ONE BELT AND ONE ROAD: LITERATURE ANALYSIS

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In the late 2013 One Belt and One Road (OBOR) was announced in Chinese international political speeches. Thereafter, this significant investment program started and research works were also initiated. We found that first journal publications (in English) appeared in 2016, and thereafter their amounts have increased, especially in 2018. Most of the contributing authors are China based or Chinese scholars living in abroad. Highest citations amounts are for the works published in the first analysis year, however, some differences exist between Scopus and Web of Science citation service amounts. Ten highest cited works account most of the citations on analysed 66 articles. Literature analysis uses tag cloud and network analysis to identify and analyse what are the most used references of these OBOR works. There does not exist any clear key reference among articles, but most used references form a network among analysed research work citations. This further verifies that OBOR program is significantly sized in topics covered, and it is still difficult to define its central or key area.

Keywords: OBOR, literature analysis, China, network analysis

1. Introduction

Chinese President Xi Jinping firstly announced the OBOR Initiative in the late 2013 in official visits to Kazakhstan and Indonesia (Huang, 2016; Du and Zhang, 2018). It is also known as the Belt and Road Initiative (BRI). In November 2013, this Initiative was put into the comprehensive reform adopted by the Central Committee of the Communist Party of China. In March 2015, NDRC, Foreign Ministry and Ministry of Commerce in China cooperated to provide detailed plans for the Belt & Road Initiative (Huang, 2016). The Initiative consists of Silk Road Economic Belt and the 21st century Maritime Silk Road (Zhang *et al*., 2019). The main objectives of OBOR are to promote economic and social connectivity, partnership, and security cooperation between China and relevant countries (Kwang *et al*., 2018). Now OBOR members cover 65 countries, which are mainly located in Asia and Eastern Europe.

The BRI provides innovative model for international economic cooperation. It promotes many significant infrastructure projects, which include for example cross-border high-speed railways, freight railways, oil/gas pipelines links, and telecommunications as well as electricity infrastructure. However, the BRI is much more comprehensive than just plain infrastructure development (Huang, 2016). It contains the following five priority areas for cooperation (Huang, 2016). The first cooperation is to create a multitier inter-governmental mechanism for policy dialogues. The second cooperation is to strengthen infrastructure connectivity. The third cooperation is to facilitate investment and trade as well as formation of cross-country industry value chains. The fourth cooperation is financial support, which includes AIIB and BRICS New Development Bank, Silk Road Fund etc. The last cooperation point is to set up some forms and mechanisms for cultural, academic and talent exchanges.

BRI is China's new strategy to build a base for further economic growth having intensive collaboration and economic cooperation with large geographical area of countries. As China's economic growth patterns have changed in the recent years and its economic growth have faced moderation challenges. BRI enables China to search and explore for new economic opportunities, which are in support of economic growth in coming decades (Wang, 2017). From 1980 to 2018, China's real GDP annual growth rate was well over 9 %, and its GDP per capita increased from few hundred USD to around 8000 USD. However, China's economic growth was also interrupted in some periods, especially in 1989–90 (to around 4 %), 1998–99 (to around 7.8 %) and 2008-2009 (in this last period GDP dropped from well above 10 % to around 9.5 %). In 2012, GDP growth rate started its slow decrease to below 8 %. Growth has a little bit slowed down thereafter, where current growth being somewhat above 6 %.

As OBOR Initiative is in its initial phases, so most researches are focusing on its importance, strategy, the expected impacts on regional development, etc. However, as time proceeded further, scholars' research will move and has already moved to more wide fields such as the economic growth, energy, and environmental issues. Therefore, it is necessary to complete literature analysis concerning the research works from OBOR published in English language journals. It will provide the better understanding of OBOR research, and its application areas. It will also shed new light on the evolved practice of OBOR.

This research is structured as follows: in following Section 2 is introduced research methodology of completed literature review. Analysis follows in Section 3. Research is concluded in Section 4, where also future research avenues are being proposed.

2. Research Methodology

To gather relevant English written academic articles on the topic of One Belt and One Road (OBOR) were databases of Elsevier Science Direct and Emerald Publishers used. This took place in the period of Aug.-Nov.2018. Search was time consuming due to the reason that search words of "belt" and "road" were used to find relevant research works. This resulted on the initial check for several hundred articles – many of these concerned traffic safety. In total 66 relevant OBOR articles were found. These are analysed in the following. First one of the articles were published in 2016, and last ones will be released during 2019 (they were available through early view).

As OBOR Initiative itself is diverse, so are the topic areas and journals involved in this following analysis. Table 1 illustrates division to five different areas. Economics, trade and finance is itself largest branch of research and it has in total attracted 23 publications. This is followed by natural key area, logistics, supply chain and operations management with 16 publications. Energy and environment have attracted somewhat below 10 articles. Outside of these areas, other branches have attracted in total 10 research works.

Table 1. Division of analysed OBOR research works to different branches / topic areas

Branch/topic area	Publications
Logistics, supply chain and operations management	16
Energy	8
Environment	9
Economics, trade and finance	23
Other	10
Total:	66

In total, articles of the following analysis were published in forty different journals. Highest publication amounts were in the following journals: *Transportation Research Part E* (eight articles), *China Economic Review* (five articles), *Journal of Eurasian Studies* (five articles), *Applied Energy* (three articles), *Journal of Cleaner Production* (three articles), *Physica A* (three articles), and *Science of the Total Environment* (three articles). Apart of Journal of Eurasian Studies, these journals are high impact factor journals in Web of Science (Thomson-Reuters/Clarivate Analytics). Journals having published one or two research works from OBOR were also in general rather prolific, and typically well indexed. Even if these analysed articles have been available on the journals for readers and citations for limited amount of years, their interest should already have been recorded, although, in smaller numbers.

In the following citation analyses we used Scopus (Elsevier) and Web of Science (Thomson-Reuters/Clarivate Analytics) to analyse the interest of other researchers on OBOR articles (search date, 27.Feb.2019). In general, it could be stated that Scopus attracts a little bit higher citation amounts in general as it includes more journals and publications in its citation analysis. However, in the following analysis this was not found to be that significant, however, difference was there. Scopus argued that following analysed articles attracted 339 citations, where Web of Science showed amount of 258 (81 citation or 23.9 % lower).

3. Literature Analysis

Scientific publishing is always delayed activity – article appearing today might have been actually completed year or two years ago (or even longer time, depends from journal). Recently this has been shortened in open access journals, but still classical journals keep strict control and approach within peer review process, which takes from several months up to year (sometimes even longer). If research work is

accepted, then after peer review process, it will be put in the final editing, and in pipeline waiting for available slot in journal issues. On the top of this, research work needs its time. This is typically from several months to year. Due to these delays, it is understandable that OBOR research did not gain interest that early. First publications were found from year 2016 (Table 2). These have attracted most of the citations in Scopus and WoS – around 58-59 % from citations depending on citation service used. This well illustrates the early mover advantage.

In 2017 publication amounts from this topic remained nearly as the same, illustrating small growth. However, in 2018, publishing activity increased considerably, and it reached 39 articles. Year 2019 is showing only six articles to be published, but this situation is from November 2018 (and through early view). Probably actual publishing volumes in 2019 will be double or even higher to this, but most certainly, volumes of 2018 are difficult to match. In peak year 2018, share of publications in this analysis is 59 %, similar to citation share of 2016.

Table 2. Publishing amounts and citations to these publications in two different citation services (Scopus and Web of Science)

Year	Publications	Scopus	WoS
2016	9	199	151
2017	12	46	35
2018	39	93	72
2019	6	1	0
Total:	66	339	258

Institution country of authors indicates rather well from which region or country research interest have originated. Authors of course might be coming from different country as what their writing institution is, however, academic expert mobility is not that extremely high, it is rather moderate. In the gathering of institution countries, some authors might have had several affiliations. These all were taken into analysis as such. As Figure 1 illustrates, research interests of OBOR are originating mostly to China as authors had named this as their affiliation in 71.2 % of all cases. Small shares of Pakistan, Singapore, Australia, Republic of Korea and USA follow this. There were also bunch of other countries (in total 14), which had very small share, and they are included in the class of "others". Most distant were North European countries, like Denmark, Norway and Sweden.

In reality, share of China in research works is higher than 71.2 % as stated in Figure 1. As completing this analysis, there were many authors having clearly Chinese name, and working e.g. in USA, Sweden or Australia, or having other affiliation in Singapore. Therefore, the share of Chinese scholars in OBOR research is clearly dominating, and is challenge in the future research project and publications. In the end, OBOR concerns international collaboration in Eurasia, Middle East and Africa.
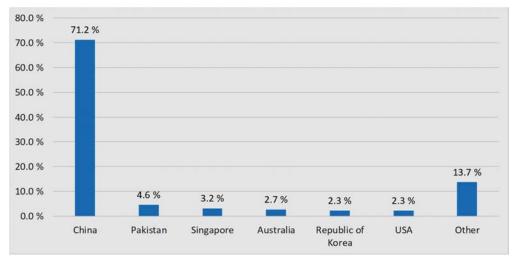

Figure 1. Authors' institution country in analysed OBOR publications

In both citation services used, four first most cited research works were the same (Table 3 and 4). Highest citation amount is for Huang (2016), which examines OBOR motivation and potential implications. It is work positioned in strategy level of this theme. Huang (2016) stresses the importance of economy and economic growth in OBOR programme agenda. It is basically multi-faced interaction between Chinese economy, emerging economies and European economies, and all risks (geopolitics, financial sustainability and politics) related to these. Second highest cited manuscript of Cai *et al*. (2016) in turn examines current cement production emissions in China and their distribution among different sized companies. Work has as one theme OBOR, and the implications of infrastructure construction during the forthcoming years in the Silk Road. Most probably cement production will significantly increase in China and nearby areas, which should receive more attention to control CO_2 emissions of cement production. As suggestions for preventing harmful emissions, Cai *et al*. (2016) propose "cap and trade" mechanism for CO_2, and benchmarking from the industry's best actors. Third most cited research work in turn concentrates on oil imports to China from Africa and Middle East, and alternative routes to support this (Shaikh *et al*., 2016). One competitive route is using in Middle East imports route of Pakistan through Gwadar sea port, and then to build oil pipeline reaching Chinese border. As it is highlighted in the research work that oil pipeline is high risk project with estimated budget of 4.6 bill. USD; this project is dependent also on other already planned projects (port of Gwadar and hinterland infrastructure) in Pakistan to realize its potential. Fourth highest cited research is critical review and assessment of OBOR, particularly concerning its future success prospects. OBOR operates in the large geographical area and many of its countries are developing ones and being dependent on changes of raw material prices. Some of these countries cannot be considered as peaceful and safe. Also real objectives of the programme and other superpower influences in numerous OBOR countries raises concerns.

Highest cited research works in ranks of four to seven are same in both Table 3 and 4. However, their sequence is different. All of these research works concern energy industry issues (Duan *et al*., 2018; Xu *et al*., 2017; Han *et al*., 2018). They are all having positive tone in them, and see future opportunities in often argued negative implications of this huge investment program. Duan *et al*. (2018) propose evaluation model for energy investments of OBOR area through risks, and evaluate all countries with it. Han *et al*. (2018) see opportunities to have further energy efficiency convergence through international investments and higher amount of trade. This is also justified with older data from other groups of countries belonging to joint economic and political development (like OECD, APEC, ASEAN, and EU). Xu *et al*. (2017) stress the importance of green energy in the energy investments and regional development in OBOR programme. For ranks from eight to ten, Tables 3 and 4 only share one same publication that of Zhang *et al*. (2018). This study concerns water origins and export through agricultural products as virtual water in OBOR area. It shows that China has in past exported a lot of products requiring water resources in production and growing (like maize, apples, tea, beans, garlic etc.). However, there exist some countries in OBOR programme, which are having surplus with China, and these are e.g. European countries. In Table 2, two other research works are general descriptions, economics and strategy development works (Clarke, 2016; Malle, 2017). Both of these works describe the political and economic situation in Eurasia, and consider it through influential countries such as China, Russia and USA. Malle (2017) analyses further Chinese-Russian collaboration progress, and sees it in pragmatic light. Two remaining research works in Table 3 are quantitative analyses of coal industry in China (Wu *et al*., 2017) as well as exchange rates among OBOR countries (Lai and Guo, 2017). Coal industry has been on persistent troubles with slowing domestic economic growth and implementation of sustainable energy production. Wu *et al*. (2017) see OBOR together with "Energy Internet" as potential aids to sustain (or even increase) the use of coal (both thermal and coking). Lastly, it is notable that exchange rate risks among main OBOR countries to China (based on trade volume) are considerable, and these countries could face difficulties e.g. in future loan payments due to this.

Tables 3 and 4 attract major share from all OBOR article citations – in Table 3 ten articles share is 72 %, and in Table 4, these highest cited ten publications account 75 % of all citations. Highest cited research work of Huang (2016) accounts 22 % of all citations in Scopus (Table 3), and 23 % of those in WoS (Table 4).

It is rather interesting to note that in Tables 3 and 4 there does not exist single research work from supply chains concerning China-Europe, even if there has been a lot of development in this regard within OBOR programme (building of railway e.g. in Hungary and Balkans, direct container landbridge trains between Europe and China, investments of Chinese companies to European sea ports etc.). There are some research works published in 2018, which have received growing interest, but they stay outside of highest citation works (Yang *et al*., 2018; Jiang *et al*., 2018). Yang *et al*. (2018) analyses supply chains between China and Europe with systems approach, where container shipping, new possible railway alignment

(starting from Piraeus sea port of Greece and proceeding through Balkans to Budapest, Hungary) and Eurasian landbridge (direct trains between Europe and China) are all included. It is concluded that new European railway alignment (Piraeus-Budapest) will increase in volumes, if container ship calls to Piraeus are increased. Yang *et al*. (2018), however, argue that Eurasian landbridge connections are too expensive for further and sustainable growth. Jiang *et al*. (2018) share similar opinion from cost level of Eurasian landbridge container trains, and argue that Chinese subsidies are important for the sustainability of these in the future. Many important electronics and high-tech manufacturers are now located in hinterland of China, and Eurasian landbridge serves their European market purposes well.

Table 3. Publishing amounts and citations to these publications in two different citation services (Scopus and Web of Science)

	Authors	Year	Title	Scopus cites
1	Huang	2016	Understanding China's Belt & Road Initiative: Motivation, framework and assessment	73
2	Cai et al.	2016	Evaluating CO2 emission performance in China's cement industry: An enterprise perspective	47
3	Shaikh et al.	2016	Prospects of Pakistan–China Energy and Economic Corridor	29
4	Cheng et al.	2016	Three questions on China's "Belt and Road Initiative"	24
5	Duan et al.	2018	Energy investment risk assessment for nations along China's Belt & Road Initiative	17
6	Xu et al.	2017	Renewable and sustainable energy of Xinjiang and development strategy of node areas in the "Silk Road Economic Belt"	13
7	Han et al.	2018	Energy efficiency convergence across countries in the context of China's Belt and Road initiative	12
8	Clarke	2016	Beijing's March West: Opportunities and Challenges for China's Eurasian Pivot	11
9	Zhang et al.	2018	Virtual water trade of agricultural products: A new perspective to explore the Belt and Road	9
10	Malle	2017	Russia and China in the 21st century. Moving towards cooperative behaviour	8

Total: 243

Table 4. Highest cited research works of OBOR based on Web of Science

	Authors	Year	Title	WoS cites
1	Huang	2016	Understanding China's Belt & Road Initiative: Motivation,framework and assessment	59
2	Cai et al.	2016	Evaluating CO2 emission performance in China's cement industry: Anenterprise perspective	40
3	Shaikh et al.	2016	Prospects of Pakistan–China Energy and Economic Corridor	22
4	Cheng et al.	2016	Three questions on China's "Belt and Road Initiative"	20
5	Xu et al.	2017	Renewable and sustainable energy of Xinjiang and development strategy of node areas in the "Silk Road Economic Belt"	11
6	Duan et al.	2018	Energy investment risk assessment for nations along China's Belt & Road Initiative	10
7	Han et al.	2018	Energy efficiency convergence across countries in the context of China's Belt and Road initiative	9
8	Zhang et al.	2018	Virtual water trade of agricultural products: A new perspective to explore the Belt and Road	9
9	Wu et al.	2017	Competitiveness analysis of coal industry in China: A diamond model study	7
10	Lai et al.	2017	The performance of one belt and one road exchange rate: Based on improved singular spectrum analysis	6

Total: 193

To examine further and deeper the most influential works among analysed 66 manuscripts, was reference data of all articles gathered together. This was considerable work as it consisted numerous filtering phases, e.g. removing number based citation brackets and numbers themselves. As data was in concise form, it was imported to Wordle (2019) application. Figure 2 illustrates the outcome of all reference data. As expected, such words as "Accessed", "Retrieved", "Vol.", "pp." and "July" appear to have high frequency, but these only due to the reason of references themselves containing detailed publishing data. It is also inevitable that authors built their research works from the Chinese angle as words "China", "China's" and "Chinese" got so high importance. Energy, transport and internationalization are also vital parts of used references in these studies.

For the purposes of this study, we were trying to find from Figure 2 the most frequently used author surnames, in order to gather them together and possibly find key references used in published OBOR studies. After analysing Figure 2 in details such surnames as Wang, Liu, Lee, Li and Zhang were chosen as most potential ones. All of such publications with these names involved from all 66 research works were taken for further analysis to examine, whether any key reference could be found.

In total 409 citations from all analysed articles were found with these surnames. As they all are Chinese surnames and rather common, it was not guaranteed that some named author would be key reference. Further examination revealed that there were not necessarily any key reference or couple of references among OBOR articles. Highest frequencies were found in three articles, which had been cited four times in different OBOR articles. Two articles having citation in three OBOR articles followed these. Rest of the analysed literature was having just one or two citations. This situation is rather unpredictable and gave indication that OBOR research might be just loose concept without that much in common. However, it was decided that we apply network analysis and Pajek (64 bit, 5.06a) software, whether this literature could have connection as we include citing article (from pool of 66 analysed articles) and corresponding potential pool of key references being cited two times or more.

Figure 2. Tag cloud analysis from all references used in analysed OBOR research works

Network analysis outcome can be seen from Figure 3. Actually, using citing articles and cited articles together reveals that this literature do have connection, and it is connected network, where only few key references are left outside (Wang *et al*., 2014a; Borensztein *et al*., 1998; Buckley *et al*., 2007). Key literature and influential works for OBOR literature used could be found from Figure 3 starting out of upper part of network and proceeding to middle and then little a bit left. This finding was so interesting and significant that network was enhanced to incorporate all connections, those of one cite per key reference. This network is shown in Figure 4. This further supports that even single citation manuscripts do form network of dependencies among OBOR articles. So, there does not exist single or couple of key references, but OBOR area should be treated like network of dependencies and topics.

From all analysed OBOR 66 articles, Figure 3 consists as citing reference 26. However, Figure 4 consists 57 citing OBOR articles. Therefore, in one way of approaching used OBOR references, these 26 articles citing are core of OBOR research. However, as core of network is so crowded in Figure 4, there are also other important works in the group of 66 articles.

Used references in Figure 3 are worth of being analysed further. Three of these six manuscripts are concerned about logistics (Ishii *et al*., 2013; Ducruet *et al*., 2010; Lee *et al*., 2018), and of particular interest is on port competition and evolution of hub sea ports. This is one indication that published OBOR manuscripts are aware of the coming changes in global logistics system as this investment initiative continues to be implemented with significant investments. Three other publications were about green energy (Xu *et al*., 2017), and pollution as well as emissions caused by OBOR programme investments (Zhang *et al*., 2017a) or trade and global supply chain activity itself (Zhang *et al*., 2017b). It is notable that Xu *et al*. (2017) is also part of analysed 66 OBOR articles – it is simultaneously being cited (three times) and part of analysed OBOR articles.
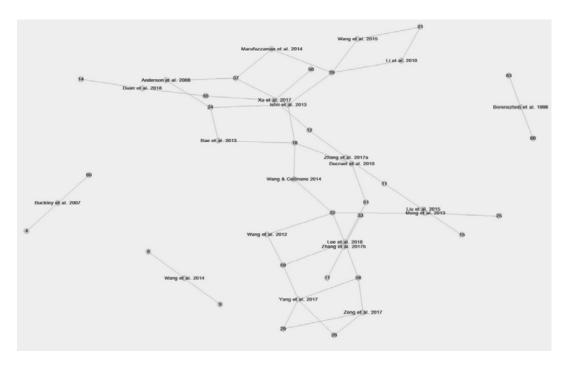
Figure 3. The most cited articles (having two or more citations; in surnames within network) among analysed OBOR research works (represented as numbers) as network presentation
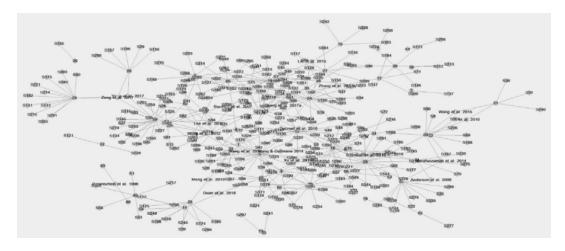

Figure 4. The most cited articles (all, where single citation denoted with S and running number from one to 357, two and higher with surnames) among analysed OBOR research works (represented as numbers) as network presentation.

4. Conclusions

Research works typically concern long-term sustaining themes, topics and trends, which will not change overnight to something else. This long-term requirement makes the analysis of OBOR research as difficult one as entire term was introduced in the first time during the late 2013. As OBOR progresses further and is implemented through investments in different countries, it is expected that interest in this topic shall sustain and remain. Articles analysed in this work could all be seen as seminal ones, which are cited in the future frequently. Current citation volumes are rather low, and concentrated on few published works in this area.

As challenge for OBOR research to sustain in prolific research, it is both to have its publishing volumes to keep at least the current levels. Based on the analyses of this research work, it could accomplished by having more international scholars making research on the topic. Currently, publications are mostly arising from China. One natural increase in international scholarly interest is through implementation of OBOR. Another one is the continuing internationalization of Chinese universities, which concerns both students and faculty. This enhances the collaboration opportunities of future research works, where international teams may join to contribute on this topic.

OBOR area is very diverse, and it is difficult to find key references on its theoretical basis. In this research was introduced use of tag cloud analysis and network analysis to identify the possible key references. As it was shown, citing and cited articles form in OBOR research connected network, in which has some central nodes. These are not in traditional form key references, but they could be considered as important ones being needed clue between different research works and topics.

As a further research in this area, we would of course be interested to gather more OBOR research works to analysis base, and conduct similar analyses as presented in here. However, another interesting development area would be to further use tag cloud analysis and network analysis together to detect dependencies and core actors as well as areas. In transportation and supply chains, there is clear need for more studies in European and Chinese interface.

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