

A bibliometric analysis of e-government research

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Abstract— A lot of researchers from all over the world investigate e-government research problems both independent and its combination with other disciplines in last fifteen years. In this paper bibliometrical analysis of scientific materials from Google Scholar database during 15 years (2000-2014) was carried out, popular topics, most productive authors and international collaboration of e-government research were determined.

Key words—e-government, e-government research, science mapping, bibliometrical analysis, vosviewer.

I. INTRODUCTION

Electronic government or e-government is a creation of conditions for providing various information and electronic services by government bodies to all citizens, legal entities, foreign citizens and the persons without citizenship. Main objective of the e-government development is the maximum reduction of "distance" between simple citizens and government officials, ensuring transparency and simplification of their relationship. For achievement of this purpose an obligatory factor is broad application of the electronic services provided by government bodies, increasing their quantity and quality on the base of citizens usage analysis results.

Since e-government is a relatively new research area, there is a limited literature analyzing its adoption and implementation process. Therefore, the authors critically review other relevant areas that support the adoption of ICT. An example of such an area is electronic commerce adoption, electronic web services, and electronic business. As a result, the authors will be able to adopt factors from other relevant areas to conceptualize a strategic framework for e-government adoption [7]. E-government involves many organizations and is a complex and multidisciplinary domain [8]. The field of e-government involves the interactions and reciprocal conditioning of several different systems, which cannot be treated as a simple industry and even less as a product [9].

In this report, a bibliometric analysis of papers published in 4 scientific journals and 12 proceedings of the International Conference on Electronic Government was provided for getting representation about real provision of e-government research in the world. A distribution of materials on subjects of e-government research was described, list of the most productive authors, their indicators

and use of science mapping software was visualized international collaboration of countries from all over the world on the base of citations in e-government research area.

II. LITERATURE REVIEW

Bibliometric analysis of the literature on e-government carried out by some researchers, e-government and information sciences problems for research evaluation, identification of main vehicles of scientific output, most cited authors, papers, journals, countries and institutions have been studied. Some of them have used ISI Web of Science, and CiteSpace or HistCite software [1-3]. Przeybilovicz, et al. have analyzed research on e-government development using local journals and authors from Brazil, have demonstrated most popular topics, most productive authors, organizations and international collaboration between Brazil and other countries on given research area [4], also structuring of electronic government research were studied on performed comparative analysis of co-authorship relationships between scholar published papers at the Europe Conference on e-Government and the International Conference on e-Government [5] e-government research maps among authors induced by papers published in the four proceedings of the International Conference on e-Government was constructed [6].

III. E-GOVERNMENT RESEARCH TOPICS

E-Government research has been clustered around following topics [10] based on Barki and Rivard keyword classification scheme of information systems (IS) literature [11]:

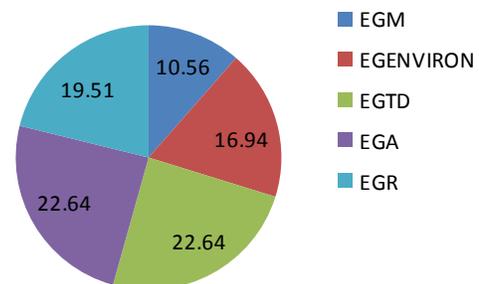


Fig 1. Distribution of materials by categories

TABLE I. MOST PRODUCTIVE AUTHORS FROM GOOGLE SCHOLAR ON E-GOVERNMENT RESEARCH (TOP 15)

N	Name	Organization	Number of Documents in Google Scholar	Number of citations	h-index	i10-index
1.	Marco Janssen	Arizona State University (USA)	276	10942	47	40
2.	Shan Ling Pan	National University of Singapore (Singapore)	248	4472	37	32
3.	Yagesh K. Dwivedi	Swansea University (UK)	207	1771	20	44
4.	Vishanth Weerakkody	Brunel University (UK)	151	1906	25	23
5.	France Belanger	Virginia Polytechnic Institute (USA)	146	5524	32	47
6.	J. Ramon Gil-Garcia	Center for Technology in Government, University at Albany, SUNY (USA)	248	2667	25	62
7.	Maria A. Wimmer	University of Koblenz – Landau (Germany)	207	1771	20	44
8.	Ralf Klischewski	German University in Cairo (Egypt)	110	1357	19	36
9.	Tung Lai Lai	Nanyang Technological University (Singapore)	50	1380	19	23
10.	Lemuria Carter	North Carolina A & State University (USA)	71	2398	16	20
11.	Shirish Shrivastava	HEC Paris (France)	76	769	16	19
12.	Ana Cristina Bicharra Garcia	Universidade Federal Fluminense (Brasil)	192	842	14	22
13.	Alexander van Deursen	University of Twente (Netherlands)	54	727	14	15
14.	Alina Chirchu	Bentley University (USA)	43	1142	14	15
15.	Enrico Ferro	Istituto Superiore Mario Boella (Italy)	65	586	13	16

TABLE II. NUMBERS OF ANALYZED SCIENTIFIC PAPERS

N	Included in analysis	Number of analysed papers			
		2000-2004	2005-2010	2011-2014	Total
Scientific Journals					
1	Government Information Quarterly	14	33	41	88
2	Electronic Government an International Journal	11	45	83	139
3	Journal of Government Information	11	17	22	50
4	The journal of Strategic Information systems	7	19	12	38
Conferences					
5	International Conference on Electronic Government	16	18	32	66

cycle activities, testing, development methods and tools, project management, implementation, input operations, data processing, database operation and hardware and software concepts, such as computer organization, computer networks, etc;

- E-Government management (EGM) - constitutes a view of management that sees its functions as including planning, organizing, staffing, evaluating, controlling, security, data resource management, e-Gov security and IS management issues;
 - E-Government organizational and external environmental (legal, economical & social) (EGENVIRON) issues. Organizational environment includes organizational characteristics, organizational functions, task characteristics and organizational dynamics; external environment includes economic, legal, political and social environmental factors;
- E-Government Technological & Developmental Issues (EGTD) – include topics related to development strategies, life cycle activities, testing, development strategies, life

- E-Gov Applications (EGA) – include the topics related to types of applications, application products related to areas such as marketing, health, and human resource, components of application products and characteristics of application products;
- E-Gov Research (EGR) – includes status/maturity of e-Gov research (e.g., inquiries into status of the e-Gov field itself), trends in e-Gov research (e.g., diffusion of e-Gov research), and historical aspects of e-Gov area.

IV. ANALYSIS

Usage of different data sources of scientific information allows us to get review for each scientific area, journal ranking, authors in this area and institutions, which they represent. Google Scholar is an open access and wider database, which lets analyze a lot of materials: scientific papers, conference proceedings, books and citations for each document. in this paper 381 scientific documents were analyzed to get review of e-Government research area using Google Scholar. To identify publications on e-government area, the queries were carried out using following search-terms: “Electronic Government” or “Egovernement” or “e-government” or “e-gov” or “egov”. The distribution of analyzed papers to journals and conferences and also for year periods were shown on table 2. After clustering the given scientific materials a distribution of research materials by the categories of e-Government research was received (Fig.1). As result, we can say, that most popular and researched areas are E-Government Technological & Developmental Issues (EGTD) and E-Govapplications (EGA). Most productive authors of e-government research are from the best institutes of USA, Singapore and UK (Table 1). Their indicators (number of published papers, h-index, i10-index, number of citations) recieved from Google Scholar database are shown on the table.

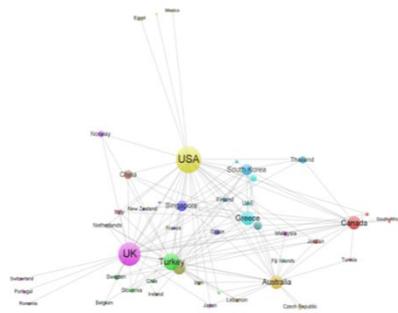


Fig. 2. International collaboration on e-government research

Finally, for visualizing of the results, international collaboration map was constructed by vosviewer software (fig.2). The map was constructed using the number of citations for each paper. VOSviewer is a computer program that was developed for creating, visualizing, and exploring bibliometric maps of science [12]. VOSviewer can be used for analyzing all kinds of bibliometric network data, for instance citation relations between publications or journals collaboration relations between researchers, and co-occurrence relations between scientific terms. The input file of Vosviewer was file of NET extension, received using Pajek program [13]. The structure is easy, Pajek files are text files, where each line is an element, and the list of edges follows the list of nodes, for our example, nodes of the net file presents countries and the edges are the numbers of citations of countries to each other. In this report, we presented relations between countries on e-Government research, and determined the clusters of developed countries as UK, USA, Denmark, and also developing countries as South Korea, Greece, Singapore, Turkey, which are also active in e-Government research area.

V. CONCLUSION

Review of the e-Government research area allows us to evaluate research and identify more productive countries, authors and organizations. Also distribution of published works by categories or research topics gives information about little studied areas on giving sphere. This information is very important both for researchers and funding agencies, institutions and governments.

REFERENCES

- [1] G.O. Almeida, D.M. Zouain, Y.L. Mahecha “The status of E-Government Research: a bibliometric study”, *Business and Management Review*, v. 3(11), pp. 7-22.
- [2] G.P. Sahu, Y.K. Dwivedi, V. Weerakkody “E-government development and diffusion: Inhibitors and Facilitators of Digital Democracy” *ISI Global*, 2009, 258 p.
- [3] S. Cheng, L.Ding “A quantitative study on the research fronts of Electronic Government”, *Proceed. of the 5th International Conference on Business, Intelligence and Financial Engineering*, China, 2012, pp. 481-485.
- [4] E. Przeybilowicz, T.R. Coelho, M.A. Cunha “The development of studies on electronic government in Brazil: A bibliometric and sociometric study”, *Proceed. of the International Conference on Information Resources Management*, 2014, pp.1-12.
- [5] N.Erman, L. Todorovski “Collaborative networks of two e-government conferences: are we building a community”, *Proceed. of the 11th European Conference on eGovernment*, Slovenia, 2011, pp. 224-233.
- [6] N.Erman, L. Todorovski “Mapping of the e-government research with Social network analysis”, *Proceed. of the 8th International Conference on eGovernment*, 2009, pp. 13-25.
- [7] Z. Ebrahim, Z.Irani, S.A.Shawi, “A Strategic Framework for E-government Adoption in Public Sector Organisations”, *Americas Conference on Information Systems*, 2008, pp. 1116-1125.
- [8] M.A. Wimmer, “The Role of Research in Successful e-Government Implementation”, *E-Government Guide Germany. Strategies, Solutions and Efficiency*, Stuttgart, Fraunhofer IRB Verlag, 2007, pp. 79-87.
- [9] M.A.Wimmer, C.Codagnone, M.Janssen, “Future e-government research: 13 research themes identified in the eGovRTD2020 project”, *Proceedings of the 41st Hawaii International Conference on System Sciences*, 2008, 11p
- [10] Z.Irani “Trends of electronic government research”, <http://www.lse.ac.uk/management/documents/ISRF-Irani.pdf>
- [11] H. Barki, S. Rivard, J. Talbot An information systems keyword classification scheme // *MIS Quarterly*, v.6, no1, 1988, pp. 299-322.
- [12] <http://www.vosviewer.com>
- [13] <http://vlado.fmf.uni-lj.si/pub/networks/pajek/doc/pajekman.pdf>