# Bibliometrics Study: Article Usage and Citation Counts Metric in Trade Liberalization

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## Abstract

This paper examined the relationship between article usage count and citation count metric for published studies in trade liberalization. Data were extracted from Thomson Reuters Web of Science, Social Science Citation Index Expanded database a hub for markedly prominent journals. The data covers articles that are published from 1980 to 2015. Our study grouped articles published in trade liberalization according to their total citations into 4 categories. These are 1st, 2nd, 3rd and 4th top 50 cited articles. Kruskal-Walis test was used to analyze the total citation and citation per year data. While Spearman's correlation was used to analyze prospective relationship between total citations received by articles and the length of abstract and article title word counts at 95% confidence interval. Based on the aforementioned arrangement, the usage count in the last 180 days and since from January 2013 to December, 2015 showed that 1st top 50 cited articles retained their position for both usage counts in the last 180 days and since 2013. Surprisingly, 4th top cited articles usage count since 2013 became second ranked to that of 1st top 50 articles. Thereby, surpassing 2nd and 3rd top 50 cited articles. Research and publication interest in the field of trade liberalization in the study period had grown remarkably. These research activities also attract huge usage counts especially from 2013 as acknowledged by this study. Moreover, this trend suggests that trade liberalization may have high impact on future research focus and on economic policies.

**Key words:** Bibliometric, Web of Science, article usage count, citation count metric, research trend

## Introduction

For decades, trade liberalization had assumed the notoriety of attracting state centric nations including China to the mainstream free market venture (Bell, Khor, & Kochhar, 1993; Deng & Moore, 2004; Kim, 2003). The China inclusion is a significant element which explains the universal transition. During the last 3 decades since the China economic reform and opening up, China has achieved at a wonderful swiftness, what is undoubtedly a growth miracle. This phenomenon is regarded as the 'China factor' (Zhang, 2009). The experience is forecasted to continue (Alden, 2007). The China manufacturing industry has made large strides with the spreading of more affordable goods that are outdoing the locally produced goods in a most devastating manner (Renne, 2015). Certainly, it is logical that liberalized market will return the most effective mechanism, which will in time bring about the tremendous collective universal development (Barber, 2010). Liberal trade outcome will remove economic crises and produce global industrial activity. Simmons and Elkins (2004); Tian and Yu (2015); Wacziarg and Welch (2008) and Edwards (1993) assume that unbridled global markets will in return have a forthright decisive correlation with industrial growth and development. Market supremacy failed when economies are integrated to compete on unequal basis. Stiglitz (2002) believes that trade liberalization referred to as the removal of hindrances to free trade and the closer integration of national economies "can be drive for good and that it can possibly improve economic standards of all countries in the world, especially the poor". He called for the reevaluation of the process including the international trade agreements for a better and more prosperous world. Bibliometric studies on article usage and citation counts metric determining scholars work in trade liberalization has not being conducted despite its significance on business and social development.

In this research, we undertook the bibliometric analysis of the article usage count and citation count metric in trade liberalization. This was done to determine the consistence or rather inconsistence usage of the research output in this area of study. The analysis was done based on the research papers reported for the past 35 years (1980 - 2015) in Web of Science core collection database (Bornmann et al., 2009; Hall, 2011). The study will provide a descriptive as well as inferential analysis to get understanding into this significant universal phenomenon (Bruns & Stern, 2015; Cobo, Martínez, Gutiérrez-Salcedo, Fujita, & Herrera-Viedma, 2015; Ekeroma, Shulruf, McCowan, Hill, & Kenealy, 2016).

Our work found research in trade liberalization viable based on usage count. Interestingly, of recent the top cited articles usage count is gaining momentum. Statistical test also proved the result is significant. Moreover, the study assessed the probable relationship between page count and total citations. The result indicated a positive correlation with correlation coefficient of 0.259. Spearman's correlation test shows a 2-tail significant (P<0.01) correlation. Findings from this analysis can propel scholars to further understand the viability and relevance of free unrestricted trade. Increase in usage and citation counts will stimulate research and to further provide study directions.

## Methodology

Our study utilized data retrieved from the reputable online Social Science Citation Index (SSCI) database retrieved from multidisciplinary Institute for Scientific Information (ISI), Web of Science based in Philadelphia, United States of America (Ahmed, Adam, Ghafar, Muhammad, & Ale Ebrahim, 2016; Akhavan, Ebrahim, Fetrati, & Pezeshkan, 2016; Bakkalbasi, Bauer, Glover, & Wang, 2006; Glanzel, 2003; Nwagwu & Egbon, 2011). The search was restricted to the span of 1980 to 2015. Only 886 original publications were employed in this research. The bibliographic title search is related to trade liberalization

related data. The search topics include published results on 'welfare', 'access', 'open economy', 'low cost', 'trade policy', 'productivity growth', 'comparative advantage', 'free trade', 'import', 'China', 'wage', 'United States'', 'unemployment', 'taxes', 'tariffs', 'scale', 'returns', 'reforms', 'quality', 'productivity', 'prices', 'pollution', 'policy', 'plants', 'performance', 'panel data', 'monopolistic', 'model', 'Mexico', 'market', 'labor', 'investment', 'international trade', 'integration', 'inequality', 'industry', 'impact', 'growth', 'globalization', 'gains', 'firms', 'export', 'employment', 'efficiency', 'economy', 'economic growth', 'dynamics', 'developing countries', 'demand', 'countries', 'costs', 'competition', 'Canada', 'agreements', and 'adjustment'. The result obtained was then refined with planning development, international relations and economics from the Web of Science categories. IBM SPSS 21 software for windows was used to analyze the data. Non-parametric paired comparison was used to analyze the total citation and citation per year data. Tukey Post-hoc test was further used to precisely determine the significant variable. While Spearman's correlation was used to analyze for prospective relationship between total citation received by articles and the length of abstract and article title word counts. $P<0.05$ was taken to be statistical significant at 95% confidence interval. Consequently, the bibliometric analysis determines viability and impact of reported studies on trade liberalization. The dominant trends on citation research stream are also extensively reported. Data obtain from bibliometric research could be used to assess the performance of the academic field of study (Di Stefano, Peteraf, & Verona, 2010; Priem & Hemminger, 2010). Therefore, after carrying out extensive search in Web of Science core collection database 886 academic articles were collected.

## Result

*Analysis Based On Article Usage Counts*

This study grouped articles published in trade liberalization according to their total citations into 1st, 2nd, 3rd and 4th top 50 cited articles. Based on the grouping of the Web of Science usage counts in the last 180 days and since 2013 were analyzed and plotted in Fig. 1. Our result showed that the 1st top 50 cited articles still retained their position for both usage counts in the last 180 days and since 2013. Interestingly, 4th top 50 cited articles usage counts since 2013 followed that of 1st top 50 articles. Thereby, surpassing 2nd and 3rd top 50 cited articles. Although for usage count in the last 180 days, 2nd top 50 articles surpass 4th top 50 but 4th top 50 usage counts was still more than that of 3rd top 50 cited articles.

To substantiate this findings, we statistically tested whether these difference are actually significant or not. Our result showed that there was a significant difference ($P=0.01$) among the four citation groups (see Tables 1 and 2) for both last 180 days and since 2013. The 1st top 50 cited and 3rd and 4th top 50 cited articles are significantly different ($P<0.05$) from each other in usage counts in the last 180 days. This translates that the usage counts of 1st top 50 cited articles is significantly more than that of 3rd and 4th top 50 cited articles. Whereas, no significant difference ($P>0.05$) between 2nd top 50 cited articles and other citation groups (see Table 1).

Considering the usage count since 2013, only 1st top 50 cited and 3rd top 50 cited articles are statistically significant ($P=0.002$) (see Table 2).
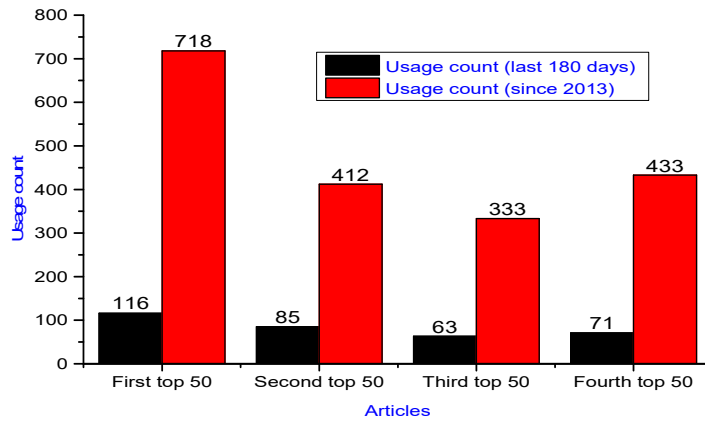
Fig. 1: Top 200 best cited articles and their corresponding Web of Science usage count

Table 1: Testing the usage count (last 180 days) between the categories of highly cited articles

| Citation Ranking Group (n=50) | Usage Count (Last 180 Days) Mean (S.E) | Mean Rank | Chi-Square (df) | P-Value |
|---|---|---|---|---|
| First top 50 | 2.320 (0.289)[a] | 119.98 | 11.306 | 0.010* |
| Second top 50 | 1.700 (0.206)[a,b] | 105.50 | | |
| Third top 50 | 1.260 (0.166)[b] | 88.68 | | |
| Fourth top 50 | 1.420 (0.252)[b] | 87.84 | | |

Values represent mean (S.E). Kruskal-Walis test was used to test all data. P<0.05 was chosen to be statistically significant at 95% confidence interval. Different superscript letter denotes statistical significance (P<0.05) from each other while same superscript shows not significant (P>0.05) from each other.

*=P<0.05

Table 2: Testing the Usage Count (Since 2013) Between the Categories of Highly Cited Articles

| Citation Ranking Group (n=50) | Usage Count (Since 2013) Mean (S.E) | Mean Rank | Chi-square (df) | P-Value |
|---|---|---|---|---|
| First top 50 | 14.360 (1.790)[a] | 127.65 | 19.940 | 0.002** |
| Second top 50 | 8.240 (0.722)[a] | 98.21 | | |
| Third top 50 | 6.660 (0.784)[b] | 76.29 | | |
| Fourth top 50 | 8.660 (0.936)[a] | 99.85 | | |

Values represent mean (Standard Error). Kruskal-Walis test was used to test all data. P<0.05 was chosen to be statistically significant at 95% confidence interval.

**=P<0.01

*Analysis on the Relationship between Page Counts and Total Citation Counts*

In addition, the study further assesses the probable relationship between page counts and total citations of all 200 highly cited articles considered in section 3.1. Fig. 2 depicts the scatter plot of the correlation between total citations and page counts. Result shows a positive correlation with correlation coefficient of 0.259 (Table 3). Spearman's correlation test shows a 2-tail significant (P<0.01) correlation (see Table 2). Likewise, Figs. 3 and 4 also shows the scatter plot between total citations and articles Web of Science usage counts in the last 180 days and since 2013. Respective correlation coefficient equals 0.239 and 0.151 with statistical significant of 0.001 and 0.033 p-values respectively (see Tables 3 and 4).

**Figure 2:** Scatter Plot showing the Correlation between Total Citations (TC) and article Page Count (PG) for the First 200 Highly Cited Articles. $R^2$=0.099.
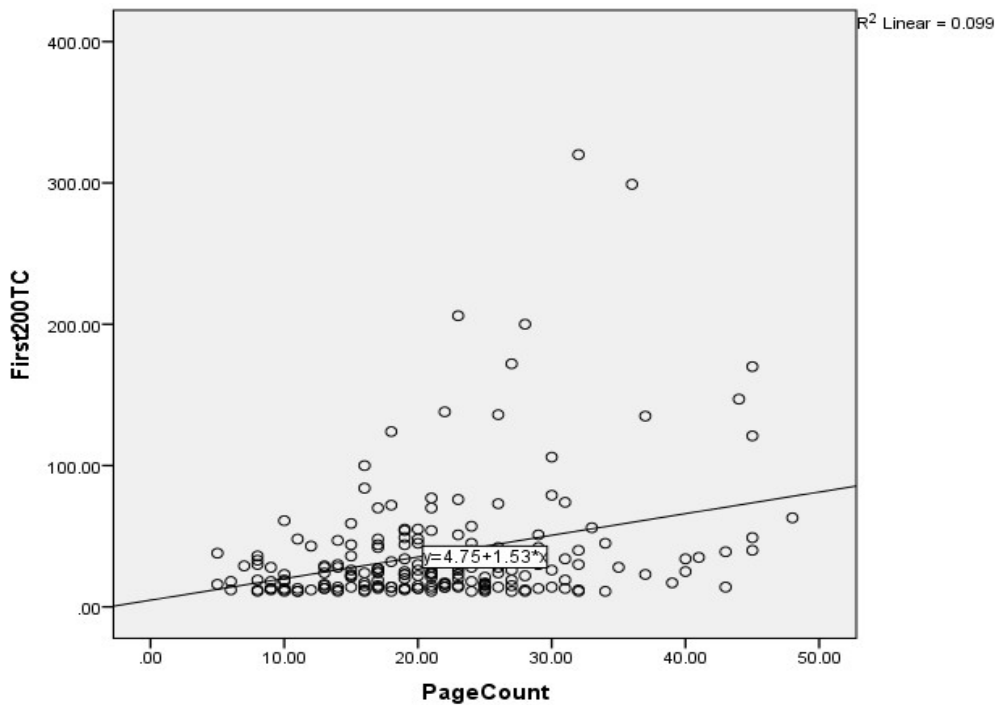


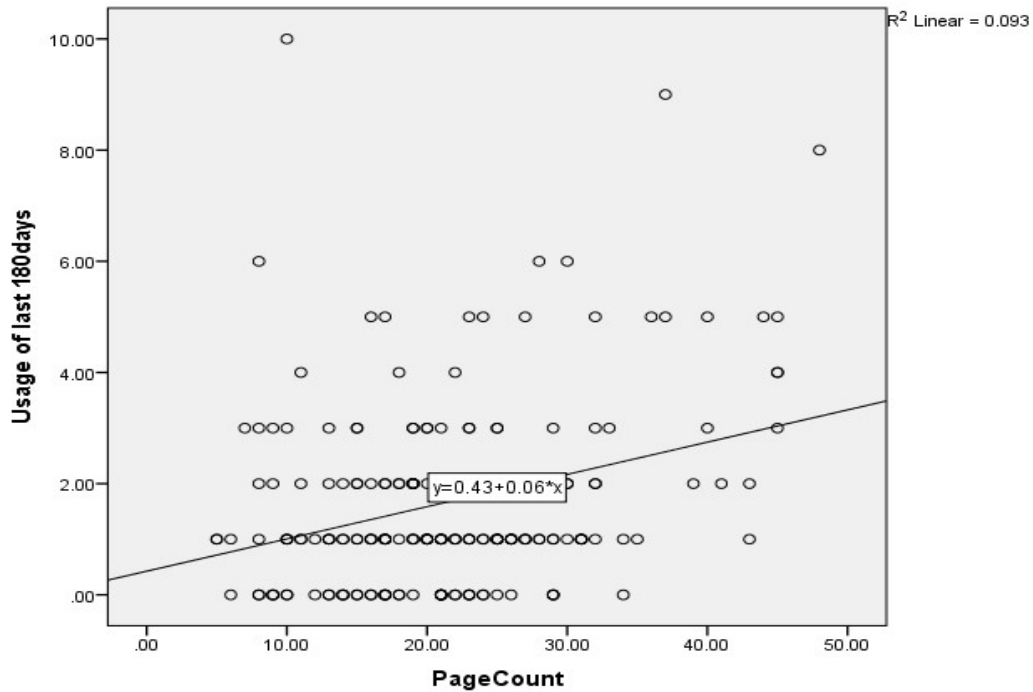**Table 3: Statistical test showing relationship between total citation and article page count**

| Variables | Mean (S.E) | Correlation Coefficient | P-Value (2-tail) |
|---|---|---|---|
| Total Citation | 37.700 (3.058) | 0.259 | 0.0001** |
| Page Count | 21.525 (0.628) | | |

Values represent Mean (Standard Error). All data were analysed using Spearmans correlation. P<0.01 was taken to be statistically significant.

**=P<0.0001

Note: there was a significant positive correlation (25%) between total citation and article page counts for first 200 highly cited articles.

**Figure 3:** Scatter plot showing correlation positive correlation between article page count and usage in the last 180days. $R^2$= 0.093 and regression equation is y=0.43+0.06*x



**Table 4: Statistical test showing relationship between publication usage (last 180 days) and page count**

| Variables | Mean (S.E) | Correlation Coefficient | P-Value (2-tail) |
|---|---|---|---|
| Usage in Last 180 days | 1.675 (0.119) | 0.239 | 0.001* |
| Page Count | 21.525 (0.628) | | |

Values represent Mean (Standard Error). All data were analyzed using Spearmans correlation. P<0.05 was taken to be statistically significant.
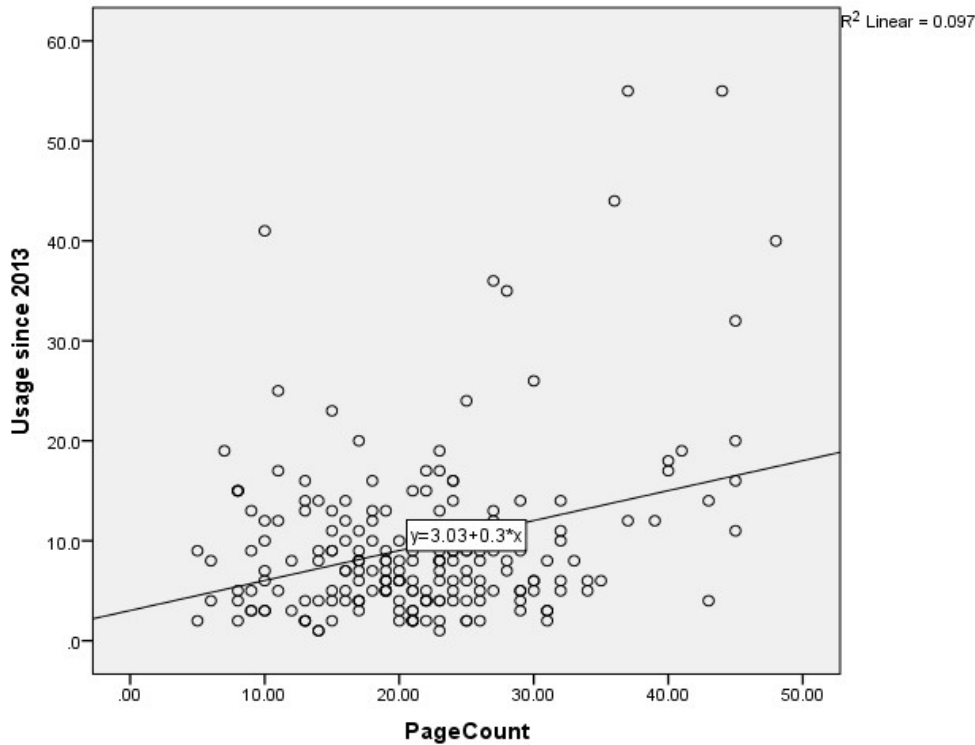
*=P<0.05

Figure 4: Scatter plot showing correlation positive correlation between article page count and usage since 2013. $R^2 = 0.097$ and regression equation is y=3.03+0.3*x

Table 5: Statistical test showing relationship between publication usage (since 2013) and page count

| Variables | Mean (S.E) | Correlation Coefficient | P-Value (2-tail) |
|---|---|---|---|
| Usage Since 2013 | 9.480 (0.6034) | 0.151 | 0.033* |
| Page Count | 21.525 (0.628) | | |

Values represent Mean (Standard Error). All data were analysed using Spearmans correlation. P<0.05 was taken to be statistically significant.

*=P<0.05

## Discussion

Scientific research is appreciated in several ways among which are citation usages and citation counts. Scholarly works are necessary to readers in finding and identifying sources of information. The importance in article citations and citation counts significantly indicate the growth and spread of authors work. Succinctly, the promotion of trade liberalization encourages research and huge usage and citations count. We discover that the 1st top 50 cited papers maintained the upward surge for both usage counts in the last 180 days and the lead since 2013. Phenomenally, 4th top 50 most cited papers attract the most Web of Science

usage counts against 2nd and 3rd top 50 cited papers since 2013. Although for usage count in the last 180 days, 2nd top 50 articles surpass 4th top 50 but 4th top 50 usage counts were still more than that of 3rd top 50 cited articles. These differences are tested statistically and the result showed significant difference (P=0.01) among the four citation groups for both last 180 days and since 2013. Importantly, three categories of the top 50 most cited articles are statistically different (P<0.05) from each other in usage counts in the last 180 days. These groups are the 1st, 3rd and 4th top 50 cited articles. In all, the usage counts of $1^{st}$ top 50 cited articles are significantly more than that of 3rd and 4th top 50 cited articles. Whereas, no significant difference (P>0.05) between 2nd top 50 cited articles and other citation groups.

Nevertheless, the usage counts since 2013, only 1st top 50 cited and $3^{rd}$ top 50 cited articles are statistically significant (P=0.002) from each other.

In analyzing the apparent relationship between page counts and total citations of all 200 highly cited articles. The outcome indicated a positive correlation with correlation coefficient of 0.259. Spearman's correlation test shows a 2-tail significant (P<0.01) correlation. Furthermore, respective correlation coefficient equals 0.239 and 0.151 with statistical significant of 0.001 and 0.033 p-values respectively. Additionally, there was a significant positive correlation (25%) between total citation and article page counts for first 200 highly cited articles. There is positive correlation between article page count and usage in the last 180 days. $R^2$= 0.093 with regression equation y=0.43+0.06*x. Equally, there is positive correlation between article page count and usage since 2013. $R^2$= 0.097 and regression equation is y=3.03+0.3*x. The implications of these results show that trade liberalization have become dominant and pervasive. Scholar's usage counts and citations had increased tremendously in recent years. The substantial upsurge is dominantly because of the acceptance of the doctrine of free market economy universally. Studies have revealed that trade liberalization hitherto held with disdained by state command economies is generally accepted. The general implication is the provision of social security and increase in manufacturing activities.

## Conclusion

Our study studied the relationship between article usage counts and citation counts metric for published studies in trade liberalization. The research tests the usage count between the categories of highly cited articles in the last 180 days and since 2013. Advance statistical test on the relationship between total citation and article page count was conducted. Correlation statistics was carried out between total citations and article page counts in 180 days and since 2013. Under the present circumstances, in formulating international economic strategies for the future, we would need to individually and collectively emphasize on creating a new partnership for development through the establishment of all inclusive economic agenda. This economic order will generate stability and order that will generate prosperity for all countries and all peoples. Further research in trade liberalization should be encouraged for the better of the world.

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