# Fuzzy comprehensive evaluation over the differences and similarities of financial and accounting functions in enterprises

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**Abstract**

As for this issue, the thesis firstly analyzes the specific functions of the finance and accounting in enterprises and certifies the differences. Later, Analytic Hierarchy Process (AHP) is adopted to establish the multilevel fuzzy comprehensive evaluation model respectively for corporate financial performance and the accounting information quality. Besides, the main evaluation criteria of an enterprise's financial and accounting functions and the main factors affecting the functions of the evaluation are analyzed to explore specific measures for improve corporate financial and accounting department. It can be concluded that the exercise of the financial functions need to rely on the profitability and the development capacity of the enterprises and specifically speaking, the utilization of factors of production and the quality of the portfolio operating should be placed under well control. The key evaluation criterion of the accounting function is the quality of accounting information, which will exert a positive impact on long-term business decisions. The fuzzy comprehensive evaluation studied in this thesis does not include all the evaluation indicators. And in the practices of corporate development, new evaluation indicators should be explored continuously to improve the evaluation system. Therefore, the financial and accounting functions can be better understood and applied.

*Keywords*: enterprise, financial function, accounting function, differences and similarities, fuzzy comprehensive evaluation

## 1 Differences and similarities of financial function and accounting function in enterprises

With the constant deepening of China's economic reform, as an autonomous operator and a self-financing body, the enterprise's independence is growing stronger and stronger, where independent property rights is the most prominent [1-3]. Corporate finance department belongs to the management level. And in enterprises, the access to and effective use of funds is called as financial management, and it is a part of the corporate management. In real economic life, finance and accounting is inseparable and very similar to each other. In the financial sector of any enterprise, there will be accounting positions. And accounting also occupies a pivotal position in financial management. Therefore, the functions of corporate finance department include both financial functions and accounting functions [4-6]. The two influence each other and differentiates from each other. Meanwhile, they are closely related to each other.

### 1.1 FINANCIAL FUNCTIONS

The main goal of business is survival, development and profit-making. To achieve such objectives, financial management needs to make decisions and plans and be placed under control.

### 1.1.1 Decision-making function

Financial decision refers to the decisions concerning funds-raising and using [7-10]. Financial decision-making process is generally divided into four stages:

1) Intelligence Activities Stage.

Probe into the environment and look for conditions to make decisions. To collect information in accordance with the envisaged objectives and identify the basis for the decision-making;

2) Activity Design Stage.

Create, develop and analyze possible solutions. According to the gathered intelligence, design alternative solutions to address the problems facing businesses. And the pros and cons of each solution should be analyzed and evaluated;

3) Choosing Activity Stage.

Select an action plan from all the alternatives. Evaluate each solution according to the then circumstances and predictions for the future as well as certain values. And choose an action plan in accordance with certain criteria;

4) Activity Review Stage.

Make evaluation of past decisions. According to the actual development process, compare the action plans and evaluate the quality of the decision-making, in other words, the consistency degree between the subjective and the objective, so as to improve the follow-up decisions.

### 1.1.2 Financial planning function

In the broad sense, financial planning includes many aspects, such as determining financial goals, developing financial strategies and financial policies, preparing financial budgets and making financial rules particularly the financial rules for a specific problem, and stipulating financial procedures and regulations; in the narrow sense, financial planning work refers to the financial planning and budgeting during a specific period [11, 12].

Financial planning is a process. In order to coordinate the enterprises' funds, benefits that may be obtained and the costs that may generate in the future and to fulfill financial

goals, the size and level of business activities need to be adjusted; the budget is the currency-based expected result and it is both the starting point of the controlling work and the terminal point of the planning work. It connects the planning with the controlling. The main role of the budget work is to urge the management staffs at all levels to make a detailed and concrete plan for their work.

### 1.1.3 Financial control function

Financial planning and financial control are closely linked. The control is the very means to implement the plan and the plan is an important basis for the control. They constitute a financial management cycle. The main links of financial management cycle are listed as below: making financial decisions; making budgeting and standards; recording actual data; calculating the due standards; comparing the standards and the reality; variance analysis and adjustment; implementation; evaluation and assessment; motivation; and making predictions.

### 1.2 ACCOUNTING FUNCTION

Accounting is a complete, continuous and systematic accounting and monitoring over economic activities via scientific methods and currency, the main measurement unit. Also, it is a kind of operation and management activity by confirming, measuring, recording and reporting of the transaction items and by providing information relevant to the financial positions, operations achievements, cash flow, and other cash-related data. Therefore, accounting has two functions.

### 1.2.1 Reflection function

As an information system, on the basis of financial accounting, accounting provides information users with the accounting information of the economy and businesses concerning the subjects of the accounting, in order to reflect their functions. And the result is the output of the accounting information, and the quality of accounting information actually shows the effects of the reflection function. Accounting reflection includes the forms and contents of the reflection: the forms of accounting reflection manly refers to the methods, procedures and forms adopted by accounting information disclosure; the contents of the accounting reflection refers to a series of data about business transactions of the accounting subjects confirmed, measured, recorded and disclosed by the accounting system. Such data constitutes a substantial portion of the accounting information, and the relevance and reliability is the basic quality attributes that reflect the reflection contents. And these two attributes can be further broken down into the following specific characteristics, such as verifiability, comparability, neutrality and consistency.

### 1.2.2 Oversight function

As an important means of senior operators to manage corporate internal structures, accounting also has a function of internal supervision. To ensure that all business activities are carried as required, the accounting can supervise and monitor the legality, authenticity and rationality of various economic businesses and correct deviations at any time. Accounting oversight does not have the function of supervising the operators, because it is merely a kind of top-down internal supervision within the enterprises over their own economic activities.

### 1.3 DIFFERENCES BETWEEN FINANCE AND ACCOUNTING

As can be seen from Table 1, finance work and accounting work differ from each other in the following aspects: work objects, working methods, working principles, working purposes, working basis, working procedures, job requirements and knowledge structure.

TABLE 1 Difference between finance and accounting

| Items | Accounting | Finance |
|---|---|---|
| Work Objects | Business transactions in the funds movement that can be measured by currency | Capital verification, funds-raising, application and distribution and other links in funds movement |
| Working Methods | Account-setting, double-entry bookkeeping, filling the examining vouchers, registering account books, preparing financial statements etc. | Prediction, decision-making, budgeting, control, analysis, quantitative and qualitative methods |
| Working Principles | Objective, authentic, comparable, consistent, solid, clear, etc. | Environment adaptation, fiscal balance, system coordination, optimized proportion, flexible organization of capital movement |
| Working Purposes | Provide systematic, complete, true and effective accounting information | Optimize the financial condition, control risks, rationalize distribution of incomes, increase owners' equity |
| Working Basis | Accounting standards system | Enterprise financial systems, financial management methods |
| Working Procedures | Obtain original documents - prepare accounting documents - register account books - calculate costs - prepare statements | Forecasting - Decision - Budgeting - Control - Analysis |
| Work Requirements | Meet norms and management, and the information is real and effective. | Be in line with management purposes. |
| Knowledge Structure of Working Staffs | Accounting management, accounting principles, professional accounting, operational knowledge | Financial theory and practices, investment theory and practices, management science, financial studies, accounting |

## 2 Fuzzy comprehensive evaluation model of corporate financial functions

According to the enterprise performance evaluation guidance made by the Ministry of Finance, and after taking reference from a large number of domestic and foreign financial performance evaluation data, the within- and among-class comparison matrix is established. Because all of the five comparison matrixes pass the consistency test, the results as shown in Table 2 can be obtained via relevant calculation.

The evaluation method of corporate financial capacity is as below:

$$F = \sum_i WEIGHT_i \times X_i \ .$$

Out of it:

$F$ stands for the solvency, development capacity,

profitability or operational capacity;

$X_i$ stands for the indicators to measure various financial capacity after the standardization;

$WEIGHT_i$ stands for a, the relative weight for each specific indicator in Table 2, for example

$$F_{DevelopmentCapacity} = 0.058 \cdot X_8 + 0.106 \cdot X_9 + 0.032 \cdot X_{10}$$

The evaluation method of corporate comprehensive financial capacity is:

$$TF = \sum_i WEIGHT_i \times F_i \ .$$

Out of it:

$TF$ stands for the comprehensive financial capacity;

$F$ stands for single financial capacity;

$WEIGHT_i$ stands for b, the relative weight for each specific indicator in Table 2.

TABLE 2 Financial evaluation weight

| Evaluated Items | Relative Weight b | Specific Indicator | Relative Weight a | Absolute Weight |
|---|---|---|---|---|
| Operation Capability | 0.196 | Total Asset Turnover | 0.272 | 0.053 |
| | | Accounts Receivable Turnover | 0.483 | 0.095 |
| | | Mobile Asset Turnover | 0.157 | 0.081 |
| | | Inventory Turnover | 0.088 | 0.017 |
| Debt-Paying Ability | 0.102 | Debt Asset Ratio | 0.540 | 0.055 |
| | | Time Interest Earned Ratio | 0.297 | 0.030 |
| | | Quick Ratio | 0.163 | 0.017 |
| Development Ability | 0.196 | Sales Growth Rate | 0.297 | 0.058 |
| | | Sales Profit Growth Rate | 0.540 | 0.106 |
| | | Total Asset Growth Rate | 0.163 | 0.032 |
| Profitability | 0.506 | Return on Total Assets | 0.235 | 0.119 |
| | | Return on Net Assets | 0.235 | 0.119 |
| | | Profit Ratio of Sales | 0.449 | 0.027 |
| | | Ratio of Profits to Cost | 0.081 | 0.041 |

## 3 Fuzzy comprehensive evaluation model of corporate accounting quality

Here, the quality of accounting information is treated as the main object, and analytic hierarchy process and fuzzy comprehensive evaluation is adopted to discuss the quality evaluation of corporate accounting information.

Through analysis, the relevant factors of the problem are found out. Then, according to the mutual influence and functions of various factors, classifications are made. Each category is deemed as a level: the highest level (i.e., the target layer), a number of relevant intermediate layers and the lowest layer (to express the problem-solving measures and programs). All of them are then lined up to form a hierarchical structure table, as shown in Table 3.

TABLE 3 Relevant factors hierarchical structure table

| | Criterion Level | Indicator Level |
|---|---|---|
| Accounting information quality evaluation A1 | Correlation B1 | Feedback Value C1 |
| | | Prediction Value C2 |
| | | Timeliness C3 |
| | Reliability B2 | Integrity C4 |
| | | Authenticity C5 |
| | | Neutrality C6 |
| | Other B3 | Comparability C7 |
| | | Consistency C8 |
| | | Clarity C9 |

In accordance with the AHP Rules, the judgment matrix at various levels and the weight of each indicator can be obtained, as shown in Table 3 to Table 5. All of the C.R

value of each element can pass the consistency test with satisfactory results. Based on experts' opinions, the fuzzy comments on each indicator can be obtained.

TABLE 4 A1's judgment matrix and its weight

| A1 | B1 | B2 | B3 | Weight WI1 |
|----|----|----|----|----|
| B1 | 1 | 7.88 | 8.23 | 0.787966 |
| B2 | 0.126904 | 1 | 2.23 | 0.13448 |
| B3 | 0.121507 | 0.44843 | 1 | 0.077554 |

TABLE 5 B1's judgment matrix and its weight

| B1 | C1 | C2 | C3 | Weight WI2 |
|----|----|----|----|----|
| C1 | 1 | 6.89 | 8.56 | 0.770888 |
| C2 | 0.145138 | 1 | 2.98 | 0.158074 |
| C3 | 0.116822 | 0.33557 | 1 | 0.071038 |

TABLE 6 B2's judgment matrix and its weight

| B2 | C4 | C5 | C6 | Weight WI2 |
|----|----|----|----|----|
| C4 | 1 | 8.86 | 7.68 | 0.789614 |
| C5 | 0.112867 | 1 | 2.21 | 0.130235 |
| C6 | 0.130208 | 0.452489 | 1 | 0.080151 |

TABLE 7 B3's judgment matrix and its weight

| B3 | C7 | C8 | C9 | Weight WI2 |
|----|----|----|----|----|
| C7 | 1 | 8.62 | 8.43 | 0.793052 |
| C8 | 0.116009 | 1 | 2.39 | 0.131927 |
| C9 | 0.118624 | 0.41841 | 1 | 0.074121 |

Select 10 experts to give scores to various indicators of accounting quality evaluation, and the results are shown in Table 8.

In accordance with the data in Table 8，the fuzzy evaluation $Q_i$ (i=1,2,3) of A in comparison with the counterpart *A*, namely each indicator in the first level and the calculation results are listed in Table 9.

TABLE 8 Accounting quality evaluation form

| Criterion Level | Indicator Level | Weight WI2 | Comment Grade | | | |
|----|----|----|----|----|----|----|
| | | | Excellent W1 | Good W2 | Ordinary W3 | Poor W4 |
| | C1 | 0.770888 | 0.7 | 0.2 | 0.1 | 0 |
| B1 | C2 | 0.158074 | 0.5 | 0.4 | 0 | 0.1 |
| | C3 | 0.071038 | 0.1 | 0.1 | 0.2 | 0.6 |
| | C4 | 0.789614 | 0.4 | 0.2 | 0.1 | 0.3 |
| B2 | C5 | 0.130235 | 0.2 | 0.3 | 0.2 | 0.3 |
| | C6 | 0.080151 | 0.1 | 0 | 0.4 | 0.5 |
| | C7 | 0.793952 | 0.2 | 0.6 | 0.1 | 0.1 |
| B3 | C8 | 0.131927 | 0.1 | 0.2 | 0.3 | 0.4 |
| | C9 | 0.074121 | 0.5 | 0.2 | 0.2 | 0.2 |

TABLE 9 Fuzzy evaluation

| Fuzzy Evaluation in Comparison with Criterion Level A | | | | | |
|----|----|----|----|----|----|
| | Correlation Q1 | 0.625763 | 0.224511 | 0.091296 | 0.05843 |
| | Reliability Q2 | 0.349908 | 0.196993 | 0.137069 | 0.31603 |
| | Other Q3 | 0.209044 | 0.510169 | 0.133797 | 0.14699 |

TABLE 10 Comprehensive fuzzy evaluation based on weighted algorithm

| Criterion Level | Weight WI1 | Fuzzy Evaluation in Comparison with Criterion Level A | | | |
|----|----|----|----|----|----|
| Correlation | 0.787966 | 0.625763 | 0.224511 | 0.091296 | 0.05843 |
| Reliability | 0.13448 | 0.349908 | 0.196993 | 0.137069 | 0.31603 |
| Other | 0.077554 | 0.209044 | 0.510169 | 0.133797 | 0.14699 |
| Comprehensive Fuzzy Evaluation | | 0.556348 | 0.242964 | 0.100748 | 0.09994 |

Specify a weight W for all levels of evaluation Q based on the experts' opinions, here:

W1=100, W2=80, W3 =60, W4=40

The total score of the evaluation can be calculated as below:

SA=100×0.556348+80×0.242964+60×0.100748+40×

0.09994=85.114

**4 Conclusion**

By making fuzzy evaluation of the quality of corporate accounting information, judgment on the quality of accounting information in an enterprise can be made. And based on the evaluation results, the key points that affect the quality of such accounting information can be discovered. Accordingly, the quality of accounting information can be improved.

It can be known from analysis that the comprehensive financial capability is mainly influenced by the profitability and development capacity. Therefore, companies should focus on improving their profitability and development ability. Specifically speaking, do a good job in the utilization of factors of production and the quality of portfolio operations; efficient use resources, make technological innovation to explore product and market and foster new output growth.

Enterprises should specify the relationship between finance and accounting and set up financial accounting body. In addition to providing external financial information, it will respectively provide relevant financial accounting information to the finance management agency and management accounting agency. On the basis of information sharing and a clear division of labor, the two agencies will do their work independently and jointly serve the long-term development of an enterprise.

## References

[1] Wang X, Jin C 2013 Ubiquitination of tumor necrosis factor receptor-associated factor 4 (TRAF4) by smad ubiquitination regulatory factor 1 (Smurf1) regulates motility of breast epithelial and cancer cells *Journal of Biological Chemistry* **288**(30) 21784-92

[2] LaLonde D P, Bretscher A 2011 The UBX protein SAKS1 negatively regulates endoplasmic reticulum-associated degradation and p97-dependent degradation *Journal of Biological Chemistry* **286**(6), 4892-901

[3] Shaik M, Abdul-Kader W 2011 Context specific antecedents for reverse logistics enterprise performance: Research framework *61st Annual Conference and Expo of the Institute of Industrial Engineers* 2011

[4] Silva Filho Oscar Salviano 2013 An open-loop approach for a stochastic production planning problem with remanufacturing process *8th International Conference on Informatics in Control, Automation and Robotics, ICINCO 2011* **174 LNEE** 211-25

[5] Gao Y-S, Hubbert C C., Yao T-P 2010 The microtubule-associated histone deacetylase 6 (HDAC6) regulates epidermal growth factor receptor (EGFR) endocytic trafficking and degradation *Journal of Biological Chemistry* **285**(15) 11219-26

[6] Copsel S, Garcia C 2011 Multidrug resistance protein 4 (MRP4/ABCC4) regulates cAMP cellular levels and controls human leukemia cell proliferation and differentiation *Journal of Biological Chemistry* **286**(9) 6979-88

[7] Li Y H, Rajakaruna S, Choi S S 2007 Control of a solid oxide fuel cell power plant in a grid-connected system *IEEE Transactions on Energy Conversion* **22**(2) (2007) 405-13

[8] Komatsu Y, Kimijima S, Szmyd J S 2013 Numerical analysis on dynamic behavior of solid oxide fuel cell with power output control scheme *Journal of Power Sources* **233**(2) 232-45

[9] Wang C, Nehrir M H 2007 Short-time overloading capability and distributed generation applications of solid oxide fuel cells *IEEE Transactions on Energy Conversion* **22**(4) 898-906

[10] Du W, Wang. H F, Zhang. X F, Xiao L Y 2012 Effect of grid-connected solid oxide fuel cell power generation on power systems small-signal stability *IET Renewable Power Generation* **6** (1) 24-37

[11] Ito Y, Kawauchi S 1995 Microprocessor based robust digital control for UPS with three-phase PWM inverter *IEEE Transactions on Power Electronics* **10**(2), 196-204

[12] Ilyas E 2006 Sliding mode control with PID sliding surface and experimental application to an electromechanical plant *ISA Transactions* **45**(1) 109-18

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