SCIENTOMETRICS ASSESSMENT OF MALAYSIAN SOCIAL SCIENCE RESEARCH IN THE WEB OF SCIENCE (2007 - 2017)

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DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF LIBRARY & INFORMATION SCIENCE

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
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Scientometrics Assessment of Malaysian Social Science Research in the Web of Science (2007 - 2017)

Abstract

Previous studies mostly have looked into the growth of science-based research and there has been limited empirical work carried to look into the research performance including publication productivity and impact of Malaysian Social Science Research Systems. Therefore, the purpose of this study is to explore the research performance using scientometric assessment of Malaysian Social Science Research in the Web of Science (WoS) over the period of 11 years from 2007 to 2017 at the meso and micro levels. This study covers the discipline's productivity, impact and publication patterns. The research questions posed are (a) What is the growth of Malaysian Social Science Research literature in the Web of Science over the period of 2007 - 2017? (b) What is the scientific performance of Malaysian Social Science Research in the Web of Science at the meso and micro level? (c) What is the research impact of Malaysian Social Science Research in the Web of Science at the meso and micro level? and (d) What are the characteristics of the journals that Malaysian Social Science researchers published in? A total of 9929 publications retrieved from the Web of Science Core Collection database over the period of 2007 to 2017 covered in the Social Science Citation Index (SSCI) is used for to answer the research questions posed. Based on search criteria used which is "Malaysia" in address and "Article" in type of document, 6249 records were retrieved and used for analysis. The analysis of trends, profiles in publication and citation patterns explore the strength of different research areas. The findings indicate that the publication of Malaysian Social Science research in the WoS has been increasing since 2008. The most productive institution and social scientist are both from the Universiti Malaya. University Tunku Abdul Rahman has the highest total citation per paper over the period of study. One of the characteristics of WoS indexed

journals that published Malaysian Social Science research is obviously the international commercial publishers as the coverage of Malaysian social science journals in WoS is only limited to the Malaysian Journal of Library & Information Science. The finding of this study found that the overall publication and citation of Malaysian Social Science research in the WoS have a positive growth in the duration of the study. The study may provide a better insight of research evaluation decision in terms of the award of research grant, staff promotion and staff recruitment considering publications in the core literature.

Keywords: Productivity, Assessment, Informetric (Bibliometrics), Performance Evaluation, Social Science Research, Malaysia

Penilaian Scientometrics Penyelidikan Sains Sosial Malaysia dalam *Web of Science* (2007 - 2017)

Abstrak

Kajian terdahulu kebanyakannya meninjau pertumbuhan penyelidikan berasaskan sains dan terdapat sejumlah kecil penyelidikan yang dilakukan untuk melihat pertumbuhan penerbitan termasuk corak kutipan dan kesan Sistem Penyelidikan Sains Sosial Malaysia. Oleh itu, tujuan kajian ini adalah untuk menerokai prestasi saintifik menggunakan penilaian saintometrik Penyelidikan Sains Sosial Malaysia dalam *Web of Science* (WoS) untuk tempoh 11 tahun dari 2007 hingga 2017 di peringkat meso dan mikro. Kajian ini meliputi pola produktiviti, corak dan penerbitan disiplin. Soalan penyelidikan yang ditimbulkan adalah: (a) Apakah perkembangan kesusasteraan Penyelidikan Sains Sosial Malaysia dalam WoS sepanjang tempoh 2007 - 2017? (b) Apakah prestasi saintifik Penyelidikan Sains Sosial Malaysia di Web of Science di peringkat meso dan mikro? (c) Apakah kesan kajian Penyelidikan Sains Sosial Malaysia di WoS di peringkat meso dan mikro? (d) Apakah ciri-ciri jurnal yang diterbitkan penyelidik Sains Sosial Malaysia? Sebanyak 9929 penerbitan yang diperoleh daripada WoS sepanjang tempoh 2007 hingga 2017 berdasarkan Indeks Rujukan Sains Sosial (SSCI) - 1980 dan sekarang akan digunakan untuk analisis. Berdasarkan carian menggunakan alamat Malaysia dan jenis dokumen, 6249 rekod diambil dan digunakan untuk analisis. Analisis arah aliran, profil dalam penerbitan dan pola petikan menerangkan kekuatan bidang penyelidikan yang berbeza. Penemuan menunjukkan bahawa penerbitan penyelidikan Sains Sosial Malaysia di WoS telah meningkat sejak tahun 2008. Institusi dan saintis yang paling produktif adalah dari Universiti Malaya. Universiti Tunku Abdul Rahman mempunyai jumlah petikan tertinggi setiap kertas sepanjang tempoh pengajian. Salah satu ciri yang diindeks WoS yang diterbitkan oleh penyelidikan Sains Sosial Malaysia adalah penerbit komersial antarabangsa sebagai jurnal

utama yang diterbitkan. Ini merupakan satu dapatan yang agak ketara memandangkan *Malaysian Journal of Library & Information Science* adalah satu-satunya jurnal sains sosial Malaysia yang diindeks di *Web of Science.* Hasil kajian ini mendapati keseluruhan penerbitan dan impak Sains Sosial Malaysia di WoS mempunyai pertumbuhan positif sepanjang kajian. Kajian ini berharap dapat mencapai lebih baik mengenai keputusan penilaian penyelidikan dari segi pemberian geran penyelidikan, kenaikan pangkat dan pengambilan staf berdasarkan penerbitan mereka di dalam literatur teras.

Kata Kunci: Produktiviti, Penilaian, Informetrik (Bibliometrics), Penilaian Prestasi, Penyelidikan Sains Sosial, Malaysia

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Table of Contents

List of Figures

List of Tables

List of Symbols and Abbreviation

IF	-	Impact Factor
ISI	-	Institute of Scientific Information
JCR	-	Journal Citations Report
JIF	-	Journal Impact Factor
MASTIC	-	Malaysian Science and Technology Information Centre
MASTIC	-	Malaysian Science and Technology Information Centre
MCC	-	Malaysian Citation Centre (since 2019 known as the Citation & Informetrics Centre)
MCU	-	Malaysia Comprehensive Universities in which consist of university from Universiti Malaysia Sabah, Universiti Malaysia Sarawak and Universiti Teknologi MARA
MMU	-	Multimedia University
MOE	-	Ministry of Education
MOSTI	-	Ministry of Science, Technology and Innovation
MRU	-	Malaysia Research Universities in which consist of university from Universiti Malaya, Universiti Sains Malaysia, Universiti Kebangsaan Malaysia, Universiti Putra Malaysia and Universiti Teknologi Malaysia
MTU	-	Malaysia Technical Universities in which consist of university form Universiti Tun Hussein Onn Malaysia, Universiti Malaysia Perlis, University Malaysia Pahang and Universiti Teknikal Malaysia Melaka
MUSC	-	Monash University Sunway Campus
S&T	-	Science and Technology
SSCI	-	Social Science Citation Index

SSH	-	Social Science and Humanities
SSRS	-	Social Science Research Systems
UIAM	-	Universiti Islam Antarabangsa Malaysia
UiTM	-	Universiti Teknologi MARA
UKM	-	Universiti Kebangsaan Malaysia
UM	-	Universiti Malaya
UMS	-	Universiti Malaysia Sabah
UN	-	University of Nottingham
UNIMAS	-	Universiti Malaysia Sarawak
UPM	-	Universiti Putra Malaysia
USM	-	Universiti Sains Malaysia
UTAR	-	Universiti Tunku Abdul Rahman
UTM	-	Universiti Teknologi Malaysia
WoS	-	Web of Science

Chapter 1: Introduction

1.0 Introduction of Chapter One

The direction of this study is to fulfil a scientometrics assessment of Malaysian Social Science Research in the Web of Science (WoS) for 11 years between 2007 to 2017 at the meso and micro levels. There was lack of studies that look into the research performance including publication productivity and impact of Malaysian Social Science Research Systems (MSSRS). Therefore, the focus of this study is to explore the scientific performance in Social Science Research using scientometrics assessment. As a result, the study conducted has shown that the overall publication and citation performance of Malaysian Social Science Research in the Web of Science increased in which shown that the government significantly invested in research funding to agencies including public and private universities, as well as research institutions. This study hopes to have a better understanding of research assessment decisions on research grant award, staff recruitment and promotion considering publications in the core literature. This chapter begins with the introductory section of the study, followed by context of the research which also explains the scope of the study. This chapter also covers the problem statement, research objectives and the research questions, significance of the study, scope and limitation of the study and definition of terms. It ends with a description of how this dissertation is organized.

1.1 Background of the Study

The ability to create and disseminate scientific knowledge is a major source of competitive advantage and wealth creation to improve the quality of life for all. Therefore, a nation's wide overall scientific performance needs to be gauged and

research strength could be determined. Bibliometrics used as a tool for research assessment is best defined as the application of mathematical statistical methods to any publications and other media communication (Pritchard, 1969). While scientometrics is the application of those quantitative methods that examine to have the information as scientific perceive (Nalimov et. al, 1969). Even both scientometrics and bibliometrics are methodological tools to measure and monitor the scientific literature of authors and journals as subject of analysis, it still different between these two for research assessment. As bibliometrics has the overwhelmingly used to study dominant publications and literature growth, it can be concluded that bibliometrics tool is more to library and information science (LIS) studies while the scientometrics tool has more accepted as propensity to policy studies. In this study, scientometrics is being used to measure the evolution of scientific performance including publication productivity, research impact, pattens of authorship while bibliometrics tools focuses on measuring the authorship and contribution of journals in which also involve content analysis of such words in titles to reflect research disciplinarity. Moreover, the bibliometrics tools also focus on co-citation analysis such as the relationship of authors and journals.

In this regard, bibliometrics and scientometrics are sets of methods used internationally to measure the production and dissemination of scientific knowledge, in particular based on research. Research tools and indicators are developed to gauge research performance not only based on the goal of researchers to advance knowledge, but also to build reputation at the international, national, organizational level based on their research output and advance their careers. It was only with the advent of the tools developed by the Institute for Scientific Information (now an agency under Clarivate

Analytics) and the studies conducted by its founder Eugene Garfield, that the use of bibliometrics in scientometric assessment became widespread.

Scientometric assessment of research aims at achieving a better understanding of the mechanisms of scientific research as a social activity. Leydesdorff, et. al (2012) explained that scientometrics perspective provides a quantitative focus on texts and communication to the interdisciplinarity of science and technology studies. The area of scientometrics has additionally increased to unique types of archives and different domains. Scientific strength index proposes a goal mode of measuring performance at a combination stage that will allow an assessment of individual fields within different disciplinary areas. The disciplinary characterization of national research efforts identifies the mainstream and dominant scientific fields in which it allows to explore the connection between researcher's field among different discipline areas such as science, social science, medicine etc. Thus, the developed scientific strength index can be an essential tool for national science policy as the governments and institutions give grants support to the scientists. This statement supported by Reza's (2010) study indicated that scientific power index being used to measure the differences in rankings in terms of publication output, citation distribution, and mean discovered citation rate are large. Government in many countries are responsible to monitor scientific performance because it is vital at the national level especially for policy makers and higher education. This statement is supported by Braun, et. al (2005) who examined the UK scientific overall performance based on publication and citation counts used scientometric assessment of research performance. Another study conducted by Gupta, et. al (2018) also used scientometrics assessment to examine the global publications on

yoga research over the period of 10 years (2007-2016). It gives insight at the country level to give priority for the research direction and promote international collaboration.

Schneider (2009) used bibliometrics to measure the overall research performance of the Nordic countries for the period of 1989 to 2008. Schmoch, et al. (2011) studied the overall performance of German covering the period between 2000 and 2010, and compared with that of China, as in the last decade China has become a major player in science and that a closer examination is necessary to appropriately assess these research activities. A previous study by Cancino, et. al (2018) supported that bibliometric analysis helped to explore the development of future research agenda. However, bibliometrics as a traditional tool to gauge scientific impact has shortcomings compared to altmetrics as the latter has more societal interaction to the strict scientific citations which helped researchers' work more reachable as the social web rise used for academic publication (Karanatsiou, et. al, 2017). On the other hand, bibliometric methods from Social Sciences and Humanities (SSH) and Science & Technology, Engineering and Mathematics (STEM) were dissimilar and this was acknowledged by Melchiorsen, et. al (2019). Nonetheless, their findings do not show either SSH or STEM has the perfect way of doing research as a separate framework in research performance assessment may cause disadvantages such as biased in the particular of field. The indicators for scientific performance such as productivity indicate activities and the numbers of publications produced by researchers. Abramo's et. al (2014) study on productivity performance revealed that bibliometric indicator as a popular tool used to analyse rankings based on publication output and the strength of scientific production in terms of quantity or impact. Other study also supported the argument which Yaakub's, et. al (2019) study revealed the ranking system used to evaluate the strength of a particular

Malaysia Private Higher Education Institutes' performance. Based on Su's et. al (2019) study, the valuable information for authors and practitioners has been identified used bibliometric analysis through the current state of the academic literature in social network analysis such as research authors, research countries, document type, keyword analysis and subject areas. However, both studies do not focus on the use of bibliometrics for SSH or STEM as the studies focus on research assessment. It can be concluded that the tools being used to analyze the scientific performance are based on the need of a particular study in which looks into research performance or research visibility as an assessment exercise.

Bibliometric analysis is also being used to assess research performance the micro level. There was study conducted by Cao, et. al (2021) in which used bibliometric analysis of publication (articles and patterns) to explore the research trends of specific research areas such as phosphogypsum (PG) treatment based on Web of Science database from 1990 to 2020. Based on the study it shows the academic hotspots and the various impact of product quality and future direction of study for improvement in future. Another study conducted by Zhang, et. al (2021) also used bibliometric analysis to explore the evolution of disciplinary emphases in China's research systems in which at the micro level, they are looking into subjects of the research to identify the problem-solving patterns and predict potential connections between existing problems and possible solutions that later become interest for policy makers and ranking. However, other study indicated that the paper citation weighted indicator in bibliometric analysis is the procedure used for institutional ranking.

Various studies used bibliometrics and scientometrics network analysis tools to discover literature growth and research performance on a particular area or topic, such as for the literature on Internet of Things (IoT) research community (Mishra et. al, 2016) where the authors looked over the past 16 years literature including top authors, subject areas, and most influential works. The prominent works of Halal research were identified from the citation analysis using bibliometric method and network tools to evaluate and review the Halal's literature (Haleem, et. al, 2020). Bibliometric technique also has been used to develop a conceptual framework of international franchising and the change of research patterns in which treasures for future research (Alon, et. al, 2020). Bibliometrics approach has also been used to review the growth of Blockchain technology literature and productivity and the study indicated the literature is increasing and techniques of Blockchain and smart contract were centre of attention by researchers (Miau, et. al., 2016).

Bornmann, et. al (2016) used bibliometric study and scientometrics indicators to develop procedures for the normalization of citation impact, building on procedures of classical bibliometrics in the humanities and social sciences, methods for the assessment of research performance. Garg, et. al (2017) in their study revealed a better understanding of the strength and capabilities of Indian Library and Information Science research using bibliometric analysis on pattern of literature growth. The future directions and major conceptual framework can be identified using bibliometric citation analysis to enhance better understanding and obtain new insights (Rodríguez-Ruiz, et. al, 2019).

Mokhtari, et. al (2020) conducted a bibliometric overview and visualization of the scientific output that resulted to be beneficial to decision makers for further development and helped researchers and practitioners in Library & Information Science (LIS) field to have better connection and journals' contributions. Nagariya, et. al (2020) also supported the notion that bibliometric analysis and content analysis provides future research directions for the diversification of research areas within the service supply chain (SSC). Fischer, et. al. (2021) presented a bibliometric review of research published from 2000 until 2021 provided further insights on the current research in which leads to maturation and specialization of ritualistic research over the last 20 years. Whether used for literature growth or sociological research or for evaluation in a science policy context, bibliometrics and scientometrics are used in various research fields especially the sciences because these fields have appropriate bibliographical characteristics for bibliometric analysis as currently practised.

1.2 Context of Study

As a country that has made significant progress in research, Malaysia needs to further strengthen the country's recognition in scientific performance in the region of science and technology, as well as humanities as there is no standard classification of research performance. In line with this, we can see that the government really support research activities in Malaysia through initiatives conducted especially in research funding, and the related government agencies such as the Malaysian Science and Technology Information Centre (MASTIC) and the Malaysian Citation Centre (MCC, since 2019 known as the Citation & Informetrics Centre [Pusat Sitasi & Infometrik [PSI]) play major roles to provide the research performance data. Based on MASTIC's report on the national bibliometric study published in 2003 that conducted for strategic planning

of Science and Technology (S&T) development of the country which explored the strengths and weaknesses of the S&T performance including collaboration among institutions and countries (Science and Technology Knowledge Productivity in Malaysia: Bibliometric Study 2003, 2003). Later, MASTIC's report in 2008 expanded their study which explored articles published by Malaysian universities and research institutes as early as 1927 because only the S&T articles available and being recorded (Science and Technology Knowledge Productivity in Malaysia: Bibliometric Study 2008, 2017).

In 2012 based on MASTIC report, the bibliometric study covered on research articles published in both Malaysia and international journals between 2001 to 2011 and showed that during the 11 years of study, the growth of publication start from 2002 onwards with 15.9 percent increase and in 2008 was in sharp increase due to Ministry of Higher Education's policy and high in expenditure in national research and development expenditures (Science and Technology Knowledge Productivity in Malaysia: Bibliometric Study 2012, 2017).

MASTIC then in 2015 evaluated the status of research productivity at the national level including publication and patent in both field of Science & Technology and Social Sciences (Bibliometric Study 2015, 2017). It was the reflection to strengthen Malaysia Higher Institutions research ecosystem. The performance of every academic staff based on research grant received is one of the important aspects to boost publication productivity in Higher Education Institution.

In a recent report by MASTIC in 2020, the study used bibliometric databases namely Scopus, Web of Science and MyCite to explore the publication productivity in Malaysia and it has been found that there was steady growth in Malaysia's scientific publication such articles and proceedings since 2001 as in 2008 the implementation of the Malaysia Action Plan 2007-2010 and government initiatives to scale up Malaysian's research capabilities (National Bibliometric Study: 2001-2017, 2020).

A research culture activity in Malaysia, reflected through publication productivity in peer-reviewed journals, seriously started in 2006 only after the government embarked with the research-intensive university agenda which provides research and development grants and the identification of five research universities in Malaysia. In Clarivate's article published in 2018 (*A look at the research and innovation performance of Malaysian Universities* 2013 – 2017, 2018) mentioned that the study and report produced by Clarivate Analytics and Ministry of Higher Education revealed that research activities among Malaysian universities and approximately 60 percent of Malaysia's research output dominated by the five Research Universities. Through this initiative, the increasing number and quality of publication happened. To support the agenda, the new indicator for staff promotion and special incentive has been offered as a driven in fostering publication activities among researchers.

Malaysian Citation Centre (MCC) report in 2012 used Web of Science database and timeframe between 2001 and 2010 explored the Malaysian scientific performance and contribution both in Science & Technology and Social Science to literature published in journals (Malaysian Scientific Performance in the Web of Science 2001 to 2010, 2012). In MCC's report for the year 2013 on performance of Malaysian Journals in

MyCite 2012 was the first report about the status and performance of Malaysian journals indexed in Malaysian Citation Index (MyCite) which explored academic publishing in journal. The study revealed that Arts, Humanities and Social Sciences journals performed well within Malaysia however not internationally favour as received a low indexation status (Performance of Malaysian Journals in MyCite: 2012, 2013).

As the government show interest in the productivity of Malaysia's research activity, MCC published their report in 2015 on performance of Malaysian journals in MyCite 2013 which showed the performance indicators were used to evaluate the publication productivity and impact to highlight research disciplines, authors and institutions of excellence including reported international collaborations (Performance of Malaysian Journals in MyCite 2013, 2015). The report has helped to improve the publication quality of scholarly journals in Malaysia.

Based on the MCC report in 2017 on the performance of Malaysian 2016, the bibliometric approach used to explore the scholarly communication in the form of journals and assessed the strength and weaknesses in research outputs (Malaysian Scholarly Outputs 2016, 2017). The report found that the scholarly output in Malaysian journals dominated by Social Science disciplines.

Recent report by MCC published in 2018 on performance of Malaysian scholarly outputs: 2013-2017 used bibliometrics analysis focused on the performance of Malaysia's scientific articles indexed by international databases such Web of Science and Scopus and national bibliometric databases (MyCite and MyJurnal). In the report also the study explored collaboration between local institutions, writers, and

counterparts in other countries. Overall, the study found that Malaysia produced output as the highest ranked in the ASEAN countries performance between 2013 to 2017 and very active in collaboration with 50 institutions in Africa and 47 institutions in the European region (Performance of Malaysian Scholarly Outputs: 2013-2017, 2018).

Thus, the continuous study on Malaysian research performance should be done as to inform the government, policy maker and funder to decide the research priority to be focused based on the national agenda. The objective of this study is to assess the performance of Malaysian social science research in eleven-year period (2007 - 2017) as the country's Higher of Education ecosystem has gone through the expansion in research activities.

1.3 Problem Statement

Apart from the reviews from MASTIC (2010) as well as annual reports from MCC, there has been either no comprehensive research or lack of studies that explore the trends and profiles of Malaysian Social Science Research System (MSSRS) in terms of publication and citation patterns at the meso and micro levels. In view of this, a study must be carried out to see the developments of Malaysia Social Science Research overall performance and impact.

According to Liu, et. al (2020) reviewed the Social Science Citation Index (SSCI) as a main indicator of evaluation of Social Science Research System as to facilitate the development of social sciences in China. The argument shows that the important of SSCI has become basis evaluation of talent recruitment including awarding the scientific research grants. Therefore, the used SSCI of the Web of Science in this study

as the database with the greatest potential for social sciences bibliometrics because the SSCI offers bibliographical access to a curated collection of over 3,400 journals across 58 social sciences disciplines and this statement is supported by De Filippo's (2018) study mentioned that the Web of Science and output listed in the SSCI was chosen because the data of very various disciplines to conduct the analysis proposed.

In addition, the government also studies authors' productivity including international collaboration level, and this can be concluded from the studies conducted to understand the patterns of productivity in Malaysia. Scholarly publications by Malaysian or Malaysian-based researchers represent the published research heritage of the country. The pattern of publication in Malaysia is vital as it become the main contribution in publication productivity that help to identify future direction of education and economy. Moreover, the awarded system by government to the selected institution for grant allocation has become attention in institutions. It is clear why to understand the patterns of productivity to make decision more transparent and can be used for improvement. This statement is supported by study by Ductor (2015) discovered that higher collaboration leads to larger research productiveness. It also will become a foundation for recruitment, promotion, tenure, and workload decisions in institutional or agencies.

Malaysia's research productivity is quite lacking in a number of research fields, specifically in Social Science Research. This argument is supported by Alatas's (2000) study that indicated it would be easy for Malaysian researchers to publish their work in the English language especially in United States and UK-based journals as the language communication is one of factors in market and it dominated by the social science research in publication. The rapid development in research and conjunction with

economic development in Malaysia, will pull attention to industry partner to invest. This declaration was also supported by Mammo and Baskaran (2009) in which they emphasized that Universities want to achieve their goals to transform in terms from producing public knowledge to knowledge for private economic profit as the interaction may influence the productivity and performance.

Worldwide reports indicate that the Social Science Research System (SSRS) overall is significantly lagging behind the sciences in terms of scientific excellence is no longer sufficiently linked to policy-making. According to Ejdus's, et. al (2018) study on Social Science Research System (SSRC) in Serbia revealed that although great in number the articles published there are extremely rarely cited in leading international journals. Moreover, Social Science & Humanities is not sufficiently contributing to evidence-based policy making. According to Boswell, et. al (2017), the social science research is not sufficiently linked and supporting to policy evidence-based policy making because the contribution for research-policy relations across fields of social science is narrow; the research impact was not disseminated effectively and accessible to policy makers; and the research impact agenda seems likely to reward academics for achieving impacts for political interest than research or impact activities.

Other study by Abdulra'uf (2021) also supported the argument indicated that there are four major themes that underpinned the production of social science research in Malaysia and the result also revealed that Malaysian states' industrial development significantly influences by Malaysian social science knowledge which contributed to the development aspirations of the state through a policy coherence between development and new values system of the society. Ho's (2014) study revealed that the

classic articles might not always be highly cited which depends on the interest of the research area by researchers as studies in social work field are less frequently cited and use fewer references. This shows that it being absorbed by the current knowledge and the growth of publication come from the improvement of previous research and new direction of research.

In addition, only a few bibliometric research relevant to Malaysian publication output in Social Science was conducted. There was a particular lack of bibliometric research on publication output and citation have an influence in the Malaysian social sciences as well. Thus, this study additionally pursuits to discover the traits and profiles in publication and citation patterns at institutional and researcher's levels. This statement is supported through the previous studies carried out by Davarpanah (2009), Abrizah, et. al (2013) and Ahmad (2012) in which only a few bibliometric searches for applicable to Malaysian statistics output in Social Science research carried out.

The use of Web of Science for social science research assessment resulted in the reliability for the bibliometric analysis and produced more diverse types of output than just research articles compared to other databases which have low coverage (Prins, 2016). The study also explained that the bibliometric systems in the social science and humanities from the perspective of assessing their potential for institutional research evaluation nationally or internationally and the bibliometrics method is reliable indicators for international benchmarking of fields and institutions.

According to Ahmad's (2012) study on funding availability and publication with focus on social science research in Malaysia showed that there was a strong relationship

between fund received and publication in Malaysia universities which were important performance indicators for research. Moreover, the study also revealed that there was an overall upward trend to all research areas including social science and humanities research in Malaysia.

According to Wang's, et. al (2019) study used a bibliometric method to analyse research performance in social science to identify the collaboration effectiveness among countries for researchers and policy makers. The technique is still relevant as it helps the researchers to decide on their direction and have better understand the research status, know the current research interests, patterns and provide useful information for future strategies.

There have been many bibliometrics studies on Malaysia's research performance focusing on various research areas. Moreover, the related studies also have been conducted by the MCC and MASTIC in which they focus on publication productivity and research performance for a particular time period until today. More attention from other institutions to the research performance is the key form in Higher of Education in Malaysia. Therefore, the study as little as possible help to understand the patterns and publication productivity in Malaysian from 2007 to 2017. Even in Malaysia we have Malaysia Research Assessment (MyRA) and Rating System for Malaysian Higher Education Institutions (SETARA), therefore the bibliometrics analysis as one of the major points which not depending on the peer review as it emphasizes on research performance.

In addition, it also contributes to policymakers to strategize collaboration with attainable main foreign institutions or researchers. The higher collaboration in research also makes contributions advantage of the Higher Education Malaysia Universities to evaluate research overall performance in Malaysia. Thus, this study might additionally make a valuable insight into many factors of the institution to other researchers. The scientometrics assessments of Malaysian Social Science research will help the Ministry to look attentively at the research performance in Malaysia. This is because research funding in Malaysia and funder have shift their attention towards science and technology research activities compared to social science research. Moreover, the Research Universities in Malaysia are performing better in science and technology research rather than social sciences. Missen's (2020) study revealed that more research is being conducted in science disciplines as compared to social sciences in Pakistan for the past decade which showed that the publication rates of science disciplines are much higher than social science articles. This statement is supported by Balakrishnan's (2018) study revealed that large portion of research grants dedicated for science and technology development activities as the importance of social science research is growing day by day, the quantum of social science research in Malaysia is not encouraging. This argument also supported by Ahmad (2020) which RM400 million has been allocated for budget 2021 Malaysia's research and development in science and development. According to Heleta (2016) reported that up to 1.5 million peer-review articles were published annually and 82 percent of articles published in social science and humanities journal were not cited even once and being ignored even within scientific communities. This statement shown social science research has much put effort in publication and have potential being cited from other countries. However, contradict to study conducted by Farley, et. al (2012 & 2013) which revealed the

funding reforms would not affect the implementation of government strategic plans as the public universities in Malaysia are working to achieve the government objectives as stated in the strategic plans even though during the government funding cuts.

Therefore, the aim of the study is to examine the performance of Malaysian Social Science research for an eleven-year period as it has already gone through a lot of changes and there are many new research institutions including universities and research groups for the past eleven years. Research and development have led and become the centre of attention in each institution, the award of research university status by the government body towards the selected institutions and the numbers of allocation grants from funding bodies and governments in social sciences are increasing too. Therefore, Elsevier has partnered with Ministry of Higher Education Malaysia to recognize the country's most outstanding researchers with the Malaysia's Research Star Awards 2019 (Asia Pacific, 2019). There were two categories of award which as Hot Review Paper Award (nominated based on the number of citation of papers within a define period) and the Research and Innovation Excellence Award (nominated based on number of patents, number of inventions and patent strength score) and it is including various of disciplines namely engineering, information and communication technology, clinical and health sciences, natural sciences and social sciences.

To date, there are five universities identified as research-intensive universities namely University of Malaya (UM), Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM), Universiti Putra Malaysia (UPM) and Universiti Teknologi Malaysia (UTM); and one of the criteria in sustaining the status is by producing a good number of impact-factored publications and funded research. Therefore, the study being carried

out to explore the publication growth at micro and meso levels including publication patterns and impacts of Malaysian Social Science Research. The study is expected to have increasing number of publications since 2008 in which after the establishment of research universities in Malaysia. Specifically, the purpose of this research being conducted is to perform a scientometrics assessment of Malaysian Social Science research in the Web of Science (WoS) Core Collection over the period of 11 years (2007 – 2017) at institutional and researcher's levels. This covers the discipline's productivity, impact, and publication patterns. The focus of research and development became attention in Malaysia as increasing the number of allocation research grants from funding bodies and the existence of five research universities in Malaysia. The use of WoS as database because it produced the only available bibliographic databases from large scale and produce statistics based on traditional bibliometric indicator. Moreover, the WoS coverage more important than field-specific indices. It was observed a lack of empirical studies on the growth of social science in Malaysia and should be strengthened by resources such as WoS to highlight the research output in social sciences.

1.4 Research Objectives & Research Questions

The objective of the present study is to perform a scientometrics assessment of Malaysian Social Science Research (MSSR) in the Web of Science (WoS) over the period of 2007 – 2017 at the meso and micro levels. The assessment covers the discipline's productivity, impact and publication patterns. Aggregation levels of bibliometric studies range from micro (author) to with different kinds of meso level such as institutions, journals and research fields and subfields. The following four research questions are posed:

(a) What is the growth of Malaysian Social Science Research literature in the Web of Science over the period of 2007 – 2017?

(b) What is the scientific performance of Malaysian Social Science research in the Web of Science at the meso and micro level?

(c) What is the research impact of Malaysian Social Science research in the Web of Science at the meso and micro level?

(d) What are the characteristics of the Web of Science indexed journals that Malaysian researchers in the social sciences published in?

1.5 Significance of the Study

The findings of this study may contribute valuable insight into many aspects to the government, institution, policy makers, top management of groups or agencies and academics. In addition, the scientometrics research can be formed as a foundation for recruitment, promotion, tenure and workload selections in institutional or agencies.

Performance through publication contribution have become a compulsory method in a university's Key Performance Indicator as nowadays the distribution of research grant allocation influences the university ranking. Thus, understanding these more than one factors in assessment in evaluation would assist administration and establishments or researchers to formulate and prioritize its scientific policies.

Furthermore, this study on the productivity in Social Science in Malaysia may help the findings would be valuable for related researchers. Previous research done by MOSTI investigated patterns and publications productivity in ten year and this study address concerns social science research in Malaysia as very low study has been conducted so

far to map the information literacy literature in social sciences. Previous study conducted mostly only produced report. Therefore, the study will be useful in understanding the progress on information literacy in social sciences in Malaysia and significantly for social researchers to foster further research in this emerging area.

The study conducted also to provide researchers insight actionable future research direction. The results of this study can be beneficial to government and ministry for decision making on its further development as well as helpful for researchers and practitioners to have better contact with and contributions to the journal.

1.6 Scope and Limitation of the Study

This dissertation particularly views the research performance of the social science discipline for Malaysia and does not attempt to benchmark the performance with other disciplines, and with a variety of countries. The study exclusively uses bibliometrics approach, and its sub-field i.e. scientometrics to gauge the performance. It does identify the emerging research fields in social sciences based on citations.

Data for the study is retrieved from the Social Science Citation Index (SSCI) of the Web of Science database released between January 2007 and December 2017. The publication type additionally limits to "article" and in the English language over a duration of 11 years. The study also does not look into the relationship between the growth of publication and funding received by the researchers.

1.7 Definition of Terms

Relating to the research objective and research questions in this study, the definition of terms is listed below:

Social Science Research Systems (SSRS)

The combination of scientific analysis study and the activity of gathering, analyzing and interpreting information for a variety of social, economic, educational and political purposes that lead to a strategic lever for more ownership and capacity in global development. The analysis of study includes individuals, groups, organizations, countries, technologies, objects, and such.

SSCI-Indexed Journals

The Social Sciences Citation Index (SSCI) is a commercial citation index product of Clarivate Analytics. It was originally developed by the Institute for Scientific Information from the Science Citation Index. The SSCI citation database contains over 3,400 journals across 58 social sciences disciplines that are available through the Web of Science (WoS).

Scientific Publications

Articles in scientific journals that are mostly written by active scientists such as students, researchers and professors instead of professional journalists. Scientific publication outputs are signs of understanding production and expertise utilization.

Scientometrics Assessment

Scientometrics assessment is defined as quantitative study in various kinds of intelligence process in the development of science communication. It also can be defined as the evaluation of various disciplines that uses mathematical methods to quantify the scientific research for improving information retrieval, scientific decision making and to evaluate scientific research activities.

Scientific Performance

Scientific performance can be defined as a quantitative analysis or the evaluation at four different levels of research groups such as researcher, scientific journal, university, and country.

Research Impact

Research impact is the outcomes from research activity that benefits community, organization and society in which changes affected and measurable change that occurs for example lower unemployment, increased quality of life, reduced accidents etc. It also can be defined as the contribution that research cause to the society, economy, environment, culture and as overall it can be concluded as the impacts that beyond academia.

Meso and Micro Level from The Context of Scholarly Communication

The aggregation level of bibliometric studies range from micro (author) and meso (institution) to macro (country) level. The micro level from the context of scholarly communication is defined as individual academic or known as scientific community such as individuals, researchers, research managers, laboratories etc. who is

significantly contributed to the determinants of successful research and publication; and researchers who did the research collaborative work by research field, discipline, citation etc. Meso level from the context of scholarly communication is referred to an activity of organization or agencies or universities in the regional aspect that allow to look a comprehensive picture of the performance.

1.8 Organization of the Dissertation

This dissertation is divided into five chapters. Chapter 1 provides the background of the study, definition of the problem that motivated the research, including why that problem is important, followed by the pertinent research questions and overall purpose. Chapter 2 consists of a review of existing literature mainly from research articles and other resources. The review covers particularly bibliometrics in the social sciences and humanities, scientometrics in social science research assessment, studies on scientometrics research assessment at the country, institutional, author, subject area level and journal. Chapter 3 deals with the research methodology. The contents in Chapter 3 provide the methodology employed to solve the research problem, as mentioned in Chapter 1. Techniques and procedures in bibliometric methodology which are applicable in this study are detailed out. This approach involves the compilation of information and measurement of statistical data aimed at analysing the content of publications with Malaysia in the address field indexed in the Web of Science's Social Science Citation Index. This is followed by Chapter 4, which provides an analysis on the information collected, followed by a discussion of the research findings. This dissertation concludes with consideration of the implications and limitations of the research, and suggestions for future research initiatives in Chapter 5.

Chapter 2: Literature Review

2.0 Introduction of Chapter Two

In chapter two, the literature and previous research concerning the assessment of social science research or publication bibliometric of research had been compiled and discussed. The introductory part of the Malaysian Social Science Research (MSSR) assessment additionally being addressed. It additionally gives some evidence on MSSR being used is important to evaluate overall performance and other related issues where some similarities and differences may be discovered as to be related with the study.

A key search for references was conducted to complete the literature review by using a combination of search terms such as bibliometric, scientometrics, research assessment, research performance, research productivity, research impact, social science research, Malaysia and various combinations of these terms.

The reference sources used include databases subscribed by the University of Malaya Library (UML) such as Science Direct, ProQuest, Emerald, EBSCOhost, Library and Information Science Abstracts (LISA) that linked to articles from many online journals. Relevant articles also had been obtained from citation of author articles through the Web of Science, Scopus and Google Scholar.

Each full-text paper retrieved in the search was reviewed based on title, abstract, keyword and the paper that addressed “Social Science Research Assessment” were identified as relevant sources. Besides that, the present study also scanned the reference list of those selected papers and further study on the topic. For instance, the paper must

describe the concept of bibliometrics and scientometrics in research performance in general and social science research performance in particular. Generally, all the papers should be written in English and should be discussed related to the topic. The social science research literature involves various disciplines or areas and this is also considered to understand the publication in social science areas. This search has been done to ensure no important published literature was left out. The reviews are presented in the following sub-sections:

2.1 Bibliometrics and Scientometrics in the Social Sciences and Humanities Research Assessment

2.2 Meso level

(a) Studies on Scientometrics Research Assessment at the Country Level

(b) Studies on Scientometrics Research Assessment at the Institution Level

2.3 Micro level

(a) Studies on Scientometrics Research Assessment at the Author Level

(b) Studies on Scientometrics Research Assessment at the Discipline Level

(c) Studies on Scientometrics Research Assessment at the Article Level

(d) Scientometrics Assessment of Journals

2.4 Summary of Chapter Two

2.1 Bibliometrics and Scientometrics in Social Sciences and Humanities Research Assessment

Pitchard (1969) defined bibliometrics as a tool that used mathematical statistical methods to any publications to know the research performance assessment. Other study by Broadus (1987) and Borgman (2002) defined the term bibliometrics as the use of the literature of publication to examine the research performance in a wide range of

methods and measures for scholarly productivity evaluation and comparing the recognition how and why the work of others cited including individuals, groups, fields, universities, nations and etc.

Scientometrics can be defined as the use of quantitative methods to examine the information of scientific perceived (Nalimov, et. al, 1969). Qiu, et. al (2017) defined scientometrics as a discipline that uses mathematical methods to quantify the scientific research basis achievements to explore the process of scientific development for scientific decision making and management. Both bibliometrics and scientometrics are tools that are used to study the influence of discipline as effect from the literature produced. In addition, both methodological tools are also used to measure and monitor the authors and journal's scientific literature. However, there is still a gap of between bibliometrics and scientometrics in which bibliometrics have a specific meaning and a clear object of study and scope explore more to LIS research compared to scientometrics taken as leaning towards policy studies. This is why the study use bibliometrics study to measure the evolution of Malaysian scientific performance in social science research.

Most social science journals in SSCI database publish papers dedicated to quantitative or hard social science research and methodology, for example in economics, business studies, management science, law and political science. The journal impact factored articles illustrate the use of quantitative techniques to empirically review the social science theory. Social science is a category of academic disciplines that involved with society and the relationships amongst individuals within a society. However, social science also covers the following subjects such as anthropology, archaeology,

communication studies, economics, history, musicology, human geography, jurisprudence, linguistics, political science, psychology, public health, and sociology. The term is mainly to the field of sociology, the unique "science of society", established in the nineteenth century.

Persson's (2009) study examined the global papers were no longer excellently represented amongst high influence papers in research areas. The importance of output was considered in the citations the papers obtained. Hence, it has being used largely and has been identified as an evaluative bibliometrics. The bibliometrics study has been utilized as an indicator to assess overall productivity and influence scientists, departments, universities, establishments, and countries.

The study on the use of bibliometrics in the social sciences and humanities was carried out by Shahbodaghi, et. al (2010) found that many articles written in English language in recent years. Other study emphasized the types of research output, benchmark for comparative evaluation and citation of social sciences disciplines (Abramo, et. al, 2011). Ochsner's (2017) study found that the research assessment in the Social Sciences and Humanities (SSH) delicate and the methods that are usually applied to SSH research was bibliometric approach.

According to Ahmad's (2012) study, the growth of Malaysian Social Science and Humanities publication patterns and research funding has become essential for overall Malaysia performance indicators. The study also confirmed that the investment in research funding has caused a usual upward trend in specific research areas in the social sciences.

According to Van Leeuwen's (2013) study, the quality assessments of the Non-Science & Technology scholarly activity were inconsistent and there is a need of standard bibliometric technique applied to ensure research quality assessments.

A study conducted by Mohammadi, et. al (2014) revealed that the overall performance of Mendeley readership counts and citations for the social sciences was higher than humanities. The correlations between Mendeley publication and citation counts in all disciplines effect from the research activity conducted.

According to Hicks's, et. al (2015) study, there were increasing in scientific performance in both sciences and social sciences areas and bibliometrics indicator used as a tool to measure the performance. As such, across the world, universities have become obsessed with their position in global rankings.

Sivertsen's (2016) study indicated that the articles journals published in native language is regular practice for most Social Sciences and Humanities (SSH) researchers. Other study on the diversity of publication patterns in the Social Sciences and Humanities (SSH) and bibliometrics tools conducted by Verleysen (2016) showed the growth of publication productivity. In the study conducted by Hammarfelt (2016), the bibliometrics approach was used to analyze the social sciences and humanities publications with the aims to better understand on Social Science and Humanities publication pattern. Tang's (2017) study reported that a bibliometric analysis on digital humanities literature showed steady growth and collaboration among authors with

different countries expended. Bhardwaj's (2017) study found that 1990 documents originated from 79 countries were published in the social science and humanities area. In Gumpenberger's (2016) study on bibliometric analysis exploring the development research output in social science and humanities at University of Vienna over six-year period (2007 to 2012) showed an increase in the peer-reviewed articles and articles in Arts & Humanities Science Index and the Social Sciences Citation Index.

Similarly, Kulczycki's, et. al (2018) study on patterns in the language and type of social sciences and humanities publication revealed that the article was published in English is increasing in all countries.

Heilbron's (2018) study explored the international collaboration in social sciences and humanities using bibliometrics approach and found that the collaboration has increased strongly between 1980 and 2014. Another study by Pearse (2019) investigated that the disciplinary domains in the social sciences and humanities used quantitative citation data from the Web of Science and the result showed the marginalisation of feminist discipline subfields appeared to be strong disciplinarity.

Reale's (2018) study revealed that the evaluation of the scientific, social, and political impact of Social Sciences and Humanities (SSH) research has become a demand of policy makers and society. The study also indicated that the international scientific partners has made significant advances which transformed the impact of evaluation landscape.

According to Tripathi's (2018) study on bibliometrics of social science and humanities research in India revealed that the multi-authored research papers received more citation than single-authored papers over the ten years period from 2005 until 2014. Lee's, et. al (2018) study that aimed to bibliometrically evaluate and compare the research performance of public and private Malaysian universities by examining publications that were indexed in Social Science Citation Index (SSCI) and Arts and Humanities Citation Index (AHCI) discovered that both types of universities do not collaborate much with each other.

Wang's, et. al (2019) study used a bibliometric analysis based on Science Citation Index Expanded (SCI-EXPANDED) and Social Sciences Citation Index (SSCI) in the Web of Science found that the sustainable city research in natural science and social science were well-matched in quantity which China has been ranked as highest in Natural Science research while USA led in social science research.

Jaffe's (2019) study on the use of patent citation data in social science research explored the frequency in 2000 and 2014 and it became intangible assets for future direction. Shaukat's, et. al (2020) study explored the publication of COVID and SARS on the Social Sciences from 2003 to 2020 and the study found that the future directions in the related research area were helpful for researchers. Bruno's (2020) study explored and found that 81 percent of North American rangeland social science has studied ranchers, farmers and landowners.

The study conducted by De Filippo (2020) concluded that the publication coverage especially in the social sciences and humanities research has been expanded and the

sub-fields such as Ethics, Poetry, Cultural Studies or Asian Studies improved their visibility.

Biresselioglu's (2020) study used a bibliometric analysis and content analysis to determine future arctic region related research themes in social science. However, the broad variety of journal articles published through Malaysian Social Science researchers in international scientific journals was very low such as only one Malaysian Journal of Library & Information Science indexed in the Web of Science. This showed that the Malaysian social science journal has a potential to be an impactful journal in future.

Aristovnik's (2020) study showed an extensive bibliometric analysis of COVID-19 research across the science and social science research landscape using bibliometric approaches and the result indicated that the health sciences have large number in both publications and total citations while physical sciences and social sciences and humanities less significantly. However, the study revealed that the research collaboration in non-health scientific disciplines within different subject area gradually increase.

2.2 Meso Level

Meso level can be considered the institutional and country to be measured. In this section, the review describes previous studies conducted on scientometrics research assessment at the country and institutional level

2.2.1 Studies on Scientometrics Research Assessment at the Country Level

In a recent study, Vready (2020) reported that Malaysia was experiencing breakthrough with growth quantity in research performance for the period of 2004 - 2017 and had successfully applied in the agenda during the economic crises during 1997 - 1998. Malaysia also was reported to have a sharp increase in some years and then led to Malaysia's achievement in research has been a useful contribution to its economy. Previous report by EasyUni (2018) declared that Malaysia Higher Education has gained international attention when the number of papers cited worldwide growth and left behind China and Japan. In the report also mentioned citations of Malaysian-published papers have increased 4 times even the budget 2016 cut with RM2.4 billion but the scholarly publications even increased by 29,867 in that year alone compared to previous years. This statement show that Malaysia always strengthens their position and come up with strategies for challenges and better direction in future.

Moreover, University World News (2021) report mentioned that global university rankings has impacted universities including Malaysia because of the ranking exercises force universities to invest in the business of international knowledge production and academics are required to publish their work. World Bank (2020) also reported that Malaysia has seen positive trends in research and innovation activities through overall growth in R&D intensity, the number of R&D personnel, growth in overall research output and inventions among many other indicators. It also brought large reforms to the roles and governance of public research organizations and universities. This is why Malaysian scientific output has increased between 1982 and 2014 as Malaysia has also greatly

increased its commitment in research fund to scientific research (Lewison, 2019).

Previous report by MASTIC in 2010 revealed that the scientific overall performance of Malaysian performance through Web of Science was very valuable and indispensable to decide a unique direction for researchers their research (Landry et. al, 2001). Malaysian research performance was recognized internationally and has a good reputation. This statement was supported by Zainab, et. al (2012) on their study which found that the publication performance in Malaysia steadily increase and time cited dominated by using the utilization of public universities such as UM, USM, UPM, UKM and UiTM.

Recent report by Issues in Science and Technology (2021) on China's scientific performance mentioned that China recently had overtaken the 27 countries of the European Union and moreover, China's elite universities place increasingly higher in international rankings, and the Chinese Academy of Sciences consistently as top in the Nature Index of institutional scientific output. This is argument supported by Guangchao's (2020) report which stated that China invested in a large amount research fund for China's scientific achievement. Fu's, et. al (2011) study indicated that about one half of China's Elite Scholars of China papers had been internationally collaborative, and the eight fundamental industrialized nations carried out an outstanding position in scientific collaboration with China and the worldwide collaborations made incredible contributions to academic research in China. Miyairi's, et. al (2012) study examined that Taiwan's international collaborations represented in its

relatively stated papers to look at any significant adjustments amongst its key research partners.

Kumar's, et. al (2013) study also found that Malaysia's top international partners were all developed countries includes the US, Australia, Japan, the UK, and Canada. However, Malaysia has had quite little collaboration with ASEAN nations. Another study by Pislyakov's, et. al (2014) additionally demonstrated that the lag was mainly important in the higher part of the pyramid of science and the broadly common view was world collaboration which almost a requirement for publishing rather cited papers. Evaluating the research evaluation productiveness is an essential rely on analyzing world productivity to compare research output worldwide and this statement also supported by Ductor's (2015) study which determined that the improved affiliation leads to greater educational productiveness. Later study revealed that China's Social Science research performance was equally nationally and globally oriented and stable over the years and the study indicated that Chinese Social Science has improved international networking (Liu, et. al, 2015). Moreover, the study also proved that co-authored with international partners help them to receive more funds.

Later, Abrizah's, et. al (2017) study indicated that the measures of establishing trust and authority in scholarly communication that China stands second globally to the USA in terms of scientific output. The study helped to understand that publication productivity is one of the important bibliometric indicators to measure scientific output. Erfanmanesh's, et. al (2017) study indicated that

Scopus indexed journals published in the US, UK and the Netherlands are the most strongly overrepresented due to the fact some most important publishing organizations are positioned in these countries, usually Elsevier that is based in the Netherlands. Based on the Abrizah and Wee's (2011) study, the percentage of international collaboration was low, and it can be concluded that computer science publications from Malaysia were more likely to collaborate with domestic researchers. Bakri's, et. al (2017) study also explored that a huge development of research happened in these 20 years in Malaysia and it showed a positive sign in Malaysia's research and development. Sakikawa's, et. al (2017) explored that the management practices and manufacturing performance from Malaysia and India were effective in providing insight into the capability of national culture in the same region of Southern Asia.

According to Onyancha's (2018) study on the collaboration patterns and citation impact of the Library and Information Science research in sub-Saharan Africa between 1995 and 2016 revealed that the research output continued to grow since 1995 which co-authored in collaboration with international partners obtained more citations. According to Kosyakov's, et. al (2019) study on the performance of all Russian scientific organizations revealed that increased interest in the scientometrics evaluation associated with global trends not only in this area but also in general approaches to public administration.

According to Atanassova's, et. al (2019) study on scientific performance which there were many studies internationally conducted on the use of scientific documents with bibliometric application that showed the growing interest of the

bibliometric community in this subject. This statement is supported by Zhu's, et. al (2019) study on bibliometric review of papers published between 2003 to 2018 on the water footprint in China expanded significantly as have collaboration with international partner. Elango's (2019) study on a bibliometric analysis of literature on engineering research among Brazil, Russia, India and China (BRIC) countries revealed the publication trends and collaboration patterns of BRIC countries in the field of engineering which may be useful for the academic fraternity and decision makers.

Although spatial bibliometrics and scientometrics have traditionally focused on examining both country and regional levels. However, Csomós's (2020) study on the challenges ahead of spatial scientometrics focusing on the "city level" revealed that there was no standardized method of how bibliometric and scientometric data clearly define how cities can profit from the results of scientometrics. This argument showed that the approach should be defined clearly to have better assessment.

The bibliometric analysis applied to analyse the growth and publishing trends in Islamic finance literature in which found that the research has grained largely in Malaysia (Tijjani, et. al, 2020). Other study by Putera, et. al (2020) indicated that the authors with affiliations from Malaysia were more productive than authors from Singapore and Indonesia during 1998 to 2019 which it showed that Malaysian researchers actively produced articles. Later, Ganasegeran's, et. al (2021) study revealed that the overall literature and publication productivity of diabetes research in Malaysia has grown steadily over the past 19 years. Lu's,

et. al (2020) study used scientometrics analysis in social science research on antimicrobial resistance (AMR) reviewed that in the past five years, the literature grown rapidly, western developed countries contributed most to the field; and Asia and Africa have the most collaborations with one another.

2.2.2 Studies on Scientometrics Research Assessment at the Institution Level

According to Coccia's (2005) study revealed that the Italian science area was undergoing a strategic reform due to budget cuts and the study measure to assess the scientific research performance of public research institutes that supports the policymakers which decide about the direction of public funding for research.

A study by Shao, et. al (2011) described several universities used h-index values and number of articles produced in high impact journals as a base promotion decision. Moreover, the study also revealed that some universities in Scandinavia and China used research performance to allocate research funding or bonuses. In Malaysian context, research performing institutions more frequently collaborated with foreign partners than with other establishments inside Malaysia, the country's five research universities were amongst the top-most productive of all institutions in Malaysia (Kumar, et. al, 2013).

According to Ammarukleart's, et. al (2017) study on the trends of research in the area of Institutional Repositories (IR) used bibliometric and text-mining methods which revealed that there has been a notable growth trend in research outputs and collaboration among institutes and countries. The study also

explored that there was a significant variability in the topics covered in the literature in which get the overview of publication, authorship, and research themes in the IR research field.

According to Galyani-Moghaddam's, et. al (2017) study on the assessment of co-authorship network structure in Allameh TabatIba'i University revealed that faculty members had the most international cooperation with colleagues from USA and Switzerland and it showed that the collaboration with international partners were increased and provided insight into the scholarly works.

Other study additionally revealed that the production of research papers written in the English language used to be the vital result through the years and only three Saudi universities can be considered as the most influential educational establishments in article production terms (Nikolaidis, et. al. 2018). According to Bornmann's (2018) study on the institutional performance revealed that the Journal Impact Factor (JIF) and the number of affiliations have a statistically significant effect on institutional performance. The study showed that institutions with a particular subject profile have an advantage. Esam's, et. al (2018) study also found that bibliometrics can be one of the indicators as a benchmarking to other universities through collaborative work especially for the new universities in Malaysia. This is why collaboration is encouraged as to make sure research and development activity can benefit and solve the societal issue.

According to Chik, et. al (2018) study that explored the outputs performance of Malaysian Universities and Research Institutions (MURI) with the timeframe from 2014 to 2017 gathered from SOPUS and WoS, the top 10 of MURI which published most publications in SCOPUS, and it also declared that Malaysian publication is the highest in this region which surpasses publications by Singapore and Thailand. Malaysia has intensely collaborated more with the developed countries also signifies the intensity of these countries' investment in research and development

According to Chan's (2019) study, Malaysia's research output was primarily from the five public research-intensive universities' research institutes and centre of excellence, reflecting funding model and the research output had increased rapidly in recent years as the incentives provided by the government to these research universities to put greater emphasis on research, development and innovation activities.

According to Mukundan's, et. al (2019) study on the impact of research publications of Khalifa University in UAE, that the university leads in productivity compared to other UAE universities, but the citation impact of its publications is less in comparison to United Arab Emirates University and New York University, Abu Dhabi in terms of citations per publication. The study also indicated that publishing in top-ranked journals would improve the chance of getting more citations.

2.3 Micro Level

The aggregation at the micro level can be considered as researchers, authors, journals, articles that are chosen to be measured. This section describes previous studies on the scientometrics research assessment at the author, subject, article and journal level.

2.3.1 Studies on Scientometrics Research Assessment at the Author Level

Xie's, et. al (2008) study concluded that the significant increase in length of 1995–2006 and greater in the research areas over the years which collaborative articles had shifted from home collaboration to global collaboration. Previous study by Persson (2009) also indicated that the international papers were no longer properly represented amongst excesses and have an effect on papers in research specialties and found additionally aid researcher's collaboration.

Aksnes's (2003) study determined that enormously cited papers are normally authored by a huge number of scientists. This study was supported by Nwagwu, et. al (2011) in which their findings published that multi-authored research papers obtained larger citations than single-authored papers and Abrizah, et. al (2012) indicated that the high tiers of collaboration amongst authors were evident amongst the top 10 most productive countries.

Moreover, the share of publications with global author groups in every examined database does not exceed 32 shares per 12 months which indicated that the small tendency of Iranian authors to collaborate with world companions (Erfanmanesh, et. al, 2013).

Other studies carried out by Martínez, et. al (2015) indicated that the scholars from many different nations were being cited in the literature and being considered internationally. The study also supported Lrhoul's, et. al (2021) findings which water research in Morocco are mainly conducted by a limited number of researchers such as Azzedine Elmidaoui and Ibn Tofail University as they have mostly collaborated with each other in developing research papers. Moreover, the domination of local scientists on the list of most productive authors of Moroccan water research proves that local research outputs about water resources is fully managed by Moroccan capacities although it is driven by international collaborations and confirms on the other hand that large Moroccan universities are the ones that are leading water research in Morocco.

Sahu's, et. al (2014) study indicated that there are six authors in their study were common in publications indicated the healthy research exercise in the discipline. There was no impact on multi-authorship to publish in core journals and the expansion of publication in core journals in relation to grow in authorship suggests a non-causal correlation.

Among of the nine (9) characteristics of Malaysian highly cited papers were represented particularly by articles but evaluations have greater impact; more often than not published in the first quartile; generally authored by way of many; basically, Malaysian as reprint authors and first authors; often affiliated to Malaysian research universities and many internationally collaborative (Noorhidawati, et. al, 2017).

Nazarovets's (2018) study which determined that the collaboration of Ukrainian scientists from different scientific fields using citation analysis data from Scopus in the period of 2011-2015 showed the number of documents of highly cited Ukrainian scientists that have received enough citations to be included to the top 1 percent, 5 percent and 10 percent most cited documents in the world which proved there were significantly different in different subjects' areas.

According to Khasseh's, et. al (2018) study on the author co-citation analysis revealed that theoretical foundations and citation analysis is the biggest cluster which comprises 59 authors in which provides beneficial information for both researchers and policymakers.

Other study also determined that the journal articles published by three authors obtained the most range of citations observed through collaboration used more than four authors when consider in terms of citation per article which confirms that the collaborative works received greater citations than the article published individually (Bhui, et. al, 2018).

Previous study by Tahira, et. al (2018) found that the citation count had a strong relationship with the quantity of the productive core and cannot be use as sole impact evaluation measure in Malaysian engineering researchers at the micro level. The study also revealed that eighty percent of the most productive Malaysian engineering researchers have an affiliation with five research universities.

Dion's (2018) study examined the gender gap in citations across political science subfields and across methodological subfields within political science, sociology, and economics which revealed that the men's research was viewed as the most central and important in a field. According to Pestana's, et. al (2020) study on the emerging trends and future research opportunities via a bibliometric analysis of senior tourism research from 1998 until 2017 revealed that a slow increase in the publication output and most cited articles are mainly older.

2.3.2 Studies on Scientometrics Research Assessment at the Subject Level

Certain researchers, organizations and countries are active in different and very focused subject areas. A recent study by Zhu, et. al (2021) which used scientometric analysis found that the alfalfa field tends to be stable on Web of Science from 2009 to 2010 and moreover, China and the United States have made remarkable achievements in the field of alfalfa. The study will help scholars in this field grasp the future research direction.

Li, et. al (2021) performed a scientometrics analysis based on Science Citation Index-Expanded (SCI-E) to understand the research trends and areas of focus in grassland remote sensing (GRS) and found that the remote sensing, environmental sciences, and ecology were the most popular Web of Science research areas. It also be found that more than 100 papers were published each year since 2010 and the results can help related researchers better understand the past and future of GRS research studies that increased exponentially.

A bibliometric analysis and assess the trends to evaluate the global scientific production of microbubbles and nanobubbles from 2000 to 2020 and found that the most dominant categories for microbubbles were environmental sciences and environmental engineering were among the dominant categories for nanobubbles and a general growth trend in published articles in a 20-year period which China had the most significant collaboration with other countries (Movahed, et. al, 2021).

A previous study by Davarpanah (2009) revealed that the wide variety of Social Science Citation Index (SSCI) publications by Malaysian researchers showed an extent from 38 in 1999 to 149 in 2008. The study also indicated that the Malaysian researchers were turned into considerations internationally in fields such as psychology, economics, and management whereas the country produced very little in some other massive social science disciplines such as political science and communications.

According to Abramo's, et. al (2011) study examined the rapid trend toward the adoption of assessment exercises for national research. They also strongly supported that the methodology overcomes the typical limits of bibliometric analyses and allowed strong rankings and field of research.

Tahira et. al (2013) reported the productivity of Malaysian researchers in engineering and discovered that this field promoted international visibility of Malaysia in engineering research based on publication in IF journals. Diem's, et. al (2013) study reported the overall performance of individual researchers in

the field of education sciences based on the Web of Science and Google Scholar. They found that both databases show a very unequal distribution of the individual research output, and the indicators used to measure research performance (quantity of publications and citation impact) from the two data sources are highly positively correlated.

Li, et. al (2015) explored the patterns in scientific outputs and academic collaborations and served as a progressive way of revealing international research developments in the research field. Bornmann's, et. al (2015) study revealed that the publications steadily growth for tsunami research between each year cumulative range of publications for the durations from 1991 to 1998 and 1998 to 2004. Moreover, the study revealed the relationship of authors and the variety of output, the range of journals and the range output, and the percentage of total output and the variety of times a keyword was once used.

Janudin, et. al (2016) examined the existence of strategic, comprehensive, and dynamic dimensions in university Performance Measurement System (PMS) and the findings contributed to the line of research in the area of PMS design that can be used as a guideline by universities in designing the PMS.

According to Geng's, et. at (2017) study on the patterns of life cycle assessment (LCA) that were published from 2000 to 2014, there was a rapid growth of building LCA related publications with the USA as lead country and explored most energy, materials, and carbon were the hot topics in the research field that were useful references to researchers.

Bakri's (2017) study found that there have been statistically significant changes in the types of articles in the numbers of references per article and in the lengths of the articles.

It also has been concluded that the bibliometric method showed the scientific pattern in the wine tourism in both Web of Science and Scopus (Durán, 2017). Chew's, et. al (2018) study also found that the bibliometric methods allowed establishment of prior research trends, output and performance in order to reorient future resources and improve research collaborations.

Kura, et. al (2018) reviewed numerous studies on groundwater in Malaysia with the aim of assessing past trends and the status for discerning the sustainability of the water resources in the country in which found that most of the previous studies focused on the islands and seawater intrusion studies. This showed the work helped the policy makers for better future improvement and sustainable development.

According to Gupta's, et. al (2018) study on analyzing library marketing research output used bibliometric indicators revealed that the literature in library marketing research was still very small, highly scattered and has so far registered no growth during the last 12 years (2006 to 2017). The study also revealed that the library marketing research was yet to emerge as a popular research area in library and information science.

Khiste's, et. al (2018) study on the big data over the period of 2013 to 2017 revealed that there was significant research activity in the field used bibliometric analysis and showed the publication trends in the subject Information Science and Systems. A previous study by Sedigheh, et. al (2018) indicated that a bibliometric study used to assess the research performance in a particular field or journal and its allied research to regulate policies both in terms of allocation of funds and scientific research area that play an essential aspect in creating better impact, visibility, and citation.

Pestana's, et. al (2018) study evaluated the evolution of publication used bibliometric analysis based on the Science Citation Index Expanded (SCIE). The results showed a significant growth on the growth in the number of publications provided opportunities for its greater development.

Mishra's, et. al (2018) study used bibliometrics analysis and the result indicated that the number of articles on supply chain was increased in the past few years. Furthermore, the study also identified some of the most influential articles on performance measurement and metrics and concluded that there has been a transition from traditional to more sophisticated performance measurement systems. According to Qi's, et. al (2018) study on the assessment of public services in e-participation found that the trend of e-participation research has obviously increased and become the new research focus that helped mapping knowledge domains.

Rusly's, et. al (2019) study of the bibliometric analysis concluded that the payroll systems patent developments were increased and while the publication of payroll empirical studies were quite low in number. The also study found that more empirical studies were needed which enable the exploration of further insights on socio-technical elements and behavioural impacts of payroll systems implementation.

According to Hilal's, et. al (2019) study on the scientometrics assessment of categorize Building Information Modelling (BIM)-Facility Management (FM) publications revealed that the scientometrics helped researchers to strategize the authors and journals that were related with BIM-FM topics.

According to Golizadeh's, et. al (2019) study on the assessment of the current state of research in this emerging discipline and future research direction on remotely piloted aircraft (RPA) revealed a field of study in its fledgling stage, with a limited number of experts and main focus of research being in the technical areas of remote sensing, photogrammetry and image processing.

A scientometric analysis of global publication output in liposome research (2011-2020) and found that the biochemistry, genetics and molecular biology field have the largest number of publications in liposome research which global publication output on liposome research increased in 2011 and the United States was the most productive country in liposome research (Sharma, et. al, 2021). The study is useful to overcome current translational and regulatory limitations

by better understanding the difficulties and developments in liposomal technology.

According to Suominen's, et. al (2019) study on the use of terminology by reviewed the literature with bibliometric approach and co-citation analysis revealed that the three largest clusters were from innovation system studies, regional innovation studies and technological innovation studies that helped institutional direction in future.

According to Su's, et. al (2019) study on the bibliometric analysis identified the current state of the academic literature regarding social network analysis (SNA) found that the research on SNA has been very popular and still in the highly mature period. The study also revealed that the information would be valuable for related authors, practitioners and who may be interested in applying the theory or ideas of SNA.

According to Ahmad's, et. al (2019) study on the scholarly research in Library and Information Science used scientometrics analysis based on the Web of Science revealed that the USA has the highest overall output of LIS scholarly publications, and the Journal of Medical Library Association was the most highly cited journal in LIS. This study helped the researchers in conducting bibliometric research studies in LIS.

Teng's, et. al (2020) study found that the number of rheumatological publications in Malaysia have increased and however, the average number of

citations per publications remained low and most publications were in journals with low impact factors. Thus, the study helped to improve the quality of rheumatological publications from Malaysia.

2.3.3 Studies on Scientometrics Research Assessment at the Article Level

According to Pathak's, et. al (2020) study on scietometrics analyzed the 239 publications under research area plant sciences with more than 1000 citations indexed in the Web of Science revealed that highly cited publications have been published in high impact journals such Annual Review of Plant Physiology and Plant Molecular Biology.

In another study, Sudhier, et. al (2020) used scientometrics analysis to measure the biochemistry research contributions of Indian scientists covered in the Web of Science for a period of 10 years (2004-2013) and revealed that the highly cited articles highly cited 10 papers are identified with more than 300 citations and covered in the international journals.

Recent study on Scientometric analysis was used to know the status of current literature and provide guidance to future studies and revealed that the highly cited publications were are produced by large establishments from highly capitalized organizations and countries (Kemal, et. al, 2021).

Therefore, the need of study on scientometrics at micro level (article level) are important as the information is useful to help the effectiveness of future research works management with emphasizes on the gaps of research, more citable

documents; and allocation of budgets on more needed research and to avoid the duplication of research.

2.3.4 Scientometrics Assessment of Journals

Bordons's, et. al (2004) study proved that the bibliometric approach has proved beneficial for complementing different methodologies. However, the improvement of bibliometric research was not a problem. The lack of the diversity of classification schemes used in the specific research was some of the problems to be solved. Moreover, they also examined the classification of journals into categories as they were the basis for many of the bibliometric indicators designed to measure cross-disciplinarily.

Study conducted by Hall (2011) examined some of the bibliometric matters related with the judgement of productivity and ranking and it also identified the growth of importance journal ranking exercises. The findings call for scholars to recognize the important to post a significant variety of papers in journals that were appreciably visible such as e-journals and in specific open access journals to acquire many citations (Lwoga, et. al, 2013).

Abrizah's, et. al (2013) study revealed that the articles with citations to Malaysian journals were low and average overall performance in the Web of Science (WoS) in terms of the cited and the citing journals. However, it was significant as only 9 Malaysian journals were indexed in the WoS. The study also revealed that Malaysian journals were cited as a credible source in high ranked journals in the Journal Citation Report in the WoS.

Later, Bales, et. al (2014) discovered that the unique authorship patterns to be statistically notably related with issues in high school impact journals such as fundamental frequency skill investigators as authors have been all strongly associated with pamphlets in high impact diaries.

Abrizah's (2016) study also discovered that the productivity and citation were only one of the measures for describing the overall performance and influence of Malaysian journals indexed in MyCite which the citation measures can supply very beneficial insights into scholarly research and its communication. The relative quantity of productiveness and impact measures helped when evaluating research overall performance of individuals rather than relying on single indications such as the number of publications.

This statement was supported by Abrizah's (2016) study indicated that the performance of Malaysian Medical Journals at the international level was gauged through the global citation databases. The government were concerned about journal performance in international databases and through MyCite the performance of journals helped editors to improve the quality and visibility at the international level.

According to Elango's (2017) study on the scientometrics analysis on the Nature Nanotechnology journal over the period of 10 years revealed that the founding year, the number of publications was very low because the journal was first published in October 2006 and from 2007 onwards, the number of publications rise more than 200.

According to Lv's (2017) study on the bibliometric study of the characteristics and patterns of publication outputs and the major journals in global law and psychiatry research during 1993-2012 from the Web of Science (WoS) revealed that International Journal of Law and Psychiatry, Journal of the American Academy of Psychiatry and the Law and Psychiatry, Psychology and Law were the representative journals in the field of L&P research. The study also provided a potential guide for future research among professionals concerned constructive contribution to the area.

The quality and performance of researchers depends on the type of journal They choose. This statement is supported by Paiva's, et. al (2017) study which indicated that the researchers in the medical area who published in high-impact journals have distinct profiles compared with the researchers who published in low impact journals. Therefore, the choice of paper published in the quality journal by researchers influences the success of institution performance.

According to Dhanani's, et. al (2017) study on the assessment academic journals represent a key institutional mechanism in the governance and functioning of the academic community revealed that the overall board trends including internationalisation were consistent with societal diversity and value of diversity.

The bibliometric tool was used to collate citation information from Google scholar and the study examined article productivity in Medical Journal of Malaysia (MJM) published between 2004 and 2008 showed that the

contributors to MJM were mainly Malaysian and the number of Malaysian-Foreign collaborated papers were very small. The study concluded that although MJM have some international significance even not WoS indexed and being visible (Sanni, et. al, 2017). Kevin's, et. al (2017) results showed the bibliometric studies that cover journals in various fields helped to improve the quality of journals both international and national level. According to Elango's, et. al (2018) study on the publication trend in the World Psychiatry Journal found that a variety of characteristics of the journal World Psychiatry which can be used to understand the characteristics of a high impact psychiatry journal which helped establish international partners for future research projects.

Later, Erfanmanesh, et. al (2018) published that the eight Iranian journals placed in the first and 2nd quartile (top 50 percent) of journals of the same subject in the JCR and results also showed some Iranian journals go through from low global recognition depicted from foreign contributions. According to Duran-Sanchez's, et. al (2019) study on the trends and changes in the International Journal of Entrepreneurial Behaviour & Research found that the increased internationalisation of the topics and countries represented in the journal as evident in the bibliometric analysis and growth of citations.

There was a positive evolution in the number of publications which showed a growth of interest in publishing in Journal of Knowledge Management (Gaviria-Marin, et. al, 2019). The study also found that the USA and the UK lead the publications in Journal of Knowledge Management. The study was useful for obtaining a quick snapshot of what is happening in the journal reflecting its

main research trends. Jyotshna's, et. al (2020) study on the authorship trend and content analysis revealed that the top-ranked library and information science (LIS) journals, individual productivity, collaboration patterns, country and institutional productivity and impactful areas increased in the research field of the LIS. Farajnezhad's, et. al (2020) study examined the highly relevant journals, the provisional extension and the countries with the highest publications on the Web of Science which the resulted showed an overall image more important studies in the economics field. Lei's (2020) study explored the hot topics published in the Journal of King Saud University, and found the tendency for authors to collaborate with the same researcher and research team in the journal publication

2.4 Summary of Chapter Two

This chapter has examined the bibliometrics and scientometrics literature on gauging research performance at the meso and micro level in various research disciplines and topics. The findings from this review reveal a lack of significant extant literature on the specifics of the topic of investigation for this research, i.e Malaysian Social Science Research.

The next chapter presents the methodology of the study.

Chapter 3: Methodology

3.0 Introduction of Chapter Three

This chapter covers the research methodology that explains the systematic approach to examine the research problem of interest and describes the specific methods and procedures taken to address the research objective and questions stated in Chapter One. The objective of the study is to perform a scientometrics assessment of Malaysian Social Science Research (MSSR) in the Web of Science (WoS) over the period of 2007 - 2017 at the meso and micro levels. Through bibliometric analysis, the quality and quantity of publications produced by Malaysian social science researchers can be measured. This chapter presents the research methodology in the following sections:

(a) Research Method

(b) Bibliometrics as a Research Design

(c) Materials

(d) Data Collection

(e) Data Analysis

(f) Validity and Reliability

(g) Summary of Chapter Three

3.1 Research Method

Scientometrics and bibliometrics are both the methodological way as subject of analysis for the scientific literature and involve the monitoring of research and assessment. Scientometrics analysis are more often used to measure the evolution of a scientific domain, the impact of scholarly publications, the patterns of authorship, and the process of scientific knowledge production. Bibliometrics studies attempt to measure the

authorship and contribution of journal articles and research organization. As the objectives of this study focus on the evolution and growth of Malaysian Social Science research, the terminology of scientometrics analysis was used to measure the needs of this study. However, the terminology of bibliometrics analysis not being used as the title of the study because bibliometrics has a specific meaning and have a clear scope of study for library science. Therefore, the quantitative research approach has been used to conduct this study in which the results acquired and the measurement of the prevalence of numerous perspectives and opinions in each pattern.

Therefore, the data collection is a difficult task, and it requires careful handling at each stage which can lead to wrong interpretation. The materials used in this study are derived from the Social Science Citation Index (SSCI) present in the Web of Science Core Collection database, which was accessed from the Clarivate Analytics' Web of Science database on 30 October 2018.

The Web of Science was used to perform this study because the database was the first broad scope international bibliometrics and become the most influential bibliographic data source for journal selection and research evaluation. This is why SSCI was used in this study as it is a global database and covered journals from social sciences. This study conducted a scientometric analysis of the research productivity performance of Malaysian Social Science Research's time span that focus on 11 years from 2007 to 2017. Besides the study is extended from past studies on Malaysian research performance, the originality to perform this study will allow to measure the performance of social science research at global levels as Ministry of Higher Education has contributed most for research and development in Malaysia since 2006 as the

establishment of research university to have productive institutions in terms of producing new knowledge and impressive outcome. There are five public universities in Malaysia namely Universiti Malaya, Universiti Kebangsaan Malaysia, Universiti Sains Malaysia and Universiti Putra Malaysia were given as research university status by the Malaysian government in 2006, and in 2010 Universiti Teknologi Malaysia was recognized as research university.

In the Web of Science database, the basic search function was used to extract the data and refine function to filter and narrow the scope of data. Therefore, the refine function search such as duration, article type, WoS database collection and keyword was used in the study. The period of data was limited 2007 to 2017, include article document type published in English language only and no other document type (such as proceeding. This is because an Article document type is ranked higher than a Proceedings Paper in the order of precedence. SSCI database was selected and Malaysia as address to extract the data and considered in the search process.

The original data for the study in the WoS database were 9929 records. As described earlier, the data used basic search function which are address, SSCI and field (to display the data) duration and language to extract the data. A total of 6521 records were retrieved and the final data set that were used for analysis only 6249 records due to incomplete data (for example missing author names) obtained. The mistakes and changes both in ISBN or ISSN numbers may lead to misidentification of the data source. The duplication data can be minimized as the Web of Science has declared no duplication if duplicate records across. The EndNote reference manager was used to find and remove duplicate references. The study checked for the incomplete data

manually using data compiled in Microsoft Excel. For example, authors without complete information for references were excluded from this dataset. However, the study tried to find corresponding publication based on Digital Object Identifier (DOI) then tried to match based on combination name of author and first initial author.

The data was exported in comma-separated values (csv) format and being compiled in Microsoft Excel. The final dataset used for analysis of trends, profiles in publication and citation patterns explore the strength of different research areas. Articles have been obtained from the effects of the search for document type and were analysed in line with their publication output, language of publication, authorship, publication patterns, distribution of subject category, distribution of journal, country of publication and most frequently cited articles. Figure 3.1 presents the stepwise bibliometrics approach conducted for this study.

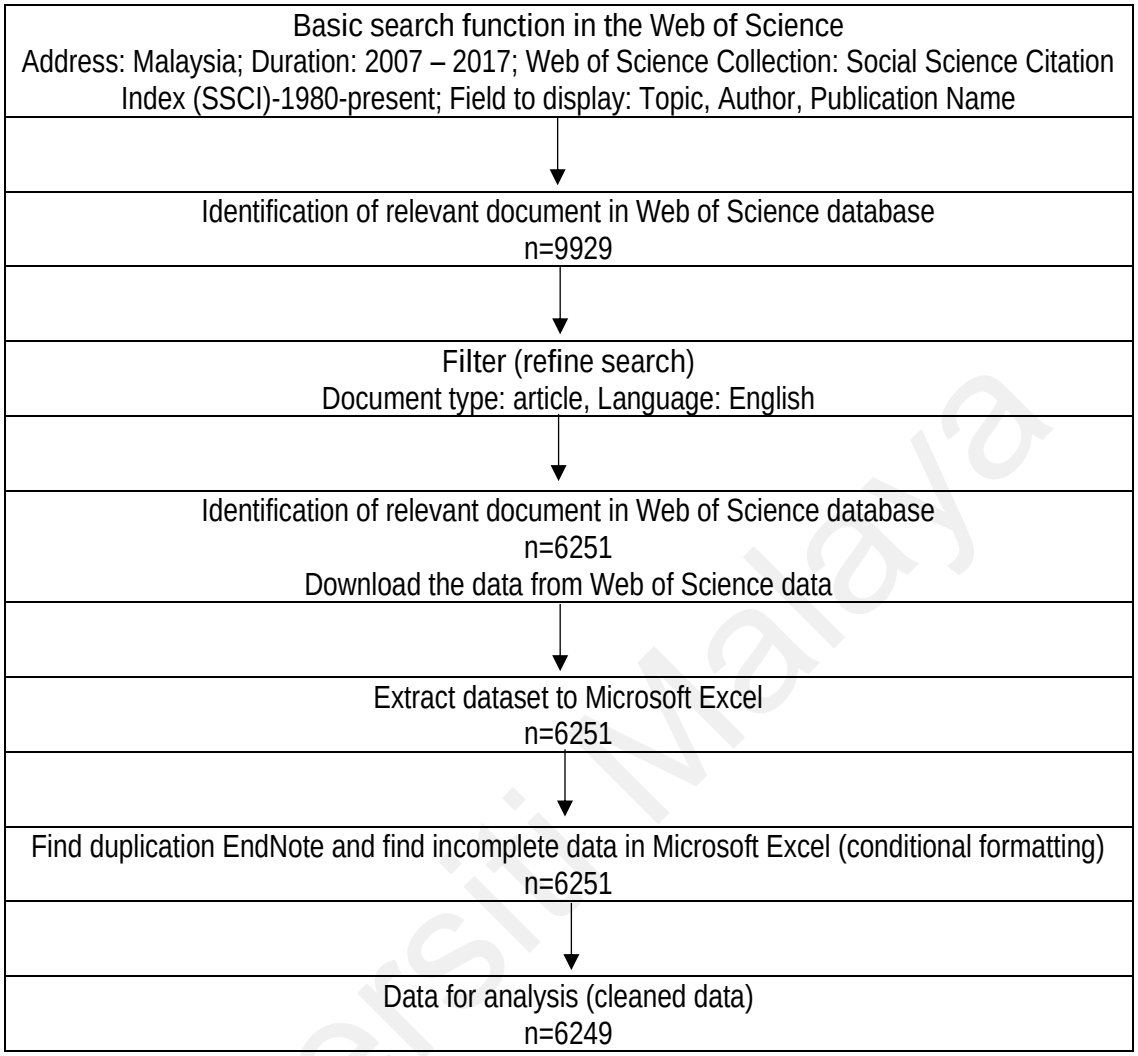

Figure 3.1: Stepwise Bibliometrics Approach Conducted on 30 October 2018

3.2 Bibliometrics as a Research Design

Bibliometrics definition can vary from the perspective of researchers who studied this topic. However, bibliometric method as a research design was first brought by Alan Pritchard in a journal article entitled “Statistical bibliography or bibliometrics” in 1969 to mean, “the software of mathematics and statistical techniques to publication and unique media of conversation to illuminate the strategies of incited communications” (Pritchard, 1969; page 348-349). The word bibliometrics originates from the Latin and Greek words 'biblio'‘and 'measurements' which explains to the use of science to the

investigation of list of sources (Thanuskodi, 2010). Zainab's, et. al (2013) study found that the citation indexing is other terminology besides bibliometric in papers and articles. However, Karanatsiou's, et. al (2017) study found that both bibliometrics and altmetrics as an indicator that can be manipulated by human factor intervention. According to Nkiko and Adetoro (2007) revealed that bibliometrics and citation evaluation were numerous and research in these areas have supplied perception become apparent areas of research by investigating these substances that are used regularly. The bibliometrics as a method has been used to emerge and scholarly linkages of a variety of fields of research. Bibliometric research has been carried out to be used by the institutions and nations in terms of research productivity through number of publications and research influence through citations. Bibliometric studies are also utilized to explore the territorial examples of research, the degree of participation between research gatherings and national research profiles.

Nowadays, bibliometric analysis is still being used as an assessment method and has become popular and vital to assess the achievement which influence the respective institutes or universities with ranking, reputation and research grant allocation. Previous study conducted by Eugene Garfield (Garfield, 1979) revealed that the citations are the formal, particular linkages between papers that have precise points in common. Currently, the citation statistics designate a significant requirement in world university ranking. The emphasize of obtained much attention both useful and negative from scientists, researchers, funders and policymakers. Through bibliometric assessment which their performance has been assessed such contribution, collaboration and the production of articles by researcher, it gives benefits to government agencies to identify which research or university or researcher that catch attention that might have the

opportunity to perform through their fund investment. Besides, the bibliometric analysis can help future direction or research to be determined for the current development. In this study, the articles published as an evidence that useful to determine the effort of researchers as to show their commitment in research activities. Two aspects that are important to be determine the development of research are bibliographical and citation impact. Based on the bibliometric analysis, the future direction of research can be identified and give insight to individual, institutions and countries. Bibliometric as the indicator to measure the productivity namely years of publication, type of documents etc. whereas to measure the impact of publication namely as h-index or citation analysis. Research performance is quantified by two kinds of matters in which research activity and research impact. Therefore, using bibliometrics as the approach for this study that aims to measure the social science research productivity in Malaysia from the aspect of total number of publications, the growth of publication in institutional and individual levels, and most productive authors in 11 years is found to be very suitable.

3.3 Materials

This study focuses on Malaysian Social Science Research contribution to world literature published in journals that were indexed in Web of Science (WoS). Web of Science is the world's most relied on and largest publisher citation index, international discovery and citation analytics throughout the sciences, social sciences and art & humanities. With over 1.4 billion cited references going back to 1900 from leading government and educational institutions and research-intensive agencies the Web of Science citation network serves as the foundation for the Journal Impact Factor, InCites, and different effective and trusted citation-impact measures. The Web of Science is a

multidisciplinary useful resource providing access to citation databases: Science Citation Index Expanded, Social Sciences Citation Index, Arts and Humanities Citation Index, Conference Proceedings Citation Index, Index Chemicus, and Current Chemical Reactions. It covers over 8000 scientific journals international in sciences, social sciences, arts, and humanities (Reuters, 2009). According to Clarivate Analytics (2021), Web of Science Core Collection is the world's leading citation databases, with multidisciplinary information from over 18,000 high impact journals, over 180,000 conference proceedings, and over 80,000 books from around the world. It can cover various research areas namely Arts & Humanities, Life Sciences & Biomedicine, Physical Sciences, Social Sciences and Technology. Thus, Web of Science was selected as the database for this study as it is a multidisciplinary database and one of medium for all higher education institutions to monitor the publication productivity of its academics. The information used in the study all originated from the Social Science Citation Index (SSCI) – 1980 and current (Web of Science Core Database). The study used information Malaysian-predicated authors acquired from the Web of Science database, especially the Social Sciences Citation Index (SSCI) the period covered from 2007 to 2017 which opens an eleven-year window to the publication productivity of Malaysian Social Science primarily predicated authors and Malaysian institutions. The publications covered include articles and English language only. 6249 cleaned records were retrieved and used for this study. This study analyzed the citations in these research evaluations and explored profiles performances from the institutional, author and self-discipline levels and thereby assisting the government, top management, policymakers, scientists to determine which substances and sources are closely used and which materials are needed to improve.

3.4 Data Collection

The Web of Science used to discover and examine the citation influence of over a century of research publications located in the most prestigious articles, convention proceedings, and journals. The accurate data for data collection sources were required for bibliometric analysis. Thus, the publication and citation data have been collected totally from the internationally recognised publisher of citation data, namely Web of Science retrieved in October 2018. Data analysis and records were checked to ensure the accuracy of affiliation and Social Science Citation Index (SSCI) – 1980 and existing (Web of Science Core Database) earlier than remaining enter for records processing. The study used the length of information for a period of eleven years (2007 to 2017) and the group of Malaysia social science research disciplines as categorised in the SSCI. The records have been downloaded from SSCI in the end of October 2018. The time frame of the data was publications posted between 2007 and 2017 because the information collection was carried out in 2018 and it was assumed that publication and citation counts would have been suggested by 2017. There were more than 9929 records retrieved from the SSCI database in which the articles listing an author address in Malaysia had been selected for affiliation. The final dataset retrieved was 6249 records and was exported to Microsoft Excel spreadsheet for analysis because only include article and English language and excluded other type of document. Figure 3.2 shows a screenshot as an example during the data collection process in the Web of Science conducted on 30 October 2018.

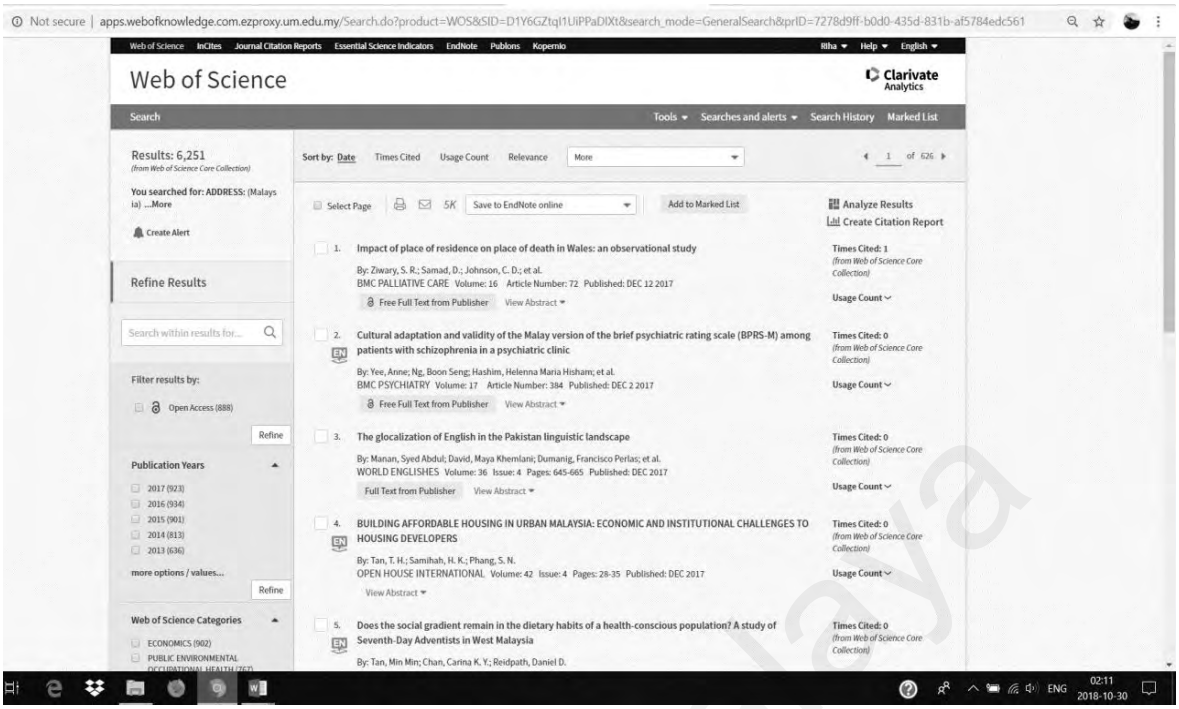

Figure 3.2: Data Collection in the Web of Science on 30 October 2018

3.5 Data Analysis

Statistical treatment of data in research is important in maintaining the reliability and accuracy of the research. Therefore, the statistical method being used in this study and descriptive statistics was used to summarize the data in the study as a graph.

This study focused on time span started from 2007 to 2017. The main objective of this study is to analyze the scientific research performance in Malaysia for 11 years. The Web of Science database was used on this study, using keyword 'Malaysia' in address and narrowed the filter with article type, English language, and SSCI. All related articles were extracted with total of 9929 data was retrieved from WoS. Then, from the total data, the data cleaning was done and only 6249 data. The documents were checked and any articles that incomplete were removed. The data was exported and compiled into a separate database using spreadsheet (Microsoft Excel). Only completed data after

data cleaning which the full count of data and bibliometric analysis was used to analyze the data.

Additional verification was carried out for each bibliometrics indicator. The scientometrics assessment on publications of institutional or individuals is more complicated than journals or countries in some characteristic publication features of institutional and individuals. These factors can also strongly influence the scientometrics symptoms selected. In this study, the data that needed to be unified belonged to three categories in which authors of articles, agencies (authors' affiliations) and journal titles connected to articles. Finally, the main file for each and all three categories of records used to be created and full count number base used for this study. Each of these categories had to be retrieved and the data has been then sorted through excel spreadsheet according to the authors' full names and variations of names, the names of firms and their variations, journal titles and their abbreviations or variations. The bibliometric indicators used to analyze the data are as follows:

(a) Total number of articles published over the period of eleven years;

(b) Total number of articles published by particular institutions and authors over during the period of study;

(c) Total number of citations received, mean citation per article published, collaborative activity, international and national origins of journals, and subject categories;

(d) A full-counting was applied in this study; in which co-authored publications are fully assigned to each co-author or the organization. For example, a publication co-authored by three authors or universities counts as a full publication for each of the three author and university.

(e) The evaluation was based on whole publication count in which greater than one establishment collaborated on a publication and one guide was counted for each institution.

The common problems faced during the analysis were in name disambiguation, especially for Malay and Chinese names, the affiliation of the author, the same initial name and the use of abbreviation. Circumstances in completing the evaluation of the analysis due to the many versions and inconsistencies of names and institutional used in numerous articles. Verified and edited names had been analyzed and tabulated to produce the anticipated output in tables and charts, in order to reap all precise pursuits of the study.

3.6 Validity and Reliability

The validity and reliability of bibliometric indicators have been the concern of researchers engaged in the improvement of such indicators. There were two types of analysis, uncommon by the variable on which topics are assessed, are dominant in evaluative bibliometrics. The first type is publication evaluation which based on counts of the activities on which the documents produced through each author (or by using each organization, every concern area, every country, etc.) have been published. Publication analysis also conceived of as a form of productiveness analysis on the assumption that counts of publications serve as dependable indicators of the rate at which their authors are productive. The assessment of the validity of analysis of each of these sorts rests on our attitudes toward each of a chain of successively more fundamental premises. The second type is citation evaluation as a specialised structure of utilization analysis and it is assumed that counts of citations serve as dependable

evidence of the amount of use to which citing authors have put mentioned documents. Usage analysis is itself occasionally conceived of as a structure of influence analysis on the assumption that counts of usage events serve as reliable indicators of the quantity of have an effect on that archive have had on a given population of authors. There was a various practice were observed from the previous research to meet the ethical issue of data verification and validation. In this study, the various practices were used for data verification and validation such (a) the verification used to be made feasible via checking with expert directories and internet web sites by universities and research organizations. This practice used to be the most tedious and time-consuming system of statistical analysis; (b) the author's last affiliation was considered as the final and cleaned manually and (c) the data and other documentation were kept in the record. All data extracted were verified using the first method which is through checking the expert's directories. However, if the data is incomplete or missing, the author's last affiliation was used as manual method for data verification and validation.

3.7 Summary of Chapter Three

This chapter has detailed out method used in this study. An explanation of research design i.e. bibliometrics was given. The data source, the search strategies and the data collection process were described.

The next chapter presents the analysis and results of the study.

Chapter 4: Data Analysis and Findings

4.0 Introduction to Chapter Four

This chapter presents the analysis and discusses the findings of the study that gauges the scientometrics assessment of Malaysian Social Science Research in the Web of Science (WoS) over the period of –007 - 2017. It describes the discipline's productivity, impact and publication patterns at the meso and micro levels and answer the four research questions posed:

(a) What is the growth of Malaysian Social Science Research literature in the Web of Science over the period of 2007 - 2017?

(b) What is the scientific performance of Malaysian Social Science Research in the Web of Science at the meso and micro level?

(c) What is the research impact of Malaysian Social Science Research in the Web of Science at the meso and micro level?

(d) What are the characteristics of the Web of Science-indexed journals that Malaysian researchers in the social sciences published in?

4.1 The Growth of Malaysian Social Science Research literature in the Web of Science Over the Period of 2007 - 2017.

This section addresses research question one and reports on the growth of the Malaysian Social Science literature in the Web of Science over the period of 2007 - 2017, with a total of 6249 papers.

Table 4.1 shows the annual productivity in terms of number of publications, and impact in terms of total citations of Malaysian Social Science literature in the Web of Science

from 2007 to 2017. The highest number of publications achieved was 934 in the year 2016 (14.95 percent), followed the year in 2017 (14.74 percent) and 14.42 percent for year in 2015. In the first four years, Malaysian Social Science researchers produced below 500 articles annually but there was a gradually increase in publication from 2007 to 2010. There was also a sharp increase in 2011. However, in 2012 there was a drop of 77 publications (17.7 percent) from previous year in which shown the biggest drop throughout the 11 years. Then, it bounced back and steadily increased in 2013 with 106 publications (20 percent). Overall, the total number of publications increased with 834 papers (13.35 percent) in 11 years (from 2007 to 2017) as illustrated in Figure 4.1. Figure 4.1 presents the publication growth from 2007 (87 papers) to 2017 (934 papers).

The percentage of yearly publication being calculated as per details below:

$$\frac{\text{Total Publication in N year X 100\%}}{\text{Overall publication}}$$

For example:

$$\frac{\text{Total publication in 2007 X 100\%}}{6249}$$

= 1.39 percent

The highest publication growth was in 2011 with 3.31 percent growth (207 papers). For the percentage of publication growth, it has been calculated as per details below:

$$\frac{\text{Total Publication in current year (N) – total publication in previous year (M) X 100\%}}{\text{Overall publication}}$$

For example:

$$\frac{\text{Total publication in 2008 (169)} - \text{Total publication in 2007 (87)}}{6249} \times 100\%$$

= 1.31 percent

Table 4.1: Annual Productivity and Impact of Malaysian Social Science Research Literature in the Web of Science (2007 – 2017)

Malaysian Social Science Research Literature	Total Publication	Percentage of Publication	Percentage of Publication Growth	Total Citation	Mean Citation Per Paper
2007	87	1.39	-	2168	24.92
2008	169	2.70	1.31	3228	19.1
2009	251	4.02	1.31	4721	18.81
2010	400	6.40	2.38	6025	15.06
2011	607	9.71	3.31	5793	9.54
2012	530	8.48	-1.23	4929	9.3
2013	636	10.18	1.70	5956	9.36
2014	813	13.01	2.83	6726	8.27
2015	901	14.42	1.41	5536	6.14
2016	934	14.95	0.53	3600	3.85
2017	921	14.74	-0.21	1740	1.89
Total	**6249**	**100**	-	**50422**	**126.24**

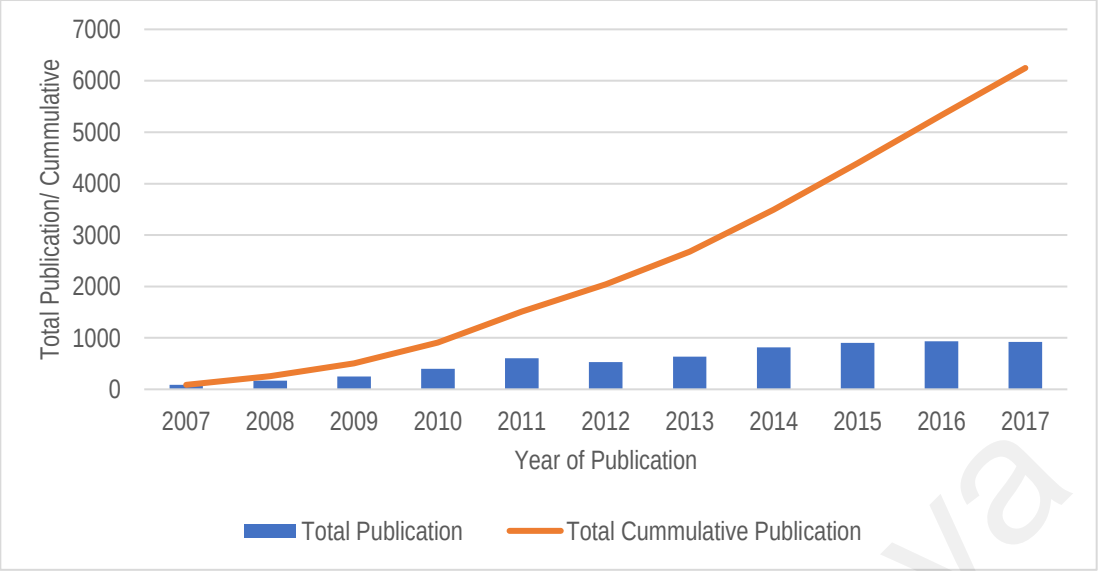

Figure 4.1: The Growth of Malaysian Social Science Research Literature in the Web of Science Over the Period of 2007 – 2017

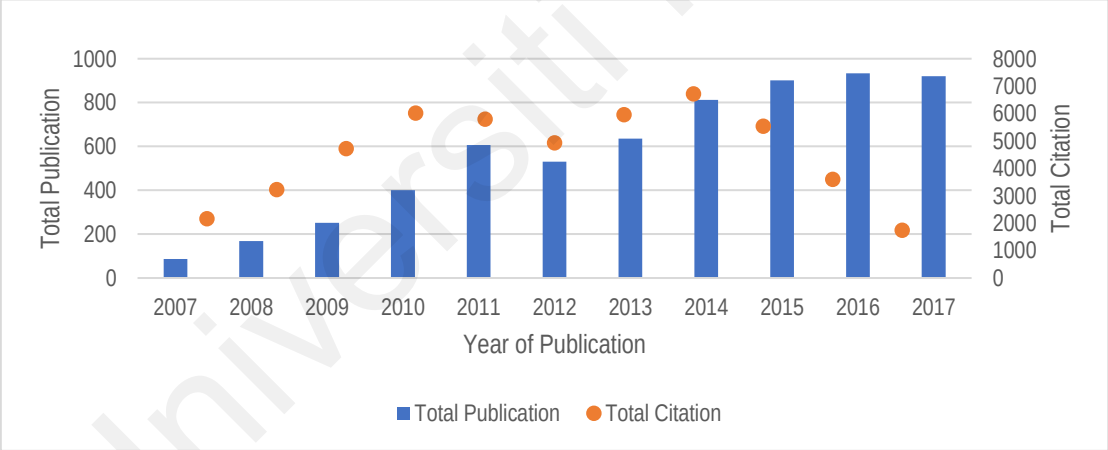

Figure 4.2: The Publication and Citation Growth of Malaysian Social Science Research Citation in the Web of Science Over the Period of 2007 – 2017

The total number of citations received by Malaysian Social Science research publications indexed in Web of Science from 2007 to 2017 is 50422. Figure 4.2 shows the publication and citation growth of Malaysian Social Science Research Citation in the Web of Science over the period of 11 years. Publications in the year of 2014

achieved a total of 6726 citations (13.3 percent) which is the highest throughout the 11 years of publication. From 2008 to 2010, the number of citations received by Malaysian Social Science research indexed in the Web of Science went up and start in 2011 the number went down. The citation started to plunge from year 2015 until 2017.

The yearly mean citation per paper published from 2007 to 2017 is indicated in Figure 4.3. As overall, there is decline of average citation per year and it can be seen between the last 7 years. The average citation is very low in the year of 2017. The result also indicated that the citation was high in early 4 years of publication as the articles have major influence and researchers might cited the articles more.

Total citation of each year of publication is based on total citation received for all papers in the particular year. The mean citation per paper was calculated with dividing the total number of citations by the total number of papers.

For example, the mean citation per paper in 2007 was calculated:

$$\frac{\text{Total citation (2168)}}{\text{Total papers published (87)}}$$

= 24.92 mean citation per paper

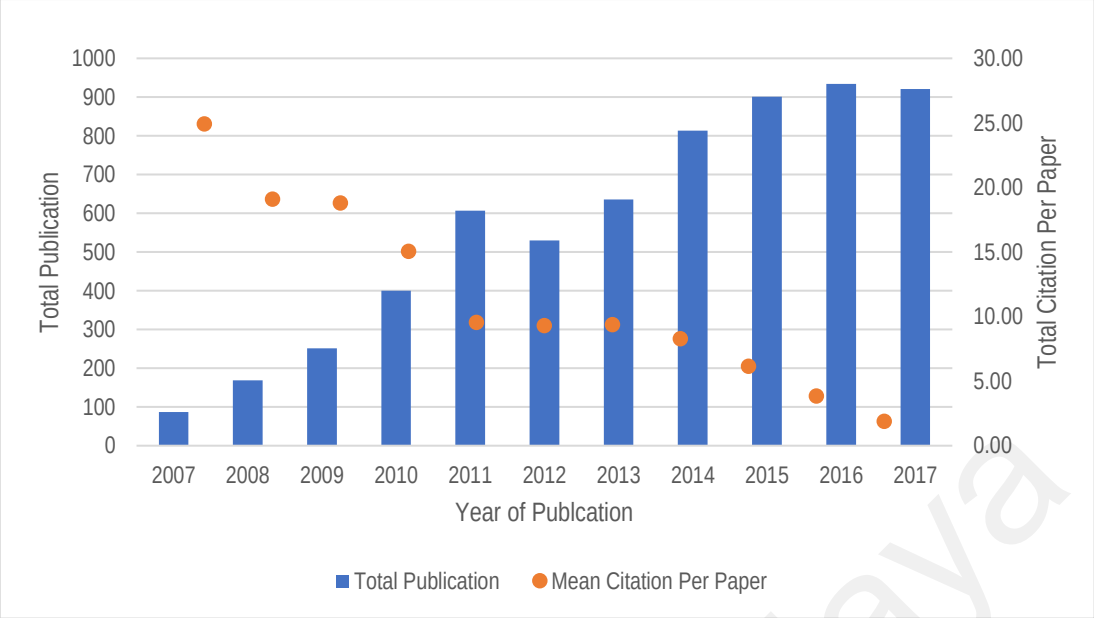

Figure 4.3: Mean Citation Per Paper for Malaysian Social Science Research in the Web of Science Over the Period of 2007 – 2017

4.2 The scientific performance of Malaysian Social Science Research in the Web of Science at the meso and micro level

This section addresses research question two and reports on the scientific performance of the Malaysian Social Science literature in the Web of Science at the meso and micro level over the period of 2007-2017. In the Web of Science, the institution gets counted as the author's name is affiliated to the respective institutions.

Meso level

Table 4.2 highlights the publication performance by the various institutions in Malaysia. Universiti Malaya leads (1187 papers) compared to Universiti Sains Malaysia (789 papers). As expected, the grant funding enables the Malaysia Research University to perform very well as we can see the publication output from 2008. Among the private universities, Monash University leads in terms of total publication output (359 papers) and followed by University of Nottingham (244 papers).

Table 4.2: The Scientific Performance of Malaysian Social Science Research in the Web of Science at the Meso (Institutional) Level

No.	Affiliation	Year											Total Publication	Percentage Publication Contribution	Category of Institution
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017			
1	Univ Malaya	24	37	76	128	188	190	202	263	292	311	265	1976	31.6	Malaysia Research University
2	Univ Sains Malaysia	11	28	35	62	79	70	89	96	123	103	93	789	12.6	Malaysia Research University
3	Univ Putra Malaysia	8	23	32	48	70	49	70	72	89	93	78	632	10.1	Malaysia Research University
4	Univ Kebangsaan Malaysia	11	18	20	37	56	49	78	60	58	65	47	499	8.0	Malaysia Research University
5	Monash Univ	1	13	15	20	29	29	26	70	53	61	42	359	5.7	Private University
6	Univ Teknol Malaysia	2	2	4	12	25	21	33	41	67	74	77	358	5.7	Malaysia Research University
7	Univ Teknologi MARA	3	7	12	15	36	22	21	29	44	25	40	254	4.1	Malaysia Comprehensive University
8	Univ Nottingham	2	1	6	8	14	13	27	39	29	45	60	244	3.9	Private University
9	Multimedia Univ	6	10	18	12	27	10	18	15	17	25	22	180	2.9	Private University
10	Univ Utara Malaysia	2	2	5	13	10	7	9	15	21	25	36	145	2.3	Malaysia Focus University
11	Int Islamic Univ Malaysia	3	3	8	4	13	11	17	17	18	23	16	133	2.1	Malaysia Islamic University
12	Univ Tunku Abdul Rahman	0	2	2	13	21	12	9	14	19	13	19	124	2.0	Private University
13	Univ Malaysia Sabah	3	2	10	9	15	11	8	8	13	21	20	120	1.9	Malaysia Comprehensive University
14	Univ Malaysia Sarawak	6	3	7	13	8	7	11	7	14	13	22	111	1.8	Malaysia Comprehensive University
15	Taylor Univ	0	0	0	2	4	5	8	7	21	14	26	87	1.4	Private University
16	Sunway Univ	0	0	0	2	3	3	5	6	10	19	26	74	1.2	Private University
17	Int Med Univ	0	3	3	6	7	3	7	6	10	3	6	54	0.9	Private University
18	INCEIF	0	0	0	1	2	0	3	12	8	10	12	48	0.8	Private Agency
19	Univ Tenaga Nas	1	0	1	2	1	0	3	6	11	13	8	46	0.7	Private University
20	Minist Hlth Malaysia	0	0	2	2	3	3	3	11	6	4	5	39	0.6	Government Agency

Figure 4.4 the top 20 scientific performance of Malaysian Social Science Research in the Web of Science at the meso (institutional) level indicated affiliation mentioned. Throughout the year from 2007 to 2017 publication indexed in the Web of Science, the highest institution contribute to the publication is Universiti Malaya which 31.6 percent (1976 papers), followed by Universiti Sains Malaysia (12.6 percent; 789 papers) and Universiti Putra Malaya (10.1 percent; 632 papers). The finding showed that Malaysia Research University as the dominant contribution for the Malaysian Social Science research in the 11 years. The finding also showed that Private Universities are also moving along following the steps of Malaysia Research University in contributing publication. It also showed the Malaysian Higher of Education ecosystem contributed 99.7 percent for publication published in the 11 years. Ministry of Health is the only government agency that was active in social science publication activity, contributing 39 publications (0.6 percent).

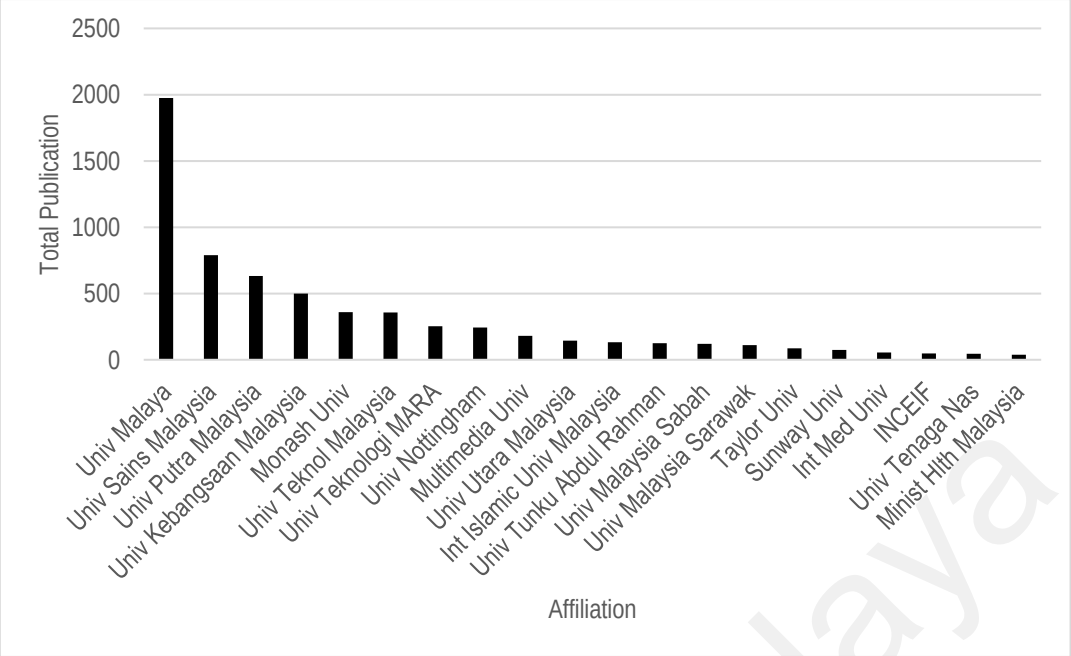

Figure 4.4: The Top 20 Institutional Scientific Performance of Malaysian Social Science Research in the Web of Science at the Meso Level

Micro Level

Table 4.3 refers to the scientific performance of top 20 Malaysian Social Science Research in the Web of Science. Universiti Malaya is represented by 12 authors in the top 20 social scientists, followed by Universiti Sains Malaysia with five authors and Universiti Putra Malaysia with four authors each in the list. Rajah, Rasiah (Universiti Malaya) and Thurasamy, Ramayah (Universiti Sains Malaysia) shared the first ranked in the top 20 social scientists with 54 total publication which more three publications compared to the second ranked (Abrizah, Abdullah, Universiti Malaya).

Table 4.3: The Scientific Performance of Top 20 Malaysian Social Science Researchers in the Web of Science (2007-2017)

Rank	Author	Affiliation	Total Publication
1	Rasiah, Rajah	Univ Malaya	54
1	Thurasamy, Ramayah	Univ Sains Malaysia	54
2	Abrizah, Abdullah	Univ Malaya	51
3	Tang, Chor Foon	Univ Sains Malaysia	41
4	Baharumshah, Ahmad Zubaidi	Univ Putra Malaysia	37
5	Ooi, Keng-Boon	UCSI Univ	36
6	Sidi, Hatta	Univ Kebangsaan Malaysia	34
7	Lean, Hooi Hooi	Univ Sains Malaysia	33
8	Wong, Li Ping	Univ Malaya	32
9	Wong, Chan-Yuan	Univ Malaya	26
10	Law, Siong Hook	Univ Putra Malaysia	25
10	Furuoka, Fumitaka	Univ Malaya	25
11	Alam, Gazi Mahabubul	Int Islamic Univ Malaysia	22
12	Ibrahim, Mansor H.	INCEIF	21
12	Tan, Andrew K. G.	Univ Sains Malaysia	21
13	Amran, Azlan	Univ Sains Malaysia	20
13	Balakrishnan, Vimala	Univ Malaya	20
13	Saidur, R.	Univ Malaya	20
14	Ellis, Lee	Univ Malaya	19
15	Estrada, Mario Arturo Ruiz	Univ Malaya	18
16	Krauss, Steven Eric	Univ Putra Malaysia	17
16	Sambasivan, Murali	Univ Malaya	17
16	Khin, Edward Wong Sek	Univ Malaya	17
17	Abdollahi, Abbas	Univ Putra Malaysia	16
17	Sufian, Fadzlan	Int Islamic Univ Malaysia	16
18	Devadason, Evelyn Shyamala	Univ Malaya	14
19	Suki, Norazah Mohd	Univ Malaysia Sabah	12
20	Lim, Weng Marc	Monash Univ	11

4.3 The research impact of Malaysian Social Science Research in the Web of Science at the meso and micro level

This section addresses research question three and reports on the research impact of the Malaysian Social Science literature in the Web of Science over the period of 2007 - 2017, with a total of 50422 total citation reported.

Meso Level

Table 4.4 shows the top 20 institutions in publication with their research citation report and the number of Web of Science categories. Universiti Malaya achieved 28.2 percent in citation (7.2 mean citation per paper) and this finding found that the institution with the highest number of publications does not necessarily contribute to higher citation. This is because Universiti Tunku Abdul Rahman (ranked 10th, with 124 papers) has the highest mean citation per paper with 11.5. The study used the number of citations to each of the affiliation's publications to normalize the data by dividing it with the average of citations to publications the same year. The indicator is the mean value of all the normalized citation counts for the affiliation total publication

Table 4.4: The Research Impact of Malaysian Social Science in the Web of Science at the Meso Level Over the Period of 2007 – 2017 (Ranked by Total Citations)

Rank	Affiliation	Total Publication	Total Citation	Mean Citation Per Paper	Total WoS Categories
1	Univ Malaya	1976	14236	7.2	116
2	Univ Sains Malaysia	789	7481	9.5	100
3	Univ Putra Malaysia	632	4633	7.3	92
4	Univ Kebangsaan Malaysia	499	3390	6.8	94
5	Monash Univ	359	3024	8.4	81
6	Univ Teknol Malaysia	358	2628	7.3	67
7	Univ Nottingham	244	1964	8.0	69
8	Univ Teknologi MARA	254	1860	7.3	73
9	Multimedia Univ	180	1846	10.3	42
10	Univ Tunku Abdul Rahman	124	1426	11.5	42
11	Univ Malaysia Sabah	120	903	7.5	45
12	Int Islamic Univ Malaysia	133	825	6.2	62
13	Univ Utara Malaysia	145	811	5.6	45
14	Taylor Univ	87	704	8.1	37
15	Univ Malaysia Sarawak	111	567	5.1	54
16	Sunway Univ	74	453	6.1	45
17	Int Med Univ	54	384	7.1	25
18	Univ Tenaga Nas	46	355	7.7	22
19	INCEIF	48	350	7.3	10
20	Minist Hlth Malaysia	39	264	6.8	15

Figure 4.5 presents the top 20 of institutional publication with their research citation report. Universiti Malaya reported received as the highest total citation with lead 6755 total citation compared to Universiti Sains Malaysia (received 7481 total citation) and Universiti Putra Malaysia (4633 total citation).

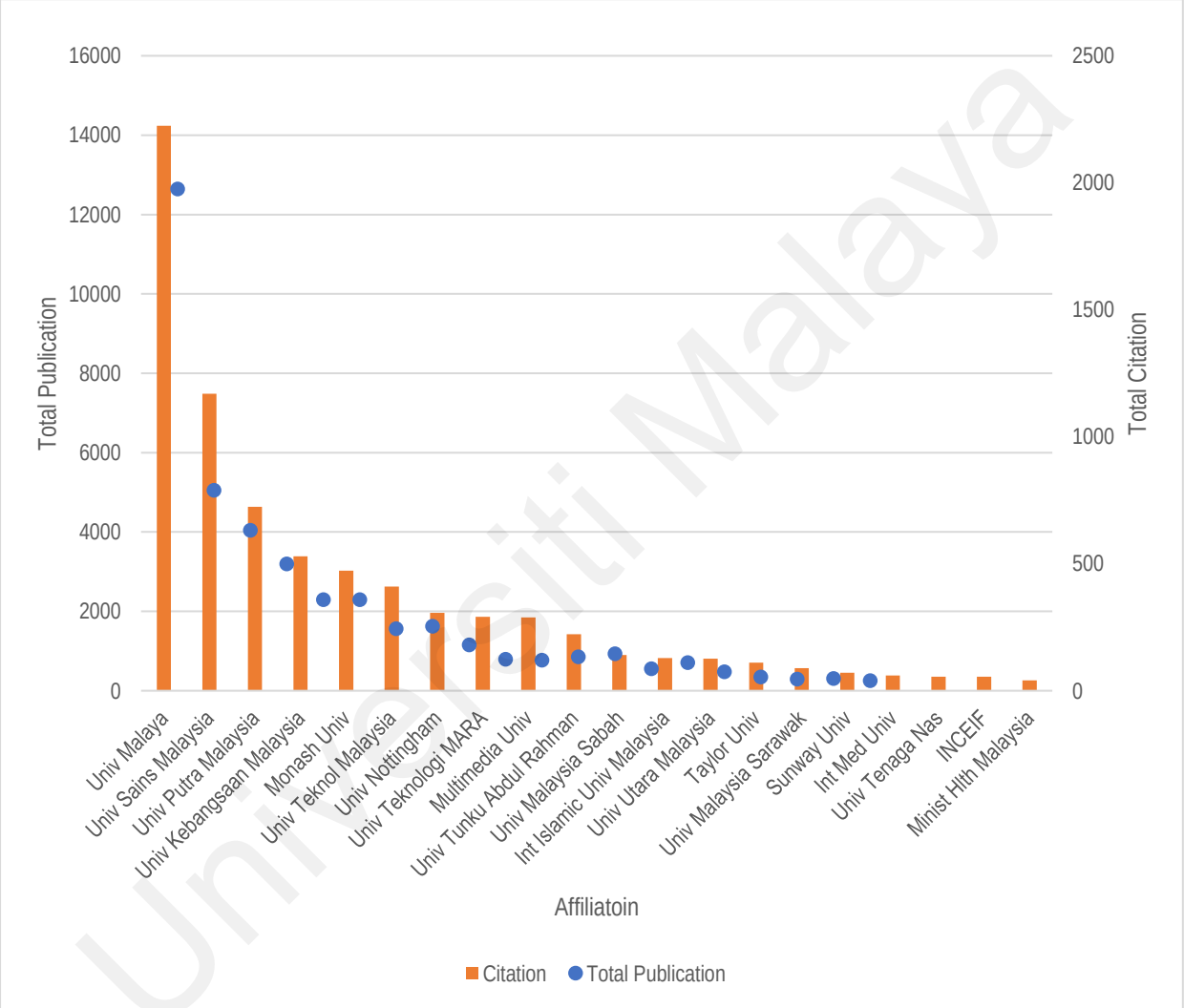

Figure 4.5: The Top 20 Institutional of Malaysian Social Science Research in the Web of Science with Total Publication and Citation

Figure 4.6 presents the top five institution with their top 3 fields which Universiti Malaya dominated in the top three fields namely public, environmental & occupation with 4.37 percent total publication (273 papers) then followed by Economics with 3.8 percent (239 papers) and Information Science & Library Science with 3.3 percent (208 papers). Only one private university listed as the top fields namely Monash University which contributed 0.70 percent publication (44 papers) on public, environmental & occupational health, 0.75 percent publication (47 papers) on business and 1.15 percent publication (72 papers).

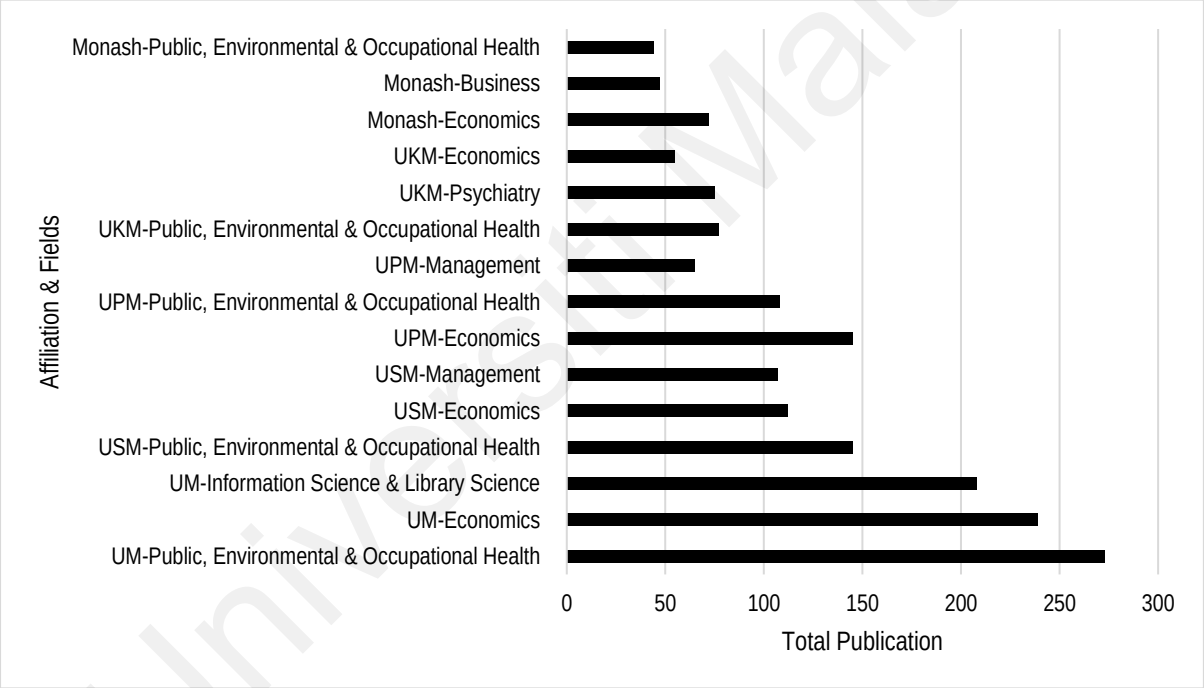

Figure 4.6: Top 5 Institution with Their Top 3 Fields

Micro Level

Table 4.5 highlights the scientific performance of Malaysian Social Science Research in the Web of Science at the micro level with their respective Web of Science subject categories reflecting their research fields which Thurasamy, Ramayah from Universiti Sains Malaysia ranked having the highest subject categories (28 categories) followed by

Wong, Li Ping from Universiti Malaya with 20 categories. However, in the result also show that even their publication is ranked as the highest, authors' mean citation per paper does not reflect and ranked as highest. For example, Rasiah, Rajah (Universiti Malaya) is ranked as having the highest publication but when ranked based on mean citation per paper, he is ranked in 11th. The total mean per citation is calculated as dividing the total number of citations by the total number of papers.

This can be concluded that the various of categories used to published paper not contributed to high citation in publication. The highest citation received by the top 20 Malaysian Social Science research are Saidur, R. and Balakrishnan, Vimala both from Faculty of Engineering and Faculty of Computer Science & Information Technology Universiti Malaya respectively who only contributed 20 outputs throughout the 11 years of study. The study also found that the Science & Technology researchers also published their papers in social science areas.

Table 4.5: The Scientific Performance of Malaysian Social Science Research in the Web of Science at the Micro Level with Their Fields

Rank	Author	Affiliation	Total no. of WoS Categories	WoS Categories	Citation
1	Rasiah, Rajah	Univ Malaya	15	Area Studies (9); Business (18); Economics (20); Engineering, Environmental (2); Environmental Sciences (2); Environmental Studies (3); Green & Sustainable Science & Technology (2); Information Science & Library Science (1); Management (11); Planning & Development (4); Public, Environmental & Occupational Health (2); Social Issues (1); Social Sciences, Interdisciplinary (2); Statistics & Probability (2); Urban Studies (4)	282

1	Thurasamy, Ramayah	Univ Sains Malaysia	28	Business (18); Planning & Development (2); Economics (2); Ethics (1); Management (25); Planning & Development (2); Communication (1); Computer Science, Cybernetics (1); Ergonomics (1); Information Science & Library Science (9); Computer Science, Information Systems (2); Telecommunications (1); Criminology & Penology (1); Education & Educational Research (3); History & Philosophy Of Science (1); Social Sciences, Interdisciplinary (6); Engineering, Industrial (1); Operations Research & Management Science (1); Environmental Studies (1); Hospitality, Leisure, Sport & Tourism (3); Planning & Development (2); Urban Studies (1); Industrial Relations & Labor (2); Psychology, Applied (2); Psychology, Multidisciplinary (2); Psychology, Experimental (2); Sociology (1); Statistics & Probability (2)	709
2	Abrizah, Abdullah	Univ Malaya	6	Computer Science, Information Systems (2); Computer Science, Interdisciplinary Applications (5); Education & Educational Research (1); Information Science & Library Science (49); Psychology, Experimental (1); Psychology, Multidisciplinary (1)	324
3	Tang, Chor Foon	Univ Sains Malaysia	11	Business (1); Economics (28); Energy & Fuels (7); Environmental Sciences (6); Environmental Studies (9); Hospitality, Leisure, Sport & Tourism (11); Management (3); Mathematics, Interdisciplinary Applications (1); Social Sciences, Interdisciplinary (1); Social Sciences, Mathematical Methods (1); Statistics & Probability (1)	812
4	Baharumshah, Ahmad Zubaidi	Univ Putra Malaysia	6	Area Studies (1); Business (4); Business, Finance (5); Economics (33); International	270

				Relations (3); Planning & Development (2)	
5	Ooi, Keng-Boon	UCSI Univ	11	Business (5); Communication (10); Computer Science, Information Systems (2); Economics (2); Industrial Relations & Labor (2); Information Science & Library Science (7); Management (11); Psychology, Applied (1); Psychology, Experimental (6); Psychology, Multidisciplinary (6); Telecommunications (1)	994
6	Sidi, Hatta	Univ Kebangsaan Malaysia	2	Psychiatry (33); Public, Environmental & Occupational Health (1)	166
7	Lean, Hooi Hooi	Univ Sains Malaysia	12	Business (1); Business, Finance (5); Economics (22); Energy & Fuels (3); Environmental Sciences (3); Environmental Studies (6); Hospitality, Leisure, Sport & Tourism (3); Management (3); Mathematics, Interdisciplinary Applications (1); Planning & Development (1); Transportation (1); Urban Studies (2)	555
8	Wong, Li Ping	Univ Malaya	20	Behavioral Sciences (1); Construction & Building Technology (1); Demography (1); Energy & Fuels (1); Environmental Sciences (3); Environmental Studies (2); Green & Sustainable Science & Technology (3); Health Policy & Services (6); Management (1); Medicine, General & Internal (1); Nursing (7); Pediatrics (1); Psychiatry (1); Psychology, Clinical (4); Psychology, Developmental (1); Psychology, Multidisciplinary (1); Public, Environmental & Occupational Health (20); Respiratory System (1); Social Sciences, Biomedical (2); Women's Studies (2)	270
9	Wong, Chan-Yuan	Univ Malaya	14	Area Studies (1); Business (5); Computer Science, Interdisciplinary Applications (10); Economics (6); Energy & Fuels (1); Environmental Sciences (1); Environmental Studies (1); Information Science & Library Science (12);	171

				International Relations (1); Management (2); Planning & Development (5); Political Science (1); Public Administration (2); Social Sciences, Interdisciplinary (1)	
10	Law, Siong Hook	Univ Putra Malaysia	12	Economics (12); Business & Economics (4); Mathematical Methods In Social Sciences (1); Energy & Fuels (1); Environmental Sciences (1); Environmental Studies (6); Planning & Development (1); Urban Studies (1); Finance (2); Business (4); International Relations (3); Green & Sustainable Science & Technology (1)	558
10	Furuoka, Fumitaka	Univ Malaya	10	Area Studies (1); Business (1); Business, Finance (1); Economics (17); Education & Educational Research (3); Humanities, Multidisciplinary (1); International Relations (1); Planning & Development (1); Social Sciences, Interdisciplinary (1); Social Sciences, Mathematical Methods (1)	60
11	Alam, Gazi Mahabubul	Int Islamic Univ Malaysia	6	Business (17); Demography (1); Education & Educational Research (3); Management (17); Public, Environmental & Occupational Health (2); Social Sciences, Biomedical (1)	420
12	Tan, Andrew K. G.	Univ Sains Malaysia	11	Agricultural Economics & Policy (2); Business (1); Economics (9); Education & Educational Research (2); Environmental Studies (1); Ethnic Studies (1); Fisheries (1); Information Science & Library Science (2); Public, Environmental & Occupational Health (6); Social Sciences, Biomedical (1); Transportation (1)	120
12	Ibrahim, Mansor H.	INCEIF	10	Agricultural Economics & Policy (1); Business, Finance (4); Economics (18); Energy & Fuels (1); Environmental Sciences (1); Environmental Studies (4); Management (1); Mathematics, Interdisciplinary Applications (1); Planning & Development (3); Urban Studies (2)	105

13	Amran, Azlan	Univ Sains Malaysia	14	Business (11); Business, Finance (1); Ecology (1); Education & Educational Research (1); Engineering, Environmental (1); Environmental Sciences (1); Environmental Studies (6); Ethics (1); Green & Sustainable Science & Technology (5); Hospitality, Leisure, Sport & Tourism (1); Management (11); Planning & Development (2); Social Sciences, Interdisciplinary (1); Sociology (1)	148
13	Balakrishnan, Vimala	Univ Malaya	9	Business (1); Computer Science, Cybernetics (3); Computer Science, Information Systems (2); Computer Science, Interdisciplinary Applications (1); Education & Educational Research (6); Ergonomics (3); Information Science & Library Science (6); Psychology, Experimental (4); Psychology, Multidisciplinary (4)	688
13	Saidur, R.	Univ Malaya	9	Economics (8); Energy & Fuels (8); Environmental Sciences (15); Environmental Studies (10); Green & Sustainable Science & Technology (9); Engineering, Environmental (5); Thermodynamics (1); Energy & Fuels (4); Engineering, Chemical (1)	688
14	Ellis, Lee	Univ Malaya	15	Anthropology (4); Communication (1); Criminology & Penology (7); Demography (1); Psychiatry (1); Psychology, Applied (3); Psychology, Developmental (1); Psychology, Experimental (1); Psychology, Multidisciplinary (3); Psychology, Social (4); Public, Environmental & Occupational Health (1); Religion (1); Social Sciences, Biomedical (1); Sociology (1); Women's Studies (1)	94
15	Estrada, Mario Arturo Ruiz	Univ Malaya	4	Economics (9); Planning & Development (1); Social Sciences, Interdisciplinary (8); Statistics & Probability (8)	76
16	Krauss, Steven Eric	Univ Putra Malaysia	14	Education & Educational Research (1); Family Studies (3); Management (1); Psychiatry (1);	115

				Psychology, Clinical (1); Psychology, Developmental (2); Psychology, Multidisciplinary (4); Public, Environmental & Occupational Health (3); Religion (4); Social Issues (2); Social Sciences, Interdisciplinary (3); Social Work (3); Sociology (5); Substance Abuse (1)	
16	Sambasivan, Murali	Taylor Univ	16	Business (6); Computer Science, Information Systems (1); Economics (1); Engineering, Civil (1); Engineering, Environmental (1); Engineering, Industrial (2); Environmental Sciences (1); Green & Sustainable Science & Technology (1); Hospitality, Leisure, Sport & Tourism (1); Management (5); Nursing (2); Operations Research & Management Science (1); Psychology, Applied (2); Social Issues (1); Telecommunications (1); Transportation (1)	294
16	Khin, Edward Wong Sek	Univ Malaya	4	Business (5); Economics (13); Hospitality, Leisure, Sport & Tourism (1); Management (3)	10
17	Abdollahi, Abbas	Univ Putra Malaysia	13	Education & Educational Research (2); Nursing (2); Psychiatry (5); Psychology, Clinical (2); Psychology, Developmental (1); Psychology, Educational (2); Psychology, Multidisciplinary (2); Psychology, Social (1); Public, Environmental & Occupational Health (3); Religion (1); Social Issues (1); Social Sciences, Biomedical (1); Substance Abuse (2)	79
17	Sufian, Fadzlan	Int Islamic Univ Malaysia	7	Business (1); Economics (10); Management (3); Mathematics, Interdisciplinary Applications (2); Operations Research & Management Science (1); Planning & Development (3); Social Sciences, Mathematical Methods (1)	118

18	Devadason, Evelyn Shyamala	Univ Malaya	7	Area Studies (6); Business (1); Economics (5); Education & Educational Research (1); International Relations (2); Management (1); Planning & Development (2)	69
19	Suki, Norazah Mohd	Univ Malaysia Sabah	12	Business (2); Computer Science, Cybernetics (1); Computer Science, Information Systems (1); Computer Science, Interdisciplinary Applications (1); Ecology (3); Engineering, Environmental (1); Environmental Sciences (1); Green & Sustainable Science & Technology (4); Information Science & Library Science (4); Management (2); Transportation (1)	63
20	Lim, Weng Marc	Monash Univ	8	Business (7); Hospitality, Leisure, Sport & Tourism (3); Management (3); Computer Science, Information Systems (2); Information Science & Library Science (1); Telecommunications (1); Computer Science, Cybernetics (1); Ergonomics (1)	55

Table 4.6 refers to the impact of Malaysian Social Science Research at micro level. In respect to this, the most cited authors are presented together with their affiliation. The author who has most citation over the past 11 years is Ooi, Keng-Boon (UCSI University) which garnered 994 total citation followed by Tang, Chor Foon (Universiti Sains Malaysia) with 812 total citation. The study found that only two authors from International Islamic University Malaysia listed which Alam, Gazi Mahabubul with 420 total citation and Sufian, Fadzlan from International Islamic University Malaysia with 118 total citation. These findings are also shown in Figure 4.7.

The study did not use first author in this study and the indicator that being used to compare in this study is number of citations as it will provide quantification of research output contribution and paper's cited is better to measure the impact of author's papers rather than how many papers as an author. To normalize the data analysis at the author level, the methods of publication and citation count being categorized at the author-level as follows: (a) the indicator of paper published (output) used as a method of counting paper published; (b) the indicator of the output effect such as citations, publication and field which compare the researcher's citation and their field; and (c) rank the publication of author and selected of top performance of publication. The h-index data included in the Table 4.6 because the h-index is a broad and simple measure of the author's impact in scientific contribution and h-index is also known as indicator for individual evaluation at author level.

Table 4.6: The Research Impact of Malaysia Social Science in the Web of Science at the Micro Level Over the Period of 2007 – 2017

Rank	Author	Affiliation	Total Publication	Total WoS Categories	Total Citation	Mean Citation Per Paper	H-Index
1	Ooi, Keng-Boon	UCSI Univ	36	11	994	27.6	15
2	Tang, Chor Foon	Univ Sains Malaysia	41	11	812	19.8	16
3	Thurasamy, Ramayah	Univ Sains Malaysia	54	28	709	13.1	4
4	Balakrishnan, Vimala	Univ Malaya	20	9	688	34.4	9
5	Saidur, R.	Univ Malaya	20	9	688	34.4	11
6	Law, Siong Hook	Univ Putra Malaysia	25	12	558	22.3	10
7	Lean, Hooi Hooi	Univ Sains Malaysia	33	12	555	16.8	10
8	Alam, Gazi Mahabubul	Int Islamic Univ Malaysia	22	6	420	19.1	11
9	Abrizah, Abdullah	Univ Malaya	51	6	324	6.4	10
10	Sambasivan, Murali	Taylor Univ	17	16	294	17.3	13
11	Rasiah, Rajah	Univ Malaya	54	15	282	5.2	10
12	Baharumshah, Ahmad Zubaidi	Univ Putra Malaysia	37	6	270	7.3	8
13	Wong, Li Ping	Univ Malaya	32	20	270	8.4	10
14	Wong, Chan-Yuan	Univ Malaya	26	14	171	6.6	9
15	Sidi, Hatta	Univ Kebangsaan Malaysia	34	2	166	4.9	8
16	Amran, Azlan	Univ Sains Malaysia	20	14	148	7.4	9
17	Tan, Andrew K. G.	Univ Sains Malaysia	21	11	120	5.7	7
18	Sufian, Fadzlan	Int Islamic Univ Malaysia	16	7	118	7.4	7
19	Krauss, Steven Eric	Univ Putra Malaysia	17	14	115	6.8	7
20	Ibrahim, Mansor H.	INCEIF	21	10	105	5.0	6

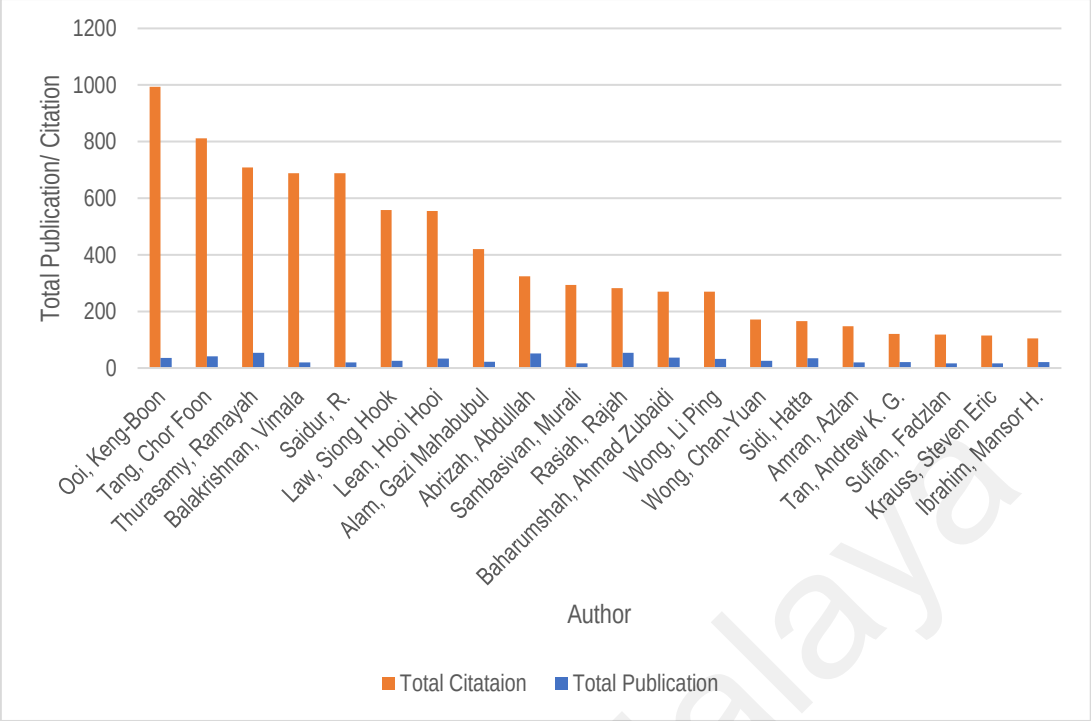

Figure 4.7: The top 20 Most Cited Malaysia Social Science Researchers (Authors) in the Web of Science (2007-2017)

Table 4.7 lists the top 20 most cited Malaysian social science researchers based on Web of Science Categories. The most productive social scientist Thurasamy, Ramayah (Universiti Sains Malaysia) with 28 Web of Science Category is ranked in third with 709 total citation. The highest ranked in citation is Ooi, Keng-Boon (UCSI University) with 994 total citations but ranked in 12th in Web of Science Categories (11). Rasiah, Raja (Universiti Malaya) the most productive is ranked 11th in terms of citation. This study shows that having the highest in Web of Science categories as well as very productive in terms of publication may not necessarily contribute the highest in terms of citations. These findings also shown in Figure 4.8. The number that stated in the Web of Science Categories indicate the subject categories of its source publication and choose by author. In one article of publication, it can be more than one subject category which easy to retrieve or analyze from multiple databases that pertain to the same subject.

Table 4.7: The top 20 High Citation Malaysian Social Science Researchers (Authors) with Web of Science Journal Categories (Micro Level)

Rank	Author	Affiliation	Total Citation	Total WoS Categories	WoS Categories
1	Ooi, Keng-Boon	UCSI Univ	994	11	Business (5); Communication (10); Computer Science, Information Systems (2); Economics (2); Industrial Relations & Labor (2); Information Science & Library Science (7); Management (11); Psychology, Applied (1); Psychology, Experimental (6); Psychology, Multidisciplinary (6); Telecommunications (1)
2	Tang, Chor Foon	Univ Sains Malaysia	812	11	Business (1); Economics (28); Energy & Fuels (7); Environmental Sciences (6); Environmental Studies (9); Hospitality, Leisure, Sport & Tourism (11); Management (3); Mathematics, Interdisciplinary Applications (1); Social Sciences, Interdisciplinary (1); Social Sciences, Mathematical Methods (1); Statistics & Probability (1)
3	Thurasamy, Ramayah	Univ Sains Malaysia	709	28	Business (18); Planning & Development (2); Economics (2); Ethics (1); Management (25); Planning & Development (2); Communication (1); Computer Science, Cybernetics (1); Ergonomics (1); Information Science & Library Science (9); Computer Science, Information Systems (2); Telecommunications (1); Criminology & Penology (1); Education & Educational Research (3); History & Philosophy Of Science (1); Social Sciences, Interdisciplinary (6); Engineering, Industrial (1); Operations Research & Management Science (1); Environmental Studies (1); Hospitality, Leisure, Sport & Tourism (3); Planning & Development (2); Urban Studies (1); Industrial Relations & Labor (2); Psychology, Applied (2); Psychology, Multidisciplinary (2); Psychology, Experimental (2); Sociology (1); Statistics & Probability (2)
4	Balakrishnan, Vimala	Univ Malaya	688	9	Business (1); Computer Science, Cybernetics (3); Computer Science, Information Systems (2); Computer Science, Interdisciplinary Applications (1); Education & Educational Research (6); Ergonomics (3); Information Science & Library Science (6); Psychology, Experimental (4); Psychology, Multidisciplinary (4)
5	Saidur, R.	Univ Malaya	688	9	Economics (8); Energy & Fuels (8); Environmental Sciences (15); Environmental Studies (10); Green & Sustainable Science & Technology (9); Engineering, Environmental (5); Thermodynamics (1); Energy & Fuels (4); Engineering, Chemical (1)
6	Law, Siong Hook	Univ Putra Malaysia	558	12	Economics (12); Business & Economics (4); Mathematical Methods In Social Sciences (1); Energy & Fuels (1); Environmental Sciences (1); Environmental Studies (6); Planning & Development (1); Urban Studies (1); Finance (2); Business (4); International Relations (3); Green & Sustainable Science & Technology (1)

7	Lean, Hooi Hooi	Univ Sains Malaysia	555	12	Business (1); Business, Finance (5); Economics (22); Energy & Fuels (3); Environmental Sciences (3); Environmental Studies (6); Hospitality, Leisure, Sport & Tourism (3); Management (3); Mathematics, Interdisciplinary Applications (1); Planning & Development (1); Transportation (1); Urban Studies (2)
8	Alam, Gazi Mahabubul	Int Islamic Univ Malaysia	420	6	Business (17); Demography (1); Education & Educational Research (3); Management (17); Public, Environmental & Occupational Health (2); Social Sciences, Biomedical (1)
9	Abrizah, Abdullah	Univ Malaya	324	6	Computer Science, Information Systems (2); Computer Science, Interdisciplinary Applications (5); Education & Educational Research (1); Information Science & Library Science (49); Psychology, Experimental (1); Psychology, Multidisciplinary (1)
10	Sambasivan, Murali	Taylor Univ	294	16	Business (6); Computer Science, Information Systems (1); Economics (1); Engineering, Civil (1); Engineering, Environmental (1); Engineering, Industrial (2); Environmental Sciences (1); Green & Sustainable Science & Technology (1); Hospitality, Leisure, Sport & Tourism (1); Management (5); Nursing (2); Operations Research & Management Science (1); Psychology, Applied (2); Social Issues (1); Telecommunications (1); Transportation (1)
11	Rasiah, Rajah	Univ Malaya	282	15	Area Studies (9); Business (18); Economics (20); Engineering, Environmental (2); Environmental Sciences (2); Environmental Studies (3); Green & Sustainable Science & Technology (2); Information Science & Library Science (1); Management (11); Planning & Development (4); Public, Environmental & Occupational Health (2); Social Issues (1); Social Sciences, Interdisciplinary (2); Statistics & Probability (2); Urban Studies (4)
12	Baharumshah, Ahmad Zubaidi	Univ Putra Malaysia	270	6	Area Studies (1); Business (4); Business, Finance (5); Economics (33); International Relations (3); Planning & Development (2)
13	Wong, Li Ping	Univ Malaya	270	20	Behavioral Sciences (1); Construction & Building Technology (1); Demography (1); Energy & Fuels (1); Environmental Sciences (3); Environmental Studies (2); Green & Sustainable Science & Technology (3); Health Policy & Services (6); Management (1); Medicine, General & Internal (1); Nursing (7); Pediatrics (1); Psychiatry (1); Psychology, Clinical (4); Psychology, Developmental (1); Psychology, Multidisciplinary (1); Public, Environmental & Occupational Health (20); Respiratory System (1); Social Sciences, Biomedical (2); Women's Studies (2)
14	Wong, Chan-Yuan	Univ Malaya	171	14	Area Studies (1); Business (5); Computer Science, Interdisciplinary Applications (10); Economics (6); Energy & Fuels (1); Environmental Sciences (1); Environmental Studies (1); Information Science & Library Science (12); International Relations (1); Management (2); Planning & Development (5);

					Political Science (1); Public Administration (2); Social Sciences, Interdisciplinary (1)
15	Sidi, Hatta	Univ Kebangsaan Malaysia	166	2	Psychiatry (33); Public, Environmental & Occupational Health (1)
16	Amran, Azlan	Univ Sains Malaysia	148	14	Business (11); Business, Finance (1); Ecology (1); Education & Educational Research (1); Engineering, Environmental (1); Environmental Sciences (1); Environmental Studies (6); Ethics (1); Green & Sustainable Science & Technology (5); Hospitality, Leisure, Sport & Tourism (1); Management (11); Planning & Development (2); Social Sciences, Interdisciplinary (1); Sociology (1)
17	Tan, Andrew K. G.	Univ Sains Malaysia	120	11	Agricultural Economics & Policy (2); Business (1); Economics (9); Education & Educational Research (2); Environmental Studies (1); Ethnic Studies (1); Fisheries (1); Information Science & Library Science (2); Public, Environmental & Occupational Health (6); Social Sciences, Biomedical (1); Transportation (1)
18	Sufian, Fadzlan	Int Islamic Univ Malaysia	118	7	Business (1); Economics (10); Management (3); Mathematics, Interdisciplinary Applications (2); Operations Research & Management Science (1); Planning & Development (3); Social Sciences, Mathematical Methods (1)
19	Krauss, Steven Eric	Univ Putra Malaysia	115	14	Education & Educational Research (1); Family Studies (3); Management (1); Psychiatry (1); Psychology, Clinical (1); Psychology, Developmental (2); Psychology, Multidisciplinary (4); Public, Environmental & Occupational Health (3); Religion (4); Social Issues (2); Social Sciences, Interdisciplinary (3); Social Work (3); Sociology (5); Substance Abuse (1)
20	Ibrahim, Mansor H.	INCEIF	105	10	Agricultural Economics & Policy (1); Business, Finance (4); Economics (18); Energy & Fuels (1); Environmental Sciences (1); Environmental Studies (4); Management (1); Mathematics, Interdisciplinary Applications (1); Planning & Development (3); Urban Studies (2)

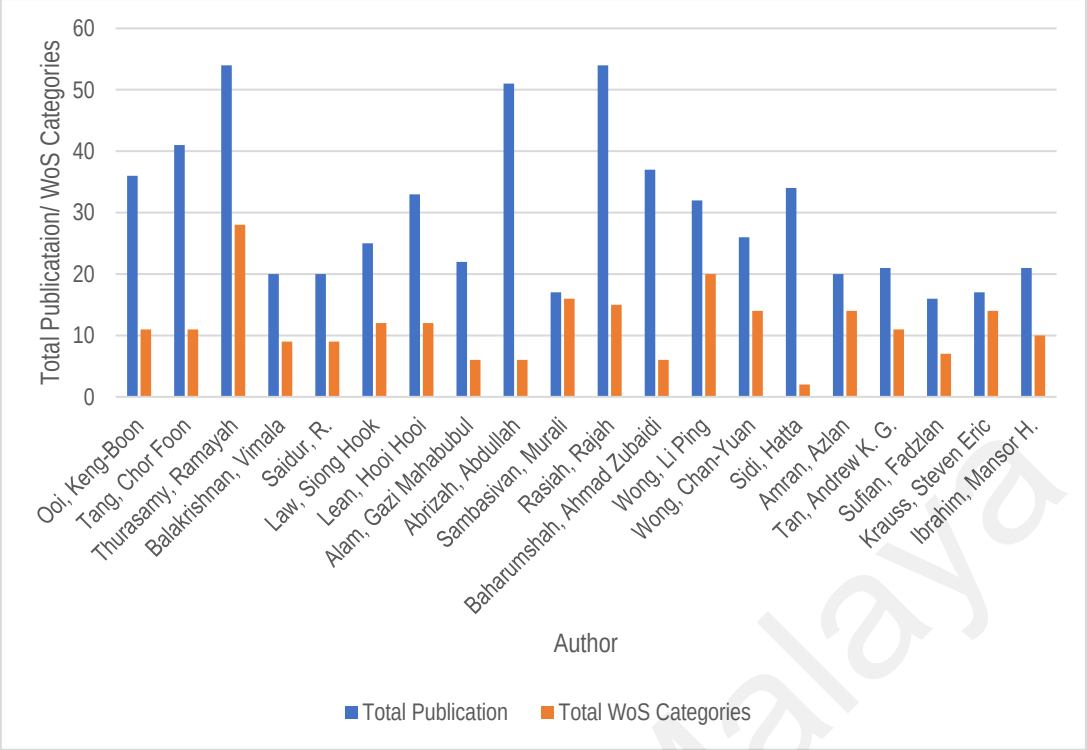

Figure 4.8: The Top 20 High Citation Author in their Web of Science Journal Categories

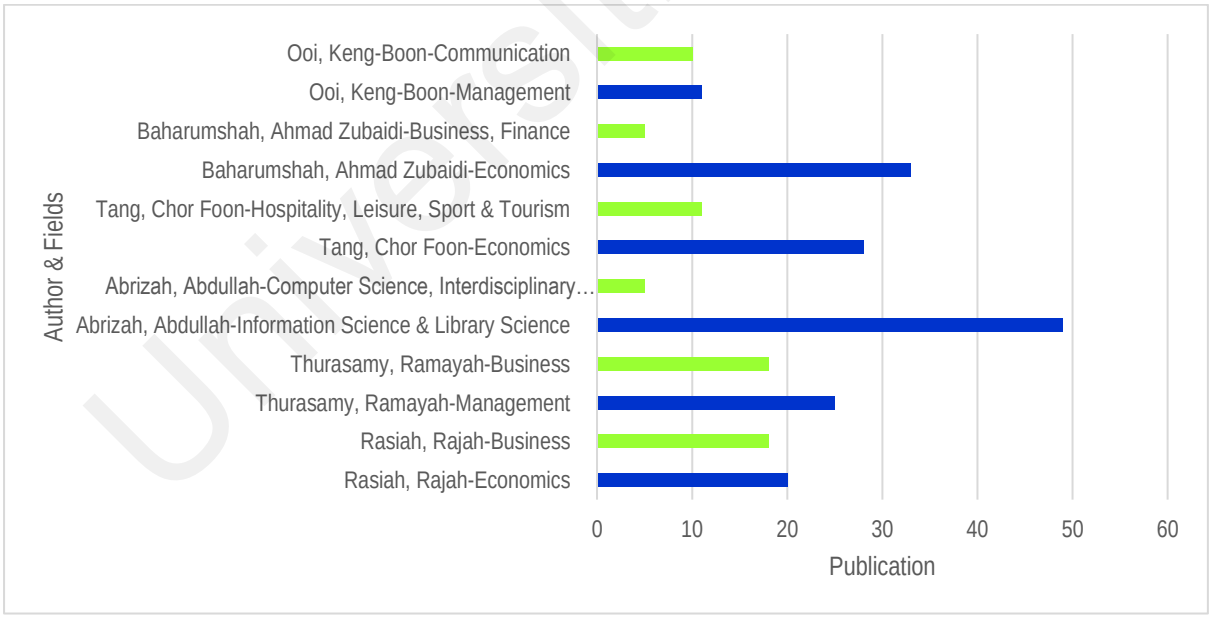

Figure 4.9: The Most Cited Social Science Researchers in their top 2 fields (2007-2017)

Figure 4.9 refers to the leading authors in their fields and 6 most cited author in their top 2 fields are determined. To know the leading authors in the field is the reason why only selected top 2 fields given. Moreover, the world's top researchers whose citation records ranked in top 1% in the Web of Science database will allow the recognition to the author. The process to select the highly citation author with their field as follows: (a) All highly cited author records are reviewed with specific fields; (b) The number of authors selected in each field is based on the authors listed on the field's highly cited papers; and (c) The number of those with cross-field influence is determined by finding those who have influence equivalent to those identified in the top 2 fields. All the data being normalized with compare author's citation to output in their field. The rationale citing papers consider cited papers relevant to their work and belong to the same field. The leading authors in their field are Abrizah, Abdullah (Universiti Malaya) in the field of Information Science & Library Science (21.03 percent; 49 papers), followed by Baharumshah, Ahmad Zubaidi (Universiti Putra Malaysia) in Economics (14.1 percent; 33 papers). Other leading authors in their top 2 field are the overall productive authors, Rasiah, Rajah (Universiti Malaya) in Economics and Thurasamay, Ramayah (Universiti Sains Malaysia) in Management. Another two leading authors in their top 2 fields are the overall most cited authors - Ooi, Keng-Boon (UCSI University) in Management and Tang, Chor Foon (Universiti Sains Malaysia) in Economics. The study found that the top field dominated by mostly author from Research Universities.

Table 4.8 refers to the most cited paper in the Web of Science which in year 2010 ranked as the most cited paper (188 citations) throughout the 11 years of study entitled "Facebook: An online environment for learning of English in institutions of higher education?" published in Internet and Higher Education. Elsevier has the most cited paper overall for 5 consecutive years (2013-2017), followed by Academic Journal for 3 years (2009-2011). The study found that all most cited paper listed was published with international publisher.

Table 4.8: The Most Cited Paper in the Web of Science based on Year (2007-2017)

Year of Publication	Authors Name	Title of Paper/ Journal Title	Sum of Times Cited	Publisher
2017	Rasoolimanesh, S. Mostafa; Ringle, Christian M.; Jaafar, Mastura; Ramayah, T.	Urban vs. rural destinations: Residents' perceptions, community participation and support for tourism development (TOURISM MANAGEMENT)	19	ELSEVIER SCI LTD
2016	Hashem, Ibrahim Abaker Targio; Chang, Victor; Anuar, Nor Badrul; Adewole, Kayode; Yaqoob, Ibrar; Gani, Abdullah; Ahmed, Ejaz; Chiroma, Haruna	The role of big data in smart city (INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT)	64	ELSEVIER SCI LTD
2015	Saeidi, Sayedeh Parastoo; Sofian, Saudah; Saeidi, Parvaneh; Saeidi, Sayyedeh Parisa; Saaeidi, Seyyed Alireza	How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer satisfaction (JOURNAL OF BUSINESS RESEARCH)	117	ELSEVIER SCIENCE INC
2014	Lau, Lin-Sea; Choong, Chee-Keong; Eng, Yoke-Kee	Investigation of the environmental Kuznets curve for carbon emissions in Malaysia: Do foreign direct investment and trade matter? (ENERGY POLICY)	101	ELSEVIER SCI LTD

2013	Gupta, Prashant; Seetharaman, A.; Raj, John Rudolph	The usage and adoption of cloud computing by small and medium businesses (INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT)	128	ELSEVIER IRELAND LTD
2012	Saboori, Behnaz; Sulaiman, Jamalludin; Mohd, Saidatulakmal	Economic growth and CO2 emissions in Malaysia: A cointegration analysis of the Environmental Kuznets Curve (ENERGY POLICY)	161	WORLD SCIENTIFIC PUBL CO PTE LTD
2011	Shahbaz, Muhammad; Tang, Chor Foon; Shabbir, Muhammad Shahbaz	Electricity consumption and economic growth nexus in Portugal using cointegration and causality approaches (ENERGY POLICY)	148	ACADEMIC JOURNALS
2010	Kabilan, Muhammad Kamarul; Ahmad, Norlida; Abidin, Mohamad Jafre Zainol	Facebook: An online environment for learning of English in institutions of higher education? (INTERNET AND HIGHER EDUCATION)	188	ACADEMIC JOURNALS
2009	Lean, Ooh Kim; Zailani, Suhaiza; Ramayah, T.; Fernando, Yudi	Factors influencing intention to use e-government services among citizens in Malaysia (INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT)	138	ACADEMIC JOURNALS
2008	Tang, Chor Foon	A re-examination of the relationship between electricity consumption and economic growth in Malaysia (ENERGY POLICY)	88	ROUTLEDGE JOURNALS, TAYLOR & FRANCIS LTD
2007	Saidur, R.; Masjuki, H. H.; Jamaluddin, M. Y.	An application of energy and exergy analysis in residential sector of Malaysia (ENERGY POLICY)	125	INST ASIA PACIFIC EDUCATION DEVELOPMENT

Table 4.9 refers to top 20 most cited papers which in 2010 with 188 total citation. Only two papers have one local collaboration namely Alam, Gazi Mahabubul (2009) from International Islamic University Malaysia and Saidul, R (2010) from Universiti Malaya. All most cited paper published their paper with international publisher, most of the paper collaborate with local collaboration and have more than 3 authors (multi-authored) involved in the paper. The study found that the most cited paper is not influenced by type of collaboration (international or local).

Table 4.9 also shows the number of authors involved in the paper published as the author contribution may a much larger impact on citation indicator for scientists. With the number of papers published annually, the old papers had smaller literature could cited within a few years of publication as compared with more recent papers. The year of papers' publication is apparently an easily normalization factor. The paper published in 11 years ago had more time to accumulate citations than paper published only a year ago. The citation characteristics became increasingly stratified as the clusters were reduced in size, raising serious questions about the credibility of a selected denominator for normalization studies. The number of citation for a paper used to normalize as indicator. Since the author with different scientific age, therefore the normalize indicator result occurred when all the retrieved articles were sorted by number of citations.

Table 4.9: Top 20 most cited papers in Social Science by Malaysian Researchers (Article Level)

Rank	Year of Publication	Authors Name	Total of Author Involved	Type of Collaboration	Title of Paper / Journal title	Sum of Times Cited	Authors' Countries	Publisher
1	2010	Kabilan, Muhammad Kamarul; Ahmad, Norlida; Abidin, Mohamad Jafre Zainol	3	Local collaboration	Facebook: An online environment for learning of English in institutions of higher education? (INTERNET AND HIGHER EDUCATION)	188	Malaysia	ACADEMIC JOURNALS
2	2010	Hairi, Noran N.; Cumming, Robert G.; Naganathan, Vasi; Handelsman, David J.; Le Couteur, David G.; Creasey, Helen; Waite, Louise M.; Seibel, Markus J.; Sambrook, Philip N.	9	Combination of local and international collaboration	Loss of Muscle Strength, Mass (Sarcopenia), and Quality (Specific Force) and Its Relationship with Functional Limitation and Physical Disability: The Concord Health and Ageing in Men Project (JOURNAL OF THE AMERICAN GERIATRICS SOCIETY)	163	Australia, Malaysia	WILEY-BLACKWELL PUBLISHING, INC
3	2012	Saboori, Behnaz; Sulaiman, Jamalludin; Mohd, Saidatulakmal	3	Local collaboration	Economic growth and CO2 emissions in Malaysia: A cointegration analysis of the Environmental Kuznets Curve (ENERGY POLICY)	161	Malaysia	WORLD SCIENTIFIC PUBL CO PTE LTD
4	2011	Shahbaz, Muhammad; Tang, Chor Foon; Shabbir, Muhammad Shahbaz	3	Combination of local and international collaboration	Electricity consumption and economic growth nexus in Portugal using cointegration and causality approaches ENERGY POLICY)	148	USA, Pakistan, Malaysia	ACADEMIC JOURNALS
5	2009	Lean, Ooh Kim; Zailani, Suhaiza; Ramayah, T.; Fernando, Yudi	4	Local collaboration	Factors influencing intention to use e-government services among citizens in Malaysia (INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT)	138	Malaysia	ACADEMIC JOURNALS

6	2010	Bene, Christophe; Hersoug, Bjorn; Allison, Edward H.	3	Combination of local and international collaboration	Not by Rent Alone: Analysing the Pro-Poor Functions of Small-Scale Fisheries in Developing Countries (DEVELOPMENT POLICY REVIEW)	135	Malaysia, Norway	ELSEVIER SCI LTD
7	2013	Gupta, Prashant; Seetharaman, A.; Raj, John Rudolph	3	Combination of local and international collaboration	The usage and adoption of cloud computing by small and medium businesses (INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT)	128	Singapore, Malaysia	ELSEVIER IRELAND LTD
8	2010	Badjeck, Marie-Caroline; Allison, Edward H.; Halls, Ashley S.; Dulvy, Nicholas K.	4	Combination of local and international collaboration	Impacts of climate variability and change on fishery-based livelihoods (MARINE POLICY)	127	Canada, Malaysia, England, Germany	ELSEVIER SCI LTD
9	2007	Saidur, R.; Masjuki, H. H.; Jamaluddin, M. Y.	3	Local collaboration	An application of energy and exergy analysis in residential sector of Malaysia (ENERGY POLICY)	125	Malaysia	INST ASIA PACIFIC EDUCATION DEVELOPMENT
10	2007	Kelly-Yong, Ten Len; Lee, Keat Teong; Mohamed, Abdul Rahman; Bhatia, Subhash	4	Local collaboration	Potential of hydrogen from oil palm biomass as a source of renewable energy worldwide (ENERGY POLICY)	122	Malaysia	ELSEVIER SCI LTD
11	2015	Saeidi, Sayedeh Parastoo; Sofian, Saudah; Saeidi, Parvaneh; Saeidi, Sayyedeh Parisa; Saaeidi, Seyyed Alireza	5	Combination of local and international collaboration	How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer satisfaction (JOURNAL OF BUSINESS RESEARCH)	117	Iran, Malaysia	ELSEVIER SCIENCE INC

12	2009	Thornborrow, Thomas; Brown, Andrew D.	2	Combination of local and international collaboration	Being Regimented': Aspiration, Discipline and Identity Work in the British Parachute Regiment (ORGANIZATION STUDIE)	114	England, Malaysia	SAGE PUBLICATIONS LTD
13	2010	Saidur, R.; Ahamed, J. U.; Masjuki, H. H.	3	Local collaboration	Energy, exergy and economic analysis of industrial boilers (ENERGY POLICY)	113	Malaysia	ELSEVIER SCI LTD
14	2010	Mohit, Mohammad Abdul; Ibrahim, Mansor; Rashid, Yong Razidah	3	Local collaboration	Assessment of residential satisfaction in newly designed public low-cost housing in Kuala Lumpur, Malaysia (HABITAT INTERNATIONAL)	110	Malaysia	PERGAMON-ELSEVIER SCIENCE LTD
15	2009	Alam, Gazi Mahabubul	1	Local collaboration	Can governance and regulatory control ensure private higher education as business or public goods in Bangladesh? (AFRICAN JOURNAL OF BUSINESS MANAGEMENT)	108	Malaysia	ACADEMIC JOURNALS
16	2009	Saidur, R.	1	Local collaboration	Energy consumption, energy savings, and emission analysis in Malaysian office buildings (ENERGY POLICY)	107	Malaysia	ELSEVIER SCI LTD
17	2015	Al-Mulali, Usama; Saboori, Behnaz; Ozturk, Ilhan	3	Combination of local and international collaboration	Investigating the environmental Kuznets curve hypothesis in Vietnam (ENERGY POLICY)	106	Turkey, Malaysia	ELSEVIER SCI LTD
18	2013	Saboori, Behnaz; Sulaiman, Jamalludin	2	Local collaboration	Environmental degradation, economic growth and energy consumption: Evidence of the environmental Kuznets curve in Malaysia (ENERGY POLICY)	102	Malaysia	ELSEVIER SCI LTD

18	2010	Nga, Joyce Koe Hwee; Shamugana than, Gomathi	2	Local collaborati on	The Influence of Personality Traits and Demographic Factors on Social Entrepreneurship Start Up Intentions (JOURNAL OF BUSINESS ETHICS)	102	Malaysia	SPRINGER
19	2014	Lau, Lin-Sea; Choong, Chee-Keong; Eng, Yoke-Kee	3	Local collaborati on	Investigation of the environmental Kuznets curve for carbon emissions in Malaysia: Do foreign direct investment and trade matter? (ENERGY POLICY)	101	Malaysia	ELSEVIER SCI LTD
20	2014	Ahmad, Salman; Tahar, Razman Mat	2	Local collaborati on	Selection of renewable energy sources for sustainable development of electricity generation system using analytic hierarchy process: A case of Malaysia (RENEWABLE ENERGY)	94	Malaysia	PERGAMON -ELSEVIER SCIENCE LTD

4.4 The characteristics of the journals that Malaysian Social Science researchers published in

This section addresses research question four and reports on the characteristic of the journal that Malaysian Social Science researchers published in, with a total of 3450 journal titles.

Table 4.10 shows the growth of Web of Science indexed journals publishing articles originated from Malaysia and the highest journal indexed in the Web of Science in 2014 with 6726 total citation followed in 2010 with 6025 total citation. The study found that the publication relates with the journal indexed in the Web of Science which show growth steadily annually. However, the total citation by journal showed increasing in the first three years of publication (2008 to 2010) and drop in 2012 as showed in Figure 4.10 refer

to the growth of Malaysian Social Science Research with journal. The study also found multidisciplinary journals contributed to 28.04 percent and single discipline journal with 71.96 percent.

Table 4.10: The Number of Web of Science-Indexed Journals Publishing Malaysian Social Science Research Over the Period of 2007-2017

Year of Publication	Total Journal	Total Publication	Total Citation	Mean Citation
2007	63	87	2168	24.9
2008	120	169	3228	19.10
2009	158	251	4721	18.10
2010	232	400	6025	15.06
2011	281	607	5793	9.54
2012	335	530	4929	9.30
2013	365	636	5956	9.36
2014	447	813	6726	8.27
2015	458	901	5536	6.14
2016	510	934	3600	3.85
2017	481	921	1740	1.89

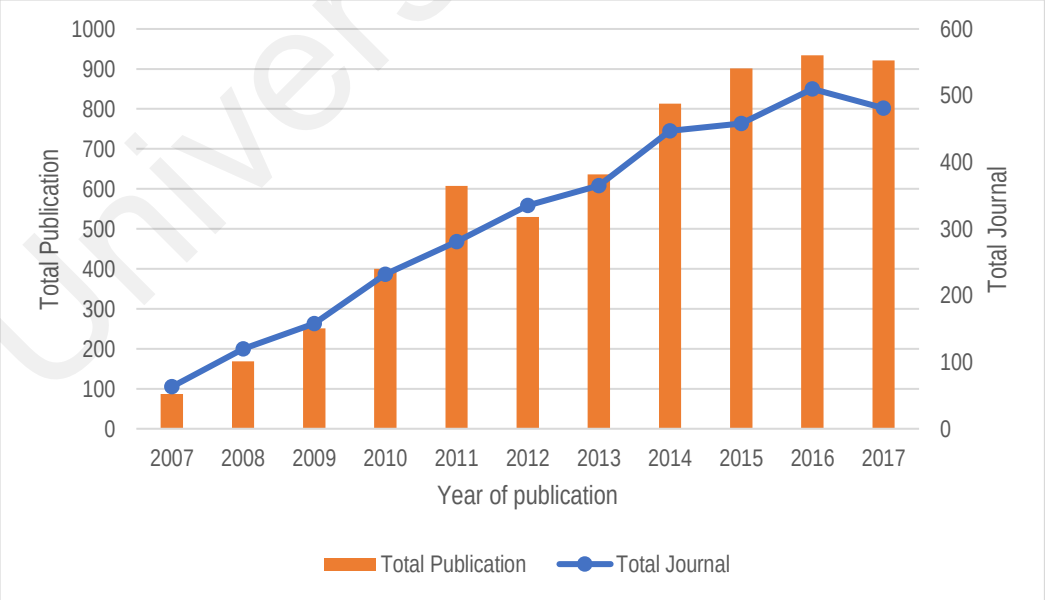

Figure 4.10: The Growth of Malaysian Social Science Research with Journal in the Web of Science Over the Period of 2007-2017

Figure 4.11 shows the types of publishers of the scholarly journals in the period of 2007 2017 which commercial publishers ranked as the highest publisher (46.7 percent) followed by Societies, Associations (23.3 percent).

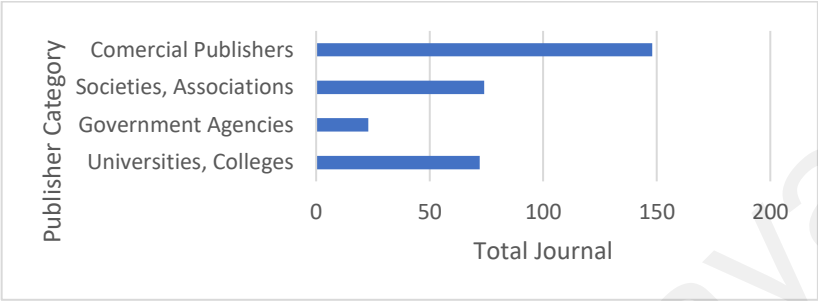

Figure 4.11: Types of Publishers of the Scholarly Journal Publishing Malaysian Social Science (2007 – 2017)

Figure 4.12 shows the total publication in the Web of Science with author over the period of 11 years which most of the publication involved three or/and more authors (18.4 percent). The highest author involved in paper is recorded in 2016 where 3 or more authors is the highest (for 249 publication).

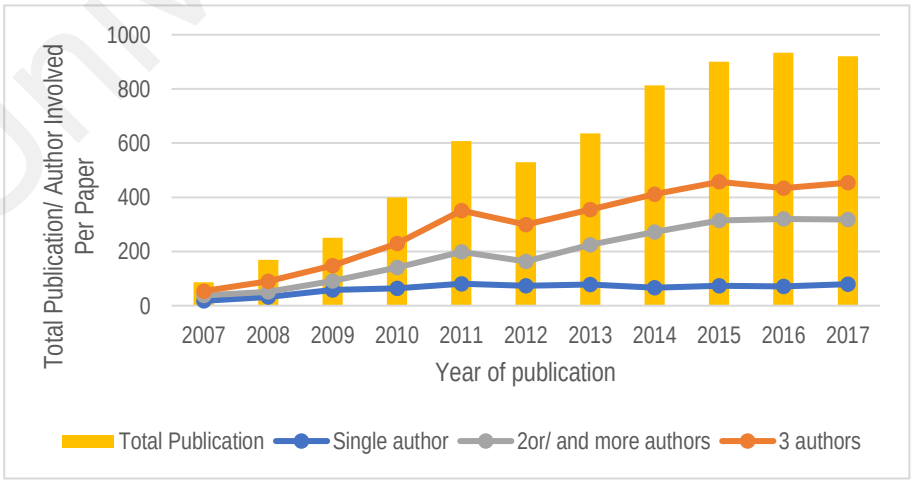

Figure 4.12: Total Publication in the Web of Science based on Authorship (2007-2017)

Figure 4.13 shows the total publication in the Web of Science with institution which most of publication collaborate 3 and/ or more institutions throughout the 11 years of study. The highest collaboration recorded was in 2015 where 3 or more institutions is the highest (for 656 publication).

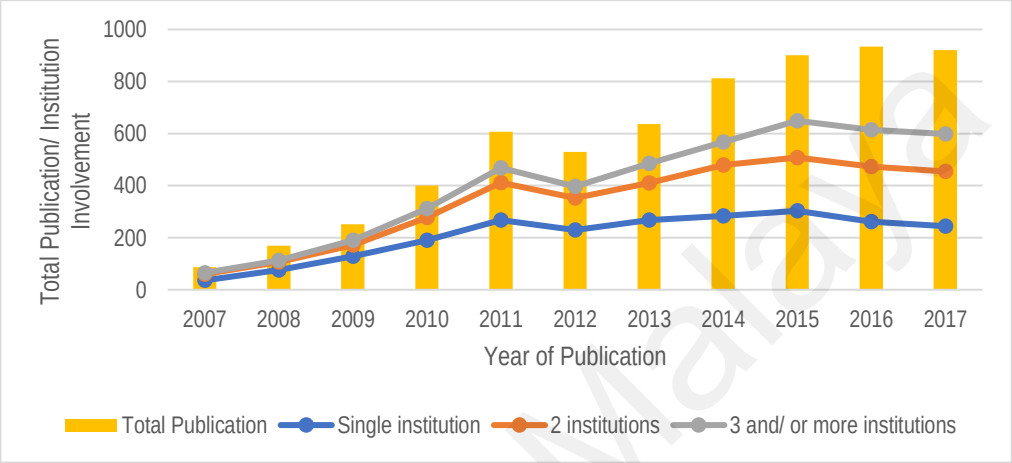

Figure 4.13: Total Publication in the Web of Science with Institutional Collaboration (2007-2017)

Figure 4.14 shows that most of publication have 3 and/ or more countries involved and the most collaboration happened in 2016.

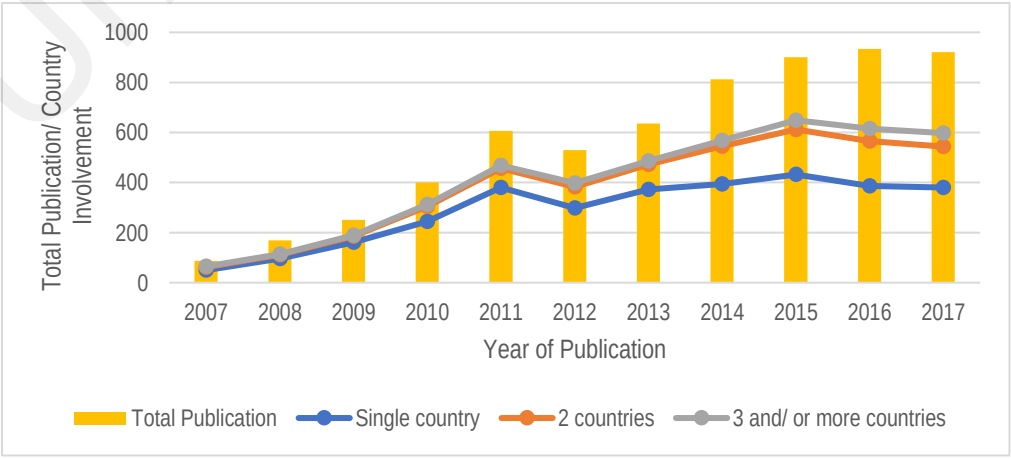

Figure 4.14: Total Publication in the Web of Science with Country (2007-2017)

Table 4.11 shows the top 20 distribution of output among international and national journal with 4352 papers published in 1037 journals. Most of the papers (1778) are published in England-based journal (436; 42 percent). The study found that only one Malaysian journal namely *Malaysian Journal of Library & Information Science* was ranked in top distribution of output in the Web of Science and indexed in Scopus (refer to Table 4.12). Most of the top 20 journals ranked in Q4 (6 journals) and the journal is international publisher. African Journal of Business Management was the highest ranked journal (popular) publishing Malaysian Social Science Research which contributed to 19.6 percent.

Table 4.11: Top 20 Distribution of Output Among International and National Journal

Rank	Journal Country of Origin	Number of papers Published	Number of Journal
1	ENGLAND	1778	436
2	USA	1072	373
3	NETHERLANDS	506	100
4	NIGERIA	204	1
5	GERMANY	119	30
6	LITHUANIA	77	6
7	SWITZERLAND	76	16
8	MALAYSIA	71	1
9	SOUTH KOREA	71	21
10	TURKEY	56	6
11	IRAN	54	1
12	SINGAPORE	52	4
13	NEW ZEALAND	35	6
14	IRELAND	34	6
15	UKRAINE	29	1
16	CANADA	27	7
17	ROMANIA	27	4
18	AUSTRALIA	24	7
19	INDIA	21	6
20	POLAND	19	5

Table 4.12: Top 20 Journals Publishing Malaysian Social Science Research

Rank	Abbre-viated Title	Full Publication Title	Type of Publisher	Indexed In Scopus	Journal Country of Origin	Number of Paper Published	Journal Impact Factor (2017)	Journal Quartile
1	AFR J BUS MANAGE	AFRICAN JOURNAL OF BUSINESS MANAGEMENT	Commercial Publisher	No	Nigeria	204	0.439	Q4
2	ASIA-PAC J PUBLIC HE	ASIA-PACIFIC JOURNAL OF PUBLIC HEALTH	Commercial Publisher	No	USA	130	1.255	Q3
3	MALAYS J LIBR INF SC	MALAYSIAN JOURNAL OF LIBRARY & INFORMATION SCIENCE	University	Yes	Malaysia	71	1.55	Q3
4	ENERG POLICY	ENERGY POLICY	Commercial Publisher	No	England	54	5.042	Q1
5	IRAN J PUBLIC HEALTH	IRANIAN JOURNAL OF PUBLIC HEALTH	Societies, Associations	No	Iran	54	1.291	Q3
6	J CLEAN PROD	JOURNAL OF CLEANER PRODUCTION	Commercial Publisher	No	England	54	7.246	Q1
7	ASIA-PAC PSYCHIAT	ASIA-PACIFIC PSYCHIATRY	Commercial Publisher	No	USA	43	1.094	Q4
8	ECON MODEL	ECONOMIC MODELLING	Commercial Publisher	No	Netherlands	41	1.93	Q2
9	SINGAP ECON REV	ECONOMIC MODELLING	Commercial Publisher	No	Singapore	41	1.93	Q2
10	BMC PUBLIC HEALTH	SINGAPORE ECONOMIC REVIEW	Commercial Publisher	No	England	40	0.807	Q4
11	QUAL QUANT	QUALITY & QUANTITY	Commercial Publisher	Yes	Netherlands	39	NA	NA
12	COMPUT HUM BEHAV	COMPUTERS IN HUMAN BEHAVIOR	Commercial Publisher	No	England	38	5.003	Q1

13	ASIA-PAC EDUC RES	ASIA-PACIFIC EDUCATION RESEARCHER	Commercial Publisher	Yes	Germany	31	0.744	Q4
14	GLOBAL ECON REV	GLOBAL ECONOMIC REVIEW	Commercial Publisher	Yes	England	30	0.533	Q4
15	J ASIA PAC ECON	JOURNAL OF THE ASIA PACIFIC ECONOMY	Commercial Publisher	No	England	30	0.877	Q3
16	ACTUAL PROBL ECON	ACTUAL PROBLEMS OF ECONOMICS	Government Agencies	No	Ukraine	29	NA	NA
17	ASIA PAC EDUC REV	ASIA PACIFIC EDUCATION REVIEW	Commercial Publisher	Yes	Netherlands	28	0.761	Q4
18	HABITAT INT	HABITAT INTERNATIONAL	Commercial Publisher	No	England	28	4.31	Q1
19	APPL ECON LETT	APPLIED ECONOMICS LETTERS	Commercial Publisher	No	England	27	0.752	Q4
20	COMPUT EDUC	COMPUTERS & EDUCATION	Commercial Publisher	No	England	26	5.296	Q1

Therefore, to address Research Question Four, it can be said that the characteristics of Web of Science indexed journals that published Malaysian Social Science Research from 2007-2017 are:

(a) They are mainly journals published by commercial publishers, compared to universities, and learned societies/ associations. The finding shows as overall 6249 publications in Malaysian Social Science Researcher, only 71 papers are published by a university publisher (Malaysian Journal of Library & Information Science) and 29 papers published in government agencies (Actual Problems of Economics Journal) in which 1.6 percent papers published by government agencies.

(b) They are mainly journals originating from England, USA, Netherlands, Germany, South Korea and Switzerland. The finding shows Malaysian Social Science Research are most likely to be published with international publisher compared to regional or Malaysia publisher. This is expected as WoS-indexed journals are mainly coming from Anglo-American and European countries. However, there was no further pattern of statistical association between the journal and countries with the most publications.

(c) They are mainly in the lower tier of the Web of Science (either Quartile 3 or 4) which journal in Q4 contributed 6.45 percent, Q3 contributed to 4.56 percent, Q2 contributed with 1.31 percent, Q1 contributed to 3.20 percent. A total of 1.09 percent is published in journals that are not yet listed in the Journal Citation Report.

(d) The highest number of papers were published in the African Journal of Business Management, a journal published by Academic Journals, a publisher that is blacklisted by the Ministry of Education Malaysia (https://www.ukm.my/fep/wp-content/uploads/2018/03/BLACKLISTED_JOURNALS_BY_MOE.pdf), and not included in the Malaysian Research Assessment MyRA. (see https://research.ump.edu.my/images/docman/ConferenceJournal/List-of-Journal-that-NOT-RECOGNISED-by-MOE-for-MyRA-Evaluation.pdf).

(e) The only Malaysian-based journal publishing Malaysian Social Science Research is the Malaysian Journal of Library & Information Science. It is also the only Malaysian social science journals indexed in WoS.

(f) The Q1 journals publishing Malaysian Social Science Research are mostly in the area of Educational Technology (Computers and Educations, Computers and

Human Behaviour) and Sustainability (Energy Policy; Journal of Cleaner Production).

(g) Out of the top 20 journals in this study, there are five journals indexed in Scopus namely Malaysian Journal of Library & Information Science (Malaysia), Quality & Quantity and Asia Pacific Education Review (Netherlands), Asia-Pacific Education Researcher (Germany), Global Economic Review (England).

4.5 Summary of Chapter Four

This chapter consists of the finding on the perform a scientometrics assessment of Malaysian Social Science Research in the Web of Science over the period of 2007 - 2017 at the meso and micro levels that covered the discipline' productivity, impact and publication patterns. The data set retrieved from the Web of Science and used for this study comprises 6249 data. Out of 6249 papers, University of Malaya dominated in the top fields, ranked as the highest paper published (31.6 percent) and also the papers were dominated by Malaysian Research University. Rajah, Rasiah from Universiti Malaya & Thurasamy, Ramayah (Universiti Sains Malaysia) contributed most paper in the study (0.9 percent). Private university author (Ooi, Keng-Boon, UCSI University) was ranked the highest citation paper published over the 11 years. Furthermore, only one Malaysian journal namely Malaysian Journal of Library & Information Science indexed in the top distribution output and indexed in MyCite. This chapter also characterizes the journals publishing Malaysian Social Science Research.

The next Chapter Five discusses the findings and concludes the research.

Chapter 5: Discussion & Conclusion

5.0 Introduction to Chapter Five

Chapter Five presents the discussion on how the study has addressed the Research Objectives and Research Questions, Limitation of the Study, Contribution of the Study, Recommendations for Future Studies and Conclusion derived from the findings. This study was aimed at performing a scientometrics assessment of Malaysian Social Science Research (MSSR) in the Web of Science (WoS) over the period of 2007 - 2017 at the meso and micro levels. Bibliometrics approach was used to answer the four research questions posed. Analysis and findings from the previous chapter are discussed in-depth and comparison is also made with previous studies. This final chapter also highlights the major outcome from findings, it also concludes and summarizes finding of the study. The chapter is sectioned as follows: (1) Discussions of Findings (2) Limitation of the Study (3) Contribution of the Study (4) Recommendation for Further Research, and lastly (4) Conclusion.

5.1 Discussions of Findings

5.1.1 The Growth of Malaysian Social Science Research literature in the Web of Science Over the Period of 2007 – 2017.

The findings in this study show a consistent with previous studies (Davarpanah, 2009; Li, et. al 2015) on Malaysia's research performance which show that in terms of publication productivity, Malaysian publication increasing from 2007 and the highest publication produced was in year 2008 with total of publication 921. Based on the present study, in total of 6249 publication produced, the publication starts to move up since 2008 onwards (32 percent). The increase in

publication activity shows a positive indication that Malaysia actively invests in terms of research and development such the creation of Malaysia Research University (five) and introducing research grant (Fundamental of Research Grant Scheme). The findings of the study also in line with the previous study conducted by Asadi, et. al (2018) show that the research output in Iran growth in recent years and bibliometrics studies expended. Other study on bibliometric approach also found that the trend and research outputs on social networks growth exponentially since 2014 (Venkatrao, et. al, 2018).

According to Study Malaysia (2012) in their article reported that the Malaysian Research Assessment Instrument (MyRA) started in 2006 which the initiative was developed to assess research performance of all Higher of Education Institutions in Malaysia (Rating Results for: Malaysian Higher Education Institution Rating System 2011 [SETARA'11] & Malaysia Research Assessment Instrument 2011 [MyRA], 2012). Thus, the assessment become an advantage for all institutions and researchers to actively involved in research activities.

According to Coccia's, et. al (2015) study revealed that the continuous reduction of public funds by governments leads to a new hybrid funding scheme for the research sector where public funds and market resources coexist and influence the scientific production. Recent study also revealed that research output was primarily from the five public research universities reflecting their privileged funding model and that output had increased rapidly in recent years (Chan, 2019). This statement shown that through monetary incentive given to

institutions or agencies may lead the growth scientific performance due to actively implementation of research activities. Besides through research collaboration among national and international partners directly injected the new discovery of research and knowledge sharing among researchers.

5.1.2 The Scientific Performance of Malaysian Social Science Research in the Web of Science at the Meso Level.

In the present study also revealed that the most productive institution throughout the 11 years of publication in Malaysia is led by Universiti Malaya (1976 papers published) due to the status as research and premier university in Malaysia. The status and reputation as research university become another factor that help Universiti Malaya become most productive institutions which it attracts attention funder to invest for research and development activity. In addition, Universiti Malaya is found dominant in the publication growth at institutional and author's level in Malaysia.

The study revealed that the social science researchers also have strength in terms of contribution of publication in global. The seven social science-based faculty at Universiti Malaya namely Faculty of Languages & Linguistics, Faculty of Economics and Administration, Faculty of Education, Faculty of Business and Accountancy, Faculty of Arts and Social Sciences, Cultural Centre and Faculty of Law should be not left out and have equal opportunity in terms of research funding to produce more quality research as to help university maintain their status as research university and achieve top 50 best university in world.

The findings of the study show that the institutional culture of research university played a good role in developing research that led competitive nature among institution to search research fund. The statement supported by previous study which the establishment of five Malaysia Research University were seen as a trigger to increase innovation in Malaysia and lead a knowledge-based economy (Ramli, et. al, 2013). The present study also found that private universities show interest and follow steps of Malaysia Research University in producing research outputs. The present study also found the public universities published distinctively bigger number of research output in the Web of Science compared to private universities/ agencies. This statement in line with previous research conducted by Ab Rahim, et. at (2013) which revealed that Malaysian private universities' author more interested to publish journal articles in conference proceedings, review and articles.

5.1.3 The Scientific Performance of Malaysian Social Science Research in the Web of Science at the Micro Level.

Rajah, Rasiah (Universiti Malaya) and Thurasamy, Ramayah (Universiti Sains Malaysia) were ranked as top scientists lead 3 papers published (54 papers published) compared to the second ranked author (Abrizah, Abdullah) with 51 papers published from Universiti Malaya. The age of service as researcher and academician maybe one of the reasons they ranked as the top productive author because they start career early compared to another author. However, this study did not explore the year of service of the author.

5.1.4 The Impact of Malaysian Social Science Research in the Web of Science at the Meso Level.

Universiti Malaya led 1976 total publication (14236 total citation,7.2 mean citation per paper). In the present study also found that the top field both for institutions and authors dominate by Malaysia Research University in which Public, Environment & Occupational Health are the strength research area that have highest number of outputs among Malaysian institutions. The institutional and author's fields are very vital as it valued for policymakers in identifying expertise and centres of excellence for the country. This statement is supported by previous study (Geng, et. al,2017; Janudin, et. al,2016) which found that the pattern of literature and hot research field were useful for researchers.

5.1.5 The Impact of Malaysian Social Science Research in the Web of Science at the Micro Level.

Previous study conducted by Ngah, et. al (1997) revealed that the consequence of publish paper early might concluded as have more citation. However, the finding on this study indicated that Ooi, Keng-Boon (UCSI University) was ranked as the highest citation received throughout the duration of study (994 total citation, 36 papers and 27.6 mean citation per papers) with the title of the paper is "Understanding and predicting the motivators of mobile music acceptance - A multi-stage MRA-artificial neural network approach" and published in 2014.

The present study also found that the highest publication does not influence the citation per paper received. However, the findings found that the article published earlier and/ or published in Science & Technology field have

influence. This however has to be further tested empirically. A recent study found that the factor that contributes most to explaining the future research performance in number of publications, research impact and citation counts was produced by the scientists in their early career years (García-Suaza, et. al, 2020). However, other study declared that the motivation to perform research influenced by other factors such as peer networks, institutional support, intrinsic and economic motivations (Savage, et. al, 2020). This statement indirectly shown that the top ranked at micro level (author) in the study was significantly with their period of career appointment.

The publications specifically in 2014, 2010 and 2013 with excessive extend in research output have low total citation. Thus, the findings also found that the collaboration and number of authors involve helps the paper being cited then duration of paper publish relates with the number of citations. This statement is supported previous study (Suhu, et. al,2014; Onyancha, 2018) found that which explored that multi-author has no correlation with impact and collaboration with international partners may cause a paper being cited more. In the present study, it can be concluded that the paper which have more author/ country/ institution involve produce more paper throughout the 11 years of study. Moreover, the numbers of articles produced in collaboration with other countries are growing.

Information Science & Library Science (49 papers) is the top field with Abrizah Abdullah (Universiti Malaya) as the author with top field. The institutional and author's fields are very vital as it valued for policymakers in identifying expertise and centres of excellence for the country. This statement is supported

by previous study (Geng, et. al,2017; Janudin, et. al,2016) which found that the pattern of literature and hot research field were useful for researchers.

The study also reveals that the top 20 high citation authors in line with their number of publications. This argument supported by LSE Impact blog (2018) which mentioned that a positive and stronger than linear relationship between productivity and quality (in terms of the top cited papers). Moreover, the same pattern also appears to apply to institutions as well as individual researchers. This is because the highest paper published more positive quality return and resulted in higher number of cited papers. This result also shows the highest paper being published have significant with Recent study conducted by Sab, et. al (2019) revealed that the top 20 Indian authors have been identified as most productive authors in Indian marketing research along with their research output, citations received and h-index.

5.1.6 The Characteristics of the Web of Science-Indexed Journals that Malaysian Researchers in Social Science Published in.

From 2008 onwards, the total number of journals published increase most. Thus, the increase of number journal by institutions has become intention from government to see Malaysian journal being indexed by international database such Web of Science. The study also found that the most cited papers have a specific characteristic which a combination of journal published by private companies, have 3 or more authors involved. Larivière's, et. al (2015) study explored on the documents indexed in the Web of Science over the period 1973-2013 revealed that the majority of Social Science & Humanities (SSH) papers

are published by journals that belong to five commercial publishers. The dependence by the researchers and large-scale coverage bibliometric databases by commercial publishers maybe one of the reason papers indexed journal published.

In this study, it found that Malaysia has potential journal to be top journal in future which only Malaysia Journal of Library & Information Science indexed in the Web of Science and Scopus over the period of 11 years of study. This is because the Malaysian journal listed ranked in Q3 and have this is a good sign that Malaysia has been recognized by international professional bodies. If more Malaysian journal indexed in the international databases, it may help to increase the reputation of university and good indication for prestige journal. This statement supported by Dhanani's, et. al (2017) study indicated that academic journals have value for government and academic community. The patterns of major journals in global may guide future research among researchers in the respective areas (Lv, 2017). Besides Malaysian Journal of Library & Information Science (Malaysia) indexed in Scopus, other journal indexed in Scopus are namely Quality & Quantity and Asia Pacific Education Review (Netherlands), Asia-Pacific Education Researcher (Germany), Global Economic Review (England).

The highest number of papers were published in the African Journal of Business Management, a journal published by Academic Journals, a publisher that is blacklisted by the Ministry of Education Malaysia. The authors may be unaware or ignorant about publishing their work in predatory journals because of the

main push of staff promotion criteria is to publish. This statement is supported by Predatory Journals and Conferences (2018) that highlighted lack of awareness and pressure to publish may lead some reason why researchers publish their work in predatory journals.

5.2 Limitation of the Study

The study has some limitation that must be mentioned. The study only covered the disciplines in the Social Science Citation Index and the widening scope of study may explore disciplines not covered in this study. The expansion in scope of study may reveal different pattern of Malaysian research productivity.

In the present study, the journal was ranked used the number of publications and not analyze based on the quality of journal as some of journals have a smaller number of articles but might have high impact factor. The ranking of journal may produce different result if a wide range dataset considered.

The category of disciplines change over the time as the field might different. For example, the data in 2007 is not the same as in 2017 and the change is reflected in comparisons of journal influence over time. In line with this, the top journals and disciplines may help to explore the research diversity in Social Science except in the specific niche journals.

Another limitation in data cleaning (institutional affiliation and author's name) that has to be careful which the process may allow misspelling, misnaming and misidentification. Thus, both institutions and authors must be assisted guidelines for

citation styles. The study captures a various name for authors and their affiliation which the process must be addressed carefully especially for Malay, Chinese and Indian which caused problem when data mining. Therefore, authors must use their name consistently.

The study used Web of Science to explore the performance of Malaysian Social Science Research over the period of 11 years and the choice specific database may cause other disciplines might be less favour.

The international visibility was limited as the present study applied the publication and citation indicator to provide the overview performance of Malaysian Social Science Research. The total contribution both national and international is not plot.

5.3 Contribution of the Study

In the present study, bibliometric analysis was used to describe the scientific activity in Malaysian social science research ecosystem. Based on the researcher's knowledge, this is the first study to analyse the quantity and quality of Malaysian Social Science Research using the Web of Science database, but also characterize the Social Science Citation Index journals that Malaysian social scientists publish in. Research activity in this field showed a promising rise in Malaysia's publications productivity and scientific impact. This paper also adds to the emerging bibliometric literature within social sciences in the core literature, reflected through the Social Science Citation Index.

5.4 Recommendation for Further Research

The critical areas of Social Science research should be strengthened to provides insights as Malaysia known as developed country status with high income. Therefore, more research needs to be conducted to improve national action plan and knowledge output in critical areas. As such, the growth of Malaysian research in terms of funding and publication can be one of major indicator that can be explored in Science & Technology and Social Science as well Humanities and the Social Science. This is because with standard classification of research performance activity between Science & Technology and Social Science researchers with amount of research fund received were different.

The respective institutions should consistently assist researchers in capacity building programme such as 'train the trainer' concept and face-to-face course including to assist Malaysian journal to be indexed in international database as it will help researchers equip with current information and as well strategize their research activity to help their institution achieve the vision.

In future research there is a need to study on the Malaysian research networking and indexation status of journal at meso and micro level. The study is important as it will help Malaysian journal to advise the related parties and strategize the direction of research in future. Besides, there also a need to look into the significant of accessibility of journal and the frequency of journal publication with the contribution of articles being cited most.

In this study the researcher believes that there was a linked between quality and quantity of publication with institution or researchers' scientific reputation. This is because the chances of obtaining fund from funder has relevant implication on researchers' scientific productivity and better academic positions. Therefore, future research is advised to look into the successful researchers' profile. This statement supported by Gulbrandsen's, et. al (2005) study indicated that there is a significant relationship between industry funding and research performance.

There also a need of study on the influence of social media platform and research performance as the media have become an important research area for researchers interested in online technologies.

There is a need for research to be conducted on articles published in regional or local languages to showcase research output in social science research.

5.5 Conclusion

Academic performance ranking become important in globally because it determines differentiation in salaries that linked to individual's Key Performance Indicator (KPI). However, the top management should also consistently assist researchers and academicians on the balance between academic matters between teaching and learning; and research and innovation as the priority national agenda to produce quality of human capital development (students). There is a need to train more bibliometricians or setup a unit in organization as this will help the respective university/ organization to become more aggressively coordinate and advise the top management or funder the direction and strength of future research. Moreover, Ministry of Higher Education should

determine a model or method of institutional assessment as inconsistency associated with different approaches by different government bodies or funder (industry). Providing such incentives relates to publication pattern that will push researchers to publish in journals indexed in the Web of Science etc.

The present study acknowledged the growth of Malaysian Social Science Research literature from 2007 - 2017 showed this broad discipline focused scientific development for the nation. Start 2008, institutions aggressively produce paper as the research and development fund being injected to improve research output. This bibliometric study is a testament to the progress in Malaysia Social Science Research in the core literature of the world, reflected in the Web of Science, over the last 11 years. More effort is needed to bridge the scientific performance gap between the hard sciences STEM (Science, Technology, Engineering and Medicine) and non-STEM research and to promote better collaboration between the two disciplines not only for quality output, but also for better outcome and impact.

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