

*Proceedings of 63<sup>rd</sup> ILA International Conference  
Babasaheb Bhimrao Ambedkar University, Lucknow, U.P  
23-25 November, 2017  
Pages 77-97  
ISBN 978-81-934120-0-8*

## **Research Dimensions on South China Sea**

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### ***Abstract***

The research quantum on the ‘South China Sea’ produced by confrontational countries has been investigated on various viewpoints. Subsequently, science funding of research has been analysed to reveal the policy of anxious countries. The study draws a comprehensive outlook on international perspective where dragon aggressively expanding its research arms which reflect its domination on the region. A comparative inquiry of research output and funded research with times growth during two eras, first from 1950 to 2005 and second from 2006 to 2015 have been presented. Indeed, China has emerged as a research trailblazer in the region. The findings revealed clear and convincing indicators that the research war will be more aggressive between China and US for their vested interests. Furthermore, inferences raised international anxiety on conflict and indicating compulsion of counter measure to compete with Chinese research forefront. The researchers, policy architects, politicians and decision makers always in search of such studies and this could be the best substantial ingredient to those who concern over the region.

*Proceedings of 63<sup>rd</sup> ILA International Conference, 23-25 November, 2017, 77-97*

## ***Keywords***

Conflicts review; International relations; Funding indicators; Research dimensions; Scientometrics; South China Sea; Chinese hegemony.

## ***Introduction***

The literature on theme has been searched in the context of scientometrics, informetrics and bibliometrics but none found relevant and valued which can be referred. The Scopus has been selected being the most reputed and exhaustive database indexes more than 22245 titles of major journals, and 5000 leading publishers nearly 88% leading research institutes Scopus data. It covers the funding information of research papers from 1975 from almost areas of knowledge and it provides appropriate tools to track, analyze and visualize research work. Science funding, considered as the key public resource in current academic community, has an irreplaceable function in research development, scientist training and cultural construction (Vardakas, et al., 2015). Various level science funding agencies of leading countries allocate an appropriate capital to gain a competitive edge over counterpart countries. Consequently, the large scale Scientometric analysis of funding and funded papers becomes a hotspot in recent years. For examples, the funding analysis in Nano research (Shapira, Philip and Wang, Jue. 2010), the general study of natural science (Wang, et al., 2012) as well as social science (Xu, et al., 2015), and the interesting and in-depth observation in the specific field, mathematics (Zhou and Tian, 2014). Related to the science funding, an organization has a vital role in decision-making apart from the state policy. It is important for a research funding organization to ensure the quality of

its peer review-based decision-making procedure. (Mutz, R., Bornmann, L. and Daniel, H.-D., 2015) The gravity of SCS affair has been acknowledged by international media and major platforms. The major leading countries of world have clear vision behind the science funding to support national interest research on identified thrust areas. Consequently, researchers identify current, realistic and exigency issues for investigations based on the importance of science funding. The tension in the SCS area has been well assessed and highlighted in The Age “SCS dispute is an intractable issue or ‘wicked problem’, having developed for decades, which presents a security risk to the region but for which no peaceful settlement is yet in sight. When the issue first arose, no-one could foresee the direction it would take. Today, the fact that tensions escalate from time-to-time to a level that may lead to military tension and deadly conflict, reflects the complexity of the issue and the strength of commitment by nations to protect their national interests”. (Hartcher, Peter 2015). The SCS conflict has multi facet dimensions and there are two streams leading into the tensions and conflicts in the region. First, between China and the US in terms of interpretation of the UNCLOS and the right of the US Navy to operate freely in China’s EEZ. Second, the disputes that China has with Vietnam, the Philippines and Malaysia and further north with Japan over the Senkaku (Diayou) islands and its efforts to step up control of the islands and features through physical occupation and denial of rights to opposite and adjacent states. However, at another level, the conflict arising from the conflicting sovereignty claims in the SCS has continued—indeed has intensified—with China leading the process by focusing on denying areas to rivals and constructing artificial islands on disputed features. (Joshi, Manoj 2016) The SCS dispute has adversely affected the relations of ASEAN countries and aggrieved the peace process. The diplomatic efforts made by ASEAN countries

over several decades to formulate a peace settlement have not resulted in any significant developments, and it is a fact that even now ASEAN member-states have different views on the issues associated with the SCS. (Rustandi, Agus 2016)

The Chinese aggression has indicated its imperialism policy which made the SCS territory a war exercise field for international community. The strategic warning signals that indicate heightened risk of conflict include political decisions and statements by senior officials, official and unofficial media reports, and logistical changes and equipment modifications. In the contingencies described above, strategic warning indicators could include heightened rhetoric from all or some disputants regarding their territorial and strategic interests. (Glaser, Bonnie S. 2015) An international tribunal ruling against the nine-dash line goes a long way toward offering a framework for a unified front against China, and that is something that worries Beijing, experts said. Such a decision could "give more hope to the Philippines and other Asian countries that claim territory in the South China Sea," according to Andrew Scobell, a political scientist at the Rand Corp. (Rosenfeld, Everett 2016) While, other confrontational countries except US are not as muscular to stand in front of China therefore China dictate them to bind in agreements or other way to resolve the conflict without losing its individual interests. The While the United States and China have both taken steps in recent weeks seemingly designed to generate at least a modicum of de-escalation, most observers believe that the SCS issue will figure prominently on the U.S.-China agenda (as well as on the East Asian and Southeast Asian foreign policy agendas) for years, if not decades, to come; and indeed, some regard the South China Sea as a crucible for possible major international conflict and even world war. (Firestein, David J. 2016)

The literature on other thrust areas, i.e., trade and economic aspects, political consequences and judiciary developments have been reviewed and relevant references have been included in the study. By assessing worldwide concerns on aggrieved situation, this study aligning with the concept has become extremely essential. The SCS is strategically, politically and internationally

important which covers 200 small islands, reefs and sand banks where a vast amount of minerals, about 11 Billion barrels of oil, about 190 Trillion cubic feet of natural gas preserves and huge amount of hydrocarbons exists. (Zhou, 2015) It is the only way for the import of oil from central Asian states and is very important for countries of Asia-Pacific like Japan, South Korea and China from where about \$5.3 Trillion (60%) of the total annual world trade passes through. The SCS has an economic and investment impact not only on local region but also on international altitude. Many industries in ASEAN are dependent on Chinese imports, meaning any stop in trade relations between the two would have an immediate effect. (Clarke, Marquise 2016)

The China National Offshore Oil Corporation has invested some \$20 billion in attempting to prove its more optimistic estimate of 125 billion barrels of oil and five hundred trillion cubic feet of natural gas. (Fensom, Anthony 2016) The disputes involve both maritime boundaries and islands. There are several disputes, each of which involves a different collection of countries: Four of the ten states in ASEAN claim some or all of the land features known in the South China Sea as the Spratly Islands, which China and Taiwan also claim. Viet Nam also claims the Parcel Islands along with China and Taiwan. (Fravel, M. Taylor 2014,)

Since 1947, the China has been claiming ownership on SCS that overlaps the exclusive economic zone claims of Brunei, Indonesia, Malaysia, the Philippines, Taiwan, and Viet Nam; propounded 'Nine-dotted line' map as substantiation and since then dispute aggravated. (Sato, K., 2013). It includes the maritime boundary along the Viet Nameese coast between China, Taiwan, and Viet Nam; north of Borneo between China, Malaysia, Philippines, and Taiwan; in the waters north of the Natuna Islands between China, Indonesia and Taiwan; off the coast of Palawan and Luzon between China, the Philippines, and Taiwan. It also includes Maritime

boundary, land territory, and the islands of Sabah, including Ambalat, between Indonesia, Malaysia, and the Philippines and Maritime boundary and islands in the Luzon Strait between the China, the Philippines, and Taiwan. Also covers Islands, reefs, banks and shoals in the South China Sea, including the Paracel Islands, the Pratas Islands, Macclesfield Bank, Scarborough Shoal and the Spratly Islands between China, Taiwan, and Viet Nam, and parts of the area also contested by Malaysia and the Philippines. (Baumert, Kevin and Melchior, Brian, 2014,)

The US has stood by its maneuvers, claiming that "peaceful surveillance activities and other military activities without permission in a country's Exclusive Economic Zone (EEZ)," is allowed under the convention. (Lawrence, Susan V.; Lum, Thomas, 2011).

China, Japan and ASEAN (Southeast Asia: Brunei, Burma (Myanmar), Cambodia, East Timor, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam) states have robust trade relations. The China-ASEAN trade relationship is especially strong. According to Asia Maritime Transparency Initiative (AMTI) and Center for Strategic and International Studies (CSIS) that the trade of \$885.64 and \$182.11 billion from China to ASEAN and Japan respectively; \$1020 and \$112.38 billion from ASEAN to China and Japan respectively; \$129.88 and \$102.88 billion from Japan to China and ASEAN respectively. (Robert D. Kaplan, 2015)

The core of the maritime disputes stems from China's increasingly strong assertion that it should control over 90 percent of the South China Sea. This runs directly counter to the claims of the Philippines and other Southeast Asian nations including Viet Nam, Brunei, Taiwan, and Malaysia (Interviews; Hayton, 2014). In 2014, China went so far as to set up an oil drilling rig within the territorial waters of Viet Nam causing major anti-Chinese riots in Viet Nam (Interviews). Following those events, the oil rig was eventually removed. (Geib, Peter and Pfaff,

Lucie, 2016) The tensions resulting from the territorial and maritime jurisdictional disputes between confrontational countries have for years dominated the headlines on the South China Sea and defined the lens through which the issue is seen. (Nguyen, Phuong, 2016)

China has become the chief trading partner with maximum countries in the region. As China becomes richer, it will become a market for the rest of Asia, just as the region will become a bigger market for China. In a way, Beijing is forging commercial agreements that enhance China's ability to influence the future global order (Bremmer, 2014/2015). The United States has significant political, security, and economic interests at stake if in case China does not slacken its ownership rights on SCS. (Bonnie S. Glaser, 2015) The United States of America's experts have conveyed their views that China is playing three types of wars, i.e., Psychological warfare; Media warfare; and Legal warfare in the region and the other counter partner China blames the United States of America to destabilize the region by providing back to Viet Nameese perspective which is totally wrong. (Halper, Stefan, 2013)

The international arbitration tribunal, constituted under Annex VII to the United Nations Convention on the Law of the Sea ("UNCLOS"), issued its final Award on July 12th in the so-called "compulsory" arbitration instituted by the Republic of the Philippines against the People's Republic of China. The Philippines had sought rulings on a number of issues, including the source of the parties' rights and obligations in the South China Sea and the effect of UNCLOS on China's claims to historical rights within its claimed 'nine-dash line.' (Klein, Joseph 2016) The UN International Tribunal Hague court has ruled in favour of the Philippines in the case over SCS dispute and after refusing to accept the judgment by China; the area has become a flashpoint with perspective crucial global consequences. The tribunal's decision in opposition to



the PRC could lead to the termination of UNCLOS by China, especially since Vietnam and Malaysia also may follow with further arbitration. For the same reasons, the likelihood of the ratification of UNCLOS by the United States is decreasing. If the PRC excludes itself from the Convention, that would represent a significant weakening of treaty norms of the international law of the sea. China has also reacted angrily to the ruling and this may lead to increased tension in the region. Incidents involving the Chinese and Philippine navies could happen, although it is less likely that U.S. ships exercising their freedoms and rights of navigation will be involved in those incidents. China's position is unchanging and its actions have deteriorated relations through a goal of *fait accompli*, especially its plans to establish an Air Defence Identification Zone covering the South China Sea. (Tarnogorski, Rafal 2016)

## ***Methods***

The Scopus, being the comprehensive database of the world's research output; largest abstract and citation database of peer-reviewed literature has been selected for the data collection. It has advanced features to track, analyze and visualize research. The outlines of research work have been set forth to ensure the study more focused, analytical and result oriented confined to confrontational countries concerned to SCS. It covered two eras, i.e., first from 1950 to 2005 and second from 2006 to 2015; Ten years from 2006 to 2015 progressive data with inputs of urgent factors to understand the trends and future perspectives. The keyword "*South China Sea*" under 'Article Title, Abstract, Keyword' option with aligned parameters have been used to fetch the statistical data sets. Furthermore, major objectives of the study have been listed by understanding the study concept, i.e., inventory of research output; periodical growth and geographical

distribution and comparative statements. It also covers the science funding evaluation, indications on thrust areas and reflections on inferences for further debate. The fetched data sets in excel files have been filtered, sorted and presented in the form of textual, table, graph and figure at an appropriate place.

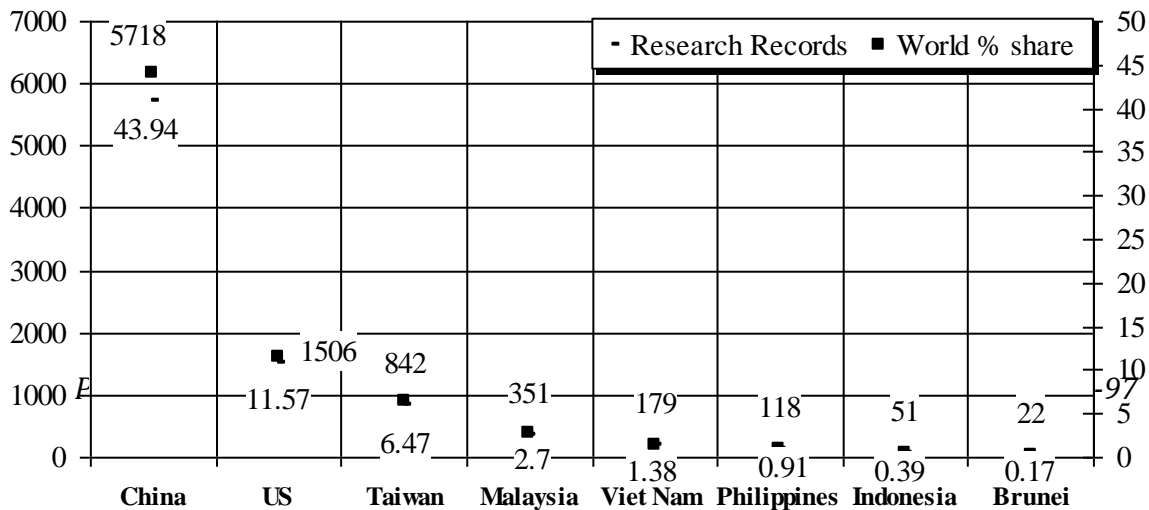
### ***Analysis and Discussion***

This study used Scientometrics analysis methods to analyse the literature and funding trends including funding ratio and countries indices. The results of the study revealed a certain trend in research and global funding by confrontational countries during the study period.

**Table -1: Formulas used for calculations**

F1	Funding % = $\frac{\text{Country funding}}{\text{Country records}} \times 100$	F2	World % share = $\frac{\text{Country records}}{\text{World records}} \times 100$
F3	Growth = Year records – Preceding year records	F4	Growth Times = $\frac{\text{Year Growth}}{\text{Preceding year records}}$
F5	% Δ over year = $\frac{\text{Yearly } \Delta \text{ of records}}{\text{Previous year records}} \times 100$	F6	% of Records = $\frac{\text{Era records}}{\text{Country records}} \times 100$
F7	Growth Times = $\frac{\text{First era records}}{\text{Growth records}}$	F8	R1 & R2 = In order of % records
F9	R3 = In order of Growth Times		

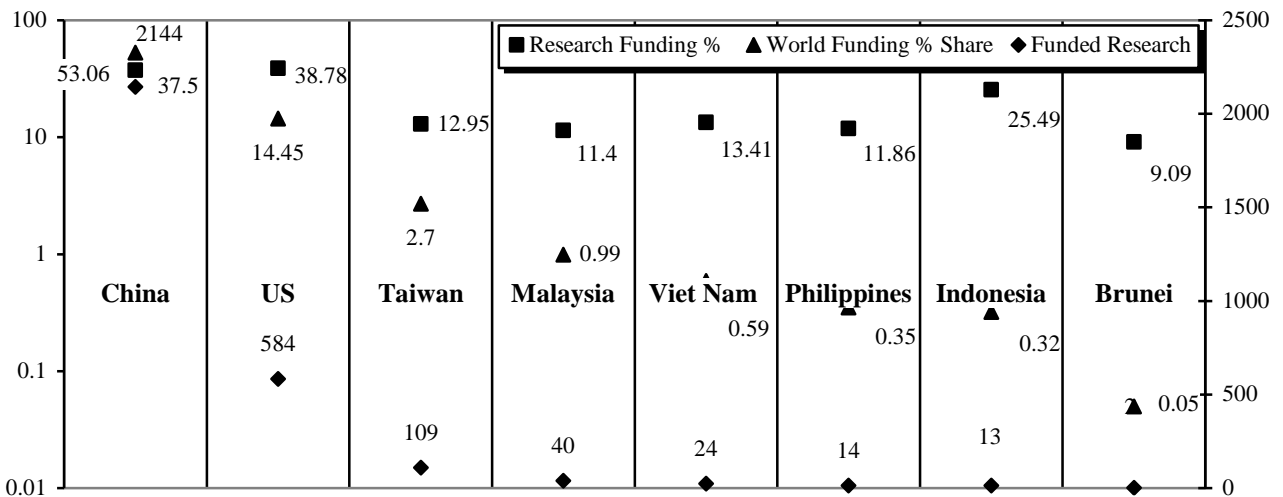
**Figure -1 Research output and World % Share from 1950 to 2015**



\* World % Share - F2

The figure -1 shows total research outputs which have been counted as 13012 worldwide from 79 countries with an average of 164.70 during 65 years span with a yearly average of 200.18. China has been at the top in producing the highest numbers of research followed by US, Taiwan and Malaysia. China has contributed the highest world share with 43.94% followed by US with 11.57%, Taiwan with 6.47% and Malaysia with 2.70%. Brunei has produced the lowest number of research outputs.

**Figure -2: Funded Research with Funding % with World Funding % Share from 1950 to 2015**



\* Research Funding % - F1; World Funding % Share - F2

Figure -2 covered total funded researches and funding percentile and world funding percentage share worldwide during 1950 to 2015. The funded research records have been counted as 4041 worldwide from 79 countries with an average of 51.71 during 65 years span with a yearly average of 62.16. China has funded the highest number of research followed by US, Taiwan, Malaysia and Viet Nam, etc. The US has accelerated his funding and surprisingly maintained top

*Proceedings of 63<sup>rd</sup> ILA International Conference, 23-25 November, 2017, 77-97*

position by funding the highest percentage of research followed by China, Indonesia, Viet Nam and Taiwan. In overall worldwide scenario, the China has contributed the highest world funding share with 53.06% followed by US with 14.45%, Taiwan with 2.70% and Malaysia with 0.99%.

**Table 2: Research output with Growth, Growth Times and World % Share**

Country	China			US			Taiwan			Malaysia			Viet Nam			Philippines			Indonesia			Brunei			Total		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Year	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times
2015	747	-8	-0.01	140	-28	-0.17	72	-3	-0.04	54	-3	-0.05	16	-5	-0.24	8	-9	-0.53	5	2	0.67	3	-1	-0.25	1045	-55	-0.05
2014	755	117	0.18	168	34	0.25	75	2	0.03	57	13	0.30	21	-8	-0.28	17	0	0.00	3	-2	-0.40	4	4	4.00	1100	160	0.17
2013	638	129	0.25	134	24	0.22	73	18	0.33	44	17	0.63	29	13	0.81	17	10	1.43	5	-2	-0.29	0	-2	-2.00	940	207	0.28
2012	509	20	0.04	110	-5	-0.04	55	2	0.04	27	-3	-0.10	16	3	0.23	7	-5	-0.42	7	4	1.33	2	2	2.00	733	18	0.03
2011	489	87	0.22	115	10	0.10	53	-22	-0.29	30	8	0.36	13	-2	-0.13	12	7	1.40	3	-4	-0.57	0	-2	-2.00	715	82	0.13
2010	402	51	0.15	105	30	0.40	75	26	0.53	22	7	0.47	15	4	0.36	5	1	0.25	7	4	1.33	2	0	0.00	633	123	0.24
2009	351	38	0.12	75	-14	-0.16	49	-12	-0.20	15	0	0.00	11	1	0.10	4	2	1.00	3	1	0.50	2	2	2.00	510	18	0.04
2008	313	77	0.33	89	25	0.39	61	17	0.39	15	2	0.15	10	3	0.43	2	-6	-0.75	2	1	1.00	0	-1	-1.00	492	118	0.32
2007	236	-23	-0.09	64	6	0.10	44	7	0.19	13	3	0.30	7	3	0.75	8	1	0.14	1	0	0	1	1	1.00	374	-2	-0.01
2006	259	-		58	-		37	-		10	-		4	-		7	-		1	-		0	-		376	669	1.15
Total	4699			1058			594			287			142			87			37			14			6918		17.80
* World % Share	48.95			11.02			6.19			2.99			1.32			0.91			0.39			0.15			72.06		

\* Research Growth -F3; Growth Times - F4; World % Share - F2

Table -2 depicts the research counts 9600 from 75 countries with an average of 128 during the period where China stands at top having 4699 research counts with 48.95% followed by US having 1058 research counts with 11.02% and Taiwan having 594 research counts with 6.19%. China has sustained continued growth onward 2007 where rest of the countries having fluctuating figures. However, overall chronological growth have been observed onward 2007 except during 2015 where a slight fall is seen. China is far

ahead than the other confrontational countries. Overall about  $\frac{3}{4}$  share (72.06%) researches have been recorded from 2006-2015 during 10 years span period with 17.8% growth per year.

**Figure -3: Periodic Research Growth from 2006 to 2015**

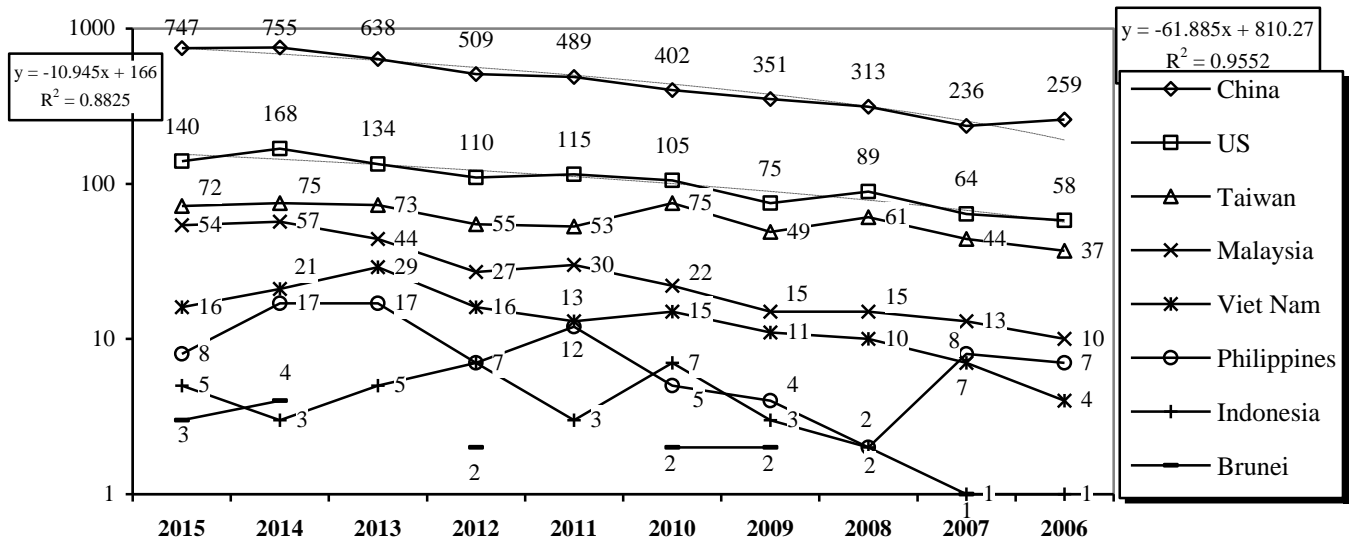
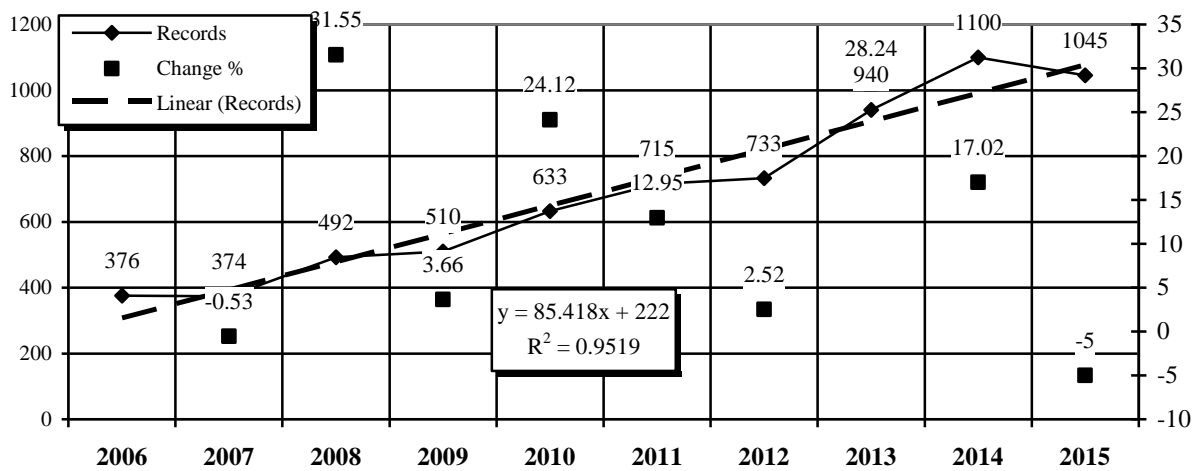


Figure -3 present the country research records in aforementioned legend box in decreasing order from China to Brunei. China has been declared undisputed leader in publishing the highest research counts on the theme. The US has positioned at second place followed by Taiwan, Malaysia and Viet Nam but these confrontational countries stays nowhere comparing to China. However, they proved their presence by producing few researches on the topic.

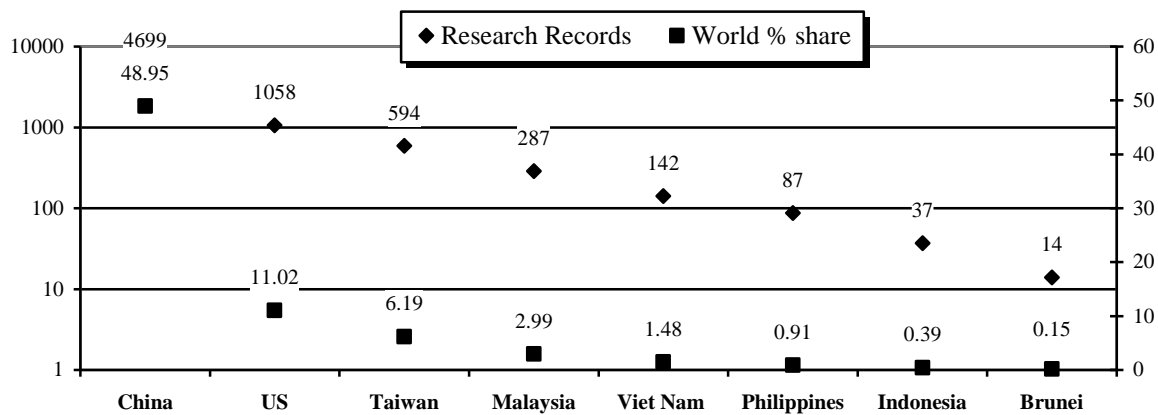
**Figure -4: Periodic Research Growth Trend with % Change over year**



\* Change % over year - F5

Figure -4 depicts the chronological growth of research and yearly change occurred during the period. It also presents the trend line of growth and percentage of change over every year. It displays the equation and R-squared value on chart. The highest research occurred during 2014 followed by 2015 and 2013. The trend line highlighted the consistency in growth during the period except minor drop during 2007, 2009 and 2015. The overall growth recorded as 2.78 times and 273.93% during the period.

**Figure -5: Country Research output and World % Share from 2006 to 2015**



\* World % Share - F5

Figure -5 represent the research records and world percentage share in decreasing order from China to Brunei. The China is far ahead in producing research during the studied period. US have also produced good number of researches but about four times less than China. However, total output of other confrontational countries is about four times less than China but figure shows their active interest in the research.



**Table -3: Two Era's Comparative Growth with % of Records and Growth times**

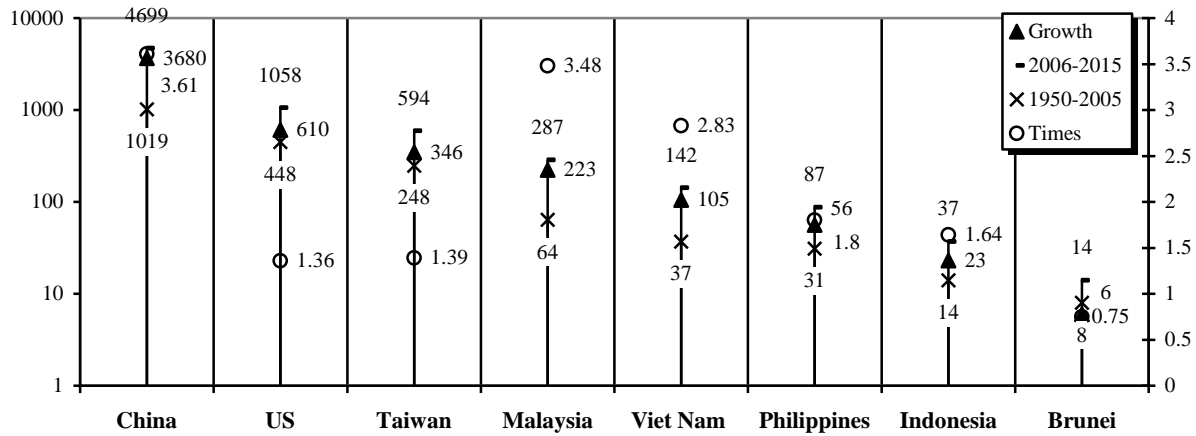
Country	Total Records	1950-2005			2006-2015			Growth		
		Records	%	R1*	Records	%	R2*	Records	Times	R3*
<b>China</b>	5718	1019	17.82	8	4699	82.18	1	3680	3.61	1
<b>US</b>	1506	448	29.75	2	1058	70.25	7	610	1.36	7
<b>Taiwan</b>	842	248	29.45	3	594	70.55	6	346	1.39	6
<b>Malaysia</b>	351	64	18.23	7	287	81.77	2	223	3.48	2
<b>Viet Nam</b>	179	37	20.67	6	142	79.33	3	105	2.83	3
<b>Philippines</b>	118	31	26.27	5	87	73.73	4	56	1.80	4
<b>Indonesia</b>	51	14	27.45	4	37	72.55	5	23	1.64	5
<b>Brunei</b>	22	8	36.36	1	14	63.64	8	6	0.75	8
<b>Total</b>	8787	1869	21.27		6918	78.73		5049	2.70	

\* Growth times - F-7; R1 & R2- F-8; R3- F-9

Table 3 depicts two eras comparison research output from 1950 to 2005 and 2006 to 2015 for 55 years and 10 years respectively. It includes the research records along with the percentage, R-Ranking and growth times during aforementioned periods. During the first era, China has been at the top in producing the highest research but at the lowest place in ranking and contrary, Brunei has been at the bottom in producing the lowest number of research but obtained the highest place in ranking. The US has been at the second highest research producer at the second rank followed by Taiwan. During the second era, China has been again at the top in producing the highest research and also obtained top in ranking. US has been at the second position in producing number of research and surprisingly fallen at seventh in ranking. Considering the growth from first era to second ear, China has sustained the first position in research productivity and the

ranking. Surprisingly, Malaysia, Viet Nam, Philippines, Indonesia and Taiwan have performed better than US which scored second to sixth rank respectively.

**Figure -6: Two Eras Research output Growth Comparative statement.**



In continuation to table 3 and figure - 6 presents the research growth and growth times. Surprisingly, Malaysia, Viet Nam, Philippines, Indonesia and Taiwan have performed better than US which scored second to sixth rank respectively. Overall, the second era of 10 years has produced 20 times high number of researches with an average of 692 counts per year as 78.73% share than first era of 55 years with an average of 34 counts per year as 21.27% share. Overall growth from first era to second era has been recorded as 5049 records with 270.14%.

**Table -4 : Funded Research records, Periodic Growth; Growth Times and World % Share**

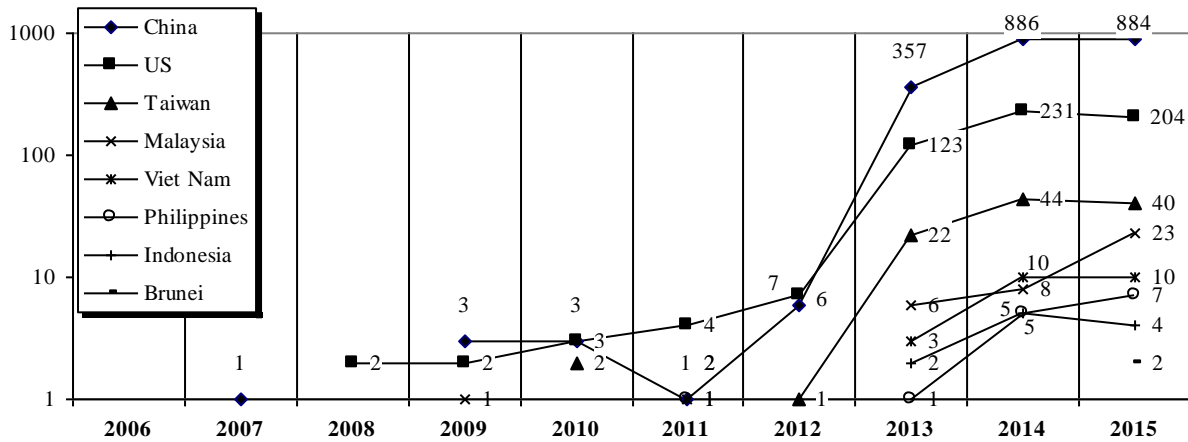
Country	China			US			Taiwan			Malaysia			Viet Nam			Philippines			Indonesia			Brunei			Total		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Year	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times	Records	Growth	Times
2015	884	-2	-0.002	204	-27	-0.12	40	-4	-0.09	23	15	1.88	10	0	0.00	7	2	0.40	4	-1	-0.20	2	2	2.00	1174	-15	-0.01
2014	886	529	1.48	231	108	0.88	44	22	1.00	8	2	0.33	10	7	2.33	5	4	4.00	5	3	1.50	0	0	0	1189	675	1.31
2013	357	351	58.50	123	116	16.57	22	21	21.00	6	6	6.00	3	3	3.00	1	1	1.00	2	2	2.00	0	0	0	514	500	35.71
2012	6	5	5.00	7	3	0.75	1	1	1.00	0	-2	-2.00	0	-1	-1.00	0	-1	-1.00	0	-2	-2.00	0	0	0	14	3	0.27
2011	1	-2	-0.67	4	1	0.33	0	-2	-2.00	2	2	2.00	1	1	1.00	1	1	1.00	2	2	2.00	0	0	0	11	3	0.38
2010	3	0	0.00	3	1	0.50	2	2	2.00	0	-1	-1.00	0	0	0	0	0	0	0	0	0	0	0	0	8	2	0.33
2009	3	3	3.00	2	0	0.00	0	0	0	1	1	1.00	0	0	0	0	0	0	0	0	0	0	0	0	6	4	2.00
2008	0	-1	-1.00	2	2	2.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1.00
2007	1	1	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.00
2006	0	-		0	-		0	0		0			0	-		0	-		0	-		0	-		0	1174	41.99
Total	2141			576			109			40			24			14			13			2			2919		1174
World Share %	52.98			14.25			2.70			0.99			0.59			0.35			0.32			0.05			72.23		

\* Periodic Growth - F3; Growth Times - F4; World % Share - F2

The table 4 presents the country data year wise, i.e., funded research records, growth in funding research and times change over year. During the period 2919 research records have noted with an average of 291.9 every year. There are 4041 funding research records worldwide from 79 countries from 1950 to 2015, but the other hand 2919 funding research records worldwide from 8 countries from 2006 to 2015 which is about  $\frac{3}{4}$  (72.23%) share of worldwide funding research output. The China has funded the highest number of researches followed by US Taiwan, Malaysia and Viet Nam and so on. The funding of research was very less till 2012 and onward 2013 it started increasing many folds. China and US have accelerated funding onward 2013. The overall highest growth was noted during 2013 and 2014 but a slight fall during 2015. There is no consistency in funding

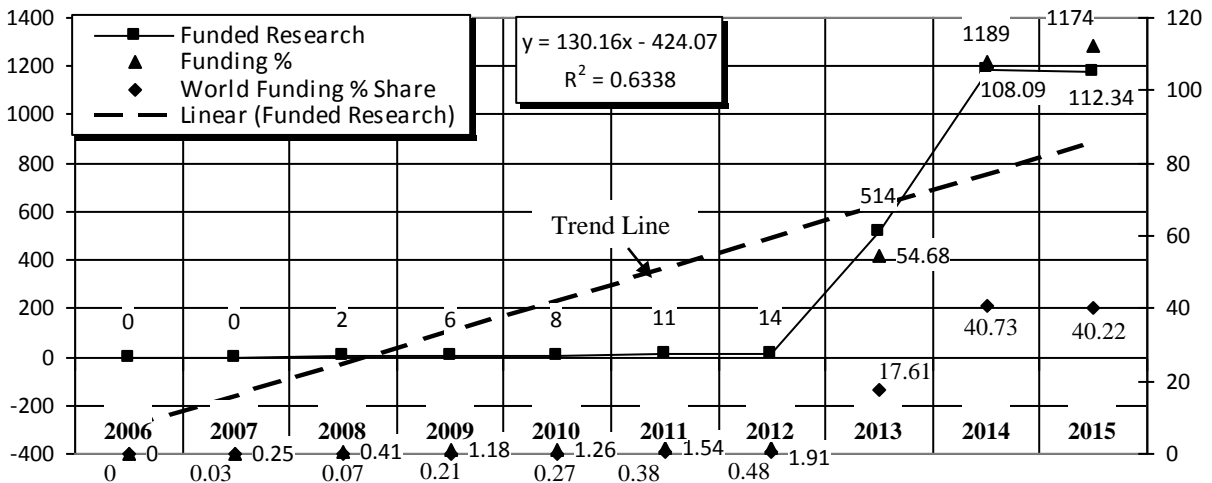
of research especially before 2012. Overall about  $\frac{3}{4}$  share (72.23%) researches have been published from 2006-2015 during 10 years span period with 11.74% growth per year.

**Figure -7: Country wise Periodic Funding Growth from 2006 to 2015**



The figure -7 shows the country funded research records in which China again has been declared undisputed leader in funding research counts on the theme. There was no funding during 2006, only one during 2007 and highest funding noted during 2014. The US is little ahead during 2011 and 2012 than China and other countries. Overall US has sustained second position but other confrontational countries stays nowhere; however they funded few researches on the topic.

**Figure -8: Funded research with Funding % and yearly World Funding % Share**



\* Research Funding % - F1; Yearly World Funding % Share - F2

This figure describes the number of funding research, funding %, world funding % share, linear graph, trend line and annual funding growth and also displayed equation and R-squared value on chart. The maximum research has been funded during 2013 to 2015. The highest research has been funded as 1189, 1174 and 514 against 1100, 1045 and 940 research during 2014, 2015 and 2013 respectively and at the other side zero funding has been recorded against 750 research during 2006 and 2007. It is very interesting fact that during 2014 and 2015, the funding quantity is more than the number of research that means, authors might have obtained multi funding from different organisations for the same researches. The funding of research does not sustain consistency and trend shows the high growth onward 2013. The total funded research records worldwide have been counted as 2919 against 6918 with a consolidated 42.19% from 79 countries with an average of 36.95 during 10 years span with a yearly average of 292. The records in the figure show a negative trend in funding of research during 2006 to 2012.

**Table -5: Two Era's Comparative Funded Research, with % of Records and Growth Times**

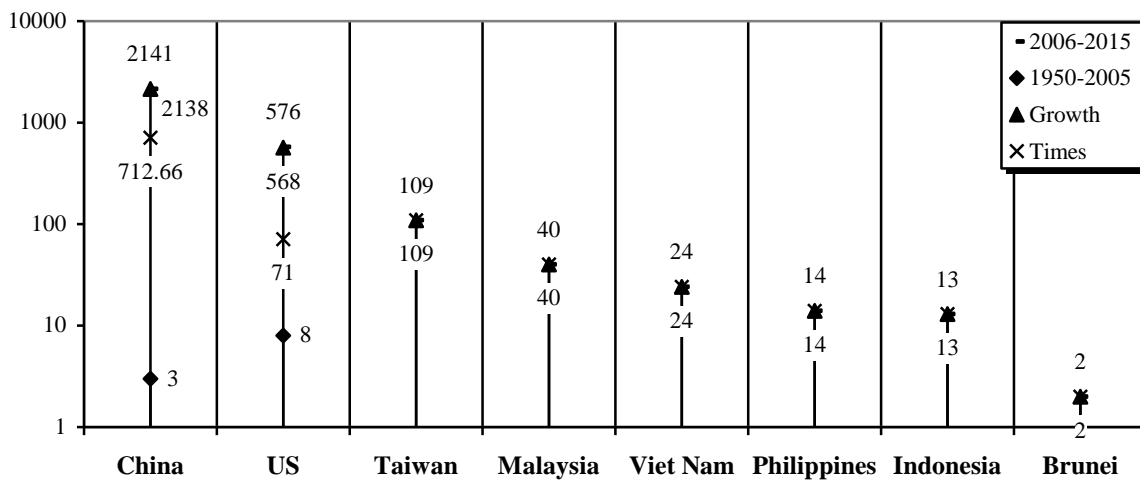
Country	Total Records	1950-2005			2006-2015			Growth		
		Records	%	R1*	Records	%	R2*	Records	Times	R3*
<b>China</b>	2144	3	0.14	2	2141	99.86	2	2138	712.66	1
<b>US</b>	584	8	1.37	1	576	98.63	3	568	71.00	2
<b>Taiwan</b>	109	0	0	3	109	100.00	1	109	109	3
<b>Malaysia</b>	40	0	0	4	40	100.00	1	40	40	4
<b>Viet Nam</b>	24	0	0	4	24	100.00	1	24	24	5
<b>Philippines</b>	14	0	0	4	14	100.00	1	14	14	6
<b>Indonesia</b>	13	0	0	4	13	100.00	1	13	13	7
<b>Brunei</b>	2	0	0	4	2	100.00	1	2	2	8
<b>Total</b>	2930	11	0.38		2919	99.62		2908	264.36	

\* Research funding % - F6; Growth Times - F7; R1 & R2 - F-8; R3 - F-9

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The table -5 provides two eras comparison statement of funded research for 55 and 10 years. It includes the funded research records, growth with growth times and (R) ranking. During the first era, US have been at the top in funding the highest number of research at third rank with 1.37% percentages followed by China and Taiwan at first and second rank respectively. Brunei, Indonesia, Philippines, Viet Nam, Malaysia and Taiwan have not funded even a single research. During the second era, China have been at the top in funding the highest number of research but at second rank with 99.86 percentages followed by US with third rank. Taiwan, Malaysia, Viet Nam, Philippines, Indonesia, Brunei have funded research in decreasing order. The funding of research in second era is 264.36 times higher than first era.

**Figure -9: Two Eras Comparative Funded Growth.**



In continuation to table 5; the figure 9 shows the comparison statement of Two Eras funded research, growth and growth times. Overall, the first era of 55 years has produced 1460 times less counts of research every year with an average of 0.2 counts per year as 0.38% share compare to second era of 10 years with an average of 692 counts per year as 99.62% share. Overall growth from first era to second era has been recorded as 2908 records with 264.36%.

Considering the growth rate from first era to second ear, China has sustained the first position and the ranking followed by US, Taiwan, Malaysia, Viet Nam in order.

**Table -6 : Top Ten highest Research producer Organisations from 1950-2015**

<b>Organisations</b>	<b>Records</b>
South China Seas Institute of Oceanography Chinese Academy of Sciences	841
Chinese Academy of Sciences	634
State Oceanic Administration China	417
China National Offshore Oil Corp	379
Ocean University of China	354
Institute of Oceanology Chinese Academy of Sciences	324
University of Chinese Academy of Sciences	287
Sun Yat-Sen University	281
Xiamen University	238
Tongji University	234

This table presents the top ten organisations which have produced the highest research counts on the topic during the period. All above-listed organisations are from China that means Dragon research institutions have left no space to other country research organizations. The aforementioned fact is frightening and forces us to rethink about the research carried out in the region, is the domination of one country on the entire region acceptable?

**Figure – 10: Research Dispersion by Subject Area from 1950-2015**



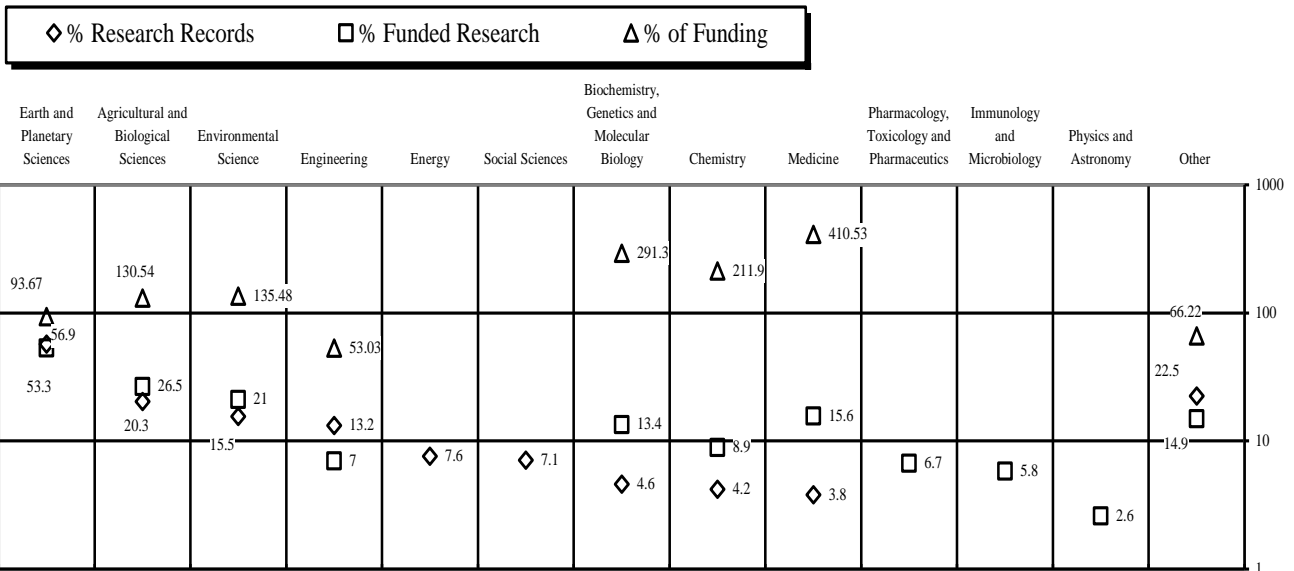


Figure 10 present the research output in various subject areas and funded research records. The highest research produced and funded in Earth & Planetary Sciences followed by Agricultural & Biological Sciences and Environmental Science. Research in Medicine has the least output followed by Chemistry and Biochemistry, Genetics & Molecular Biology. Research funding in Physics & Astronomy has the lowest figure followed by Immunology & Microbiology and Pharmacology, Toxicology & Pharmaceutics. Surprisingly where Medicine has the least output in research has the highest in the percentage of funding with 411% means got multi-sourced funding more than four times followed by Biochemistry, Genetics & Molecular Biology and Chemistry.

### ***Concluding remarks***

The research quantum on SCS produced by confrontational countries have been analysed. The comparative growth of research and funding search during two eras have been examined. An analysis revealed that the China has been aggressively conducting and funding research on the

disputed area and statistics established that China is an undisputed research leader in the region. Substantially, it is a matter of further enquiry in case a nation execute an aggressive policy of research funding on focused field only to take lead against counterpart nations, then it could be a symptom of preliminary war strategy against these nations. The study has presented tangible facts and figures to instigate confrontational countries to accelerate the research not only to counter the Chinese research aggression but to save their individual interests. In this sophisticated age, research can be the best arm to defend the counter attack and best tool not only to sustain the power balance and equal rights on natural resources but also avoid the future consequences such international conflicts. Advances in research undoubtedly enhance the moral of research fraternity and stimulate their country to counter the muscle power of unethical forces, therefore, funding policies for result oriented research should be liberally promoted.

The funding of research has been accelerated onward 2013 since the conflict continuously aggravated which indicated the policy of funding research is consistent with changing international politics over the dispute. An average annual output of funding research during 55 years from 1950 to 2005 is 0.2 counts and during 10 years from 2006 to 2015 is 290.8 counts with 14540 times higher growth annually. The USA being a world leader scored second position as a research producer and research funding country. The trend onward 2013 for research quantum and research funding indicated that it will be more aggressive. Consequently, indications convey of Chinese war against any anti-China front country like Japan, India, South Korea, Mongolia, Philippines, Vietnam, etc. on the anonymous issue in near future. A thought-provoking fact has been observed that the funding research is higher than the research quantity during 2014 and 2015 confirmed that multiple funding has been granted for the same researches.

It proved the importance of the region and the liberal funding research policy on the region. The inference revealed that the top ten highest research producing organisations are from China which confirmed China's research domination. Furthermore, fact that China is producing a huge research and far ahead than other confrontational countries which proved that at present, China is an unchallenged research superpower of the region.

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