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New agenda in Big Data and Project Management: A bibliometric analysis and a systematic literature review

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Abstract

The twenty-first century is the data revolution century and especially in the last decade, the data analysis methods are used by most scholars and practitioners in all scientific fields. Project management is a social science with heavy reliance on data, and the available data in projects can be constructed, semi-constructed or unconstructed information and project managers rely on this data to make the decision. Because project managers overwhelmed with data and information most of the time they make the decision when the problem occurred and it makes project inefficient and ineffective business. The data analyzing tools for project managers seem crucial, and big data analysis is useful tools to analyze the huge volume of any type of data and big data analysis techniques are strong tools. Here in this study the history of big data analysis in project management is reviewed and based on finding the new agenda in the application on big data analysis in project management proposed. The study's methodology is based on combination of a systematic literature review and bibliometric analysis. By reviewing the history of the application of big data in project management the gaps are identified and the new agenda for future development agendas are introduced. This article is a database for practitioners to find the application of the project management big data applications and is a guideline for project management and big data analysis for future study. Big data analysis will play a significant role in social science, especially the multidisciplinary field of science like project management.

Keywords: Project management, big data, bibliometric analysis, systematic literature review, future study

Methodology

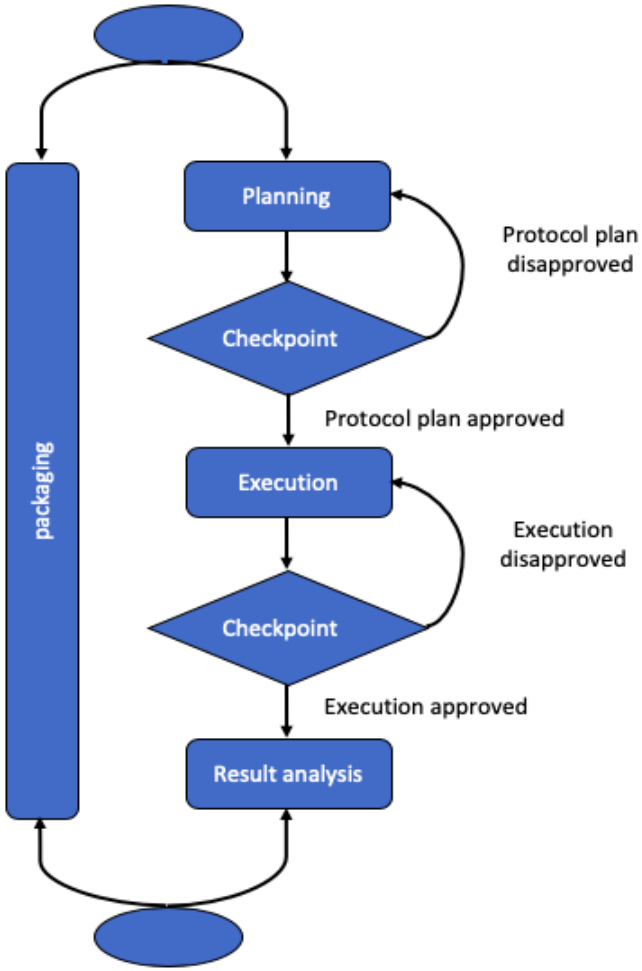

Table 1 Number of publication in big data analysis individually and big data analysis in project management

Big data analysis in project management			Big data analysis		
Publication Years	Records	Percentage	Publication Years	Records	Percentage
2020	2	2.17%	2020	407	2.21%
2019	17	18.48%	2019	2776	15.09%
2018	12	13.04%	2018	3519	19.13%
2017	11	11.96%	2017	3550	19.30%
2016	21	22.83%	2016	3284	17.85%
2015	18	19.57%	2015	2507	13.63%
2014	6	6.52%	2014	1476	8.02%
2013	4	4.35%	2013	696	3.78%
2012	1	1.09%	2012	145	0.79%
			2011	17	0.09%
			2010	2	0.01%
			2009	4	0.02%
			2008	11	0.06%
			2007	1	0.01%
			2006	1	0.01%
			2004	1	0.01%

Figure 2 Comparison graph of the number of publication in big data analysis individually and the application of big data in project management

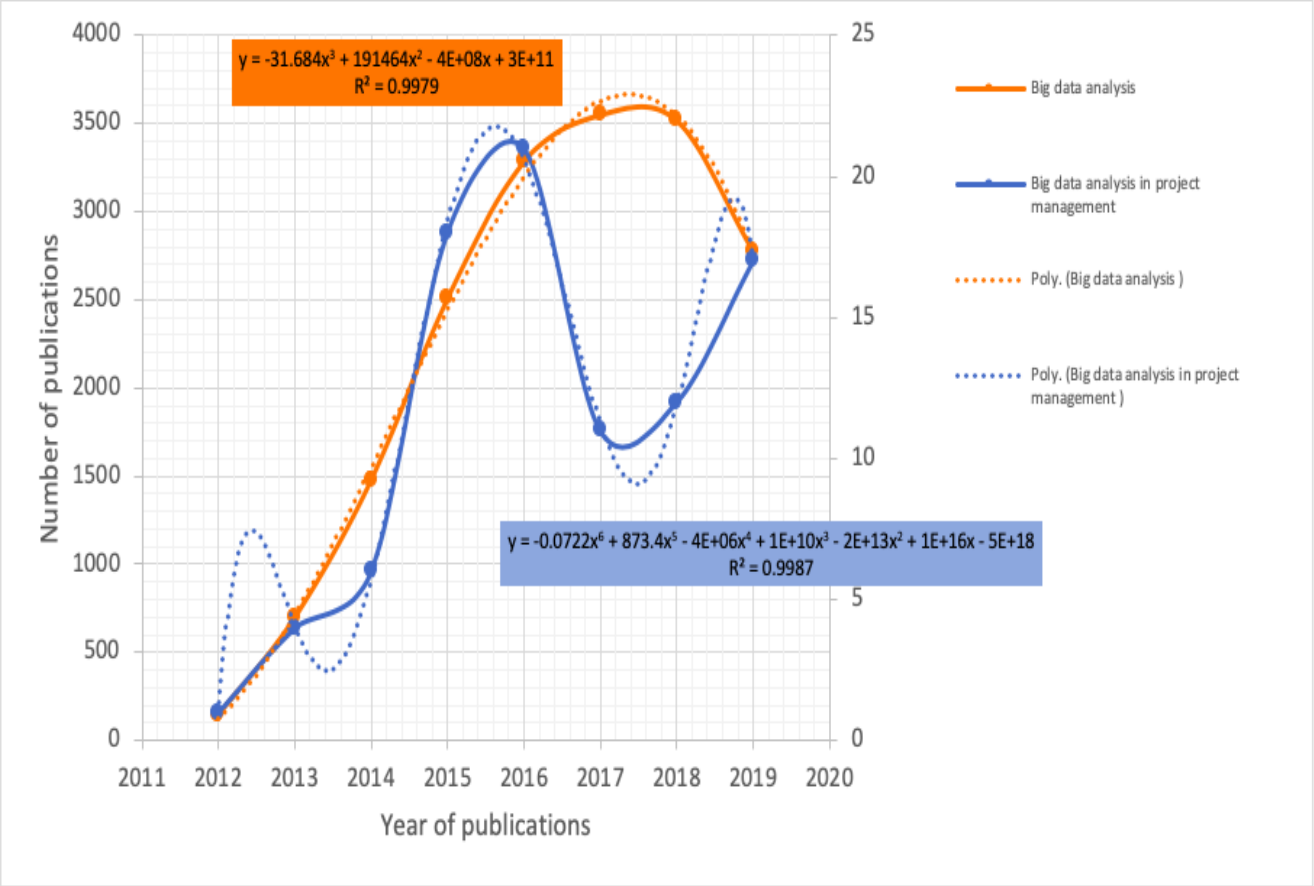

Figure 6 the keywords network for top keywords occurred in studies

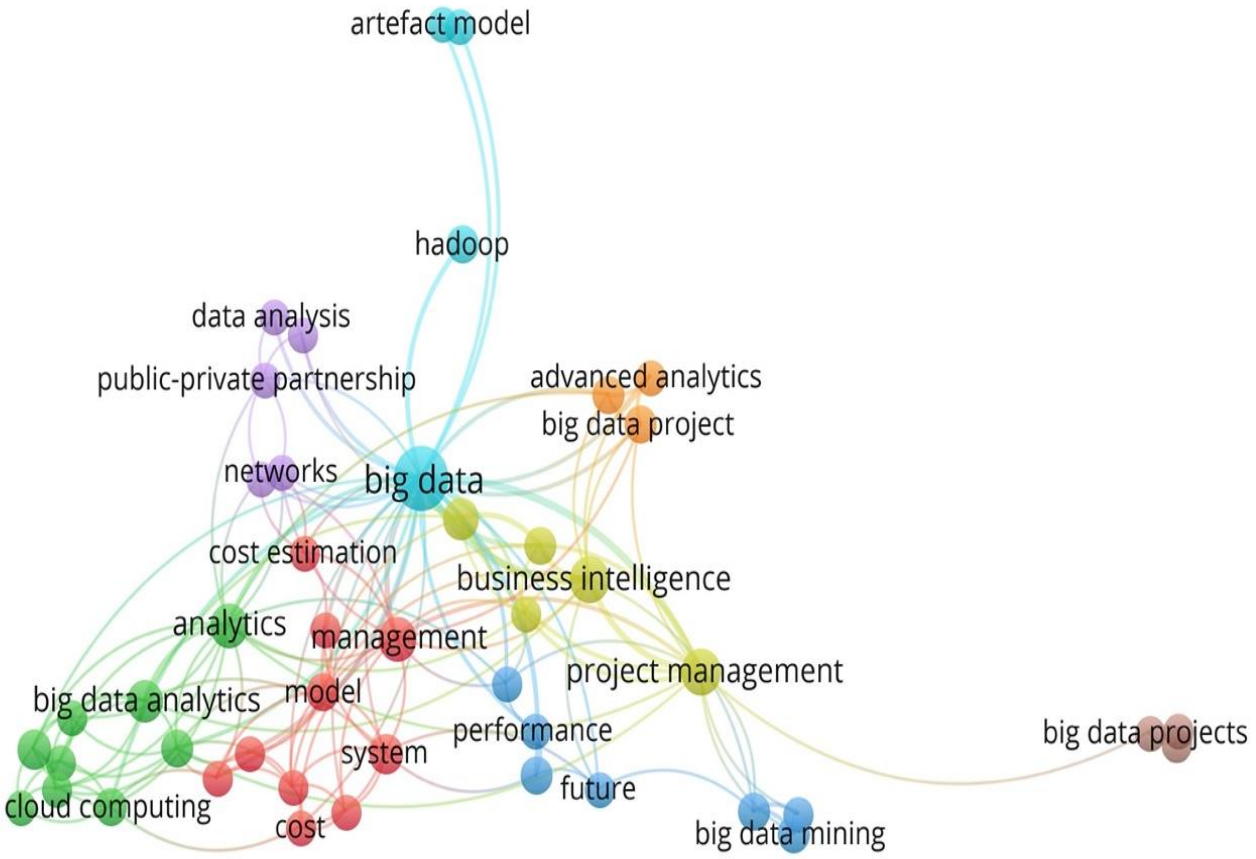

Table 5 comparison table of the applicable keywords and PMBoK and PRINCE2

*** Note: in the field of application of big data in risk in project management 3 article has been identified (Fu and Wang 2014, Gorecki 2018, Ma and Wu 2019)**

PMBOK Guide Knowledge Area	PRINCE2 theme	Application keywords
Project Integration Management	Business case, change, progress	Integration, Framework, Performance
Project Scope Management	Plans, progress	
Project Schedule Management	Plans, progress	
Project Cost Management	Plans, progress	Cost, Cost estimation
Project Quality Management	Quality	Quality
Project Resource Management	Plans	
Project Communications Management	Organization	Model, System, Networks
Project Risk Management	Risk	*
Project Procurement Management	Not covered	Supply chain
Project Stakeholder Management	Organization	Public-private partnership

6. Conclusion

The role of project management to shape the modern society is undeniable, and project management was with human form the early days of civilization. In mid of twenty-century scholars looked at project management as science and era of modern project management has been started. By entering the twenty-first century the data analysis and data science came to picture and after two decades in twenty-first century big data analysis penetrate all sector of science and project management is no exception. Project business is the high-risk business because of working with a huge amount of unconstructed and constructed information and project management can not make the decision before a problem occurred. Hence, the application of big data analysis in project management will empower the project managers to make real-time and accurate decisions. Here in this study, the history of the application of big data in project management is reviewing. A systematic literature review methodology is used to shape this study processes and bibliometric analysis is implemented to see the characteristics of the history of the big data application in project management.

To cited articles of the application of big data in project management are demonstrated. The countries' networks are presented to show the correlation if the countries. The keywords are reliable publication content indicators, so authors' keywords and Keywords plus analysis have been conducted and the network and the classification tables present to show the content of the filed of study. "Business intelligence" is the top application of big data and "construction project" is the first area that used big data analysis. With the comparison of PMBoK with results of this study, it can be seen there are studies related to knowledge areas in PMBoK such as "project integration management", "project cost management", "project quality management", "project communication management", "project risk management", "project procurement management", and "project stakeholder management". This comparison doesn't mean the scholars and practitioners can't work on these sub knowledge are in project management, vice versa the number of publications and records in these knowledge areas are limited, and the development can be done. Moreover there are the other untouched knowledge areas in PMBoK like "project scope management", "project schedule management", and "project resource management".

The big data analytic application in social science will be vast and vary like technical science, the project management with a combination of different social sciences and technical parts are one of the places which big data analysis application will play a significant role. The future relies on data science especially the science can extract information from unconstructed data and that would be the future tools of any professional person and the managers and especially project managers will be in the front line.