these Ps.

These new dimensions proposed by 6P classification, will definitely better help the researchers from varied disciplines to filter and extract articles based on their functional area. Such a possibility is limited or non-existent before as previous classifications were more concentrating on project phases. Also for organizations which have implemented, implementing or plan to implement ERP, this classification helps the formation of teams based each P category. Thus, the organization can scope their teams well and ensure there is no overlap or gap.

Coming to research interest, it is seen that quality articles published are showing a steady state over a decade now. These articles don't show any radical thinking among the researchers but are more incremental in nature. Yet careful examination tends to reflect that there are lot more areas in ERP field, which are not researched or are sparsely researched.

Even though the project grouping has maximum no: of articles, the researches seems to be interested only on conventional project practices and theories. There seems to be a dearth in articles that discusses about agile and lean project practices in ERP industry, even though most of the ERP vendors provide option for such implementation.

The performance benefits brought in by ERPs to organizations are reasonably well covered in articles. But when it comes to the factors impacting performance of an ERP in an organization, there seems to be dearth in studies. The relations between adoption and usage of ERP solution and their impact on overall organizational performance are also not adequately studied. Some of

these are gold mines for studious researchers as there are not many models and frameworks proposed. Even the proposed ones seem to be mere extensions of existing generic IS performance models where the researchers seem to have forgotten the fact that ERP is a multi-dimensional subject and it has to be dealt such.

The term ERP II was first introduced almost 2 decades back, and still the industry and researchers are not still taking of an ERP III. Even tough the technology industry has seen massive advancement in last 2 decades, ERPs seem to just utilize these technologies rather than innovate by its own. Even the adoptions seems to be slowerthan technology pace and the researchers who were earlier bringing radical changes in the way businesses are done seem to have lost steam. Researchers and industry has to work together to innovate and capitalize the capabilities of social networks, mobile phones, big data, machine learning and artificial intelligence.

The article titled, “Don’t Automate, Obliterate” by Michael Hammer in Harvard Business review which fuelled BPR’s popularity as a revolutionary concept seems have taken a back seat in last few years. The re-engineered processes, which were the core strength of any ERP system, are seen by many modern organizations as too stringent and costly to implement. Research and industry seems to be lagging behind in addressing these concerns. A menu-based process adoption, which provides the organization flexibility to pick and choose from a reasonably wide variety of processes based on the uniqueness of the organization, can be one option. Similar other options can be explored.

People-centric factors also to provide lots opportunities for further research. Even though the people factors as a critical success factor for an ERP and the coverage of HR functionalities by ERP are well covered, the issues faced by people after the ERP adoption throws us enough avenues for in-depth research. The solutions for such issues are also not seen adequately covered in literatures reviewed.

The ‘perspective’grouping, which has the smallest share of our reviewed articles, indicates that the articles fail to present the perspectives of a wider audience. The perspectives are limited to the immediate stakeholders. If there were more perspectives, it would have contributed to faster innovation in ERP products.

Hopefully this literature review provides valuable insights on the ERP field research and act as foundation for further research in this area.

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