

<http://ansinet.com/itj>

ITJ

ISSN 1812-5638

INFORMATION TECHNOLOGY JOURNAL

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Fuzzy Comprehensive Evaluation of China's News Website Competitiveness Based on the Analytic Hierarchy Process

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Abstract: This study firstly constructed a competitiveness evaluation index system of news websites in China, calculated the weight of each indicator by using analytic hierarchy process (ahp) and then selected five news website in China as study case to calculate the evaluation score of competitiveness index of each website by using fuzzy matrix to conducted empirical analysis on the competitiveness of news website in China. The empirical results show that the competitiveness of news website in China generally is weak and the competitiveness of governmental news websites is lower than commercial news sites. Therefore this paper puts forward to strengthening the competitiveness of our country news website from differentiation, paying attention to web design and information authenticity construction.

Key words: Analytic hierarchy process, news website competitiveness, fuzzy comprehensive evaluation

INTRODUCTION

From newspapers to broadcast, from TV to network, the Internet has become the birthplace of social public opinion and greatly changed people's way of life and behavior and greatly impacted on the media communication ability. Along with the rapid development of information technology, the network has developed into new media. The public tend to choose information from the network and realize publicity, communication and resource sharing through the network. Therefore, the news web sites have rapidly developed into an indispensable platform for people to get their news and information in near a decade since it boarded the stage of history at the end of the twentieth century.

News website news refers to the internet news and information service unit set by the news media of broadcasting news and information which the news media has published, providing current politics electronic messaging services and sending current politics communication information (Yin, 2010; Zhang, 2010). The construction of news websites has won the national attention and strong support since 1990s. The state formally has approved about 200 national news websites and formed the news website layout of central, provincial and municipal level step after several years of development. The news sites often relying on the mainstream of traditional media has abundant news source and professional news team, which ensures their scale and quality of news publishing and its official background also makes each news websites inherently

have higher authority and influence and become the most important propagation position of mainstream network culture. For instance, in July 2011 to celebrate the 90th anniversary of the founding of the Communist Party of China, the central focus news websites issued a total of 4, 5 00,000 articles, more than 100,000 bars of audio and video reports, special page total traffic to, 3 billion people on the Internet, create a grand warm, to create an atmosphere of solidarity. At present the utilization rate of China's Internet users using the network news has accounted for 80.1% with the second destinations in the world.

China Trade News for the first time started issuing electronic journal on the Internet since December 1995. From then on, the news website development in China can be divided into three kinds of modes: the first one is the news website established by the domestic traditional media, the second one is the commercial company website of Sina, Sohu and so on, the third one is the news sites such as Dongfang, Qianlong all generated by the news media and commercial companies. China's news website as the main force of network media has reached a high level after the development of more than a decade, but there are still some problems: the traditional media websites are serious and insufficient in vitality, the business news website is diversified in reporting way while is coarse in reporting style, the joint news website is short of original contents. The quantity of news website is large while the quality is good and bad intermingled under the act of all kinds of factors. Related studies show that the audience's newspaper plane

reading logic cannot be completely transferred to the network. And with the information explosive expansion, under impact of much information, the website the gatekeeper will often fall into the problems of information fuzzy judgment. Therefore, either the users or employees need to conduct objective evaluation on numerous news websites. At present, discussion about the website evaluation system pays more attention to the government website, e-commerce sites as well as the library website, while the discussion about news website evaluation system is still relatively in a state of blank. This paper will construct a set of evaluation index system of core competitive power based on the Analytic Hierarchy Process (AHP) and provide an objective basis for the managers and relevant practitioners to risen the construction level of news website as far as possible.

LITERATURE REVIEWS

News website is a special type of many web sites mainly providing news and information to win users' clicking on and support. In today's information society, the website as a new medium of communication accompanied with the traditional newspapers, radio and television has played a more and more important role in people's life; more and more researcher has focused their attention to the study on the news websites home and abroad.

Scholars firstly focused on the meaning of the news website. The concept of News website firstly appeared in the 1980s in the United States. At that time, American universities in journalism and communication opened a course of network communication and class content included the understanding of news website, while the class content is only search for news and academic database and computer aided report. And then the web design and production started in the 1990s (Kuang, 2007). So the news website was seen to disseminate news and information with the aid of network tool. Since the 1990s, with the rapid development of the Internet, all kinds of new and old media fell into a intense period of media competition. The traditional media has no choice to join network platform to face the competition pressure, which therefore gave birth to the concept of network media (Ying, 2005). Network media generally refers to the information releasing platform which spread digital data through the Internet. From this definition, the network media is a website releasing public information through the Internet, apparently there are quite a number of content is specifically to meet the public demand of news information, there are also other information which is not news information such as business, games, life

information, so the network media cannot represent the exact meaning of news website (Han, 2008). In China, the national press and publication authorities clearly defined the news website as Internet news information service unit of broadcasting news and information which the news media has published, providing current politics electronic messaging services to the public and sending the current politics communication information.

Scholars have carried out a large amount of research on the function of the news website after unifying the meaning of the news website. Chen (2010) pointed out that network has become an important channel for people accessing to information in the information age. Facing newly emerging network news media with strong public opinion guidance function, the authorities should attach great importance to the general public through the network to realize people's information right and pay attention to news site management to strengthen public opinion guidance. Fen (2012) pointed out that the news website has become a main platform for spreading mainstream values, so the role of news website in cultural construction should be strengthen. Bozhi (2008) thought news website as "the fourth media" is a kind of high quality information media of swift information transferring, strong interactivity and less limitation in time and space, which is the best choice for bridging the government and the public in the construction and spreading of region image, so the news sites are important means for the government to construct and of spread region image and will play more and more important role than before in the construction and communication of region image.

Due to the importance of news website in the modern information society, scholars have focused on the research of news website construction. Chen (2009) argued the network information safety and problem origins, discussed the solution from aspects of technology and management, and from several aspects put forward information security strategy for large news sites emphatically according to relevant network security technology. Mai and Qiu (2009) argued it is necessary to carry on the special safety design to ensure the safety of the government news website. Didi (2010) points out that because of the rapid development of information technology, news website has become the main channel for the public access to information and the public will choose information from the network and realize information communication and resource sharing through the net. Therefore, it is particularly important to design of the news website construction and updating. ASP in the website control system provides a reliable platform for news website construction with its convenient operation. Chen (2010) analyzed the development of news website in

China and then discussed the further development of news websites from the following aspects: making the localization, broadening the financing channels, integrating population resources, forming characteristic content, paying attention to brand management, strengthening cooperation and mutual benefit. Chen (2012) pointed out that "image transmission" the nonverbal symbols the mode of transmission can rapidly intuitively transfer information, maximum reduction event scene and characters and become the most emotional welcomed information transmission form of high efficiency. Therefore, we must pay attention to the construction of the news website through using the column cataloging principles and skills to realize the maximized spreading value.

According to the importance of the information transmission, the news websites can be divided into the central key news website, local key news website and other news websites and Chinese scholars pays more attention to the study on the development of the front two kind of news websites. Guo (2008) summarized the advantage and disadvantage of the eight central key news sites investigated and analyzed the developing opportunities and challenges for the current news website faced combining with the actual situations and proposed that the national key news sites should be enhanced and improved in the content construction, brand marketing, management, personnel training, new technology and other aspects. Chang (2011) from analyzing the definition of key news website and the developing course in China pointed out the advantages of central key news websites in news, political, brand, reputation resources and the disadvantages in running backward system, single profit model, management strength and weakness and further put forward suggestions for consolidate media credibility, enhancing core competitiveness, strengthening the brand strategy, stimulating the market vigor. Yue (2011) choosing Sichuan News Network for the local key news site representative from four aspects of advantages, defects, opportunities, threat itself and the external environment condition pointed out the urgency for Sichuan News Network to strengthen news content improved and attempted to take Sichuan News Network as a representative of the local key news website to puts forward the news content construction strategy.

Integrated above literature analysis we can see that the research on news web site either conducted from macroscopically perspective of significance, function and strategy, or from the micro angle of some technical problems, such as safety, design, content editing, etc. In fact the main problem of the current development of the news website in China is how to enhance their competitiveness. Therefore this paper constructed an

evaluation index system based on the study of the literature and selected some representative news web site in China to evaluate the status of the competitiveness and then puts forward some countermeasures for the construction of the competitiveness of news website according to the evaluation results.

Evaluation index system of the news website competitiveness:

China's news sites like traditional media are institution, so the social benefit is superior to economic benefits. At the same time, the news website in China is different from the traditional media in relative monopoly and faced fierce market competition since its birth: domestic commercial websites and foreign websites bravely and aggressively rushed into the network market with abundant venture capital funds and agile system. The competitive situation determines the news website have to adapt to the fierce competition and constant technology update to survive. Therefore, news websites development needs to realize its own situation and scientifically evaluate its imperativeness.

Evaluation index system design of news website: This paper established an evaluation index system of news website based on the site evaluation index system construction method home and abroad (Ren and Zhang, 2011) and the users' requirement and expectation for the news website construction level, according to the basis of the website can meet the needs of users and users of the website construction level evaluation principle and have practical feasibility and operability and indexes of principle, the establishment of a news website evaluation index system.

News website provide information service as its leading assignment, at the same time it will adopt new technology to obtain the users' support and feedback. Therefore this article will construct a news website evaluation index of content, technology support and social response from three basic characteristics the news website. The three level indicators are the core of news website evaluation index system, which not only briefly summarizes three key points of news website evaluation but also complete contain all aspects of the evaluation. The core business of news websites is the content service, but the content service needs technology support and aid and using of technology is to make content outstanding to win the users, because the users' support and feedback will guarantee the sustainable development, therefore the three indicators are mutual support.

The second index of content level prefers to the editor points including the selection of network news, content editor and visual effect, accordingly the

evaluation will be divided into three parts of network news selection evaluation, network news editor evaluation and network visual effect evaluation. Technical support level will divided into four secondary index of operate convenience, availability and accessibility, multimedia design and website basic data (browse effect evaluation) according to the comprehensive literature, summed up the results and based on the user's operation experience. As for the social feedback level, according to the interactive evaluation principle is discussed, will include the information exchanging level from the web sites and users and also include the information collecting level from the users, which respectively prefers to information exchange level, the information collection level, the choice of the diversification of forms. Finally the established evaluation index system divided into three level indicators, ten secondary indicators and 39 level 3 indicators, as the Table 1 shows.

Determination of the weight of each index: This article calculate the weight of each index system through the Analytic Hierarchy Process (AHP). The first thing in the Analytical Hierarchy Process (AHP) is to determinate the target layer, so this paper defined the competitiveness of news website for the evaluation target layer, defined as A, the first level index is B and the third level evaluation index is X. The first thing is to build judgment matrix, the judgment matrix often use the number 1-9 and its reciprocal to represent the degree of importance of two elements compared. For example, in the structure of A target layer index system B, to compare the degrees of importance of Bi (i = 1, 2, 3) and the number 1 said index Bi and Bj are equally important, number 3 said Bi is more important than Bj, then 1/3 said Bj is less important than Bi. The greater of the number means more important in the degree, number 9 means maximum. Based on the above

principle, this paper constructs the judgment matrix between the target layer A and criterion layer B (Table 2), each element of the criterion layer B and evaluation indexes C (Table 3-5). The comparative figures in the judgment matrix came from the experts' investigation through selecting 30 members' experts of master, doctor in journalism and communication in a university by the form of a questionnaire to obtain the judgment matrix structure digital as follows.

Calculating the maximum characteristic root λ in the above judgment matrix and then calculate the judge the consistency index Ci of judgment matrix and C.I value and

Table 1: Competitiveness evaluation index of news website

First level indicator	Secondary level indicator	Third level indicator
Content level B1	Network news selection evaluation	Front page news selection (X11)
		The headlines choice (X12)
	Network news edit evaluation	Title production (X13)
		Single news fine editing (X14)
Technical support level B2	Network visual effect evaluation	Project planning (X15)
		Color selection (X16)
	Operate convenient	Visual form express (X17)
		Navigation interface (X21)
		Online help (X22)
	Availability and accessibility	Transmission quality (X23)
		Link stability (X24)
Multimedia design	Search services (X25)	
	Easy to identify (X26)	
Social level B3	Information exchange level	Layout Settings (X27)
		Graphics and animation (X28)
		Email (X31)
	Net friend information collection level	The blog (X32)
		Comment (X33)
		Login (X34)
		Online subscription (X35)
	Wireless subscription (X36)	

Table 2: Judgment matrix A-B

A	B1	B2	B3	Weight
B1	1	1	3	0.280988
B2	1	1	3	0.457048
B3	1/3	1/3	1	0.162228

Table 3: Judgment matrix B1-X1i

B1	X11	X12	X13	X14	X15	X16	X17	Weight
X11	1	3	2	5	1/3	3	2	0.254884
X12	1/3	1	3	7	1/5	1/3	3	0.149004
X13	1/2	1/3	1	2	2	3	1/7	0.118740
X14	1/5	1/7	1/2	1	3	3	1/3	0.090552
X15	3	5	1/2	1/3	1	2	3	0.209091
X16	1/3	3	1/3	1/3	1/2	1	1/3	0.080322
X17	1/2	1/3	1/7	3	1/3	3	1	0.097407

Table 4: Judgment matrix B2-X2i

B2	X21	X22	X23	X24	X25	X26	X27	X28	Weight
X21	1	2	1/3	2	3	1/5	2	3	0.148867
X22	1/2	1	3	3	5	1/3	2	1	0.171655
X23	3	1/3	1	2	1/3	3	2	1	0.145513
X24	1/2	1/3	1/2	1	3	1	1	3	0.118039
X25	1/3	1/5	3	1/3	1	2	2	3	0.118995
X26	5	3	1/3	1	1/2	1	1/3	1/5	0.097808
X27	1/2	1/2	1/2	1	1/2	3	1	2	0.108243
X287	1/3	1	1	1/3	1/3	5	1/2	1	0.090880

Table 5: Judgment matrix B3-X3i

B3	X31	X32	X33	X24	X25	X26	Weight
X31	1	3	3	1/3	2	1/5	0.167214
X32	1/3	1	3	5	1/3	1/2	0.157354
X33	1/3	1/3	1	2	3	1/3	0.126243
X34	3	1/5	1/2	1	3	1	0.159385
X35	1/2	3	1/3	1/3	1	2	0.135069
X36	5	2	3	1	1/2	1	0.254736

Table 6: Judgment matrix satisfactory consistency check list

Judgment matrix	Maximum characteristic root λ Max	Consistency index C.I	Average random consistency check index R.I	C.R
A-B (3 order)	2.57392800	0.081309000	0.90	0.090343333
B1-X1i (7 order)	7.02134322	0.123557203	1.32	0.093603942
B2-X2i (8 order)	5.51022103	0.081460147	1.41	0.057773154
B3-X3i (6 order)	4.81313700	0.112627000	1.24	0.090828226

average random consistency check index R.I C.R ratio calculated, such as Table 6 shows that this paper set judgment matrix is experts, according to the consistency of judgment matrix calculation of weight is reasonable.

Competitiveness evaluation on China’s news website:

After determining the weight of each indicator, this paper obtained each grade evaluation indicators through the questionnaire survey methods and then analyzed with the fuzzy statistical. In the questionnaire will each index evaluation can be divided into "excellent, good, medium and poor" four grades, corresponding 5 points, 4 points, three points, 2 points, through the statistical different expert scoring, get fuzzy evaluation matrix. This article selects the tencent, xinhua, phoenix, netease and sohu, PRC this five in China ranked in the top five big news websites competitiveness comparative study to tencent website survey data for example related calculation process.

Content level fuzzy evaluation matrix: Through the questionnaire statistical expert score from the fuzzy evaluation matrix:

$$R1 = \begin{bmatrix} 0.127 & 0.557 & 0.316 & 0 \\ 0.358 & 0.273 & 0.251 & 0.118 \\ 0.678 & 0.124 & 0.198 & 0 \\ 0.321 & 0.435 & 0.244 & 0 \\ 0.513 & 0.108 & 0.212 & 0.167 \\ 0.295 & 0.338 & 0.367 & 0 \\ 0.219 & 0.511 & 0.192 & 0.078 \\ 0.427 & 0.325 & 0.248 & 0 \end{bmatrix}$$

where, from the above analysis ability of knowledge resources X1i index weight set $W1 = (0.254884, 0.149004, 0.11874, 0.090552, 0.209091, 0.080322 \text{ and } 0.097407)$, can get to resource capacity evaluation fuzzy set: $B1 = W1 * R1 = (0.51754, 0.657894, 0.59748, 0.68971)$, normalized to deal with $B1 * = (0.2272, 0.1952, 0.2057, 0.2223)$.

Technical support level fuzzy evaluation matrix:

$$R2 = \begin{bmatrix} 0.127 & 0.557 & 0.316 & 0 \\ 0.358 & 0.273 & 0.251 & 0.118 \\ 0.678 & 0.124 & 0.198 & 0 \\ 0.321 & 0.435 & 0.244 & 0 \\ 0.513 & 0.108 & 0.212 & 0.167 \\ 0.295 & 0.338 & 0.367 & 0 \\ 0.219 & 0.511 & 0.192 & 0.078 \\ 0.427 & 0.325 & 0.248 & 0 \end{bmatrix}$$

where, from the above analysis X2i know technical ability of the index weight set $W2 = (0.148867, 0.171655, 0.145513, 0.118039, 0.118995, 0.097808, 0.108243, 0.09088)$, can get for resources evaluation of fuzzy set, normalized processing to: $B2 * = (0.2128, 0.3113, 0.2165, 0.2594)$.

Social level fuzzy evaluation matrix:

$$R3 = \begin{bmatrix} 0.469 & 0.255 & 0.106 & 0.070 \\ 0.318 & 0.397 & 0.175 & 0.010 \\ 0.536 & 0.219 & 0.245 & 0 \\ 0.351 & 0.184 & 0.465 & 0 \\ 0.407 & 0.382 & 0.211 & 0 \\ 0.546 & 0.279 & 0.175 & 0 \end{bmatrix}$$

where, from the above analysis of knowledge management ability X3i index weight set $W3 = (0.167214, 0.157354, 0.126243, 0.159385, 0.135069, 0.254736)$, can get for resources evaluation of fuzzy set, normalized processing to: $B3 * = (0.3234, 0.1876, 0.1792, 0.3098)$ Based on the above $B_i * (i = 1, 2, 3, 4)$ vector calculation, combined with "excellent, good, medium and poor" four corresponding evaluation score, we can calculate the final score of each ability to $B1 * \text{ news website content level final score as an example, the calculation process is as follows: a score vector } P = (5, 4, 3, 2) T$, the final score of resource capacity $B1 * P = (0.2272, 0.1952, 0.2057, 0.2223) * (5, 4, 3, 2)$, $T = 2.9785$ By the same token can get technical support level final score is 3.4775; the social level final score is 3.5246.

Table 7: Five news website competitiveness comparative list

News station	News website competitiveness		
	Content	Technology supporting	Social feedback
Xinhuanet	2.1475	3.1028	3.1985
Phoenix web	3.1572	3.6897	4.1541
Tencent	2.9785	3.4775	3.5246
PRC	2.5831	3.1654	3.2257
Sohu web	2.6917	3.0289	3.3581

Five news website competitiveness comparative analysis:

Based on the above to tencent company news website as an example calculation process, we have been calculated xinhuanet, phoenix nets, PRC, sohu and the remaining four websites based on analytic hierarchy process (ahp) and fuzzy calculations of the various indicators ability points situation in Table 7 shows as follows:

CONCLUSION AND SUGGESTIONS

From the results in above Table 7 to see, the news website competitiveness are generally not high, in the five big news website competitiveness constitutes index, no one news site is perfect, even the phoenix website only be good in social indicator. Further analysis show the five governmental official news website such as Xinhuanet, PRC website compared with three commercial website such as Phoenix nets and Sohu network these three commercial website, the competitiveness of all indicators are backward. This reflects China's official media as a business unit, the press and publication industry of participating in the competition is still at a disadvantage position. In three large commercial website, the strongest competitive is the order of the phoenix website, this and the site is located in China's Hong Kong area and has a wide range of information channels relevant. Gao and Xudong (2006) presented that restructuring industrial chains could improve the competitiveness of news websites.

From the news website competitiveness consists of three indicators, each big website technical support ability is higher, while the content of the evaluation scores are the lowest. This shows that China's news sites have attached great importance to the technical construction but for the content of the web site, our news audience is not satisfactory. Ying and Xin (2012) found that the content of news websites of China is monotonous and the feature of information gathering is obvious. Qun (2012) thought that the authority control of the news websites on the interview should be gradually released, so more original news would be issued for the needs of masses. This may have two reasons: first is in the information age, information transfer so quickly that led to the differences in information time shrinking, so each big news website

content basically have serious repeated phenomenon, make news audience of website content widespread a reading fatigue problem, so choose the content of the website discontent is very natural. The second is the web site; in order to maintain the superiority in the competition status, often like to use some stunt way to attract the reader, the reader once think undeserved news, to the website of the content in the long run to keep a kind of distrust.

Based on the above analysis, this paper put forward some suggestions for the development of news website development in China. First, China's news website must pay attention to the design of the content, from the web page editor, picture settings and so on to strengthen the construction of web page visual effect. Second, in the press website broadcast news, more attention will be paid to the authenticity and select good news headlines. Third, in the news website construction, want to consider differentiation, in news section construction don't pursue comprehensive, more their practical ability and actual controllable resources, form the differentiation. Establishing the diversity profit model based on the news websites' characteristics is a preferable choice (Liu, 2009).

ACKNOWLEDGMENT

Sponsored by the 2012 National Social Science Fund Project research on mass media and ethnic social and cultural change under the background of modernism (Grant No.12BMZ059) and Humanities and Social Sciences Fund Project of Ministry of Education of China research on the modernity construction of ethnic traditional culture in new media era: a case study of Dong People in Hunan (Grant No. 12YJAZH083).

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