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Impact of Pakistani Authors in the GOOGLE World: A Study of Library and Information Science Faculty

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ABSTRACT

The ranking of universities and journals have been the focus of the scholarly community. These rankings are used as a marketing tool for attracting new comers to the universities and for authors to the journals. As a consequence, ranking of authors/faculty in a field of study has also become popular which can be used as a useful tool for awards, promotion, recruitment, recognition, etc. Citations to scholarly writings have been used to develop a number of quantitative measures to determine their impact on the literature of a topic. This paper investigated the impact of 53 LIS faculty from eight Pakistani universities. The data were collected during July 2011 using Google Scholar database. Only 11 out of 53 faculty members contributed 118 publications which received 536 citations. The h-index, g-index, hc-index, h_i-norm, and e-index, were used to determine the impact of these authors. The scatter of their publications in various journals was determined and the most cited publication of each author was identified. The number of faculty members who received citations is small and their scores in various indices are generally low. There is a need for these faculty members to publish in impact factor journals in order to get more citations and higher scores.

Keywords: Impact; Publications; Faculty members; Library and Information Science; Pakistan

INTRODUCTION

The scientific community has been taking interest in the ranking of universities and journals for quite some time due to a number of reasons. Besides other purposes, these rankings

are used as a marketing tool for attracting financial resources, quality faculty, and good students to universities and quality research to journals. Similarly the ranking of authors / faculty in a discipline is also getting popular because such ranking is very significant in the academic world because it is, and can be, used as a basis for receiving a higher status for the institution (Long, Boggess & Jennings, 2011). The ranking of authors can be used as a useful tool for recruitment, promotion, recognition, awards, etc.

There are several methods to rank faculty in a discipline, however, the most suitable and logical way is the analysis of citations received by their publications. Citation analysis is used to rank the most-cited authors or measure the impact of their publications on the published literature indicating that an author has published works of quality and importance. Google Scholar, Web of Science, and Scopus are generally used to measure the impact of authors. However, the impact of authors can be easily determined within a few minutes by using Harzing's *Publish or Perish* software which collects data from Google Scholar. Therefore, the Google Scholar and *Publish or Perish* have been utilized by many authors for the ranking of faculty in a discipline.

Google and Google Scholar: Google is the most used and very popular web search engine which finds information on the World Wide Web in seconds. Google was developed by two students, Lawrence Page and Sergey Brin at Stanford University. In 1998 Page and Brin formalized their work and thus created a company known as "GOOGLE" (Google, n.d). Google receives more than a one billion queries each day (Kuhn, 2009) which makes it the world's number one search engine (Boswell, 2010).

The availability of scholarly information on the World Wide Web is increasing day by day. In order to help research scholars search information more effectively and efficiently Google Scholar was introduced in 2004 (Assisi, 2005). It is a scholarly search tool which helps researchers in locating a wide array of scholarly literature on the World Wide Web, including scholarly journals, abstracts, peer reviewed articles, theses, dissertations, books, preprints, PowerPoint presentations and technical reports from universities, academic institutions, professional societies, research groups, and preprint repositories around the world. Therefore, as compared to other scholarly databases, it is good in finding additional citations (Noruzi, 2005).

Google Scholar helps a researcher to know about the number of citations his/her work has received as well as about those sources where the work was cited. Thus due to free access, wide coverage of scholarly literature, better citation indexing the use of Google Scholar is getting popularity among the intellectuals.

Harzing's Publish or Perish: It is a software program which was designed to help individual academics to present their case for research impact to its best advantage. Using Google Scholar, it retrieves raw citations and then analyzes and presents them into many statistics for each author such as: total number of papers; total number of citations; average number of citations per paper; average number of citations per author; average number of papers per author; average number of citations per year; Hirsch's h-index and related parameters; Egghe's g-index; the contemporary h-index; the age-weighted citation rate; two variations of individual h-indices; the number of authors per paper. The results are available on-screen and can also be copied to the Windows clipboard (for pasting into other applications) or saved to a variety of output formats for future reference or further analysis (Harzing, 2011). Previous studies have demonstrated that *Publish or Perish* identifies nearly twice the number of citations than those found through the Web of Science and Scopus. This is because *Publish or Perish* / Google Scholar have access to doctoral dissertations, master's theses, books, book chapters, and conference papers, etc (Khey, et al, 2011).

Many quantitative indexes, beginning with Hirsch's h-index (Hirsch, 2005), have been developed to determine the impact of an author. A short description of various types of citation indices which *Publish or Perish* calculates is given below. These indices are used for measurement of an author's impact in his field of study.

Hirsch's h-index

The h-index, also called Hirsch-index, was introduced by J.E. Hirsch in 2005. It quantifies the impact of an author's contribution. A scientist has index h if h of his/her N_p (total papers) papers have at least h citations each, and the other $(N_p - h)$ papers have no more than h citations (Hirsch, 2005). In other words, if a researcher has h-index of 5 it means that he has written five papers each of which (on average) has been cited at least five times by other researchers. Thus h-index determines a researcher's academic impact by using the quantity (total

number of his/her papers) and quality (impact or citations to his/her papers). In spite of some shortcomings, the h-index has been considered as a good tool for comparing the researchers of the same field.

Egghe's g-index

The g-index, proposed by Leo Egghe in 2006, aimed to improve the h-index by giving more weight to highly-cited articles. The g-index was defined as "A set of papers has a g-index g if g is the highest rank such that the top g papers have, together, at least g^2 citations" (Egghe, 2006, p. 132).

Zhang's e-index

The e-index, proposed by Chun-Ting Zhang in 2009, complements the h-index for the ignored excess citations. It is the (square root) of the surplus of citations in the h-set (Zhang, Chun-Ting, 2009).

Contemporary h-index (hc-index)

The original h-index does not consider the age of an article. To overcome this drawback, hc-index was introduced by Sidiropoulos, Katsaros, and Manolopoulos (2006). It aims to improve on the h-index by giving more weight to the recent articles. It adds an age-related weight to each cited article by giving less weight to older articles. The weighting is parameterized. The Publish or Perish implementation uses $\gamma=4$ and $\delta=1$, as the authors did in their experiments. This means that the citations for an article published during the current year account four times. For an article published four years ago, the citations account for only one time. For an article published six years ago, its citations account for $4/6$ times, and so on.

Individual h-index (original)

The h_i -index, proposed by Batista, et al, (2006), adjusts the h-index score for multiple authors by dividing the standard h-index score by the average number of authors in the articles that contribute to the h-index. In this way the Individual h-index reduces the effects of co-authorship.

Individual h-index (PoP variation)

Publish or Perish also implements an alternative individual h-index which is represented by *hi-norm index* by taking a different approach. Instead of dividing the total h-index; it first normalizes the number of citations for each paper by dividing the number of citations by the number of authors for that paper, and then calculates the h-index of the normalized citation counts. According to Harzing (2011) this approach is much more fine-grained than Batista et al (2006). She believes that it works more accurately for reducing any co-authorship effects that might be present and that it is a better approximation of the per-author impact.

RELATED LITERATURE

A number of scholars have tried to determine the impact of researchers by using various sources of citations and various quantitative measures. Some of these studies are reviewed below.

Razzaque and Wilkinson (2007) utilized the freely available software, *Publish or Perish*, and freely accessible Google Scholar database to investigate the research performance of senior marketing academics of Australian universities. Their research performance was analyzed on the basis of four established metrics, i.e. h-index, g-index, hc- index, and h_i norm. The analysis revealed that there were only three professors who had h-index score of above 15, and 15 professors had g-index score of above 15. The situation of associate professors was quite different regarding the indices' values.

The research influence of 25 Library and Information Science faculty was examined by Meho and Yang (2007) using Scopus and Google Scholar and then compared the ranking measured by Web of Science. They found Google Scholar to be more useful in retrieving citations due to its wide coverage. Bar-Ilan (2008) compared the *h* scores of 40 Israeli researchers based on citations counted via Google Scholar, Scopus, and Web of Science. The author found at several stages that results obtained through Google Scholar were different from those of Scopus and Web of Science. This was because of wide range of coverage of Google Scholar.

McCallum (2010), using *Publish or Perish* software, observed the citation ratings of herpetologists. He found that the h-score and g-score increased as the career length of an author in the

field increased. By using *Publish or Perish*, Khey, et al. (2011) re-ranked the top female academic “Stars” in the field of Criminology and Criminal Justice. They found the retrieved data via Google as more comprehensive. Similarly using the same software Long, Boggess and Jennings (2011) re-ranked the top 10 academicians in the field of Criminology and Criminal Justice which were identified in an earlier study. The findings of this study were similar to the earlier studies that attempted to rank the same group of authors and thus the authors maintained approximately the same position.

Cronin and Meho (2006) identified 31 influential Information Science faculty members from the United States and ranked them on the basis of their h-index scores by including and excluding their self citations. There were 20 individuals whose h-index scores ranged from 10 to 20 while the other 11 had h-index scores below 10. Although the inclusion and exclusion of self citations did not much influence the rank order of individuals, however, slight changes occurred in their h-index scores.

Pakistan has a long history of publishing in Library and Information Science. There has been a sharp increase in the output of research literature due to the beginning of research-based post-master degrees during the past ten years. The fresh entrants and in-service practitioners who seek admissions to the schools offering these degrees need to know the quality of these programs for making their decisions. The performance of the faculty of a school can be used as an indicator of its quality. Therefore, it is important to know the ranking of the LIS faculty to help new comers in deciding which school to join. Also the ranking will help the top administration in promotion, awarding research grants, and in selection for best teacher awards. This study has been design to study the contribution and its impact on research literature of faculty members from eight Pakistani universities offering LIS education.

OBJECTIVES AND METHODOLOGY

The following objectives, methods and sources of data were determined to conduct the study.

Objectives

1. To identify the faculty members, their papers that were cited, and the number of citations received;
2. To rank these faculty members on the basis of h-index and indices scores;

3. To determine authorship pattern, multi-authored and collaborative effort, in the cited papers;
4. To identify the journals which published papers of these faculty members; and
5. To identify the most cited paper of each faculty member.

Method

The websites of eight public universities that teach LIS were examined to compile a list of their faculty. The two universities (Sargodha and Sindh) had no websites. These were contacted by telephone to get the names of their faculty members. There were 53 faculty members of various ranks teaching at these eight universities. These became the population of the study.

Sources of data

There are three sources/tools which can be used to gather information about citations or impact of authors. These are Web of Science, Scopus and Google Scholar. It has been found that Google Scholar provides higher citation counts than either Scopus or Web of Science due to better coverage of social sciences; free Internet access, better indexing of proceedings and non-English language materials (Noruzi, 2005; Vaughan & Shaw, 2008). Therefore, the Google Scholar database was selected to calculate the citation indices for the ranking of LIS faculty in Pakistan. The software *Publish or Perish* 3.2.4150 version which retrieves citation data from Google Scholar was used.

In order to test the software *Publish or Perish*, first the inverted names and then the full names, in normal order, of a few authors were entered. It was found that *Publish or Perish* retrieves better citations results when the names were entered in normal order. Therefore, each name was entered in normal order. The irrelevant and duplicate results were deleted. The publications which had received zero citations were also removed. Then the names those faculty members who did not receive any citation were excluded from the study. Finally, the results for each author were copied for further analysis and comparisons. The data were collected during July 2011.

LIMITATIONS

The findings of this study should be viewed with several limitations. First, the period covered is up to July 2011. So, the publications of the authors included and those excluded from this study might have received additional citation after July 2011 which might affect the scores for each. The citation counts are limited by the sampling frame which is Google Scholar. It is possible that some publications of these authors may not have been indexed by it. Also there may be papers which had been cited and were available online but the software did not retrieve those. For example, there are seven papers of Mumtaz A. Anwar which had been cited in one paper (Khan, et al, 1998) but the software did not count those citations. Some of the faculty members publish in local languages or in local non-LIS journals with the possibility of not being cited due to non-visibility. The trend of self-citation and citation of close colleagues was found in some authors with the possibility of making their scores higher than others. The self-citations are mentioned in Table 2 but we found no option in the software to exclude them. Therefore, this limitation should also be kept in mind.

RESULTS AND DISCUSSION

The following sections will present the results of this study.

Faculty by University, their Publications and Citations Received

There are eight public universities in Pakistan that offer master's degree in LIS and five of them offer M. Phil. and Ph. D. The number of faculty varies from university to university depending on various circumstances. Less than half of these faculty members hold post-master degrees, either from local or foreign universities. They vary in their interest in publishing research which is reflected in Table 1 which provides figures of publications retrieved from Google Scholar and the number of citations received by these publications.

Table 1, Faculty, publications and citations received

University	Total No. of Faculty	Receiving Citations (%)	Not Receiving Citations (%)	Number of Publications	Number of Citations
Allama Iqbal Open Univ.	6	1 (16.7)	5 (83.3)	4	9
Islamia Univ Bahawalpur	10	2 (20.0)	8 (80.0)	11	20
Univ of Baluchistan	9	1 (11.0)	8 (88.9)	2	5
Univ of Karachi	8	0 (0.0)	8 (100.0)	0	0
Univ of Peshawar	6	1 (16.7)	5 (83.3)	1	5
Univ of the Punjab	6	5 (83.3)	1 (16.7)	99	494
Univ of Sargodha	4	1 (25.0)	3 (75.0)	1	3
Univ of Sindh	4	0	4 (100.0)	0	0
Total	53	11 (20.8)	42 (79.2)	118	536

These eight universities have 53 LIS faculty members, 42 (79.2%) of whom did not have a single publication that received a citation. The other 11 (20.8%) faculty members altogether contributed 118 publications which received 536 citations. It is very disturbing to know that all 12 faculty members from two universities had no publication that received any citation. It may be pointed out that both these institutions offer post-master research degrees. The University of the Punjab stands out tall whose five (9.43%) faculty members contributed 99 (83.9%) out of 118 publications that received 494 (92.16%) out of 536 citations. Overall, the situation is not good and the authorities need to give serious attention to this.

Individual Faculty Members, Their Publications, Citation Details

It may be interesting to have a look at the contribution of 11 faculty members in terms of numbers of their publications, citations received, and self-citations. Table 2 provides these figures.

Table 2 shows the rank order of the faculty on the basis of total citations their publications received. Mumtaz Ali Anwar ranks first with total 218 citations followed by Khalid Mahmood with 207 and Kanwal Ameen with 61. Farzana Shafique and M. Arif occupied fourth and fifth positions with 17 and citations. The average number of citations per paper for the top three authors is 6.22 for Mumtaz A. Anwar, 4.6 for Khalid Mahmood and 4.07 Kanwal Ameen.

The tendency of self-citation and citing close colleagues and its effect of inflated impact of cited authors have been investigated by several authors (Aksnes, 2003; Dimitroff, 1995;

Fowler & Aksnes, 2007; Gianoli & Molina-Montenegro, 2009; Hartley, 2012; Zhivotovsky & Krutovsky, 2008). It has been found that self-citation does increase the impact but its exact contribution is still being discussed. Several ways have been discussed to reduce this impact. However, we did not try to remove either the self-citations or their impact. Therefore, the reader should keep that in mind while considering the contributions of these authors.

Table 2, Faculty Members, Their Publications, and Citation Details

Name	No. of Publications	Citations Received	Mean Citation/Paper	Self Citations (S.C) %	Citations without S.C.
Mumtaz A. Anwar	35	218	6.22	12 (5.5)	216
Khalid Mahmood	45	207	4.6	38 (18.4)	169
Kanwal Ameen	15	61	4.07	23 (37.7)	38
Farzana Shafique	9	17	1.89	3 (17.6)	14
Muhammad Arif	4	9	2.25	1 (11.1)	8
Nosheen Warraich	3	7	2.33	1 (14.3)	6
M. Ilyas	2	5	2.5	0	5
Rubina Bhatti	2	3	1.5	0	3
Hamid Rehman	1	5	5	0	5
M. Fazil Khan	1	3	3	0	3
Syeda Hina Batool	1	1	1	0	1

It will be interesting to look at the number of citations received by these 118 publications. Forty-nine (41.53%) publications received one or two citations each, most (n=30, 25.42%) receiving only one each. The next 27 (22.88%) publications were cited three or four times each. The following 19 (16.10%) received five to seven citations each. Another 13 (11.02%) were cited eight to ten times each. The remaining 10 (8.47%) were cited 11 to 21 times. The top two of these 10 were cited 19 and 21 times each. It is also interesting to observe that 95 (80.51%) of these publications altogether received 270 (50.37%) citations and the remaining 23 (19.49%) received 266 (49.63%). It looks like the 80/20 rule applies here also.

Out of the 11 authors presented above, five who contributed two publications or less were excluded from further analysis. It was done because their calculations would distort the results when compared with others. Therefore, the following paragraphs present data for only the first six faculty members.

H-index Related Scores

For calculating the h-index, each author must have enough amounts of publications and citations along with a certain number of citations per individual work (Long, Boggess & Jennings, 2011). So when the h-index was calculated by *Publish or Perish*, Mumtaz Ali Anwar gained first place with nine followed by Khalid Mahmood second and Kanwal Ameen third, with eight, and five scores respectively. When g-index, which gives more weight to the highly cited publications, and the *E-index*, which calculates ignored excess citations, were used these three scholars maintained their positions in the same order. However, in the contemporary indices (giving more weight to recent articles), their ranks changed. Their positions in the h_1 -index and h_1 -norm columns changed with Khalid Mahmood taking the first.

The scores received in different indices by these faculty members are low as compared to the scholars in Criminology and Criminal Justice (Long, Boggess & Jennings, 2011) as well as to the information scientists from the USA (Cronin & Meho, 2006). The reasons behind this may be low research productivity, their origin in developing countries, some publishing in non-impact factor journals and low international collaboration. The choice of research topic may also be a reason of getting less citations resulting in low scores in these indices.

Table 3, Impact Indices of Faculty Members Calculated by *Publish or Perish*

Author	h-index	g-index	hc-index	h_1 -index	h_1 -norm	e-index
Mumtaz A. Anwar	9 (1)	11 (1)	4 (1)	4.05 (3)	6 (2)	6.00 (1)
Khalid Mahmood	8 (2)	10 (2)	4 (1)	7.11 (1)	7 (1)	5.83 (2)
Kanwal Ameen	5 (3)	5 (3)	4 (1)	4.17 (2)	4 (3)	2.24 (3)
Farzana Shafique	2 (4)	3 (4)	2 (2)	0.8 (6)	2 (4)	1.73 (4)
Muhammad Arif	2 (4)	2 (5)	2 (2)	1 (5)	2 (4)	1.41 (5)
Nosheen Warraich	2 (4)	2 (5)	2 (2)	1.33 (4)	1 (5)	1 (6)

Collaborative Authors per Publication

What is the pattern of collaboration in the publications of these six authors? The details are given in Table 4. The level of collaboration of four authors is higher than that of Mumtaz A. Anwar and Kanwal Ameen whose level is the same. A close look at the

authorship shows that most of the publications of the other four authors are based on theses and student-teacher relationship.

Table 4, Number of authors in the cited publications

Author	Single author (%)	2 authors (%)	3 authors (%)	Total publications	Total Authors	Authors / Publication
Mumtaz A. Anwar	21 (60.0)	8 (22.86)	6 (17.14)	35	55	1.57
Khalid Mahmood	17 (37.78)	20 (44.44)	8 (17.78)	45	81	1.80
Kanwal Ameen	9 (60)	5 (33.33)	1 (6.67)	15	22	1.47
Farzana Shafique	2 (22.22)	3 (33.33)	4 (44.44)	9	20	2.22
Muhammad Arif	0	4 (100)	0	4	8	2
Nosheen Warraich	1 (33.33)	1 (33.33)	1 (33.33)	3	6	2

A better measure of collaborative effort would be to look at who the collaborators are? These six authors cooperated with 82 others to produce 111 publications. Table 5 provides details of only local and international collaborating authors. A large majority (n=62, 75.61%) of these 82 authors are local. Only three of the six authors associated with international researchers, with two of them joining with only one each. For Mumtaz A. Anwar, a large majority (n=18, 90%) of his 20 collaborators are international. This is understandable because he worked in foreign countries for most of his academic career.

Table 5, Nature of collaborative effort

Name	Local (%)	International (%)	Total
Mumtaz A. Anwar	2(10)	18(90)	20
Khalid Mahmood	35(97.22)	1(2.78)	36
Kanwal Ameen	6(85.71)	1(14.29)	7
Farzana Shafique	11(100)	0	11
Muhammad Arif	3(100)	0	3
Nosheen Warraich	4(100)	0	4
Total	62(75.61)	20(24.39)	82

Journals Where the Papers were Published

Another dimension of the quality of research is the source where it is published. Ninety-four (84.68%) of the 111 publications of these six authors are journal articles which were

published in 30 journals. There is a difference in quality between the papers published in impact-factor and non-impact-factor journals. Only nine of the 30 journals are impact-factored. The details of the journals and papers are given in Table 6. Only 28 (25.23%) of the 111 papers produced by four of the six authors are published in the impact-factored journals. The number of their papers varies between 12 and one.

Table 6, Journals with the distribution of each author's cited papers

Name of Journal	Impact Factor (2010)	M. A. Anwar	Khalid Mahmood	Kanwal Ameen	Farzana Shafique	M. Arif	Nosheen Warrach
Scientometrics	1.905	1	0	0	0	0	0
Lib. & Info Sc Research	1.362	2	0	0	0	0	0
Jr. of Lib. & Info Science	0.636	1	0	0	0	0	0
Program: Elec Lib. & Info Sys	0.596	0	1	0	0	0	0
Libr Coll, Acq. & Tech. Serv.	0.529	0	0	2	0	0	0
The Electronic Library	0.489	2	3	1	1	0	0
Libri	0.365	2	1	0	0	0	0
Malaysian Jr. of Lib. & Info. Sc	0.353	4	1	0	0	0	0
Information Development.	0.143	0	6	0	0	0	0
Education for Information.	---	0	2	0	0	0	0
Asian Libraries	---	1	2	0	0	0	0
Inter. Infor & Library Review	----	2	2	0	0	1	0
Library Review	---	4	4	0	2	1	0
Collection Building	---	0	1	2	0	0	0
Jr. of Edu for Lib. & Info. Science	---	0	1	1	0	0	0
Libr Philosophy and Practice.	---	0	4	1	2	0	0
Cyber Psy & Behavior	---	0	1	0	1	0	0
Webology	---	0	1	0	0	0	0
Inter. Jr. Edu. & Deve Using ICT	---	0	1	0	0	0	0
Pakistan Jr. of Lib & Info Sc	---	3	1	1	1	0	0
PLA Journal	---	0	1	0	0	0	0
Library Hi Tech News	---	0	1	2	1	0	2

Table 6. Conti...

IFLA Journal	---	0	1	0	0	1	0
LIBRES Lib. & Info Sc Res El Jr	---	0	1	1	0	0	0
World Libraries	---	2	2	0	1	0	0
Jr of Library Administration	---	0	1	0	0	1	0
The Eastern Librarian	---	1	0	0	0	0	0
Pakistan Library Bulletin	---	1	0	0	0	0	0
Library Management	---	0	0	2	0	0	0
E-JASL	---	---	1	---	---	---	---

The Most Cited Paper of the Six Faculty Members

It may be of interest to list the most-cited paper of each of these six authors. Table 7 lists these papers with the number of citations these received.

Table 7, Top-cited paper of each author with the number of citations received

Author	Most Cited Publication	Citations Received
Mumtaz A Anwar	Information needs and information seeking behavior of agricultural scientists in Malaysia	21
Khalid Mahmood	A comparison between needed competencies of academic librarians and LIS curricula in Pakistan	19
Kanwal Ameen	Developments in the philosophy of collection management: a historical review	11
Farzana Shafique	Information needs and information-seeking behavior of arts and humanities teachers: A survey of the University of the Punjab, Lahore, Pakistan	4
Muhammad Arif	Library and information science distance education and continuing professional development in Pakistan	3
Nosheen Warraich	LIS graduates employability needs and expectations of the Library and Information Science (LIS) curriculum at the University of the Punjab	3

CONCLUSIONS

No cited publication of a large majority (79.2%) of the LIS faculty in Pakistani universities was retrieved by Google Scholar. This is not a good reflection of the research performance of these individuals. There is a need to conduct an analysis of their publishing activity in order to understand the real situation. The number of citations received by each

publication of the cited authors is generally low. More than half of the publications are cited only 1 to 3 times each, which might be due to the reason that a large majority (n=83, 74.77%) of the papers are published in non-impact journals. It is suggested that these authors should make an effort to publish their research in impact-factor journals. The impact scores of these faculty members, which are generally low, should increase once they start publishing in the impact factor journals.

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