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Measuring the Influence and Impact of Competitiveness Research: A Web of Science Approach

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Abstract

The purpose of this paper is to measure the influence and impact of competitiveness research by identifying the 100 most cited articles in competitiveness that are published in academic journals indexed in the database of Web of Science of the Institute for Scientific Information (ISI) between 1980 and 2013. Using citation analysis we investigated the number of citations that were made to the 100 most cited articles that deal with competitiveness during this 34 year period. We also identified articles, authors, journals, institutions, and countries that have had the most contribution to the literature of competitiveness. Further, we determined in which categories of Web of Science these articles were published and how is the time distribution of their publication. Additionally, we investigated the level of competitiveness that has received the most attention, and the latest level of analysis in competitiveness research. We also explored the type of research design these articles used. Finally, we determined the most popular topics covered and the type of firm or industry/ name of nation or region analyzed by these articles. The findings of this research provide a reliable basis for competitiveness researchers to better plan their studies and enhance the influence and impact of their research works. However, the most cited articles published in other databases and categories, and citation to these articles in other publications and resources may deserve future research attention.

Keywords: Citation Analysis, Competitiveness, Most Cited Articles, Web of Science

Introduction

The notion of competitiveness has long been of central importance in strategic management studies (Porter, 1985; Ghemawat, 1986). It has drawn considerable attention from management, business, and economics scholars in the recent decades that has led to conceptualization and understanding of competitiveness (Waheeduzzaman and Ryans, 1996) turning it into a critical subject for all businesses, nations, and regions. Numerous studies have been conducted to explore competitiveness theoretically and examine it practically. These researches are reflected well in scientific articles, especially in the most cited articles. Reviewing these articles provides useful insights into achievements and developments in the field of competiveness.

Citation analysis is one of the useful tools to review and evaluate academic articles objectively (Law and Van der Veen, 2008). It is a relatively common procedure to examine the impact of articles published in academic journals and diffusion of knowledge (Hood and Wilson, 2001; Stremersch et al., 2007). It brings out quantitative information concerning authors, topics, and journals, which help to identify outstanding works and high-impact journals (Dubin et al., 1993).

Citation analysis has been conducted in various social science disciplines, such as management (Podsakoff et al., 2008), global strategy (Peng and Zhou, 2006), marketing (Soutar, 2013), finance (Keloharju, 2008), economics (Kim et al., 2006), health economics (Wagstaff and Culyer, 2012), accounting (Brown, 1996), tourism (Law et al., 2009), social work (Hodge et al.,

2012), and law (Shapiro and Pearse, 2012). However, no comprehensive study so far identifies the most cited articles in the field of competitiveness. As a result, competitiveness researchers are not knowledgeable well concerning the research background of the field of competitiveness to enhance the influence and impact their research works. Therefore, this paper as the first effort for addressing this research gap intends to identify the 100 most cited articles in competitiveness using the Web of Science database of Institute for Scientific Information and analyzes their main characteristics to assist competitiveness management, business, and economics scholars understand the current state of knowledge on the subject, inform them about the hot topics in the field of competitiveness, and the research gaps that should be addressed.

The primary research question of this paper is "What are the most influential competitiveness articles in journals indexed in the database of Web of Science of the Institute for Scientific Information (ISI)?", and the related questions are, as follows: What journals, institutions, countries, and categories of Web of Science did publish these influential articles?, What is the date of publication, research design and level of analysis of these influential articles?, What topics do these influential articles cover?, Who are the most common authors of these influential articles?, and What is the type of firm or industry/name of nation or region analyzed by these influential articles?.

Literature Review

Competitiveness

Competitiveness has attracted researchers since Adam Smith published his distinguished book: The Wealth of Nations, in 1776. He introduced the concept of absolute advantages and stated that wealth is created through division of labor and specialization. Thereafter, Ricardo (1817) proposed the concept of comparative advantages. He believed that resources are unchangeable and each country by the use of its resources should produce those products in which it has specialization when competing in the international markets. Finally, Porter (1980, 1985, 1990a) suggested that wealth is created by factor allocations. He introduced the concept of competitive advantages in this regard. His approach is outside-in and is classified in the market-based view of competitiveness, i.e. companies should consider market conditions to find a good position in the market first and then utilize their resources at the best way in that market to attain competitive advantage. Conversely, the resource-based view of competitiveness believes that if companies are to be competitive they should consider their valuable resources first and then find appropriate markets in which they can attain the highest returns using their resources (Rumelt, 1984; Wernerfelt, 1984).

The word of competitiveness is "originated from a Latin word, competer, means involvement in a business rivalry for markets" (Deniz et al., 2013, p. 465). Since competitiveness is nonexistent without competition it is necessary to perceive the concept of competition initially. Competition in the business literature is regarded as "a conscious striving against other business firms for patronage … for potentially incompatible positions" (Scherer and Ross, 1990, p. 16). Likewise, Stigler (1987) defined competition as "rivalry between individuals (or groups or nations), and it arises whenever two or more parties strive for something that all cannot obtain" (p. 531).

Competitiveness is a relatively complex and controversial concept. Overall, as Porter (1990b) stated there is not an accepted definition of competitiveness to understand it comprehensively. Every scholar has defined competitiveness according to his/ her viewpoint and scientific discipline. Furthermore, competitiveness can be viewed from different levels, including macro (nation), meso (industry), and micro (firm) levels. Definition of competitiveness is dependent on the level in which it is investigated.

There are much discussion on competitiveness at the macro or nation level in the literature, such as Global Competitiveness Report (2012) and World Competitiveness Yearbook (2012), which

are published annually by World Economic Forum (WEF) and International Institute of Management Development (IMD), respectively, to report the competitiveness of nations. Regarding the role of competitiveness in creating competitive products, it is considered as a key factor in contributing national prosperity (His Majesty's Treasury, 1983; Scott and Lodge, 1985; Fajnzylber, 1988; Fagerberg, 1988; Newall, 1992; European Commission, 1994; Krugman, 1994; Durand et al., 1998; OECD, 2000). At this level, competitiveness may be described as "the degree to which a country can, under free and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the longer term" (OECD, 1992, p. 237).

From a meso level, competitiveness is concerned to the industry level. Porter and van der Linde (1995, p. 98) believed that "the proper definition of competitiveness at the aggregate level is the average productivity of industry or the value created per unit of labor and per dollar of capital invested". On the other hand, Mcfetridge (1995) believed that a competitive industry is one that has firms which operate profitably in open markets in the long-term. Then, competitiveness of industries is dependent on competitiveness of their firms.

Competitiveness at the micro level refers to competitiveness of firms. Chikán (2008) suggested the following definition for firm competitiveness: "capability of a firm to sustainably fulfill its double purpose: meeting customer requirements at profit. This capability is realized through offering on the market goods and services which customers value higher than those offered by competitors" (p. 24). As Porter (1990a) noted they are firms competing in international markets, not nations, so investigation of competitiveness in any levels ends up eventually to the competitiveness at firm level. No nation or industry will be competitive unless it prospers firms, which are competitive in domestic and international markets. Therefore, firm competitiveness is of particular importance for industries and nations in addition to companies themselves.

In addition to the above three levels of competitiveness, the literature of competitiveness has been witnessed by the emergence of a new subfield of competitiveness recently, which is called region competitiveness. Region competitiveness has been introduced since Michael Porter published his famous book: The Competitive Advantage of Nations, in 1990. Regarding the globalization process, regions are now under much competitive pressure from their peers and as a result regional policy makers are forced to think about the ways by which they can respond to this challenge (Begg, 2002). Region competitiveness can be defined as "the capacity and capability of regions to achieve economic growth relative to other regions at a similar overall stage of economic development, which will usually be within their own nation or continental bloc" (Huggins et al., 2013, p.156).

Despite the long history of the research of competitiveness, much knowledge accumulated about competitiveness, and its importance and applications for firms, industries, nations, and regions as mentioned earlier no citation analysis so far has been conducted to measure the influence and impact of competitiveness research. Before performing the citation analysis of competitiveness research, the following section provides a review of this bilbliometric method in detail.

Citation Analysis

The first citation index for articles that were published in scientific journals was introduced by Eugene Garfield's Institute for Scientific Information (ISI). It proposed the Science Citation Index (SCI) initially and then expanded it to include the Social Sciences Citation Index (SSCI), and the Arts and Humanities Citation Index (AHCI) (Cherry, 2007).

The above mentioned indices provided the fundamental pillars for citation analysis. Citation analysis is one of the methods of bibliometrics that analyzes "the frequency, patterns and graphs of citations in articles and books" (Khaparde, 2011, p. 174). It considers the impact of an article quantitatively using the number of times that it is referenced in other articles over time (Moed,

2009). Citation analysis provides valuable information concerning the impact that an article or author has had on a particular field of study (Adams and Simonson, 2004; Garfield, 1972). It supports the research activity of scientific disciplines (Backhaus et al., 2011). Furthermore, it has been used to assess science policies and disciplinary development at national level (Bornmann and Daniel, 2008).

Although it is believed that citation counts is a measure of recognition and does not correlate with quality or importance of an article (Cheek et al., 2006; Tsai et al., 2006), but the number of citations to a particular article shows its utility by other authors and as a result it can be considered as a measure of impact of that article (Julie et al., 2012). Regarding the fact that authors cite their impacts, citation counts act as an indicator that shows the influence of a cited work (Acedo and Casillas, 2005). In fact, Citation counts provide an attractive measure for evaluating the performance of research, because they don't need the cooperation of respondents and don't affect the responses (Smith, 1981). Furthermore, they are simple, objective, quantifiable, and reasonable measures (Leone et al., 2012). Therefore, the number of citations represents an acceptable measure of influence of a given article, author, or journal on a research field (Culnan, 1986).

Despite the usefulness of citation counts to measure the influence of research, there are some concerns on them. Authors may cite other authors because of a mutual agreement to increase their citations or due to the popularity of them (Radicchi et al., 2008). Moreover, some journals advise authors to cite more recent articles from journals that have a high impact factor to increase their former impact factor (Gami et al., 2004), which in turn will lead to the manipulation of citation counts. Some articles may also attain high citation counts because of their flaws and negative impacts that they have on a particular field of study (Dumont, 1989; Baltussen and Kindler, 2004). Additionally, self-citations and the tendency of authors to cite articles from journal they seek to publish their manuscript can increase citation counts (MacRoberts and MacRoberts, 1989; Seglen, 1997; Vincent and Ross, 2000). However, as Backhaus et al. (2011) stated the share of such citations is very small.

Materials and Methods

Regarding the main objective of this study that intends to measure the influence and impact of competitiveness research from a Web of Science approach, we conducted a search for all articles related to competitiveness through the databases of ISI Web of Science. Social Sciences Citation Index (SSCI) and Science Citation Index Expanded (SCI-EXPANDED) were adopted as the citation databases. We did the search using only one keyword that was "Competitiveness". We filtered the search results to include only articles and exclude other document types, including proceedings papers, editorial materials, and letters by refinement. Further, since this research aims to consider competitiveness from management and economics perspective, we refined the search results to include only four categories of Web of Science, including Management, Business, Operations Research & Management Science, and Economics. The articles published from 1980 to 2013 were retrieved. Then, we ranked the final identified articles from the most to least cited. The first 100 articles were identified as the 100 most frequently cited competitiveness articles and were inserted into an Excel spreadsheet. Next, we analyzed and tabulated the articles based on the following parameters: number of citations, average citation per year, authors' name, journal title, publication year, organization, and country of origin. Furthermore, we classified articles based on the level of analysis in four categories of firm level, industry level, nation level, and region level. We also categorized them on the basis of their research design, either qualitative or quantitative. Finally, we classified articles based on the most popular topics covered and the type of firm or industry/ name of nation or region analyzed.

Results and Discussion

Most Influential Articles

The 100 most cited articles are displayed in table 1 in descending order based on the average number of citations per year (for complete reference of articles please refer to appendix 1). Table 1 shows that Porter and van der Linde' article that was published in 1995 is ranked first in both total citations with 962 citations and average citation per year with 50.63 citations, next followed by Maskell and Malmberg's 1999 article. The article ranked 100th was published in 1989 and received an average of 0.88 citation per year. On average, each of the 100 most cited articles received 70.97 citations, or 5.30 citations per year.

Table 1. The 100 Most Cited Articles in Competitiveness

Author(s)	Year	Average Citation per Year	Citation/ Year Rank	Total Citation	Total Citation Rank
Porter, M. E., & van der Linde, C.	1995	50.63	1	962	1
Maskell, P., & Malmberg, A.	1999	39.06	2	586	2
Rao, P., & Holt, D.	2005	21.77	3	196	4
Ross, J. W., Beath, C. M., & Goodhue, D. L.	1996	14.61	4	263	3
Yang, T. T., & Li, C. R.	2011	13.66	5	41	53
Boschma, R.	2004	13.5	6	135	8
Lechner, C., & Dowling, M.	2003	12.18	7	134	9
Baye, M. R., & Morgan, J.	2001	11.23	8	146	6
Tongzon, J., & Heng, W.	2005	10.33	9	93	14
Hult, G. T. M., Ketchen, D. J., & Arrfelt, M.	2007	9.57	10	67	29
Holsapple, C. W., & Singh, M.	2001	9.15	11	119	11
Enright, M. J., & Newton, J.	2004	9	12	90	15
Crouch, G. I., & Ritchie, J. R.	1999	8.86	13	133	10
Zhang, C., Cavusgil, S. T., & Roath, A. S.	2003	8.09	14	89	17
Pearce, R. D.	1999	7.93	15	119	12
Bristow, G.	2005	7.77	16	70	27
Yang, C. L., Lin, S. P., Chan, Y. H., & Sheu, C.	2010	7.75	17	31	65
Demailly, D., & Quirion, P.	2008	7.16	18	43	49
Rutkauskas, A. V.	2008	6.83	19	41	51
Wu, W. P.	2008	6.83	20	41	52
Man, T. W., Lau, T., & Chan, K. F.	2002	6.75	21	81	23
Lee, S. M., & Peterson, S. J.	2001	6.69	22	87	18
Oxley, J. E., & Yeung, B.	2001	6.46	23	84	19
Klemperer, P.	1987	6.33	24	171	5
Snieška, V., & Bruneckienė, J.	2009	6	25	30	68
Hult, G. T. M., Ketchen, D. J., & Nichols, E. L.	2002	5.83	26	70	26
Turok, I.	2004	5.7	27	57	38
Walters, A. E., Stuhlmacher, A. F., & Meyer, L.	1998	5.62	28	90	16
Lall, S.	2001	5.53	29	72	25
Gardiner, B., Martin, R., & Tyler, P.	2006	5.5	30	44	48
Bhatnagar, R., & Sohal, A. S.	2005	5.44	31	49	44
Fagerberg, J.	1988	5.34	32	139	7
Gomezelj, D. O., & Mihalič, T.	2008	5	33	30	69
Dwyer, L., Forsyth, P., & Rao, P.	2000	4.78	34	67	30
Mihalič, T.	2000	4.78	35	67	31
Krugman, P. R.	1996	4.66	36	84	21

Brown, S. P., Cron, W. L., & Slocum Jr, J. W.	1998	4.62	37	74	24
Kedia, B. L., & Mukherji, A.	1999	4.4	38	66	32
Hult, G. T. M., Snow, C. C., & Kandemir, D.	2003	4.27	39	47	45
Guan, J. C., Yam, R., Mok, C. K., & Ma, N.	2006	4.25	40	34	62
Wang, G., & Netemyer, R. G.	2002	4.16	41	50	42
Xepapadeas, A., & de Zeeuw, A.	1999	4.13	42	62	34
Alesina, A., & Perotti, R.	1994	4.05	43	81	22
Corbett, C., & Van Wassenhove, L.	1993	4	44	84	20
Jaffee, S., & Masakure, O.	2005	4	45	36	61
Snieška, V.	2008	4	46	24	87
Özçelik, E., & Taymaz, E.	2004	3.9	47	39	59
Rosenfeld, S. A.	1996	3.83	48	69	28
Dayasindhu, N.	2002	3.83	49	46	47
Malecki, E. J., & Tootle, D. M.	1996	3.66	50	66	33
Li, L. X.	2000	3.64	51	51	41
Huggins, R.	2003	3.63	52	40	54
Ghalayini, A. M., Noble, J. S., & Crowe, T. J.	1997	3.52	53	60	36
Yeo, G. T., Roe, M., & Dinwoodie, J.	2008	3.5	54	21	98
Lau, L. J.	1982	3.40	55	109	13
Fagerberg, J.	1996	3.38	56	61	35
Mayhew, K., & Keep, E.	1999	3.33	57	50	43
Tether, B. S., & Hipp, C.	2002	3.33	58	40	57
Windrum, P., & Tomlinson, M.	1999	3.13	59	47	46
Chang, Y. H., & Yeh, C. H.	2001	3	60	39	58
Fagerberg, J., Srholec, M., & Knell, M.	2007	3	61	21	99
Ekins, P., & Speck, S.	1999	2.66	62	40	55
Go, F. M., & Govers, R.	2000	2.64	63	37	60
Stroh, L. K., & Caligiuri, P. M.	1998	2.62	64	42	50
Stavrou, E. T.	2005	2.55	65	23	91
Kingsley, G., & Malecki, E. J.	2004	2.54	66	28	72
Budd, L., & Hirmis, A.	2004	2.5	67	25	83
Freeman, C.	2004	2.5	68	25	84
Reich, R. B.	1990	2.41	69	58	37
O'Farrell, P. N., Hitchens, D. M. W. N., & Moffat, L. A. R.	1992	2.40	70	53	39
Greve, H. R.	2002	2.33	71	28	73
Carlin, W., Glyn, A., & Van Reenen, J.	2001	2.30	72	30	70
Sarris, A. H., Doucha, T., & Mathijs, E.	1999	2.26	73	34	63
McCarl, B. A., Adams, D. M., Alig, R. J., & Chmelik, J. T.	2000	2.21	74	31	66
Depken II, C. A.	1999	2.2	75	33	64
Ahmad, S., Schroeder, R. G., & Sinha, K. K.	2003	2.18	76	24	88
Handfield, R. B., & Pannesi, R. T.	1995	2.10	77	40	56
Rosenfeld, S. A.	2000	2	78	28	74
Fertö, I., & Hubbard, L. J.	2003	2	79	22	93
Demeter, K.	2003	1.90	80	21	100
Ireland, R. D., & Hitt, M. A.	1999	1.73	81	26	82
Buiter, W. H., & Miller, M.	1981	1.60	82	53	40
Perks, H.	2000	1.57	83	22	94
Carraro, C., & Galeotti, M.	1997	1.52	84	26	79

Sharp, M.	1998	1.5	85	24	89
Boltho, A.	1996	1.33	86	24	90
Belohlav, J. A.	1993	1.33	87	28	75
Cole, R. E., Bacdayan, P., & White, B. J.	1993	1.33	88	28	76
Daniel, K., & Lott Jr, J. R.	1997	1.29	89	22	95
Amendola, G., Dosi, G., & Papagni, E.	1993	1.28	90	27	78
Roessner, J. D., Porter, A. L., Newman, N., &	1996	1.27	91	23	92
Hitt, M. A., Keats, B. W., Harback, H. F., &	1994	1.25	92	25	85
McShan, S., & Windle, R. J.	1989	1.24	93	31	67
Spencer, W. J., & Grindley, P.	1993	1.23	94	26	80
Kravis, I. B., & Lipsey, R. E.	1992	1.13	95	25	86
Meredith, J.	1988	1.11	96	29	71
Whipp, R., Rosenfeld, R., & Pettigrew, A.	1989	1.04	97	26	81
Oral, M.	1993	1.04	98	22	96
Fransman, M.	1986	1	99	28	77
Bovenberg, A. L.	1989	0.88	100	22	97

Year of Publication

The 100 most cited articles were published between 1981 and 2011. More than half of the articles were published after 2000 compared with that before 2000 (54 vs. 46); However, the highest number of articles (10 articles) were published in 1999 (Figure 1). They have experienced a fluctuable trend between 1981- 2011. Nevertheless, the best situation is from 1996 to 2005, which totally 67 articles were published. Before and after this time period, except 1993 and 2008 with 6 articles published in both of these two years, only a few articles were published in other years.

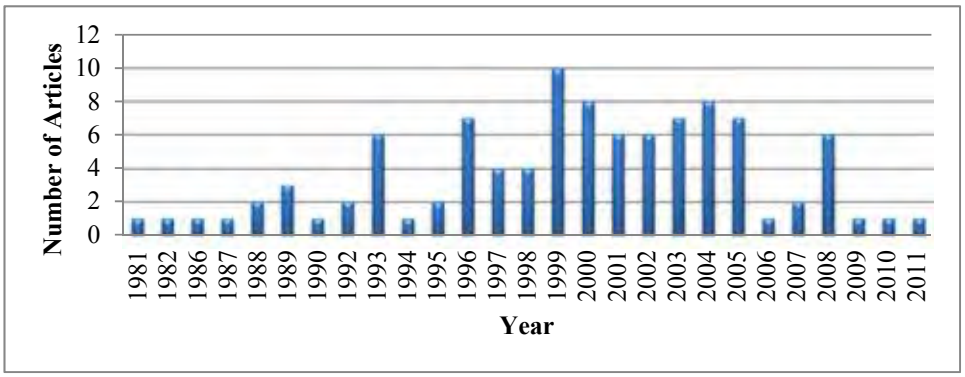

Figure 1. Number of the Most Cited Competitiveness Articles Published in Each Year

Countries of Origin

The 100 most cited articles originated from 20 countries. However, 2 countries, United States and United Kingdom altogether published 63% of all the 100 most cited articles with 42 and 21 articles, respectively (Table 2).

The reason that United States published the largest number of most cited articles can be justified with respect to several factors, such as high research funding and numerous American academic communities (Eshraghi et al., 2013). On the other hand, American authors tend to publish their articles in American journals and cite other American articles (Campbell, 1990). Furthermore, US reviewers prefer US manuscripts (Hennessey et al., 2009). The position of United Kingdom as the second highest publisher of the 100 most cited articles also can be attributed to the existence of countless associations of British scientists and different journals in the field of management, business, and economics, and the dominance of a strong research-oriented culture.

Table 2. Countries of Origin of the 100 Most Cited Articles in Competitiveness

Rank	Country	No. of Articles
1	United States	41
2	United Kingdom	22
3	Australia	4
4	Norway	4
5	China	4
6	France	3
7	Lithuania	3
8	Netherlands	3
9	Slovenia	2
10	Italy	2
11	Greece	2
12	Hungary	2
13	Denmark	1
14	Turkey	1
15	Philippines	1
16	Canada	1
17	India	1
18	Singapore	1
19	Cyprus	1
20	Taiwan	1

Institutions of Origin

Twelve Institutions published 2 or more of the most cited articles (Table 3). Michigan State University and Harvard University published the most articles with five and three articles, respectively. Among 12 institutions with 2 or more most cited articles, seven institutions were from United States, three from United Kingdom, one from Norway, and one from Australia.

Table 3. Institutions of Origin with 2 or More of the Most Cited Articles in Competitiveness

Rank	Institution	No. of Articles
1	Michigan State University	5
2	Harvard University	3
3	DePaul University	2
4	Georgia Institute of Technology	2
5	University of Pennsylvania	2
6	Massachusetts Institute of Technology (MIT)	2
7	Texas A&M University	2
8	University of Oxford	2
9	University of Reading	2
10	University of Sussex	2
11	University of Oslo	2
12	Monash University	2

Most Common Authors

Nine authors published 2 or more of the most cited articles (Table 4). G. Tomas M. Hult and Jan Fagerberg were the most frequent first authors of the 100 most cited articles. They each contributed to 3 articles. Other authors shown in table 4 each contributed to 2 articles. However, only Rosenfeld and Snieška were first authors in both of articles.

Table 4. Most Common Authors of the 100 Most Cited Articles in Competitiveness

Author	No. of Articles	First Author	Second Author	Third Author
Hult, G. T. M	3	3	0	0
Fagerberg, J	3	3	0	0
Rosenfeld, SA	2	2	0	0
Snieška, V	2	2	0	0
Mihalič, T	2	1	1	0
Malecki, E. J	2	1	1	0
Hitt, M. A	2	1	1	0
Rao, P	2	1	0	1
Ketchen, D. J	2	0	2	0

Categories of Web of Science

As it can been clearly seen in figure 2, of all the articles, 34% were published in the Web of Science category of Management, followed by Economics (32%), Business (24%), and Operations Research & Management Science (10%) categories.

Among the four selected categories of Web of Science, most of top cited articles were classified in the category of Management. Operations Research & Management Science and Business can be assumed as the two sub-fields of management. If we combine these two categories with the category of Management, they totally account for 68% of the 100 most cited articles, which is much more than those have been classified in the category of Economics (32%) (It should be noted that when calculating the share of categories, for those articles classified in more than one category, for each category in which they were positioned, they have been taken into account one time).

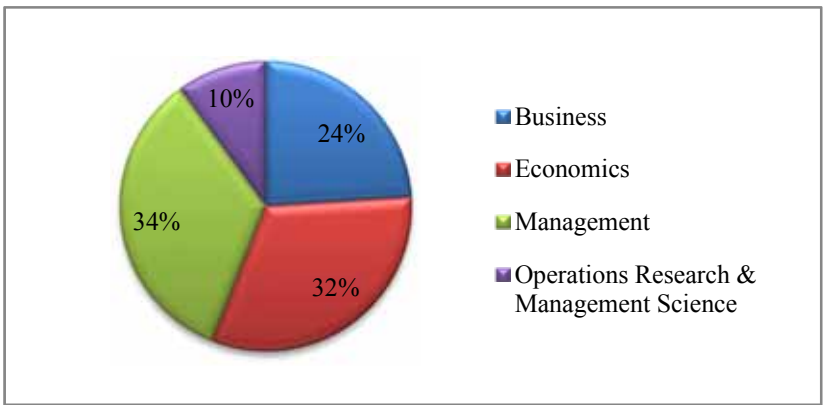

Figure 2. The Share of the 100 Most Cited Competitiveness Articles in Four Selected Categories of Web of Science (%)

Journals

The 100 most cited articles were published in 64 journals, among them 19 journals have published 2 or more articles, and totally account for 55% of articles (Table 5). The first five journals that published the 100 most cited articles are, as follows: Regional Studies and Tourism Management have published most of the top-cited articles with 6 and 5 articles, respectively. Further, California Management Review, Oxford Review of Economic Policy, and Research Policy are ranked in the third to fifth positions that each published 4 articles.

In terms of the journal impact factor that measures the significance of a journal within the corresponding field (Garfield, 2006), most of the 100 top-cited articles were published in medium

impact factor journals. Another measure of a journal is the cited half-life. It is the number of publication years from the present year, which account for 50% of the current citations received by a journal (Leydesdorff et al., 2013). The cited half-life of those journals which published 2 or more of the 100 most cited articles shows that except for two journals, the age of the majority of cited articles published in these journals is more than 6 years. On the other hand, the citing half-life refers to the number of publication years from the present year, which account for 50% of the current citations published by a journal in its articles references (The Thomson Corporation, 2005). The citing half-life of the journals with 2 or more of the 100 most cited articles indicates that except for one journal, the age of the majority of articles referenced by these journals is more than 6.6 years.

Table 5. Journals in Which 2 or More Most Cited Competitiveness Articles Were Published

Rank	Journal	No. of Articles	Impact Factor (2012)	Cited Half-Life	Citing Half-Life
1	Regional Studies	6	1.465	7.9	9.7
2	Tourism Management	5	2.571	6.7	9.7
3	California Management Review	4	1.667	>10.0	8.7
4	Oxford Review of Economic Policy	4	0.875	8.1	4.7
5	Research Policy	4	2.85	9.1	>10.0
6	American Economic Review	3	2.792	>10.0	8.5
7	Journal of World Business	3	2.617	6	>10.0
8	International Journal of Production Economics	3	2.081	6.2	8.9
9	World Development	3	1.527	9.8	8.3
10	Transportation Research Part A: Policy and	2	2.725	8	8.4
11	Technology Analysis & Strategic Management	2	1.095	6.7	9.4
12	Economic Journal	2	2.118	>10.0	8.4
13	Energy Economics	2	2.538	4.9	7.2
14	Technovation	2	3.177	6.5	8.8
15	European Journal of Operational Research	2	2.038	8.1	9.4
16	Journal of Management Studies	2	3.799	8.5	>10.0
17	International Journal of Operations &	2	1.252	>10.0	>10.0
18	Inzinerine Ekonomika-Engineering Economics	2	0.972	3.2	6.6
19	Journal of International Business Studies	2	3.062	9.9	>10.0

Research Design and Level of Analysis

A total of 60% of the articles used quantitative research design versus 40% which implemented a qualitative research design. Furthermore, 48% of the articles analyzed competitiveness at the firm level, which is next followed by industry level (23%), nation level (21%), and region level (8%) (Figure 3).

Based on figure 3, we also attained interesting insights when we combined the research design and analysis level of the 100 most cited articles, some of which are, as follows: most of articles at firm, industry, and nation levels are quantitative rather than qualitative (29 vs. 19, 16 vs. 7, and 12 vs. 9, respectively), indicating that competitiveness is perceived well at these levels and authors tend to examine it quantitatively and focus on empirical evidences. However, region competitiveness is a new field of competiveness with only 8 most cited articles that majority of them used a qualitative research design rather than a quantitative research design (5 vs. 3), showing that competitiveness at this level has not been perceived well yet and authors are now more likely to explore its concept theoretically.

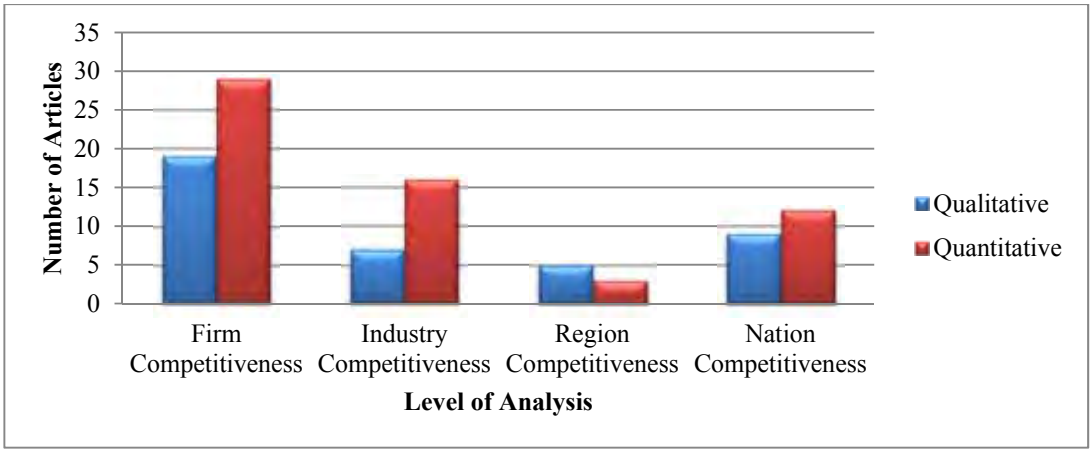

Figure 3. Research Design and Level of Analysis of the 100 Most Cited Articles in Competitiveness

Most Popular Topics

The 100 most cited articles were classified according to main topics in each of the four analysis levels of competitiveness. To do this, we reviewed the titles, abstracts, and if necessary the content of articles carefully to determine the topic of each article (Table 6).

At firm level, inter-firm collaboration is ranked first (n=6), closely followed by innovation and entrepreneurship (n=5). Tourism competitiveness with 6 article is the most popular topic at industry level, next followed by industry clusters (n=3). At nation level, notion, indices, and revitalization of nation competitiveness is ranked first with 5 articles, which is followed next by international competitiveness notion, research, and evaluation (n=4). Finally, at region level notion of region competitiveness and regional competitiveness index are the most popular topics with 5 and 2 articles, respectively.

Table 6. The Most Popular Topics in Each Analysis Level of Competitiveness

Topic	No. of Articles	Rank
Firm Level		
Inter-Firm Collaboration	6	1
Innovation, and Entrepreneurship	5	2
Environmental Issues	4	3
Market Competitiveness	4	4
Supply Chain Management	4	5
Management and Leadership	4	6
Negotiator and Trait Competitiveness	3	7
Human Resource Issues	3	8
Strategy Topics	3	9
Culture and Cultural Competitiveness	2	10
Performance Management	2	11
Airline Competitiveness	2	12
Plant Competitiveness	2	13
Firm Competitiveness Sources and Evaluation	2	14
Technology	2	15
Industry Level		

Tourism Competitiveness	6	1
Industry Clusters	3	2
Port Competitiveness	2	3
Production and Profitability	2	4
Industry Competitiveness Analysis and Evaluation	2	5
Organizational Learning and Innovativeness	2	6
Comparative Advantage	1	7
Electoral Competitiveness	1	8
Sport Competitiveness	1	9
Environment	1	10
Government	1	11
Quality Management	1	12
Nation Level		
Nation Competitiveness Notion, Indices, Revitalization	5	1
International Competitiveness Notion, Research, and Evaluation	4	2
Fiscal and Monetary Policies	3	3
Entrepreneurship and Innovation	3	4
Technology and Technological Infrastructure	2	5
Cohesion	1	6
E-commerce	1	7
Environmental Protection	1	8
Cost Competitiveness	1	9
Region Level		
Notion of Region Competitiveness	5	1
Regional Competitiveness Index	2	2
Regional Competitiveness Sustainability	1	3
Total	100	

Firm or Industry Type/Nation or Region Name

The 100 most cited articles were also classified based on the type of firm or industry/name of country or region analyzed in each article (Table 7). At firm level, most of articles analyzed competitiveness of manufacturing firms (n=8), next followed by different firms, multinational firms, airline firms, and SMEs with 6, 3, 2, and 2 articles, respectively. Tourism is ranked first at industry level with 6 articles, followed by agriculture and food (n=3), and port (n=2). At nation and region levels, all mentioned nations and regions are analyzed only in one article. However, some articles didn't mention the type of firm or industry/name of country or region they analyzed. These articles are categorized as not specified.

Table 7. Type of Firm or Industry/Name of Country or Region Analyzed in Each Analysis Level of Competitiveness

Firm or Industry Type/Nation or Region Name	No. of Articles	Rank
Firm Level		
Manufacturing Firms	8	1
Different Firms	6	2
Multinational Firms	3	3
Airline Firms	2	4

Small and Medium Enterprises (SMEs)	2	5
Automobile and Merchant Banking	1	6
Electronics	1	7
Radio Stations	1	8
Electronics, Machinery, and Transportation	1	9
Computer Hardware Firms	1	10
Small Firms	1	11
Electrical Power plants	1	12
Business Service Firms	1	13
Services Firms	1	14
International Firms	1	15
Machinery	1	16
Entrepreneurial Firms	1	17
European Firms	1	18
Not Specified	14	
Industry Level		
Tourism	6	1
Agriculture and Food	3	2
Port	2	3
Software	1	4
Furniture and Electronics	1	5
Glass	1	6
Semiconductor	1	7
Iron and Steel	1	8
Election	1	9
Sport	1	10
Machine-Tool	1	11
Manufacturing	1	12
Not Specified	3	
Nation Level		
Developing Countries	1	1
UK, Germany, Netherlands, and Japan	1	2
UK	1	3
European Countries	1	4
Different Countries	1	5
USA	1	6
OECD Countries	1	7
Not Specified	14	
Region Level		
European Regions	1	1
Lithuanian Regions	1	2
UK Regions	1	3
Not Specified	5	
Total	100	

Limitations and Future Directions

It should be acknowledged that our study has some limitations. First, it investigated most cited competitiveness articles published in the database of Web of Science of the Institute for Scientific Information (ISI). It will be interesting to analyze most cited articles published in the other databases, such as Scopus, and Google Scholar, and then compare the findings on Web of Science journals with those on Scopus, and Google Scholar journals.

Second, it does not include citation to the other publications, such as proceedings papers, editorial materials, and letters, which are classified in the database of Web of Science of the Institute for Scientific Information. These publications may deserve future research attention.

Third, we selected only four categories of World of Science to retrieve the 100 most cited competitiveness articles. Although, most of articles having a management or economics perspective are classified in these four categories, but there may exist some competiveness articles with these two perspectives in other categories that we didn't include them in our analysis. Thus, future research can be conducted to include all categories.

Last but not least, we searched the most cited articles only via internet, whereas without accessing both in print and online resources, some information may be lost (De Groote et al., 2005). Therefore, this type of resources may need to be included and analyzed in future research.

Conclusion

To the best of our knowledge, this paper is the first study concerning the most cited articles in the field of competitiveness. The findings of the study indicates that firm level is the most common level of analysis of competitiveness, next followed by industry, nation, and region levels. Furthermore, it shows that most of articles implemented a quantitative research design at firm, industry, and nation analysis levels, showing that competitiveness is well understood conceptually and empirical evidences have been of central focus in these three levels. On the other hand, at region level that was recognized as the latest sub-field of competitiveness, majority of articles used a qualitative research design, indicating that there is a need to study competitiveness at this level more theoretically.

The research findings also shows that inter-firm collaboration, tourism competitiveness, notion, indices, and revitalization of nation competitiveness, and notion of region competitiveness are the most popular topics at firm, industry, nation, and region levels, respectively. Furthermore, considering the type of firm or industry/name of country or region investigated in the most cited articles indicated that most of them analyzed competitiveness of manufacturing firms at firm level and competitiveness of tourism industry at industry level. However, at nation and region levels, competitiveness of all nations and regions was analyzed only in one article.

This citation analysis provides useful information about scientific achievement and development of competitiveness research over the past decades. It contributes to the competitiveness field by assessing the influence and impact of competitiveness research through identifying the most influential articles published in those journals indexed by the Web of Science database of the Institute for Scientific Information, their topics, and publication sources. The results help competitiveness researchers to better plan their studies, improve the impact of their research works, and make decisions about what topic to select and in which journal to publish their research findings.

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Appendix 1: Complete Reference of the 100 Most Cited Articles in Competitiveness

No.	Article
1	Porter, M. E., & Van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. Journal of economic perspectives, 9, 97-118.
2	Maskell, P., & Malmberg, A. (1999). Localised learning and industrial competitiveness. Cambridge journal of economics, 23(2), 167-185.
3	Ross, J. W., Beath, C. M., & Goodhue, D. L. (1996). Develop long-term competitiveness through IT assets. Sloan management review, 38(1), 31-42.
4	Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance?. International Journal of Operations & Production Management, 25(9), 898-916.
5	Klemperer, P. (1987). The competitiveness of markets with switching costs. The RAND Journal of Economics, 138-150.
6	Baye, M. R., & Morgan, J. (2001). Information gatekeepers on the internet and the competitiveness of homogeneous product markets. American Economic Review, 454-474.
7	Fagerberg, J. (1988). International competitiveness. The economic journal, 355-374.
8	Boschma, R. (2004). Competitiveness of regions from an evolutionary perspective. Regional studies, 38(9), 1001-1014.
9	Lechner, C., & Dowling, M. (2003). Firm networks: external relationships as sources for the growth and competitiveness of entrepreneurial firms. Entrepreneurship & Regional Development, 15(1), 1-26.
10	Crouch, G. I., & Ritchie, J. R. (1999). Tourism, competitiveness, and societal prosperity. Journal of business research, 44(3), 137-152.
11	Holsapple, C. W., & Singh, M. (2001). The knowledge chain model: activities for competitiveness. Expert systems with applications, 20(1), 77-98.
12	Pearce, R. D. (1999). Decentralised R&D and strategic competitiveness: globalised approaches to generation and use of technology in multinational enterprises (MNEs). Research Policy, 28(2), 157-178.
13	Lau, L. J. (1982). On identifying the degree of competitiveness from industry price and output data. Economics Letters, 10(1), 93-99.
14	Tongzon, J., & Heng, W. (2005). Port privatization, efficiency and competitiveness: Some empirical evidence from container ports (terminals). Transportation Research Part A: Policy and Practice, 39(5), 405-424.
15	Enright, M. J., & Newton, J. (2004). Tourism destination competitiveness: a quantitative approach. Tourism management, 25(6), 777-788.
16	Walters, A. E., Stuhlmacher, A. F., & Meyer, L. L. (1998). Gender and negotiator competitiveness: A meta-analysis. Organizational behavior and human decision processes, 76(1), 1-29.
17	Zhang, C., Cavusgil, S. T., & Roath, A. S. (2003). Manufacturer governance of foreign distributor relationships: do relational norms enhance competitiveness in the export market?. Journal of International Business Studies, 34(6), 550-566.
18	Lee, S. M., & Peterson, S. J. (2001). Culture, entrepreneurial orientation, and global competitiveness. Journal of world business, 35(4), 401-416.

19	Oxley, J. E., & Yeung, B. (2001). E-commerce readiness: institutional environment and international competitiveness. Journal of International Business Studies, 32(4), 705-723.
20	Corbett, C., & Van Wassenhove, L. (1993). Trade-offs? What trade-offs? Competence and competitiveness in manufacturing strategy. California Management Review, 35(4), 107-122.
21	Krugman, P. R. (1996). Making sense of the competitiveness debate. Oxford review of economic policy, 12(3), 17-25.
22	Alesina, A., & Perotti, R. (1994). The welfare state and competitiveness (No. w4810). National Bureau of Economic Research.
23	Man, T. W., Lau, T., & Chan, K. F. (2002). The competitiveness of small and medium enterprises: a conceptualization with focus on entrepreneurial competencies. Journal of Business Venturing, 17(2), 123-142.
24	Brown, S. P., Cron, W. L., & Slocum Jr, J. W. (1998). Effects of trait competitiveness and perceived intraorganizational competition on salesperson goal setting and performance. Journal of Marketing, 62(4).
25	Lall, S. (2001). Competitiveness indices and developing countries: an economic evaluation of the global competitiveness report. World development, 29(9), 1501-1525.
26	Hult, G. T. M., Ketchen, D. J., & Nichols, E. L. (2002). An examination of cultural competitiveness and order fulfillment cycle time within supply chains. Academy of management Journal, 45(3), 577-586.
27	Bristow, G. (2005). Everyone's a 'winner': problematising the discourse of regional competitiveness. Journal of Economic Geography, 5(3), 285-304.
28	Rosenfeld, S. A. (1996). Does cooperation enhance competitiveness? Assessing the impacts of inter-firm collaboration. Research Policy, 25(2), 247-263.
29	Hult, G. T. M., Ketchen, D. J., & Arrfelt, M. (2007). Strategic supply chain management: improving performance through a culture of competitiveness and knowledge development. Strategic Management Journal, 28(10), 1035-1052.
30	Dwyer, L., Forsyth, P., & Rao, P. (2000). The price competitiveness of travel and tourism: a comparison of 19 destinations. Tourism Management, 21(1), 9-22.
31	Mihalič, T. (2000). Environmental management of a tourist destination: A factor of tourism competitiveness. Tourism Management, 21(1), 65-78.
32	Kedia, B. L., & Mukherji, A. (1999). Global managers: Developing a mindset for global competitiveness. Journal of World Business, 34(3), 230-251.
33	Malecki, E. J., & Tootle, D. M. (1996). The role of networks in small firm competitiveness. International Journal of Technology Management, 11(1-2), 1-2.
34	Xepapadeas, A., & de Zeeuw, A. (1999). Environmental policy and competitiveness: The Porter hypothesis and the composition of capital. Journal of Environmental Economics and Management, 37(2), 165-182.
35	Fagerberg, J. (1996). Technology and competitiveness. Oxford review of economic policy, 12(3), 39-51.
36	Ghalayini, A. M., Noble, J. S., & Crowe, T. J. (1997). An integrated dynamic performance measurement system for improving manufacturing competitiveness. International Journal of production economics, 48(3), 207-225.
37	Reich, R. B. (1990). Who is us? Across the United States, you can hear calls for us to revitalize our national competitiveness. Harvard Business Review, 68(1), 53-64.
38	Turok, I. (2004). Cities, regions and competitiveness. Regional Studies, 38(9), 1069-1083.
39	O'Farrell, P. N., Hitchens, D. M. W. N., & Moffat, L. A. R. (1992). The competitiveness of

	business service firms: a matched comparison between Scotland and the South East of England. Regional Studies, 26(6), 519-533.
40	Buiter, W. H., & Miller, M. (1981). Monetary policy and international competitiveness: the problems of adjustment. Oxford Economic Papers, 143-175.
41	Li, L. X. (2000). An analysis of sources of competitiveness and performance of Chinese manufacturers. International Journal of Operations & Production Management, 20(3), 299-315.
42	Wang, G., & Netemyer, R. G. (2002). The effects of job autonomy, customer demandingness, and trait competitiveness on salesperson learning, self-efficacy, and performance. Journal of the Academy of Marketing Science, 30(3), 217-228.
43	Mayhew, K., & Keep, E. (1999). The assessment: knowledge, skills, and competitiveness. Oxford Review of Economic Policy, 15(1), 1-15.
44	Bhatnagar, R., & Sohal, A. S. (2005). Supply chain competitiveness: measuring the impact of location factors, uncertainty and manufacturing practices. Technovation, 25(5), 443-456.
45	Hult, G. T. M., Snow, C. C., & Kandemir, D. (2003). The role of entrepreneurship in building cultural competitiveness in different organizational types. Journal of management, 29(3), 401-426.
46	Windrum, P., & Tomlinson, M. (1999). Knowledge-intensive services and international competitiveness: a four country comparison. Technology Analysis & Strategic Management, 11(3), 391-408.
47	Dayasindhu, N. (2002). Embeddedness, knowledge transfer, industry clusters and global competitiveness: a case study of the Indian software industry. Technovation, 22(9), 551-560.
48	Gardiner, B., Martin, R., & Tyler, P. (2006). Competitiveness, Productivity and Economic Growth across the European Regions. Regional Competitiveness, 30, 55.
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