The Study for Selecting the WWW Service Consignment Performance of Shared Sales Resource of Publishing

Tsai-Hua Kang[1], Wei Chien[2], Jan-Ou Wu[3], Jian-An Sue[4], Kai-Jun Zhang[5]

***Abstract*—Use World Wide Web(WWW) to share sales resource in publishing, it will allow the publishing staffs to focus on its core business and thus helps it to become more competitive. This article intends to establish a set of indexes for evaluating outsourced WWW service systems in terms of three aspects, i.e. supply, demand and supervision. We then apply Analytic Hierarchy Process (AHP) to collect opinions of related decision groups and adopt TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) for the evaluation and ranking of the WWW service system providers.**

Index Terms--World Wide Web(WWW); Publishing; Performance Indices; Analytic Hierarchy Process (AHP); Technique for Order Preference by Similarity to Ideal Solution(TOPSIS)

I. INTRODUCTION

WWW has become popular using for people [9]. The shared writing resource becomes an important part of publishing. And the shared sales resource system is not specialized fields of publishing department. The outsourcing of shared sales resource systems of a publishing will reduce the burden of the department of publishing and is one of the ways to improve its overall competitiveness [6]. As publishing is service intensive, its shared sales resource outsourcing is very important. More and more publishing units start to pay more attention to the selection of an appropriate shared sales resource service provider so as to increase their performance and competitiveness. In the article, we intend to establish a comprehensive, goal and relatively simple procedure in evaluating and selecting a WWW service provider.

Tsai-Hua Kang is with Department of Electronic Engineering De Lin Institute of Technology Tucheng, New Taipei City, Taiwan, 23656, ROC (e-mail: shaka.kang@msa.hinet.net)

Wei Chien is with Department of Electronic Engineering De Lin Institute of Technology Tucheng, New Taipei City, Taiwan, 23656, ROC (e-mail: air180@seed.net.tw)

Jan-Ou Wu is with Department of Electronic Engineering De Lin Institute of Technology Tucheng, New Taipei City, Taiwan, 23656, ROC (e-mail: janou@ms42.hinet.net))

Jian-An Sue is with Department of Electronic Engineering De Lin Institute of Technology Tucheng, New Taipei City, Taiwan, 23656, ROC (e-mail: shakakang@yahoo.com.tw)

Kai-Jun Zhang is with Department of Electronic Engineering De Lin Institute of Technology Tucheng, New Taipei City, Taiwan, 23656, ROC (e-mail: shakakang@yahoo.com.tw)

In constructing indexes for evaluating WWW service provider, we look at three aspects, i.e. supply (WWW service providers), demand (publishing staff) and supervision (the management of publishing). With respect to the cooperation between publishing and WWW service providers, this research uses the hierarchy concept and Eigenvector of Analytic Hierarchy Process (AHP) to analyze and determine the weights of the evaluation indexes. Every WWW service provider is regarded as an option, and the indexes are regarded as 'attributes' or 'criteria'. By combining the weights of all indexes, the ranking of the WWW service providers can then be determined. This research adopts TOPSIS (Technique for Order Preference by Similarity to Ideal Solution)[1] to rank the WWW service providers since the weights of the attributes (indexes) are known. This research applied the proposed procedure to study the evaluation and ranking of three WWW service providers.

II. DETERMINATION OF THE INDEXES FOR SELECTING OUTSOURCED WWW SERVICE SYSTEMS BY PUBLISHING

This research examines the cooperation of WWW service providers and publishing from the perspective of economics [4]. After conducting a literature review and the brain-storming among staff of this outsourcing research office, management of publishing, and staff of WWW service providers[9], this research selected indexes from three aspects: supply (evaluating performance of WWW service providers), demand (WWW Service system and service quality), and supervision (level of cooperation of WWW service providers)[5].

III. ESTABLISHING HIERARCHICAL STRUCTURE AND DETERMINING THE WEIGHTS OF EVALUATION INDEXES

AHP is used in this research to establish the weights of various evaluation indexes. AHP was proposed by Saaty in 1971 to simplify and systemize complicated questions and to decompose these questions hierarchically from different aspects to construct a Hierarchical Structure [3,7,8](. Relative weights of the indexes will be calculated as follows [1]: (1) to construct a hierarchical structure, as shown in Fig. 1; (2) to establish a pairwise comparison; (3)

ISBN: 978-988-19252-5-1
ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)

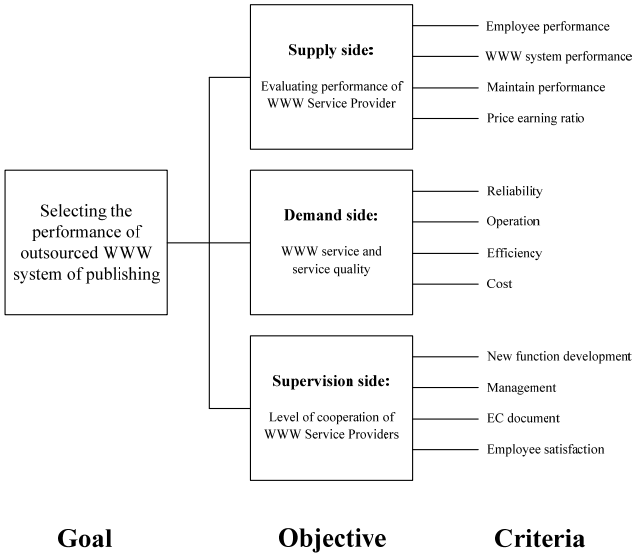

Fig. 1. The hierarchy system of selecting the performance of outsourced WWW service system of publishing [4]

to calculate Eigen values and Eigenvector to derive Priority Vector; (4) to conduct consistence test and establish relative weights of evaluation indexes. Saaty suggested Consistence Index, as in

$$(C.I = (\lambda_{max} - n) / (n-1)) \quad (1)$$

be about 0.1, and Consistence Ratio, as in

$$(C.R = C.I. / R.I.) \quad (2)$$

be less than 0.1.

IV. APPLICATION OF FUZZY MULTIATTRIBUTE DECISION MAKING

There are many methods for MADM [2]. Based on a new method proposed by Chen and Hwang and the weights of the indexes, this research conducts a comparison of the strengths of WWW Service systems for publishing as follows:

converting fuzzy data into fuzzy numbers;
converting fuzzy numbers into specific grades;
adopts TOPSIS for overall evaluation and ranking of WWW service provider

V. AN EXAMPLE OF PUBLISHING SELECTING WWW SERVICE PROVIDERS

AHP and MADM are used to evaluate the potential WWW service providers that a publishing is considering. TOPSIS is used for the final ranking of these WWW service providers.

A. Determination of the Weights of Evaluation Indexes: The opinions of three groups of people were taken into consideration for determining the weights of evaluation indexes. They are WWW service providers, publishing staff and managements of publishing. AHP is used to determine the relative weights of the performance evaluation indexes mentioned by these people. The weights of these indexes are illustrated in Table I.

B. Calculation of Evaluation Index Values: There are five levels of fuzzy words in the questionnaire of this research: extremely satisfactory, satisfactory, neutral, not satisfactory, and extremely unsatisfactory. The scores for every level are: UM (very satisfactory) = 0.89; UM (satisfactory) = 0.71; UM (neutral) = 0.51; UM (not satisfactory) = 0.33; UM (extremely unsatisfactory) = 0.18.

C. Using TOPSIS for Ranking WWW service providers: The concept of TOPSIS is to take into consideration the distance between the WWW service providers and ideal solution and negative-ideal solution. Ideally, the selected options (WWW service provider) are nearest the ideal solution, and it has the maximum distance possible away from negative-ideal solution. First, we solve for ideal solution (Vj+) and negative-ideal solution (Vj-) for every evaluation index, then we calculate the distance between every WWW service provider and ideal solution, as in

$$(S_i^- = [\sum_{j=1}^{7} (V_{ij} - V_j^-)^2]^{1/2}) \quad (3)$$

and negative-ideal solution, as in

$$(S_i^- = [\sum_{j=1}^{7} (V_{ij} - V_j^-)^2]^{1/2}) \quad (4)$$

in respect of each index. Lastly, we derive the relative distance between every WWW service provider and ideal solution, as in

$$(Ci^* = (Si-) / (Si++ Si-)) \quad (5)$$

based on which we can proceed with the ranking of the WWW service provider.

VI. CONCLUSIONS

WWW service providers focus on 'supply' side and 'demand' side, considering 'New function development', 'Efficiency' and 'Management' of WWW service system most important criteria.

Publishing staff focus on 'demand' side and 'supervision' side, considering 'New function development', 'WWW system performance' and 'Operation' of WWW service system most important criteria.

Management of publishing focus on 'demand' side and 'supervision' side, considering 'Efficiency', 'WWW system performance', 'Cost' and 'New function development' of WWW service system most important criteria.

The three sides, WWW service providers, publishing staff, management of publishing are respect 'New function development', 'Efficiency', 'Management' and 'WWW system performance'.

ISBN: 978-988-19252-5-1
ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)

TABLE I
THE WEIGHT OF INDEXES OF THE SELECTING VALUE OF THE RANKING OF THE THREE WWW SERVICE PROVIDERS

1.Supply	0.327	0.314	0.321
Employee performance	0.087	0.083	0.079
WWW system performance	0.098	0.101	0.094
Maintain performance	0.072	0.085	0.073
Price-earning ratio	0.070	0.045	0.075
2.Demand	0.351	0.345	0.357
Reliability	0.091	0.083	0.081
Operation	0.096	0.095	0.088
Efficiency	0.108	0.074	0.095
Cost	0.056	0.093	0.093
3. Supervision	0.322	0.341	0.322
New function development	0.108	0.104	0.093
Management	0.104	0.083	0.075
WWW Service document	0.041	0.061	0.071
Employee satisfaction	0.069	0.093	0.083

REFERENCES

[1] Benjamin Yuan, Tsai-Hua Kang, Gwo-Hshiung Tzeng, and Chin-Chuan Cheng, MADM Approach for Selecting the Consignment Performance with Cooperating the Information Service Company case of Computer Room of De-Lin Institute of Technology, *Journal of Information Management*, 12(1), 2005, pp131-148.

[2] Chen, S.J. and Hwang, C.L., *Fuzzy Multiple Attribute Decision Making*, Springer-Verlag, New York, 1992.

[3] Hwang, C.L. and Lin, M.J., *Multiple Attribute Decision Making*, Springer- Verlag, New York, 1981.

[4] Tsai-Hua Kang, "The Study for Selecting the WWW Service Consignment Performance of Shared Teaching Resource of Technology College", Proceedings of 2012 *The 5th Asia-Pacific Conference on Engineering and Technology Education*, Oct. 30-Nov. 2, 2012, Taipei, Taiwan

[5] Kang T.H. et al, "The Study for Selecting the Consignment Performance of E-learning of Technology College", Proceedings of *The 2nd International Conference on Multimedia Technology ICMT 2011*, July 27-28, 2011.

[6] Nabeel A.Y., AI-Qirim, The Strategic Outsourcing Decision of IT and eCommerce : The case of Small Business in New Zealand, *Journal of Information Technology Cases and Application*, 2003, p32.

[7] Saaty, T.L., *The Analytic Hierarchy Process*, McGrawHill, New York, 1980.

[8] Sugiyama K., Tagawa S. and Toda M., Methods for visual Understanding of Hierarchial System Structures, *IEEE Transation on Systems*, Man and Cybernetics, SMC-11(2),1981, pp.109-125.

[9] Tsai-Hua Kang, You-Wei CHEN, Jhe-Yuan Lin, Jun-Yu WANG, "The Study for Selecting the WWW Service Consignment Performance of Shared Publishing Resource of Publishing" Proceedings of International Symposium Computer Science and Electrical Engineering ISCSEE 2013, Beijing, China, June 14-16, 2013.

ISBN: 978-988-19252-5-1
ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)