

# Enterprise Resource Planning (ERP): An Exploratory Literature Review Using Latent Dirichlet Allocation

**Ari Mariano-Melo**

Department of Production Engineering  
University of Brasilia  
Brasilia, CEP 70910-900, Brazil  
[mktmariano@gmail.com](mailto:mktmariano@gmail.com)

**Patricio Ramírez-Correa**

School of Engineering  
Catholic University of the North  
Coquimbo, 1781421, Chile  
[patricio.ramirez@ucn.cl](mailto:patricio.ramirez@ucn.cl)

## Abstract

An Enterprise Resource Planning (ERP) system is a comprehensive packaged software solution composed of several configurable modules that integrate, firmly and in one single system, the core business activities through the automatization of information flows and the use of a shared database. In the process of integration of the packaged are incorporated the best practices, to facilitate the decision making, to reduce costs and to improve the directive control, and eventually, to reach the efficient and effective use of the enterprise resources. The scientific interest in ERP systems began around the year 2000, and since then, several authors have proposed research agendas associated with this technology; however, as far as we know, there is not an analysis of the evolution of these agendas. In this context, this study aims to explore the research topics in ERP systems and determine trends associated with them. This study uses data extracted from articles published between 2002 and 2019 in information system journals incorporated in WoS. The total number of studies for this exploration was 231; all of them contain “Enterprise Resource Planning” in their title or abstract. The research consisted of three steps that included, first, preprocessing of titles and abstracts, second, determination of topics with Latent Dirichlet Allocation (LDA), and third, trend analysis. The preprocessing involved tokenization, stemming, and stop-word removal. LDA is a topic modeling method, unsupervised and probabilistic, that extracts topics from a document collection. LDA analyzes the words in each document and calculates the joint probability distribution between the words observed and the hidden structure unobserved of the topics. This study identified a local minimum of perplexity (= 246.8) with a classification in 18 topics. This number of topics is near to the number of topics indicated in the ERP research agendas. In order to analyze the research trends, a model based on five topics was used (perplexity = 376.4). This choice is the result of the revision of the models of 2 to 18 topics. In the case of topic1, the five most frequent tokens are implement\*, enterpris\*, culture\*, assimil\*, and technolog\*; consequently, it is labeled cultura&implementation. For topic2, the five most frequent tokens are implement\*, firm\*, enterpris\*, technolog\*, and organ\*; therefore, it is labeled implementation. The five most frequent tokens for topic3 are cloud\*, trust\*, cost\*, profit\*, and vendor\*; thus, it is labeled markets. In the case of topic4, the five most frequent tokens are user\*, enterpris\*, perceive\*, satisfact\*, and train; accordingly, it is labeled users. Finally, the five most frequent tokens for topic5 are busi\*, enterpris\*, company, integr\*, and oper\*; therefore, it is labeled operation. Lastly, the trend analysis indicates that the studies on users and markets are on the increase, and on the other hand, those on implementation and operation decrease. The conclusions of the study indicate that there is a trend in ERP research, which leaves behind technical elements associated with implementation and operation and focuses on socio-technological issues. Since this study is an exploration, the findings should be taken carefully.

## Keywords

Enterprise Resource Planning, Topic modeling, Latent Dirichlet Allocation, Research agenda.

## References

- Grandón, E. E., Ramírez-Correa, P. E., and Rojas, K. P. (2018). Uso de la teoría business process change (bpc) para examinar la adopción de enterprise resource planning (ERP) en Chile. *Interciencia*, 43(10), 716-722.
- Mariano, A. M., and Rocha, M. S. (2017). Revisão da literatura: apresentação de uma abordagem integradora. In AEDEM International Conference (Vol. 18, pp. 427-442).
- Pinto, S. M., Ramírez-Correa, P., and Grandón, E. E. (2017). Antecedentes del Éxito de los sistemas de planificación de recursos empresariales en las grandes empresas chilenas: Un modelo factorial exploratorio. *Información tecnológica*, 28(3), 139-146.
- Ramírez-Correa, P. and Cruz, R. G. (2005). Meta-análisis sobre la implantación de sistemas de planificación de recursos empresariales (ERP). *JISTEM-Journal of Information Systems and Research*.
- Ramírez-Correa, P. (2004). Rol y contribución de los sistemas de planificación de los recursos de la empresa (ERP) (Doctoral dissertation, Tesis Doctoral). Universidad de Sevilla. España).
- Ramírez-Correa, P., and Cruz, R. G. (2005). Una investigación empírica sobre los factores que afectan el éxito de los sistemas ERP en Chile. *Revista Ingeniería Informática*, edición, (11).

## Biographies

**Ari Mariano-Melo** is currently working in the Department of Production Engineering at the University of Brasilia. He is a professor in the professional master's degree in applied computing at the University of Brasilia. His research includes Bibliometrics, Active Methodology, Consumer Behavior, Service Quality, and Multivariate Methods. He holds a MSc and a Ph.D. in Business from the University of Seville, Spain. He has been visiting Professor at the Catholic University of the North, Coquimbo (Chile).

**Patricio Ramirez-Correa** is an Associate Professor and Deputy Director of Research in the School of Engineering at the Catholic University of the North, Coquimbo, Chile. He earned his degree in Informatics Engineering from the Pontifical Catholic University of Valparaíso, Chile. He has a Master in Management from the Pontifical Catholic University of Valparaíso, Chile, and a Ph.D. in Business from the University of Seville, Spain. He has been visiting Professor at the University of Seville (Spain) and AUT's Business School (New Zealand). Author of more than 40 publications in international indexed journals in the field of information systems, learning and ICT. He has published his work in journals such as *Industrial Management & Data Systems*, *Computers & Education*, *Telematics and Informatics*, and *Journal of Research in Interactive Marketing*.