A Combination of BSC and ANP Approach for Advertising Agencies Key Capabilities Evaluation

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ABSTRACT

This paper raises a critical issue of how Taiwan advertising agencies can better evaluate their key capabilities. In this paper, we apply the concept of balanced scorecard (BSC) which links financial and non-financial, tangible and intangible, inward and outward factors to obtain the perspectives and criteria for determining the key capabilities of advertising agencies. Many evaluating perspectives and criteria of balanced scorecard are interrelated. Unlike many traditional multiple criteria decision making methods that are based on the independent assumption, the analytic network process (ANP) which incorporates interdependence relationships between perspectives and criteria is a new approach for multi-criteria decision making. Thus, we develop an effective model based on BSC and ANP to help advertising agencies to evaluate the key capabilities. An empirical study is also presented to illustrate the application of the proposed method.

Keywords: analytic network process, balanced scorecard, key capability, multiple criteria decision making, advertising agency

I. INTRODUCTION

The theory of competence-based competition asserts that the corporate and business strategies should be built upon the strengths of the core competencies of the firm to fully exploit business opportunities and resist environmental threats (Prahalad & Hamel, 1990; Tampoe, 1994; Hafeez, et al., 2002a). Researchers argue that key capabilities which are the sources of core competencies (Hafeez, et al., 2002b) can derive competitive advantage and success of firms (Hitt & Ireland, 1985; Henderson & Clark, 1990). In this paper, we would define capability as the ability to make use of resources to perform some tasks or activities (Hafeez, et al., 2002a). Key capabilities are those which help to generate high profit margins, and are the clear market winners in securing market share (Hafeez, et al., 2002b).

Recently, advanced countries have seen a boom in interest in the idea of the cultural and creative industries in academic and policy-making circles. In

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government cultural policy, this boom has been apparent at the international, national and local level in a massive array of reports, initiatives and partnerships that use the term "cultural and creative industries" (Hesmondhalgh & Pratt, 2005). The concept of cultural and creative industries, first promulgated by the Blair Labor government in Britain in 1998 (Flew, 2003). Britain is the first country to propose and implement the concept of cultural and creative industry and branded it as creative industry. The Department of Culture, Media and Sport (1998) defines creative industries as comprising activities which have their origin in individual creativity, skill and talent, and which have the potential for wealth and job creation through generation and exploitation of intellectual property. In 2002, Taiwan proposed "Challenge 2008－National Development Plan" to promote cultural and creative industry (Executive Yuan, 2002). The advertising agency is included in this project. Additionally, advertising agency plays a vital role in facilitating other industries development. To this end, evaluating advertising agencies key capabilities that are crucial to cultural and creative industry or other industries success is the first and foremost step.

In this paper, we apply the concept of the balanced scorecard which developed by Kaplan & Norton (1992) to evaluate the key capabilities of advertising agencies. The balanced scorecard which links financial and non-financial, tangible and intangible, inward and outward factors is suitable for key capabilities evaluation. Additionally, evaluating the key capabilities belongs to multiple criteria decision making problem. It is better to employ multiple criteria decision making methods to solve. Many multiple criteria decision making methods are based on the independent assumption. The balanced scorecard acknowledges the presence of dynamic relationships among the perspectives, which means that the importance of one perspective cannot be determined without knowing the effects of the relationships between the perspectives (Leung, et al., 2006). In other words, perspectives and criteria of balanced scorecard for evaluating key capabilities are interrelated as shown in Figure 1.

For solving the interactions among the perspectives and criteria, analytic network process as a new multiple criteria decision making method was proposed by Saaty (1996). After reviewing the literatures, we found that researchers apply analytic network process for supply chain management (Nakagawa & Sekitani,

2004), financial-crisis forecasting (Niemira & Saaty, 2004), conducting reverse logistics operations for EOL computers (Ravi, et al., 2005), selecting logistics service provider (Jharkharia & Shankar, 2007), selecting knowledge management strategies (Wu & Lee, 2007). Nobody else has applied the model which combines the balanced scorecard and analytic network process approach to evaluate the key capabilities of cultural and creative industry or other industries.
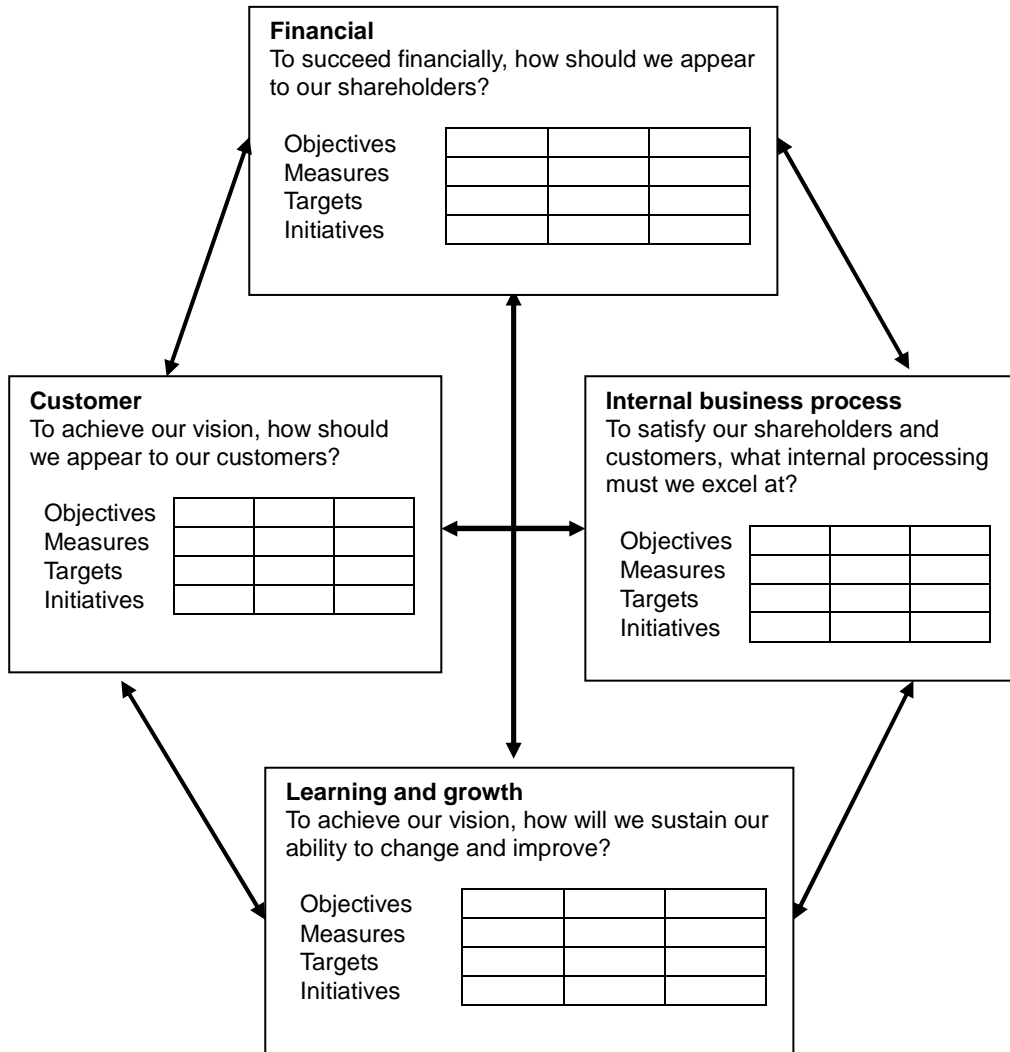

Figure 1.　The interrelated perspectives of the balanced scorecard.

With these motivations, the purposes of this paper are two-fold:

(1) Construct the model for evaluating the key capabilities of Taiwan advertising agencies based on the concept of the balanced scorecard.

(2) Evaluate key capabilities of advertising agencies applying analytic network process approach.

Section 2 presents the background of balanced scorecard and analytic network process. In Section 3, an empirical study is illustrated. Finally, conclusion is presented.

II. THE BALANCED SCORECARD AND THE ANALYTIC NETWORK PROCESS

The name of balanced scorecard is with the intent to keep score of a set of measures that maintain a balance between financial and non-financial measures, between internal and external criteria. Of the balanced scorecard's four perspectives, one is financial and the other three involve non-financial. The financial perspective typically contains the traditional financial measures, which are usually related to profitability. In customer perspective, customers are the source of business profits. Hence, satisfying customer needs is the objective pursued by companies. The objective of internal business process perspective is to satisfy shareholders and customers by excelling at some business processes. The goal of the last perspective, learning and growth, is to provide the infrastructure for achieving the objectives of the other three perspectives and for creating long-term growth and improvement through systems, employees and organizational procedures (Kaplan & Norton, 1996). Recently, many researchers applies the concept of balanced scorecard to evaluate performance, implement balanced scorecard as strategic management tool, evaluate the performance of the balanced scorecard as a management tool, evaluate projects and assess strategic impacts of ERP systems. After reviewing the literatures related to the balanced scorecard, we make a summary in Table 1.

Table 1.　　Summary of the literatures about the balanced scorecard.

Contributor	Year	Topic
Kaplan & Norton	1992	Measure performance.
Kaplan & Norton	1996	Apply balanced scorecard as a strategic management system.
Fleisher & Mahaffey	1997	Assess public relations performance.
Habann & Dimpfel	1997	Measure performance of media companies.
Oliveira	2001	Evaluate performance of healthcare organization.
Poll	2001	Manage service quality.
Abran & Buglione	2003	Incorporate the QEST model into a balanced scorecard framework for performance evaluation.
Cheng, et al.	2003	Implement performance measurement techniques and metrics in a media and software division.
Plant, et al.	2003	Measure e-business performance.
Ritter	2003	Apply balanced scorecard in corporate communication.
Banker, et al.	2004	Apply DEA to identify the tradeoff of performance metrics.
Davis & Albright	2004	Evaluate the effect of the balanced scorecard on financial performance.
Hastings	2004	Measure performance in public service broadcasting.
Milis & Mercken	2004	Evaluate the information and communication technology projects.
Papalexandris, et al.	2004	Implement a specific balanced scorecard model at a large software development company in Greece.
Anand, et al.	2005	Analyze the current practice of the organizational performance management system with a focus on the balanced scorecard.
Bremser & Chung	2005	Measure performance in the e-business environment.
Chand, et al.	2005	Assess the strategic impacts of ERP systems.
Laitinen	2005	Analyze the theoretical foundations of the balances scorecard.
Michalska	2005	Estimate the enterprise's effectiveness.
Papalexandris, et al.	2005	Develop a methodology for balanced scorecard synthesis and implementation.
Ravi, et al.	2005	Combine analytic network process and balanced scorecard for conducting reverse logistics operations for EOL computers.
Kaplan & Norton	2006	Implement the strategy.
Leung, et al.	2006	Apply the analytic hierarchy process and analytic network process to facilitate the implementation of the balanced scorecard.

When the decision making process involves attributes that have a dependency relationship, the problem should be modeled as an analytic network process. Hence, we formulate the key capability evaluation problem which applying the concept of balanced scorecard as an analytic network process. Analytic network process proposed by Saaty (1996) to overcome the problem of interdependence and feedback between perspectives and criteria provides a more accurate and general model in decision making without making assumptions about the independency of criteria or perspectives. Analytic network process enhances the function of analytic hierarchy process (Saaty, 1980) to develop a complete model that can incorporate interdependent relationships between perspectives or criteria. Priorities are established in the same way they are in the analytic hierarchy process using pairwise comparisons. The weight assigned to each perspective and criterion maybe estimated from data or subjectively by decision makers. It would be desirable to measure the consistency of decision makers' judgment. Analytic hierarchy process provides such a measure through the consistency ratio (C.R.) which is an indicator of reliability of the model. This ratio is designed in such a way that values of the ratio exceeding 0.1 indicate inconsistent judgment. The application of analytic network process for a case company in a multi-criteria decision making environment is illustrated in the next section of this paper.

III. AN APPLICATION

The model which combines balanced scorecard and analytic network process approach is applied to solve Taiwan advertising agencies key capabilities evaluation as follows:

Step 1. Construct model

With reviewing literatures of balanced scorecard as shown in Table1, we collect criteria for evaluating the key capabilities. In this paper, the questionnaires based on Likert seven-point scales are sent to forty four executives to evaluate the importance of criteria in evaluating the key capabilities of advertising agencies. According to the geometric mean values, we choose the top three criteria under each perspective to construct the model as shown in Table 2 and 3.

Table 2. Definition of advertising agencies key capabilities evaluating criteria.

Criteria	Definition	Contributors
$^2C_1$: Delegation	Authority delegation.	Kaplan & Norton, 1996; Davis & Albright, 2004; Chand, et al., 2005.
$^2C_2$: Employees satisfaction	The satisfying index of employees.	Kaplan & Norton, 1996; Cheng, et al., 2003; Davis & Albright, 2004; Bremser & Chung, 2005; Papalexandris, et al., 2005.
$^2C_3$: Employees productivity	The productivity of employees.	Fleisher & Mahaffey, 1997; Habann & Dimpfel, 1997; Oliveira, 2001; Cheng, et al., 2003; Ritter, 2003; Davis & Albright, 2004; Hastings, 2004; Papalexandris, et al., 2004; Chand, et al., 2005; Laitinen, 2005; Michalska, 2005; Papalexandris, et al., 2005.
$^2C_4$: Risk	Risk minimization.	Papalexandris, et al., 2005.
$^2C_5$: New product	The ratio of new products.	Kaplan & Norton, 1992; Fleisher & Mahaffey, 1997; Oliveira, 2001; Anand, et al., 2005; Papalexandris, et al., 2005.
$^2C_6$: Data integrity	Complete database of consumers.	Habann & Dimpfel, 1997; Chand, et al., 2005.
$^2C_7$: Quality	The degree of product quality.	Kaplan & Norton, 1992; Fleisher & Mahaffey, 1997; Habann & Dimpfel, 1997; Cheng, et al., 2003; Plant, et al., 2003; Davis & Albright, 2004; Hastings, 2004; Bremser & Chung, 2005; Papalexandris, et al., 2005.
$^2C_8$: Customer satisfaction	The satisfying index of customers.	Kaplan & Norton, 1996; Fleisher & Mahaffey, 1997; Habann & Dimpfel, 1997; Poll, 2001; Abran & Buglione, 2003; Cheng, et al., 2003; Plant, et al., 2003; Ritter, 2003; Banker, et al., 2004; Davis & Albright, 2004; Milis & Mercken, 2004; Papalexandris, et al., 2004; Anand, et al., 2005; Chand, et al., 2005; Michalska, 2005; Papalexandris, et al., 2005; Kaplan & Norton, 2006.
$^2C_9$: Brand	The reputation of brand.	Habann & Dimpfel, 1997; Hastings, 2004; Anand, et al., 2005; Papalexandris, et al., 2005.
$^2C_{10}$: Revenue growth	Revenue increasing.	Kaplan & Norton, 1992; Cheng, et al., 2003; Plant, et al., 2003; Davis & Albright, 2004; Hastings, 2004 Papalexandris, et al., 2004; Chand, et al., 2005; Papalexandris, et al., 2005; Kaplan & Norton, 2006.
$^2C_{11}$: Cost	Cost per product.	Kaplan & Norton, 1992; Kaplan & Norton, 1996; Fleisher & Mahaffey, 1997; Habann & Dimpfel, 1997; Poll, 2001; Milis & Mercken, 2004; Papalexandris, et al., 2004; Chand, et al., 2005; Papalexandris, et al., 2005.
$^2C_{12}$: New market	New market expansion.	Chand, et al., 2005.

Our case company owning about 145 employees belongs to a worldwide

group. This worldwide group is over 132 countries and 205 cities and the annual turnover is about 1.4 billion US dollars. There are four main capabilities in the case study which are creativity creation, account planning, advertising production and market investigation. The model combines balanced scorecard and analytic network process for Taiwan advertising agencies key capabilities evaluation as shown in Figure 2.

Table 3.   Four perspectives.

Overall goal	Perspective	Criteria
Key capabilities of Taiwan advertising agencies	$^1C_1$: Learning and growth	$^2C_1$: Delegation $^2C_2$: Employees satisfaction $^2C_3$: Employees productivity
	$^1C_2$: Internal business process	$^2C_4$: Risk $^2C_5$: New product $^2C_6$: Data integrity
	$^1C_3$: Customer	$^2C_7$: Quality $^2C_8$: Customers satisfaction $^2C_9$: Brand
	$^1C_4$: Financial	$^2C_{10}$: Revenue growth $^2C_{11}$: Cost $^2C_{12}$: New market

Step 2. Determine the main perspectives weights

Table 4.   Saaty's 1-9 scale for pairwise comparison

Intensity of weight	Definition	Explanation
1	Equal importance	Two criteria contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favor one over another
5	Strong importance	Experience and judgment strongly favor one over another
7	Very strong importance	An criteria is strongly favored and its dominance is demonstrated in practice
9	Absolute importance	The importance of one over another affirmed on the highest possible order
2,4,6,8	Intermediate values	Used to represent compromise between the priorities listed above
Reciprocals of above non-zero numbers	If criteria i has one of the above non-zero numbers assigned to it when compare to criteria j, then j has the reciprocal value when compared with i	

In this step, a series of pairwise comparisons made by a committee of decision makers are made to establish the relative importance of perspectives. In these comparisons, a nine-point scale as shown in Table 4 is applied to compare any two perspectives. The development of each perspective priority weight is shown in Table 5 to 9.
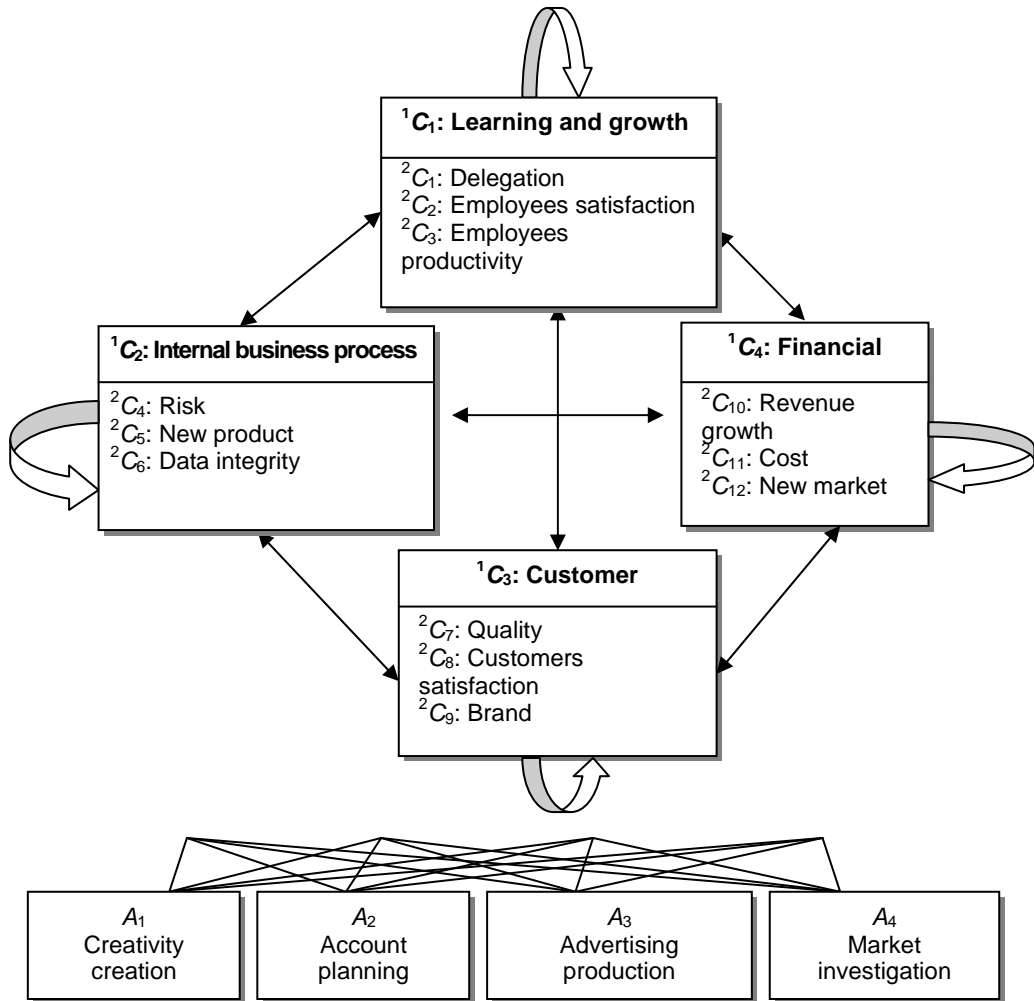

Figure 2.   Model for evaluating key capabilities of Taiwan advertising agencies.

Table 5.　　The pairwise comparisons of perspectives with respect to learning and growth.

	Learning and growth	Internal business process	Customer	Financial
	$\lambda_{max}=4.0608$　　C.R.$=0.0205$			
Learning and growth	1	1	1	1/2
Internal business process	1	1	2	1/2
Customer	1	1/2	1	1/2
Financial	2	2	2	1

Table 6.　　The pairwise comparisons of perspectives with respect to internal business process.

	Learning and growth	Internal business process	Customer	Financial
	$\lambda_{max}=4.2470$　　C.R.$=0.0832$			
Learning and growth	1	1	2	1/2
Internal business process	1	1	2	2
Customer	1/2	1/2	1	1/4
Financial	2	1/2	4	1

Table 7.　　The pairwise comparisons of perspectives with respect to customer.

	Learning and growth	Internal business process	Customer	Financial
	$\lambda_{max}=4.1177$　　C.R.$=0.0396$			
Learning and growth	1	1	3	1
Internal business process	1	1	2	2
Customer	1/3	1/2	1	1
Financial	1	1/2	1	1

Table 8.　　The pairwise comparisons of perspectives with respect to financial.

	Learning and growth	Internal business process	Customer	Financial
	$\lambda_{max}=4.0604$　　C.R.$=0.0203$			
Learning and growth	1	1	4	4
Internal business process	1	1	2	2
Customer	1/4	1/2	1	1
Financial	1/4	1/2	1	1

Table 9.　　The priority weights of perspectives.

	Learning and growth	Internal business process	Customer	Financial
Learning and growth	0.1988	0.2310	0.3126	0.4345
Internal business process	0.2364	0.3267	0.3359	0.3072
Customer	0.1672	0.1155	0.1518	0.1292
Financial	0.3976	0.3267	0.1997	0.1292

Step 3. Determine the pairwise comparisons for the model criteria

The model weights within each perspective are derived using the standard application of analytic hierarchy process. We apply pairwise comparisons again to establish the criteria relationships within each perspective. The eigenvector of pairwise comparison matrix provide the criteria weights at this level, which will be used in the unweighted supermatrix. With respect to delegation, for example, a pairwise comparison within the financial perspective can be shown in Table 10. According to this way, we can derive every criterion weight to obtain the unweighted supermatrix.

Table 10.　　The pairwise comparisons within financial perspective with respect to delegation.

	Revenue growth	Cost	New market	Priority weights
	$\lambda_{max}=3.0183$　　C.R.$=0.0139$			
Revenue growth	1	2	1/3	0.2385
Cost	1/2	1	1/4	0.1365
New market	3	4	1	0.6250

Step 4. Construct and solve the supermatrix

The unweighted supermatrix which derived from step 3 is illustrated in Table 11, is then multiplied by the priority weights from the perspectives which shown in Table 9. After multiplying unweighted supermatrix and priority weights from the perspectives, we obtain the weighted supermatrix as shown in Table 12. For example, (0.2385, 0.1365, 0.6250) ×0.3976= (0.0948, 0.0543, 0.2485). In other

words, the weights of the criteria multiply the weight of its own perspective to obtain the weighted supermatrix. Finally, the system solution is derived by multiplying the weighted supermatrix of model variables by itself, which accounts for variable interaction, until the system's row values converge to the same value for each column of the matrix. We apply this process to yield the limiting matrix as shown in Table 13.

Table 11.　　The unweighted supermatrix.

	$^2C_1$	$^2C_2$	$^2C_3$	$^2C_4$	$^2C_5$	$^2C_6$	$^2C_7$	$^2C_8$	$^2C_9$	$^2C_{10}$	$^2C_{11}$	$^2C_{12}$
$^2C_1$	0.5469	0.6267	0.5469	0.4126	0.5499	0.2599	0.4126	0.2599	0.5499	0.5842	0.5842	0.3333
$^2C_2$	0.3445	0.2797	0.3445	0.2599	0.2402	0.4126	0.3275	0.4126	0.2098	0.2318	0.2318	0.3333
$^2C_3$	0.1085	0.0936	0.1085	0.3275	0.2098	0.3275	0.2599	0.3275	0.2402	0.1840	0.1840	0.3333
$^2C_4$	0.5469	0.5469	0.6267	0.3275	0.6267	0.4665	0.4665	0.4742	0.3669	0.4054	0.3669	0.4161
$^2C_5$	0.3445	0.3445	0.2797	0.4126	0.2797	0.4330	0.4330	0.3764	0.4979	0.4806	0.4979	0.4579
$^2C_6$	0.1085	0.1085	0.0936	0.2599	0.0936	0.1005	0.1005	0.1494	0.1352	0.1140	0.1352	0.1260
$^2C_7$	0.5499	0.5499	0.6267	0.5499	0.3275	0.6267	0.6267	0.4665	0.6267	0.6267	0.3333	0.5171
$^2C_8$	0.2402	0.2402	0.2797	0.2098	0.4126	0.2797	0.2797	0.4330	0.2797	0.2797	0.3333	0.3586
$^2C_9$	0.2098	0.2098	0.0936	0.2402	0.2599	0.0936	0.0936	0.1005	0.0936	0.0936	0.3333	0.1243
$^2C_{10}$	0.2385	0.2385	0.2385	0.2385	0.2385	0.3764	0.4126	0.2385	0.2385	0.2385	0.3669	0.1919
$^2C_{11}$	0.1365	0.1365	0.1365	0.1365	0.1365	0.1494	0.2599	0.1365	0.1365	0.1365	0.4979	0.1744
$^2C_{12}$	0.6250	0.6250	0.6250	0.6250	0.6250	0.4742	0.3275	0.6250	0.6250	0.6250	0.1352	0.6337

Table 12.　　The weighted supermatrix.

	$^2C_1$	$^2C_2$	$^2C_3$	$^2C_4$	$^2C_5$	$^2C_6$	$^2C_7$	$^2C_8$	$^2C_9$	$^2C_{10}$	$^2C_{11}$	$^2C_{12}$
$^2C_1$	0.1087	0.1246	0.1087	0.0953	0.1271	0.0600	0.1290	0.0813	0.1719	0.2538	0.2538	0.1448
$^2C_2$	0.0685	0.0556	0.0685	0.0600	0.0555	0.0953	0.1024	0.1290	0.0656	0.1007	0.1007	0.1448
$^2C_3$	0.0216	0.0186	0.0216	0.0757	0.0485	0.0757	0.0813	0.1024	0.0751	0.0799	0.0799	0.1448
$^2C_4$	0.1293	0.1293	0.1482	0.1070	0.2048	0.1524	0.1567	0.1593	0.1232	0.1245	0.1127	0.1278
$^2C_5$	0.0815	0.0815	0.0661	0.1348	0.0914	0.1415	0.1455	0.1264	0.1673	0.1477	0.1530	0.1407
$^2C_6$	0.0257	0.0257	0.0221	0.0849	0.0306	0.0328	0.0338	0.0502	0.0454	0.0350	0.0415	0.0387
$^2C_7$	0.0919	0.0919	0.1048	0.0635	0.0378	0.0724	0.0951	0.0708	0.0951	0.0809	0.0431	0.0668
$^2C_8$	0.0402	0.0402	0.0468	0.0242	0.0477	0.0323	0.0424	0.0657	0.0424	0.0361	0.0431	0.0463
$^2C_9$	0.0351	0.0351	0.0157	0.0277	0.0300	0.0108	0.0142	0.0153	0.0142	0.0121	0.0431	0.0161
$^2C_{10}$	0.0948	0.0948	0.0948	0.0779	0.0779	0.1230	0.0824	0.0476	0.0476	0.0308	0.0474	0.0248
$^2C_{11}$	0.0543	0.0543	0.0543	0.0446	0.0446	0.0488	0.0519	0.0273	0.0273	0.0176	0.0643	0.0225
$^2C_{12}$	0.2485	0.2485	0.2485	0.2042	0.2042	0.1549	0.0654	0.1248	0.1248	0.0807	0.0175	0.0819

Step 5. Select the best alternative

We select the optimal alternative depends on the outcome of the desirability index (Meade & Sarkis, 1999). The weight of each alternative with respect to the criteria is shown in Table 14. According to Table 13 and Table 14, we can aggregate the desirability index of each alternative as shown in Table 15. Therefore, it is obvious that the key capability of the case is A_1 i.e., creativity creation.

Table 13.   The limiting matrix.

	$^2C_1$	$^2C_2$	$^2C_3$	$^2C_4$	$^2C_5$	$^2C_6$	$^2C_7$	$^2C_8$	$^2C_9$	$^2C_{10}$	$^2C_{11}$	$^2C_{12}$
$^2C_1$	0.1667	0.1667	0.1667	0.1667	0.1667	0.1667	0.1667	0.1667	0.1667	0.1667	0.1667	0.1667
$^2C_2$	0.1092	0.1092	0.1092	0.1092	0.1092	0.1092	0.1092	0.1092	0.1092	0.1092	0.1092	0.1092
$^2C_3$	0.0879	0.0879	0.0879	0.0879	0.0879	0.0879	0.0879	0.0879	0.0879	0.0879	0.0879	0.0879
$^2C_4$	0.1751	0.1751	0.1751	0.1751	0.1751	0.1751	0.1751	0.1751	0.1751	0.1751	0.1751	0.1751
$^2C_5$	0.1477	0.1477	0.1477	0.1477	0.1477	0.1477	0.1477	0.1477	0.1477	0.1477	0.1477	0.1477
$^2C_6$	0.0504	0.0504	0.0504	0.0504	0.0504	0.0504	0.0504	0.0504	0.0504	0.0504	0.0504	0.0504
$^2C_7$	0.0935	0.0935	0.0935	0.0935	0.0935	0.0935	0.0935	0.0935	0.0935	0.0935	0.0935	0.0935
$^2C_8$	0.0517	0.0517	0.0517	0.0517	0.0517	0.0517	0.0517	0.0517	0.0517	0.0517	0.0517	0.0517
$^2C_9$	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301
$^2C_{10}$	0.0878	0.0878	0.0878	0.0878	0.0878	0.0878	0.0878	0.0878	0.0878	0.0878	0.0878	0.0878
$^2C_{11}$	0.0533	0.0533	0.0533	0.0533	0.0533	0.0533	0.0533	0.0533	0.0533	0.0533	0.0533	0.0533
$^2C_{12}$	0.2053	0.2053	0.2053	0.2053	0.2053	0.2053	0.2053	0.2053	0.2053	0.2053	0.2053	0.2053

Table 14.   The weight of each alternative with respect to criteria.

	A_1	A_2	A_3	A_4
$^2C_1$	0.3453	0.2053	0.2053	0.2441
$^2C_2$	0.3757	0.1824	0.2019	0.2400
$^2C_3$	0.3369	0.2382	0.1416	0.2833
$^2C_4$	0.1416	0.3369	0.2833	0.2382
$^2C_5$	0.5238	0.1625	0.1625	0.1512
$^2C_6$	0.4846	0.2189	0.1663	0.1302
$^2C_7$	0.2481	0.2951	0.2087	0.2481
$^2C_8$	0.3229	0.2453	0.2453	0.1864
$^2C_9$	0.2951	0.2087	0.2481	0.2481
$^2C_{10}$	0.1542	0.3176	0.2870	0.2413
$^2C_{11}$	0.1731	0.2911	0.2911	0.2448

$^2C_{12}$	0.1372	0.3126	0.3126	0.2376

Table 15.　The desirability index.

	Wrights from limiting matrix	A_1	A_2	A_3	A_4
$^2C_1$	0.1667	0.0576	0.0342	0.0342	0.0407
$^2C_2$	0.1092	0.0410	0.0199	0.0220	0.0262
$^2C_3$	0.0879	0.0296	0.0209	0.0124	0.0249
$^2C_4$	0.1751	0.0248	0.0590	0.0496	0.0417
$^2C_5$	0.1477	0.0774	0.0240	0.0240	0.0223
$^2C_6$	0.0504	0.0244	0.0110	0.0084	0.0066
$^2C_7$	0.0935	0.0232	0.0276	0.0195	0.0232
$^2C_8$	0.0517	0.0167	0.0127	0.0127	0.0096
$^2C_9$	0.0301	0.0089	0.0063	0.0075	0.0075
$^2C_{10}$	0.0878	0.0135	0.0279	0.0252	0.0212
$^2C_{11}$	0.0533	0.0092	0.0155	0.0155	0.0130
$^2C_{12}$	0.2053	0.0282	0.0642	0.0642	0.0488
Desirability Index		**0.3544**	**0.3232**	**0.2952**	**0.2857**

IV. CONCLUSION

Through the concept of balanced scorecard, a review of the literature and interviewing the executives of advertising agencies, we construct the model which contains four perspectives and twelve criteria for advertising agencies key capabilities evaluation. We apply analytic network process approach to treat interdependence relationships problem between perspectives and criteria which come from balanced scorecard to solve the advertising agencies key capabilities evaluation problem. We argue that the model which combines balanced scorecard and analytic network process approach proposed in this paper can provide the decision maker with a more realistic and accurate representation of the problem for selecting the key capabilities of advertising agencies.

We employ EXCEL software to compute the data made by the decision makers to derive the optimal alternative. In this paper, the consistency ratio of each pairwise comparison is less than 0.1 which means the reliability of the model is accepted. Moreover, a practical application to evaluate key capabilities of

advertising agencies presented in Section 3 is generic and also suitable to be exploited for identifying key capabilities of firms.

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應用平衡計分卡與分析網路程序評選廣告代理商的關鍵才能

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摘要

　　相對於構面、準則間存在相互獨立假設的多評準決策方法，本研究結合平衡計分卡與分析網路程序，進而提出一個較佳的方法來評選台灣廣告代理商的關鍵才能。平衡計分卡連接內外部、財務與非財務、有形與無形的因素，很適合評估組織的關鍵才能。本研究首先利用平衡計

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分卡的概念以及訪問廣告代理商主管後，獲得評選關鍵才能的構面與準則。然而平衡計分卡包含許多相互影響、有關聯的構面與準則，分析網路程序方法考量到評選準則間的相互關係，提供一個包含構面與準則之間相互連結的完整架構。因此，本研究所結合平衡計分卡與分析網路程序的方法來評選台灣廣告代理商的關鍵才能。

關鍵詞彙：分析網路程序，平衡計分卡，關鍵才能，多評準決策，廣告代理商