Financial Competency Assessment Model

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Abstract

Financial analysis is one of the evaluative criteria that have drawn the most attention and importance when measuring the performance of organizations or analyzing the corporate strength of the businesses. Particularly believed that the fiscal power will extend the business lifecycle. This opens the path to the intensive use of financial analysis in assessments and the easy collection of relevant data resting on measurable parameters.

The method most widely used in the financial evaluation of organizations is the ratio analysis. By performing a ratio analysis, important information can be gained about the financial status of the enterprises. That information may include liquidity, indebtedness and profitability. For example, Banks perform ratio analysis and evaluate the business's structural condition to assess the risk and decide whether to give loans to a requesting organization. Although these analyses provide useful information it may not provide concrete evidence of financial competency. There is a need for further analysis to identify these.

In this study, Financial competency is considered to be the part of an enterprise competency assessment model. It is a nested architecture identifying the financial competency in 6 layers from the least up to the most concrete competency. Each layer has several criteria including financial ratios mentioned above. This paper describes the model and concentrates on financial competency procedures. The model proposed also highlights some remedies for the enterprises to increase their competency to upper levels. Note that, as the financial competency has a more numerical foundation than the other component of the competency model, an evaluation structure using the ratios most commonly used in the literature has been adopted in this part of the model.

Keywords: Financial analysis; Financial competency; Enterprise assessment

Introduction

Various methods and approaches are developed to assess the success of a company in different operating cycles and show the risk of a situation from a financial perspective. Literature provides studies are conducted financial analysis and performance assessments through ratio analysis [1-4]. The lack of a constant standard rate in ratio analysis and the differences between sectors and economic conditions calls into question the reliability of the results of applications. Given the ratio's, more numerical data used as financial analysis. In the scope of the study, the goal is to include assessment approaches defined as scaling areas of competency that have a different point of view from traditional financial analysis with the most convenient structure possible. With this in mind, Altman's [5] Z score model has been taken as a basis for assessing the financial competency.

Even though the ratios have been used in the Altman model as well, the results from the studies carried out are more consistent and it is shown that 80-90% is correct [5]. The Z score model consists of a function called Z function which provides a weight for each ratio by analyzing the relationship between five important components through the multiple discriminant method. The financial situation of the company can be predicted by comparing the characterized ratios as in "safe", "grey" or "distress" zones.

Financial competency assessment is designed as a six-level levelling approach in which the first level indicates the least competency level of a company under assessment, whereas the highest level shows the best and strongest competency level possible. It is certain that the ratios also play an important part of financial competency analysis. As they provide numerical data making it easy to perform the analysis. Hence, some ratios also used in this study to perform financial competency measurements. Note that the six ratio is defined for the financial assessment in this study. Defined ratios will be explained more in

relevant sections. After a brief literature survey the proposed financial assessment procedure with structure is explained. The proposed financial assessment approach is tested on a real life enterprise in order to define its financial competency.

Literature Review on Financial Assessment Analysis

The literature reveals that the financial ratios are generally used when analyzing financial competency of firms seeking for credit from especially the banks. Ratios are the results of the relationships between many indicators. As every ratio assesses a different aspect of business, various assessment models can be established by using statistical methods such as discriminant analysis Some of those are summarized below.

Çağlar [6] evaluated a variety of scoring systems and provided a model for the prediction of the probability that enterprises especially Small and Medium Enterprises (SMEs) credited would or would not fall into financial difficulties. In this study, a number of financial indicators were used to predict the enterprises that were likely to fall into financial difficulties, with many variables known as 'dependent' and 'independent'. A logistic regression method a scoring model was created and tested with the chi-squared test. An enterprise is categorized in terms of credit eligibility. A similar study is carried out by Bodur and Teker [7], a scoring model with five general parameters

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(liquidity, profitability, indebtedness, and operation cycle) was created, and the model's consistency was tested through application in a variety of companies.

By applying the developed model, a credit notes and classification score for the related enterprise is calculated.

Koyuncugil and Ozgulbas [8] mention that the biggest problem for small and medium enterprises is the generation of financial stress due to financial inadequacy and the increase of business's vulnerability. They developed an early warning model for handling financial risks through data mining.

Sohn et al. [9] proposed a Structural Equality Model to be used in the assessment of financial performance and the effective management of technology credit funds directed towards SMEs. Moon and Sohn [10] created a Decision Tree Model with the results of Data Envelopment Analysis for the effective management of government funds set aside for SMEs and proposed a smart approach that uses the results of this model as feedback information.

Sohn and Kim [11] created the Random Effects Logistic Regression Model linked to financial and non-financial factors to predict SMEs that were supported but not fulfilling their commitments.

Huang and Li [12] proposed a systematic assessment model comprising Fuzzy Logic and the Analytic Hierarchy Process in order to assess SME groups' innovativeness capability.

Ahmad and Qiu [13] identified a model that would be able to effectively assess SME analysis. Using both the Analytic Hierarchy Process and Data Envelopment Analysis, they worked to measure manufacturing businesses' performance using qualitative and quantitative input output.

In their research, by examining SME performance measuring models and bringing to light the strengths and weaknesses of each model, Abouzeedan and Busler [14] explained the superiority of their own model over the others in terms of dynamic and estimation theories.

In their study in 2009, Chang and Wang examined risk analysis and destructive innovativeness assessment in SMEs [3]. The Grey System Theory was used when carrying out risk the analysis.

Rehman [15] investigates capital structure of all non-financial firms on Pakistan Stock Exchange for the period of 2008 to 2014, in order to test relation between dependent and independent variables. In his study, ROE, ROCE, GROWTH, SIZE and AGE employed as control variables and used exponential least square regression. According to results, financial manager's aggressiveness regarding financial policy negatively, while aggressiveness regarding investment policy positively effecting the firm's performance.

Voulgaris et al. [4] developed a method using Financial Ratio Analysis. A Multi-Criteria Decision-Making Method was used in this study. In this method, a Decision Model was used to group SMEs into previously identified homogenous classes. They compared the developed method with Discriminant Analysis, Logit Analysis, and Profit Analysis methods.

Lin and Tong [16] used the Cox model and Support Vector Machine to create a two-stage credit note model. Using their proposed two-stage model, they classed the SMEs in Taiwan and showed that the accuracy rate was better than that of the available single-stage credit note models. As well as evaluating Balance Scorecards conceptually,

in his study Coşkun [17] gave examples of Balance Scorecards in the banking sector.

Some of the approaches and parameters used in financial risk assessment studies have been given in Table 1.

The financial ratios are generally concentrated on the area of liquidity, indebtedness, profitability and capital. Those were taken as the baseline in this study as well (Table 1).

Enterprise Competency Assessment Model

Competency in context of organization is generally perceived as development of skills that should be possessed by an enterprise in the area that which they are perform. The definition of competency used in this study targeting to establish a structure that can reveal the strength and capacity of the enterprises with the help of the proposed framework model through financial way. In other words; the concept of competency in the organizations is considered as living organisms

Reference	Approach	Financial Ratios
Altman [5]	Multiple Discriminant Analysis (MDA)	• Earnings before interest and taxes / total assets • Retained earnings/total assets • Working capital/total assets • Market value equity/book value of total liabilities • Sales / Total assets
Grunert et al. [25]	descriptive statistics	• Logarithm of total assets • Equity-to-assets ratio • Current ratio • Cash flow-to-net liabilities • Capital intensity ratio • Return on assets
Angelini et al. [26]	Neural Network	• Cash flow/total debt • Turnover/inventory • Current liability/turnover • Equity/total assets • Financial costs/total debts • Net working capital/Total assets
Huang [27]	Support Vector Machines	• Total assets • Total liabilities • Long-term debts/total invested capital • Net income before tax/received capitals • Net income before tax/sales • Non-operating income/sales
Lin et al. [28]	fuzzy neural network	• Net sales • Ratio of gross margin to net sales • Account receivable • Allowance for doubtful accounts • Accounts receivable as a percentage of total assets
Spathis et al. [29]	multicriteria hierarchical discrimination	• Earnings before interest and taxes/ total assets • Net income/net worth • Sales/total asset • Gross profit/total assets • Net income/working capital • Total debt/total assets • Accounts receivable/current liabilities • Current liabilities/net worth • Total debt/working capital
Atiya [30]	Neural Networks and Logistic Regression	• Book value/total assets • Cashflow/total assets • Rate of change of cashflow per share • Gross operating income/total assets • Return on assets ROA

Table 1: Financial assessment in literature.

that will in time gain certain financial capabilities through evaluation of specific qualifications.

Like individual competency, as enterprises develop their basic characteristics, it is possible to bring their competitiveness higher levels from the point of view of their products or services. This will naturally increase profitability, which is one of the main objectives of the enterprise along with its contribution to the society.

In general, even if it seems easy to assume every enterprise as an individual entity, the determination of competencies and assessment methods are rather difficult. The fact that the enterprises contain many components that have to work together, makes determination and assessment of competency difficult than individual assessment. Enterprises therefore need to develop their certain aspects in order to be competitive and maintain sustainability.

Financial analysis is one of the evaluative criteria that has drawn the most attention and importance when measuring organizations' performances or analyzing the business's corporate strength. In business, it is thought that fiscal power, particularly, will extend the business lifecycle. This opens the path to intensive use of financial analysis in assessments and easy collection of relevant data resting on measurable parameters. Even if the financial analysis is an important criterion, most researcher used various type of criteria such as technological, strategical, intellectual and R&D innovation competency assessment criteria in order to evaluate an enterprise [18]. According to Ozel [18], from an organizational point of view, organization's technological infrastructure and related implementation, financial standing, strategic restructuring with progress along this line and intellectual capacity that it possesses together with its ability to utilize these are the core competency areas. He points out that these competencies should be monitored and measured periodically to sustain business success. In addition, it is important to focus on an enterprise's ability to convert its commercial and managerial resources into benefit, and to what extent that it could use these qualities in effective and efficient manner.

A proposed competency assessment model in a doctoral thesis completed by Ozel [18] is made up of five main components to assess an enterprise. The goal of each of these components is to measure the competency of the enterprises in a certain aspect by examining from a different viewpoint. Within these five areas of competency, the general status of the assessed company will be specified both from its own point of view and that of companies wanting to support them. By comparing the competency scores gained as a result of the assessment of each business under the same model, the ability to create a sturdy fund distribution plan between the businesses will arise. Thereby the funds will be able to be sent to the correct and necessary businesses. The five competency components were stated in the thesis as the following.

- Technological competency
- Financial competency
- R&D and Innovation competency
- Strategic competency
- Intellectual competency.

When setting out the five areas of competency that make up the skeleton of the proposed model, it has been kept in mind that the most important processes that will have the biggest effect on a company's development and continuation of its existence are the accumulation of technology, finance, R&D and innovation, strategy, and intellectual knowledge.

Note that this paper only deals with the financial aspect of the proposed competency model. There are some other publications focusing the attention on the other components [18].

Financial Competency Assessment

Mainly there are two core financial statements to provide information about a business's financial infrastructure. These are the balance-sheet and revenue statement tables. Especially in Turkey, it is easy to conduct financial analysis of small and medium enterprises using financial ratios derived out of these tables. Note that these tables are the main source of financial information enabling both internal analysis (carried out for the purpose of the enterprise examining their own financial position) or external analysis (done with the purpose of examining a business for another person or organization for whatever reason). They are frequently used throughout the financial assessment of the enterprise and provide the following benefits [19].

- Measuring the degree of effectiveness and success of a business's activities.
- Determining whether or not a business has reached its primary and secondary goals.
- Researching the reasons for a goal not being reached.
- Preparing plans for the future.
- Identifying whether or not the business has the strength to fulfil its obligations or not without putting the existence of the company in danger.
- Testing and controlling the business operations.

Using the balance-sheet, revenue statement and related ratios with respective business analysis have great importance for financial assessment. Banks, for example, would like to predict whether or not the enterprises receiving the credit is likely to pay it back. They try to take a big picture of the enterprises by performing detailed financial analysis powered by historical data [20]. Similarly, rating companies offer investors analytical services under the disclosures of independence, objectiveness and security. Since they must provide services in an objective manner, without being affiliated to any bank or similar organization, and without government protection they calculate a credit score based on the financial situation of the respective enterprise. They generally classify the company as 'investible' or 'non-investible' according to mainly the following parameters:

- The likelihood of the graded company paying back the loan,
- The capacity for repayment,
- How much of the money they will be able to repay if they enter a situation where they cannot pay it all,
- How soon the total or partial payments will commence.

Apart from this, financial analysis for business is also carried out for many other reasons than just by providing credit rating. These analyses are split into internal analyses for the business to see its own performance, and external analyses for people or companies who want to see the business' status from outside.

Another issue in performing financial analysis is whether the analyses will be static or dynamic. Static analyses are done using a

more vertical percentage technique and an evaluation of the business's financial statements from periods or a particular date. Dynamic analysis, however, is done by comparing the tables of a business in relation to a particular period with other businesses. Dynamic analysis is a more horizontal approach in practice and is done using trend percentages. According to studies in literature and daily application, financial statement analysis and ratio analysis are frequently used wile assessing enterprises by a financial perspective. As financial table analyses take time and can require different methods from different types of business, ratio analysis has taken the forefront [21].

Ratio analysis is applied by comparing the financial numbers form the balance sheet and revenue statement with each other and then comparing these ratios with the industry standard or with other enterprises. Ratios can be divided into many different groups, but in the literature businesses are generally evaluated in the following areas [22,23]:

- Liquidity Ratios
- Operating Ratios
- Solvency Ratios
- Profitability Ratios.

Looking at these ratios, companies or people who are going to lend credit to a business can focus on the profitability ratios, not only paying close attention to the liquidity ratios as provided in the literature [24].

After analyzing the literature as summarized above, six ratios have been defined for performing financial competency analysis in this study. Note that chosen ratios are compared with the industry standards [25-30].

Financial competency assessment model

A levelized competency assessment is proposed. Financial situation of the enterprises is categories by six-level representation. Note that each level is assumed to cover all characteristics of the previous levels and adding some extra capabilities to financial aspect of the enterprise. A total of 120 point is given to indicate excellent financial competency in accordance with 6 financial ration as specified below. The following sections of the paper explains the financial ratios and respective levelized assessment methodology [31-33].

Definition of the assessment ratios

There have been some studies showing effective business analyses and evaluations by using financial ratios. They type of ratios used in those studies have been listed in Table 1 together with respective references. In light of the information given, six ratios have been chosen as the most used and most effective assessment criteria for assuring financial competency. The two important reasons for choosing the six ratios are;

1. Those cover the overall enterprise as whole, and

2. It is easy to obtain respective industry standards.

Industry standards are generally published periodically by authorized institutions. The industry standards used in this study have been obtained from the Istanbul Chamber of Commerce. Note that due to some economical concerns, industry standards could be changed requiring the periodical assessment to be carried out in order to sustain predefined financial competency [34].

Following ratios are considered to be good enough to indicate the financial competency level of an institution.

Sales profitability: This ratio is found by dividing Profit before Tax and Interest Expenses by Sales Revenue. It shows what percentage of Profit before Tax is generated by sales (Gross Sales Profit/Net Sales).

Asset turnover: This ratio is found by dividing Sales Revenue by Total Assets. Total assets are all the funds affiliated with a business. For that reason, it shows that how much money is turning in assets turnover activities. This ratio is equal to the multiplication of Working Capital Turnover by Working Capital Ratio (Net Sales/Total Assets).

Working capital ratio: This indicator shows in which ratio in working capital finance the assigned funds are used. The total assets show the funds affiliated to an enterprise. As for working capital, it is the part of turnover use of the funds. This ratio shows what percentage of funds allocated to the enterprise as proportion of the total amount of assets. This ratio is calculated by dividing Working Capital by Total Assets (Equity/Total Assets).

Debt burden: This ratio indicates the proportion of Financial Expenditure (paid interest) to Total Debts. Note that it shows the Cost of Borrowing (Financial Expenditure/Total Debts).

Debt/Equity ratio: This ratio is also called the debt/capital ratio. Loans or Owner's Equity are the source of money invested in the enterprise's assets. Enterprises try to earn money with borrowed money just as they earn money with a partner's money. The debt/equity ratio shows how many times loan resources are used compared to sources from the enterprise's partner (Total Debts/Owner's Equity).

Working capital turnover: This ratio shows how many times money has turned in working capital (current assets) in one year. Working Capital Turnover is found by dividing Sales Revenue by Current Liabilities (Net Sales/Current Assets).

The necessary data from the indicators for the calculation of the ratios numerically can be taken from the enterprise's balance sheet. When the ratio values calculated with this data is compared with the industry standards, an enterprise' financial position is made clear. As every competency under the scope of the thesis has been classified in six levels, a level table has been created within financial competency. In the next section, the creation of the level table for financial competency will be explained.

Each ratio is weighted in accordance with its contribution to overall financial competency of the enterprise. The weighting scheme is to be defined in accordance with the economic conditions and sectoral development. However, in this study, each ratio is assumed to have equal effect ($\alpha=0.2$ for each) on the overall competency in order to show the applicability of the proposed model.

Competency levels of the financial situation of the enterprise

A kind of a leveling table is generated to score of financial capability of the enterprises and define the respective positions in a six-level scale. First of all, the enterprise's financial data is measured and compared with the industry standards using the predefined ratios. The values measured are compared with each level of the six-step table as shown in Table 2. Note that, Table 2 defines the definition of each level of financial competency in accordance with known industrial standards.

A score is given to each ratio using the levelized score card as shown in Table 3. The competency of the enterprise is defined in accordance with its actual financial situation (retained level) in comparison with

Financial Competency Level	Explanation
Level 6 Strong Financial Situation	In this level, all financial ratios listed above, have the value which are well above the industry standards (+50% more). Moreover, any enterprise at this level is assumed to be using agent based intelligent monitoring tools for financial progress and Intelligent financial management tools are used effectively in order to sustain respective financial situations.
Level 5 Good Financial Situation	In this level, all financial ratios listed above, have the value which are above the industry standards (30% more, up to 50%). Responsive financial management and customer tracking system is assumed to be running.
Level 4 Normal Financial Situation	In this level, all financial ratios listed above, have the value which are equal or above the industry standards (up to 30% more). Efficient financial monitoring systems are used to define new financial strategies. IT based recording system is employed for financial management system that integrated with ERP system used in an enterprise-wide manner.
Level 3 Poor Financial Situation	In this level, all financial ratios listed above, have the value which are below the industry standards (up to 30% less). Ratios at this level show that an enterprise's financial situation is poor. Enterprise financial system only use offline and independent applications in order to monitor financial accounting processes.
Level 2 Weak Financial Situation	In this level, all financial ratios listed above, have the value which are well below the industry standards (up to 30% to 50% or more less). Ratios in this level show an enterprise is not in a good financial situation.
Level 1 No financial Information	At this level, there is no financial ratio monitored and no data are available for the enterprise. Financial data are not recorded or a regular balance sheet is not kept.

Table 2: Financial competency leveling.

Level	1. Level	2. Level	3. Level	4. Level	5. Level	6. Level
Level Expression	No financial Information	Weak Financial Situation	Poor Financial Situation	Normal Financial Situation	Good Financial Situation	Strong Financial Situation
Level Grade	10 p	20 p	40 p	60 p	80 p	100 p
Sales profitability	**Retained level √**					
Asset Turnover			**Retained level √**			
Working Capital Ratio		**Retained level √**				
Dept Burden			**Retained level √**			
Dept\Equity Ratio					**Retained level √**	
Working Capital Turnover						**Retained level √**

Table 3: An example of a ratio score card.

Enterprise	Industry standard	Assessment
Sales Profitability: 7.8%	6.2%	the enterprise is 25.8 % above industry standard
Asset Turnover: 133.3%	119.7%	the enterprise is 11.3% below industry standard
Working Capital Ratio: 93.3%	54.5%	the enterprise is 71% above industry standard
Debt Burden: 9.8%	10.5%	the enterprise is 6.6% above industry standard
Working Capital Turnover: 142.9%	219.8%	the enterprise is 35% below industry standard

Table 4: Industry standards obtained from the Istanbul chamber of commerce.

the predefined standards. For example, Table 3 indicates that the enterprise is at the first level in terms of sales profitability meaning that the enterprise received 20 points for this ratio. Similarly, the enterprise is in the 3rd level of the competency with respect to asset turnover receiving 60 ratio points [35].

Financial Level Score (FS) calculated by having the weighted sum of the score of each criteria. That is;

$$Fs = \sum S_i * \alpha_i,$$

where "**S**" represents ration scores and "**α**" represents respective eight value.

Once FS of an enterprise is calculated the financial competency is assumed to be as the following.

A+ if FS is above 91 points (STRONG competency)

A if FS is between 71-90 points (GOOD competency)

B if FS is between 51-70 points (MODERATE competency)

C if FS is between 31-50 points (POOR competency)

D if FS is between 16-30 points (WEAK competency)

D- if FS is between 0-15 points (TOO WEAK competency, or NO competency).

The following case study explains the application of the methodology described above.

Note that, this paper intends to present an assessment model rather than implying financial validity of the numbers (such as weight values and score levels etc.) used. It is believed that this classification and weighting scheme implemented could be done based on some better and well accepted criteria by financial community.

Case Study

The financial competency of an enterprise has been measured using the proposed model. In the assessment, the value of financial ratios has been calculated using data obtained from the enterprise's balance sheet. The score card has been marked according to a comparison of the actual values of the six financial ratios of the enterprise in comparison with the industry standards as described in Table 2. Industry standards are obtained from the Istanbul Chamber of Commerce. The analysis indicated in Table 4. Table 5 indicates the levels of financial competencies retained by the enterprise.

$$\alpha_i = 0,2$$

FCS=(60*0,2+40*0,2+100*0,2+60*0,2+40*0,2+20*0,2)=64(**MODERATE**).

Note that the enterprise has a moderate financial competency

Level	1. Level	2. Level	3. Level	4. Level	5. Level	6. Level
Level Expression	No financial Information	Weak Financial Situation	Poor Financial Situation	Normal Financial Situation	Good Financial Situation	Strong Financial Situation
Level Grade / Ratios	10 p	20 p	40 p	60 p	80 p	100 p
Sales Profitability				√		
Asset Turnover			√			
Working Capital Ratio						√
Dept Burden				√		
Dept\Equity Ratio			√			
Working Capital Turnover		√				

Table 5: Financial competency scorecard for industry.

which was well anticipated by the financial authorities of the company as well.

Conclusion

Competency of enterprises are becoming a main issue on the agenda of both management of the companies as well as fund distributing agencies of the government. There is a need for well-defined assessment methodologies. In order for the enterprises to continue their competitive strength and sustainability, some competencies need to be continually developed sustained. This paper presents a financial assessment model which is developed as part of a comprehensive assessment model proposed by Ozel [18].

It is very clear that the financial competency is an assessment area that cannot be overlooked. In fact, it is one of the areas of assessment that draws the most attention when measuring enterprises' performance. It has been frequently mentioned in the studies as it gives important results concerning an enterprise's financial strength. In addition, since this assessment is based on some parameters which can be measured and counted easily and the respective data can be obtained from enterprises' financial tables without any difficulty, financial analysis to heavily used in such concentration of evaluations. it has therefore been identified as an important assessment concept in this study and well accepted ratios are used as the assessment criteria.

By increasing the number of ratios chosen to be used in the assessment of financial competency it is possible to achieve more precise results. It is also important to make sure that the industry standards acquired for the assessment of ratios compared to be correct and up to date. While the model is still aimed at corporate use, a study into the identification of industry standards could provide the acquisition of more robust standards. This is still an issue on the research agenda.

The case study indicated that the proposed model is implementable and a powerful tool for identifying the financial competency of the enterprise where the model is implemented. The results are well accepted by the management and financial authorities as well as the consultants employed by the enterprise. The study continues to identify a methodology for ratio weighting and generating well accepted industrial standards. An integrated scheme still needs to be developed.

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