Adopting an Analytic Hierarchy Process to Select Internet Advertising Networks

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Abstract

This study develops a model for selecting Internet advertising networks. The proposed model adopts the "Analytic Hierarchy Process (AHP)" to determine the relative weights of evaluative criteria, then ranks the alternatives and selects the optimum Internet advertising network for advertisers. Additionally, a famous Taiwanese food company is used herein as an example of how an Internet advertising network can be selected using this model. The proposed model helps advertisers to effectively select Internet advertising networks, making it highly applicable for academia and commerce.

1. Introduction

As a relatively new mass medium, the World Wide Web is characterized by easy access, relatively low set-up costs, a global reach, time independence, and interactivity (Berthon et al., 1996). Moreover, the Web offers unique advantages over other media in the areas of targeting and direct marketing (Briggs and Hollis, 1997), and is simultaneously a new medium and a valuable extension of traditional media (Philport and Arbittier, 1997). Jupiter Research forecasts that global Internet advertising revenue will increase from US$ 4.2 billion in 1999 to US$ 27.8 billion in 2005 (Chen, 2000). Therefore, the Internet appears an essential part of a marketing communications strategy, despite its uncertain effectiveness (Bush et al., 1998). In Taiwan, Internet advertising is also rapidly growing, increasing from just NT$5.5 million (i.e. US$159 thousand) in 1996 to NT$600 million (i.e. US$17.4 million) in 2000 (Wang, 2001), an expansion of 108 times in just 5 years. Consequently, more and more Taiwanese advertisers have begun to include Internet advertising in their budgets.

The rapid growth of the Internet advertising market, the concentration of this budget on portal sites, the development of ad delivery software and the trend of media purchase centralization have led to the emergence of Internet advertising networks as a new business model. Internet Advertising Networks, or also referred to as Internet Advertising Agencies, are organizations which gather advertisements from various websites and distribute them via an advertising network server (Tu, 2001). The major business of such an agency is providing Internet advertisement purchasing, media planning and online ad report services to advertisers, and selling advertising space for allied websites. In Taiwan, traditional advertising agencies are still thought to lack professional Internet marketing techniques, and thus, advertisers tend to assign their Internet ads to advertising networks or Internet marketing companies. Accordingly, Taiwanese Internet Advertising Networks not only provide Internet ad delivery and Internet media buying and planning services, but also handle the creative work and integration of marketing strategies, with the aim of providing comprehensive and professional Internet marketing services. Companies currently involved in this area include DoubleClick Asia Taiwan, 24/7 Media Taiwan, ADCast, CyberOne Media Network and so on (Lo, 2000). Taiwanese advertisers are unfamiliar with this rising industry but eager to become active in Internet marketing. Consequently, how to objectively and effectively select an ideal Internet advertising network to maximize Internet marketing performance is a central problem for most advertisers.

The Internet advertising networks selection problem is a multicriteria decision-making problem, and network optimization requires suitable criteria and strict screening. Several researchers have attempted to define the criteria used in selecting traditional advertising agencies (Cagley and Robert, 1984; Dowling, 1994; Luk and Yip, 1994; Doyle, 1996). Davies (1994) applied the Analytic Hierarchy Process (AHP) to determine the relative weights of advertising agency selection criteria. However, few studies have reported the evaluative criteria required for selecting Internet advertising networks, and the issue of how to apply a concrete and specific method to select networks during

decision-making has been ignored. Regarding the procedure for selecting Internet advertising networks, it can be referred to the one adopted by traditional agencies provided by Harvey and Rupert (1988), Marshall and Woon (1994). Initially, related information is collated and a selection team organized, then each Internet advertising network is interviewed and their proposal evaluated, and finally the best network is selected based on this information.

This study creates a model for selecting Internet advertising networks based on advertiser perceptions. The proposed model, initially uses a group interview of experts to identify suitable evaluative criteria (including qualitative and quantitative criteria) for selecting Internet advertising networks, after which AHP is applied to determine the relative weights of the criteria, rank the alternatives, and thus select the ideal Internet advertising network. The AHP model can also combine both qualitative and quantitative criteria, making it an appropriate approach for solving the current problem. Additionally, a renowned Taiwanese food company is used herein as an example of how an Internet advertising network can be selected using the proposed model. This model provides advertisers with an objective and effective means of selecting an ideal Internet advertising network.

2. Methodology
Analytic Hierarchy Process (AHP)

AHP, a decision method that decomposes a complex multicriteria decision problem into a hierarchy (Saaty, 1980), is also a measurement theory that prioritizes the hierarchy and consistency of the judgmental data provided by the group of decision-makers. AHP incorporates the evaluations of all decision-makers into a final decision, without having to elicit their utility functions on subjective and objective criteria, by pairwise comparisons of the alternatives (Saaty, 1990). Lin and Hsu (2001) applied AHP for selecting an ideal advertising agency, while Goh (1997) used it for robot selection, and Barbarosoglu and Yazgac (1997) employed it to solve the supplier selection problem. AHP has thus been successfully applied to a wide variety of problems, with the calculation procedure being as follows:

(1) Establishment of Pairwise Comparison Matrix A

Let $C_1, C_2, \cdots, C_n$ be the set of elements, while a_{ij} represents a quantified judgment on a pair of elements C_i, C_j. The relative importance of two elements is rated using a scale with the values 1, 3, 4, 5, and 9, where 1 stands for "equally important", 3 for "slightly more important", 5 for "strongly more important", 7 for "demonstrably more important", and 9 for "absolutely more important". Gained an n-by-n matrix A as follows:

$$A = [a_{ij}] = \begin{array}{c} \\ C_1 \\ C_2 \\ \vdots \\ C_n \end{array} \begin{array}{cccc} C_1 & C_2 & \cdots & C_n \\ \begin{bmatrix} 1 & a_{12} & \ldots & a_{1n} \\ 1/a_{12} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & & \vdots \\ 1/a_{1n} & 1/a_{2n} & \cdots & 1 \end{bmatrix} \end{array} \tag{1}$$

Where $a_{ii} = 1$ and $a_{ji} = 1/a_{ij}$, $i, j = 1,2,\cdots,$n. In matrix A, the problem becomes one of assigning to the n elements $C_1, C_2, \cdots, C_n$ a set of numerical weights $W_1, W_2, \cdots, W_n$ that "reflects the recorded judgments." If A is a consistency matrix, the relations between weights W_i and judgments a_{ij} are simply given by $W_i/W_j = a_{ij}$ (for $i, j = 1,2,\cdots,$n).

(2) Eigenvalue and Eigenvector

Saaty (1990) suggested that the largest eigenvalue λ_{max} be:

$$\lambda_{max} = \sum_{j=1}^{n} a_{ij} \frac{W_j}{W_i} \tag{2}$$

If A is a consistency matrix, eigenvector X can be calculated by formula (3):

$$(A - \lambda_{max} I) \ X = 0 \tag{3}$$

(3) Consistency Test

Saaty (1990) proposed utilizing consistency index (CI) and consistency ratio (CR) to check the consistency of the comparison matrix. CI and CR are defined as follows:

$$CI = (\lambda_{max} - n) / (n-1) \tag{4}$$
$$CR = CI / RI \tag{5}$$

Where RI represents the average consistency index over numerous random entries of same order reciprocal matrices. If $CR \leq 0.1$, the estimate is accepted, and otherwise a new comparison matrix is solicited until $CR \leq 0.1$.

3. Model
Applying AHP for selecting Internet advertising networks

This AHP model for selecting Internet advertising networks involves the following seven steps:

Step1: Define the evaluative criteria for selecting Internet advertising networks.

Step2: Establish a hierarchical structure by breaking the Internet advertising network selection problem into a hierarchy of interrelated decision elements, including ultimate goal, criteria, sub-criteria, and alternatives.

Step3: Establish the pairwise comparison matrix using formula (1). Every decision-maker makes a pairwise comparison of the decision elements and gives them relative scores.

Step4: Calculate the eigenvalue and eigenvector of each pairwise comparison matrix using formulae (2) to (3).

Step5: Test the consistency of each comparison matrix using formulae (4) to (5).

Step6: Aggregate the relative scores provided by all decision-makers using the geometric mean method, and estimate the relative weights of the elements of each level.

Step7: Combine the relative weights of the elements of each level to determine the overall score of each of the Internet advertising networks.

4. Application

This study takes as an example a famous food company in Taiwan, which plans to utilize Internet advertising in 2002 and wishes to choose the ideal Internet advertising network. The promotional budget of this company is around NT$ 80 million per year, of which 5% is allocated for Internet marketing. Accordingly, the company organized a decision-making team, including a marketing director, marketing manager, and product manager, which were entrusted with selecting an Internet advertising network. The company then invited 4 major Taiwanese Internet advertising networks to prepare Internet marketing plans that matched the company's marketing goals and focused on target consumers. The 4 advertising networks were labeled companies A, B, C, and D, and the evaluative figures obtained from these plans were entered into this model for testing, as stated below:

Applying AHP for selecting Internet advertising networks

Step1：Define the evaluative criteria for selecting Internet advertising networks.

This study applies the nominal group technique (NGT) to define the evaluation criteria (Van de Ven and Delbecq, 1971) using 14 experts (5 from Internet advertisers, 5 from advertising agencies and 4 from Internet marketing companies) to select 7 criteria and 19 sub-criteria, as listed below:

1. Internet media quality: including the 4 sub-criteria of awareness of allied websites, number of members of allied websites, traffic volume of allied websites and professionalism of the content of allied websites

2. Business scale: including the 3 sub-criteria of categories of allied websites (such as financial, E-commerce, entertainment, medical), number of allied websites and whether or not Company A is global.

3. Advertising rates: measured by Cost per Mille (CPM), or the cost for every thousand impressions.

4. Ad management and delivery system: referring to the function of ad management software like DART of DoubleClick and 24/7, iMaster of ADCast and Engage of CyberOne, and which includes the 5 sub-criteria of targeting technique, ad delivery technique, monitoring of ad effect, and the timeliness and user friendliness of online ad reports. These five criteria are further detailed as follows: 1) Targeting technique describes the timely delivery of ads to the required destination, including advertiser requirements such as the demographic segmentation and consumer behavior of the audience; 2) Ad delivery technique means the ability to ensure steady delivery and timely renewal of ads; 3) Monitoring of ad effect refers to providing precise statistics on ad impressions, click rates, and user profile tracking; 4) Timeliness of online ad reports indicates the speed at which the on-line analytical

reports are updated; 5) User friendliness of online reports describes the ability to make it easy for advertisers to perform independent cross analysis and configuring of report formats.

5. Creativity: including the two sub-criteria of Click Through Rate (CTR), meaning the number of clicks on an ad divided by the number of impressions, and advertising layout, meaning whether the visual effect and copy of ads attract advertisers.

6. Integrated marketing planning: which includes 3 sub-criteria, namely marketing research ability, media planning ability and campaign design ability. These three criteria are further detailed as follows: 1) Marketing research ability means the ability to analyze the market and the behavior of target consumers; 2) Media planning ability describes the ability to customize media planning and purchases according to advertisers' requirements; 3) Campaign design ability indicates the ability to design Internet marketing campaigns that are attractive to their target audience.

7. Service Level: including two sub-criteria of the cooperativeness of personnel, meaning the flexibility and cooperativeness of AE, creativity staff, and network technicians, and the professionalism of the service team, which describes the professional background (including advertising, networking, and Internet marketing) of the management group.

AHP allows decision makers to use both the objective (quantitative) criteria and subjective (qualitative) criteria simultaneously. Objective criteria can be numerically defined, while subjective criteria are qualitative in nature. This study includes 6 objective sub-criteria and 14 subjective sub-criteria, and the data for the 6 objective sub-criteria are shown in Table 1.

Table 1   Data for the 6 objective sub-criteria

Item	Sub-criteria	Company A	Company B	Company C	Company D
1	Number of members of allied website (expressed in ten thousand of people)	43	38	35	32
2	Monthly traffic of allied websites (expressed in ten thousand of audiences)	450	448	431	398
3	Categories of allied websites	6	6	9	6
4	Number of allied websites	51	48	50	31
5	CTR	0.3	0.35	0.32	0.25
6	CPM (expressed in NT$)	107	173	150	166

Step 2: Establish a hierarchical structure

The problem of Internet advertising network selection is broken into four levels: first that of achieving the ultimate goal of selecting the ideal Internet advertising network, followed by the 7 evaluation criteria, 19 sub-criteria, and finally the alternatives. **Fig. 1** shows below:
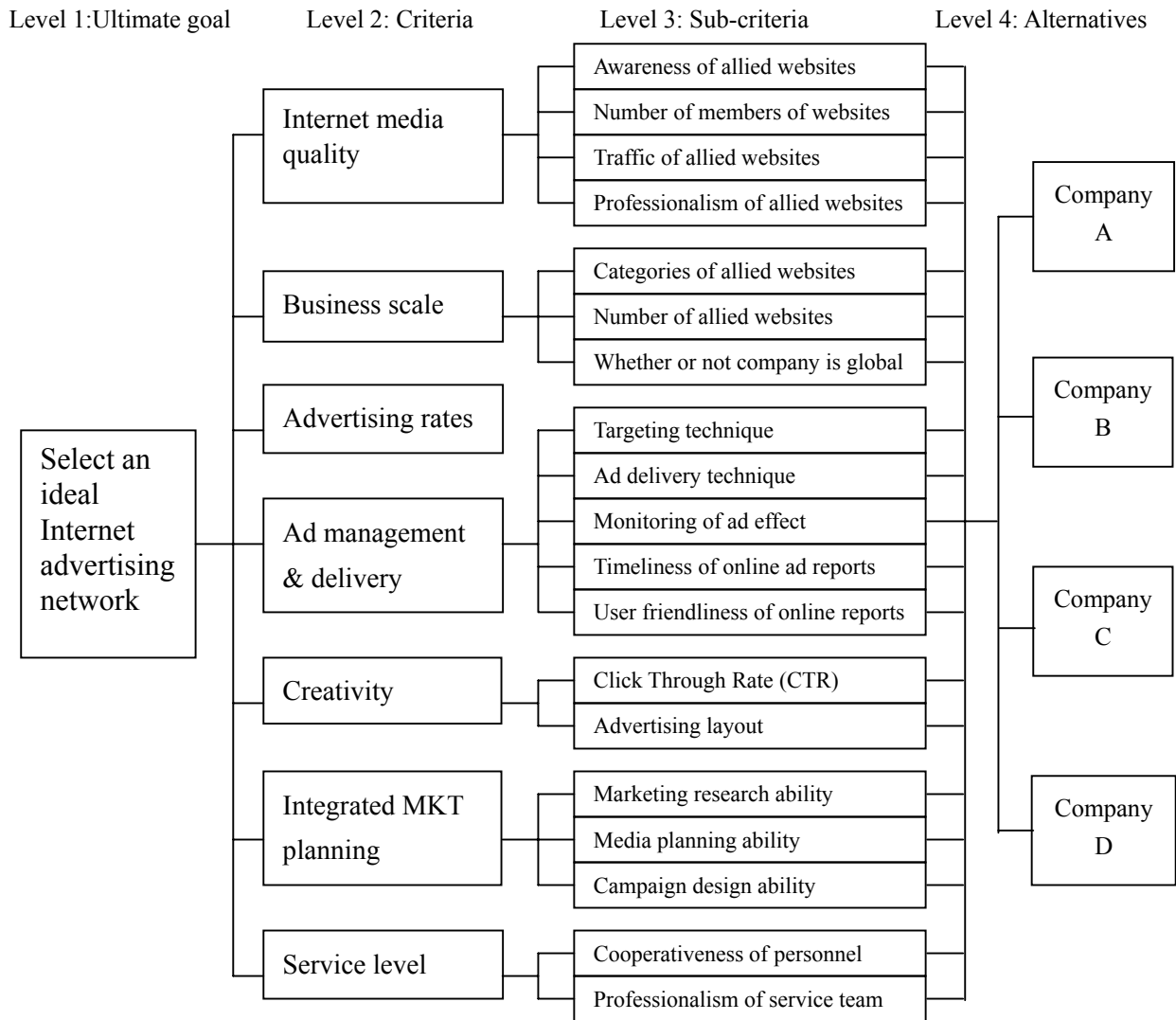
Fig 1 Hierarchical structure required to selecting the ideal Internet advertising network

Step3: Establishing the pairwise comparison matrix

This step comprises two parts. The first part applies "purposive sampling" to sample 20 respondents from Internet advertisers that meet the following characteristics: 1) Having experience in Internet advertising network decision-making and cooperation. 2) Currently being marketing managers, product managers, or advertising managers. The weights of level 2: criteria and level 3: sub-criteria were determined for a sample group of 20 individuals matching the above characteristics with every respondent making a pairwise comparison of the decision elements and assigning them relative scores. The relative scores provided by 20 experts are aggregated using the geometric mean method, and the aggregate pairwise comparison matrix for the criteria is listed in Table 2, while that for the sub-criteria are listed in Table 3. In the second part, every decision maker in the food company's selection team makes a pairwise comparison of 4 alternatives under 14 subjective sub-criteria and assigns them relative scores. The relative scores provided by the 3 decision makers are then aggregated via the geometric mean method, and the aggregate pairwise comparison matrixes are listed as Table 4.

Step4：Calculating the eigenvalue and eigenvector

Using the comparison matrix of Tables 2 to 4, the eigenvectors were then calculated using formulae (2) and (3). Table 5 lists the results of eigenvectors for the 19 sub-criteria and 7 criteria.

Table 2　Aggregate pairwise comparison matrix for criteria of level 2

	Internet media quality	Business scale	Ad management system	Creativity	Integrated MKT planning	Service level	Advertising rates
Internet media quality	1.000	4.427	2.537	2.954	2.371	1.719	2.290
Business scale	0.226	1.000	0.351	0.394	0.306	0.267	0.316
Ad management system	0.394	2.853	1.000	1.125	0.803	0.654	1.000
Creativity	0.339	2.537	0.889	1.000	0.803	0.582	0.889
Integrated MKT planning	0.422	3.272	1.246	1.246	1.000	0.644	1.246
Service level	0.582	3.743	1.528	1.719	1.552	1.000	1.719
Advertising rates	0.437	3.160	1.000	1.125	0.803	0.582	1.000

Table 3　Aggregate pairwise comparison matrixes for sub-criteria of level 3

Internet media quality

	Awareness	Members	Traffic	Content
Awareness	1.000	2.141	2.627	2.713
Members	0.467	1.000	1.552	1.528
Traffic	0.381	0.644	1.000	1.246
Content	0.369	0.654	0.803	1.000

Creativity

	CTR	Ad layout
CTR	1.000	2.667
Ad layout	0.375	1.000

Business scale

	Categories	Number	Global
Categories	1.000	0.803	1.933
Number	1.246	1.000	2.141
Global	0.517	0.467	1.000.

Integrated marketing planning

	Research	Media plan	Campaign
Research	1.000	0.803	0.725
Media plan	1.246	1.000	0.803
Campaign	1.380	1.246	1.000

Ad management & delivery system

	Targeting technique	Ad delivery technique	Monitoring of ad effect	Timeliness of ad reports	User friendliness
Targeting technique	1.000	1.380	0.544	0.844	1.070
Ad delivery technique	0.725	1.000	0.467	0.612	0.803
Monitoring of ad effect	1.838	2.141	1.000	1.552	2.108
Timeliness of ad reports	1.185	1.635	0.644	1.000	1.933
User friendliness	0.935	1.246	0.474	0.517	1.000

Service level

	Cooperative-ness	Profession-alism
Cooperative-ness	1.000	1.246
Profession-alism	0.803	1.000

Step5：Consistency test

The results of the consistency test, and the CR of the comparison matrix from each of the 20 experts and three decision makers, are all smaller than "0.1", indicating "consistency". Furthermore, the CR of the aggregate matrix is also below "0.1", also indicating "consistency".

Table 4 Aggregate pairwise comparison matrixes for alternatives of level 4

Awareness of allied websites

	Company A	Company B	Company C	Company D
Company A	1.000	2.080	0.693	1.442
Company B	0.481	1.000	0.405	0.693
Company C	1.442	2.466	1.000	2.080
Company D	0.693	1.442	0.481	1.000

Professionalism of allied websites

	Company A	Company B	Company C	Company D
Company A	1.000	1.000	0.481	0.405
Company B	1.000	1.000	0.481	0.481
Company C	2.080	2.080	1.000	1.000
Company D	2.466	2.080	1.000	1.000

Whether or not company is global

	Company A	Company B	Company C	Company D
Company A	1.000	1.000	3.000	3.000
Company B	1.000	1.000	3.000	3.000
Company C	0.333	0.333	1.000	1.000
Company D	0.333	0.333	1.000	1.000

Targeting technique

	Company A	Company B	Company C	Company D
Company A	1.000	1.442	0.693	2.080
Company B	0.693	1.000	0.693	2.080
Company C	1.442	1.442	1.000	2.466
Company D	0.481	0.481	0.405	1.000

Ad delivery technique

	Company A	Company B	Company C	Company D
Company A	1.000	1.000	1.000	1.442
Company B	1.000	1.000	1.000	1.442
Company C	1.000	1.000	1.000	1.442
Company D	0.693	0.693	0.693	1.000

Monitoring of ad effect

	Company A	Company B	Company C	Company D
Company A	1.000	1.000	0.481	1.442
Company B	1.000	1.000	0.481	1.442
Company C	2.080	2.080	1.000	2.466
Company D	0.693	0.693	0.405	1.000

Timeliness of online ad reports

	Company A	Company B	Company C	Company D
Company A	1.000	1.000	0.333	1.000
Company B	1.000	1.000	0.333	1.000
Company C	3.000	3.000	1.000	3.000
Company D	1.000	1.000	0.333	1.000

User friendliness of online reports

	Company A	Company B	Company C	Company D
Company A	1.000	1.000	0.333	1.000
Company B	1.000	1.000	0.333	1.000
Company C	3.000	3.000	1.000	3.000
Company D	1.000	1.000	0.333	1.000

Advertising layout

	Company A	Company B	Company C	Company D
Company A	1.000	0.405	0.251	0.693
Company B	2.466	1.000	0.481	1.000
Company C	3.979	2.080	1.000	1.710
Company D	1.000	0.405	0.251	0.693

Marketing research ability

	Company A	Company B	Company C	Company D
Company A	1.000	0.693	0.405	2.080
Company B	1.442	1.000	0.481	2.466
Company C	2.466	2.080	1.000	3.271
Company D	0.481	0.405	0.306	1.000

Media planning ability

	Company A	Company B	Company C	Company D
Company A	1.000	0.693	0.405	0.405
Company B	1.442	1.000	0.481	0.481
Company C	2.466	2.080	1.000	1.442
Company D	2.466	2.080	0.693	1.000

Campaign design ability

	Company A	Company B	Company C	Company D
Company A	1.000	0.693	0.405	0.523
Company B	1.442	1.000	0.481	0.585
Company C	2.466	2.080	1.000	0.693
Company D	1.913	1.710	1.442	1.000

Cooperativeness of personnel

	Company A	Company B	Company C	Company D
Company A	1.000	0.405	0.212	0.693
Company B	2.466	1.000	0.333	2.080
Company C	4.718	3.000	1.000	4.217
Company D	1.442	0.481	0.237	1.000

Professionalism of the service team

	Company A	Company B	Company C	Company D
Company A	1.000	2.080	0.481	3.557
Company B	0.481	1.000	0.281	2.080
Company C	2.080	3.557	1.000	4.718
Company D	0.281	0.481	0.212	1.000

Step6：Estimating the relative weights of the elements of each level

The relative weights of the elements of each level are estimated from the aggregated values of the 20 experts and three decision makers using the eigenvector method, and Table 5 lists the estimated results:

Criteria	Sub-criteria	Weights of sub-criteria	Company A	Company B	Company C	Company D
Internet media quality	Awareness of allied websites	0.448	0.280	0.141	0.385	0.194
	Number of members of allied websites	0.233	0.291	0.257	0.236	0.216
	Traffic of allied websites	0.169	0.261	0.259	0.250	0.230
	Professionalism of allied websites	0.150	0.154	0.161	0.335	0.350
	Overall Score		0.260	0.191	0.320	0.229
Business scale	Categories of allied websites	0.365	0.222	0.222	0.333	0.222
	Number of allied websites	0.438	0.283	0.267	0.278	0.172
	Whether or not company is global	0.197	0.375	0.375	0.125	0.125
	Overall Score		0.279	0.272	0.268	0.181
Ad management and delivery system	Targeting technique	0.176	0.282	0.235	0.353	0.130
	Ad delivery technique	0.133	0.271	0.271	0.271	0.188
	Monitoring of ad effect	0.317	0.212	0.212	0.421	0.155
	Timeliness of online ad reports	0.226	0.167	0.167	0.499	0.167
	User friendliness of online reports	0.148	0.167	0.167	0.499	0.167
	Overall Score		0.215	0.207	0.418	0.160
Creativity	Click Through Rate (CTR)	0.608	0.246	0.287	0.262	0.205
	Advertising layout	0.392	0.117	0.234	0.433	0.216
	Overall Score		0.196	0.266	0.329	0.209
Integrated marketing planning	Marketing research ability	0.275	0.193	0.251	0.446	0.110
	Media planning ability	0.330	0.133	0.174	0.378	0.315
	Campaign design ability	0.395	0.145	0.187	0.322	0.346
	Overall Score		0.154	0.200	0.375	0.271
Service level	Cooperativeness of personnel	0.555	0.098	0.227	0.548	0.127
	Professionalism of the service team	0.445	0.277	0.148	0.491	0.084
	Overall Score		0.178	0.192	0.522	0.108

According to Table 5, for Internet media quality criteria, the weights obtained for the 4 sub-criteria are ordered as follows: awareness of allied websites (0.448), number of allied websites' members (0.233), traffic of allied websites (0.169) and professionalism of allied websites (0.150). Meanwhile, the weights obtained for the 3 sub-criteria of Business scale are ordered as follows: number of allied websites (0.438), categories of allied websites (0.365) and whether or not Company A is global (0.197). Meanwhile, for Ad management and delivery system, the weights of the 5 sub-criteria were ordered: monitoring of ad effect (0.317), timeliness of online ad reports (0.226), targeting technique (0.176), user friendliness of online reports (0.148) and ad delivery technique (0.133). Furthermore, regarding Creativity, CTR (0.608) was noted to be more important than advertising layout (0.392), while for Intergraded marketing planning, the weights of the 3 sub-criteria followed the order: campaign design (0.395), media planning (0.330), and marketing research (0.275). Finally, regarding Service level, cooperativeness of personnel (0.580) was found to be more important than professionalism of the service team (0.420). The company that rated highest for Internet media quality was followed by companies A, D and B. Meanwhile, the company that rated highest for business scale was company A, followed by companies B, C and D. Furthermore, for ad management and delivery system, the company that rated most highly was company C, followed by companies A, B and D. Company C was also the most highly rated company for creativity, and was followed by companies B, D and A. Similarly, company C also rated highest for integrated marketing planning, trailed by companies B, D and A. Company C also lead in service level, with companies B, A and C following, in that order. Finally, for advertising rates (see Table 6), company A rated most highly, followed by companies C, D and B.

Step 7: Calculate the weights of overall levels

Table 6   Eigenvectors and weights of 4 Internet Advertising Networks Under 7 Criteria

Criteria	Weight	Company A	Company B	Company C	Company D
Internet media quality	0.287	0.260	0.191	0.320	0.229
Business scale	0.046	0.279	0.272	0.268	0.181
Ad management & delivery system	0.107	0.215	0.207	0.418	0.160
Creativity	0.136	0.196	0.266	0.329	0.209
Integrated marketing planning	0.185	0.154	0.200	0.375	0.271
Service level	0.121	0.178	0.192	0.522	0.108
Advertising rates	0.119	0.336	0.208	0.240	0.217
Overall Score		0.227	0.211	0.354	0.208
Rank		2	3	1	4

According to Table 6, the respective weights of the 7 evaluative criteria are Internet media quality (0.287), Intergraded marketing planning (0.185), Creativity (0.301), Service level (0.121), Advertising rates (0.119), Ad management and delivery system (0.107) and Business scale (0.046). Advertisers obviously want their advertisements to be shown on famous websites with many members and heavy traffic volumes, and thus the quality of allied websites should be the major concern. The next most important issue then becomes the ability of advertising networks in Internet marketing, media planning, and consumer behavior research, all of which help in integrating an Internet marketing strategy. Meanwhile, the third consideration is whether consumers are sufficiently attracted by the creativity of the advert to actually click on it. The cooperativeness of service teams, levels of professionalism and knowledge in marketing and the Internet are the fourth most important concern. The fifth and sixth most important concerns are advertising rates and the functions of the ad management system, respectively. Business scale is the least important issue to advertisers. The overall scores of each of the 4 Internet advertising networks, also called the relative weights, determine the priority with which each advertising networks is selected. The priorities of the 4 networks are as follows, Company C (0.354), Company A (0.227), Company B (0.211), and Company D (0.208).

5.   Conclusions

Internet advertising is increasing rapidly owing to the rapid development of Internet technologies and the unique features of the medium itself. The major business of Internet advertising networks lies not just in providing advertisers with services such as Internet marketing strategies and the purchase of Internet advertising, but also in providing website owners with advertisement space sales. Therefore, the positioning of Internet Advertising Networks differs from that of traditional advertising agencies. This study presented a new model for selecting Internet advertising networks according to advertiser perceptions. The proposed model first adopts NGT to identify suitable evaluative criteria for selecting Internet advertising networks, then applies AHP to determine the relative weights of these criteria and rank the alternatives, and finally selects the ideal Internet advertising network. A famous Taiwanese food company is used herein as an example of how an Internet advertising network can be selected using the proposed model. The model is also applied for an empirical study. The analytical results reveal that the Internet advertising networks are ranked in the following order of desirability: Company C, Company A, Company B, Company D. Consequently, Company C was selected herein as the ideal Internet Advertising Network. The proposed model ranks the importance to advertisers of the various criteria used herein to compare the desirability of different Internet Advertising Networks as follows: Internet media quality, Integrated marketing planning, Creativity, Service level, Advertising rates, Ad management and delivery system, and finally Business scale. The proposed model provides an objective and effective decision model for advertisers to use in selecting an Internet advertising network.

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