



## The role of intellectual capital in financial distress prediction

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ARTICLE INF	ABSTRACT
<p><i>Article history:</i> Received: 10-09-2018 Accepted: 6-01-2019</p>	<p>Given the growing importance of intangible assets in a knowledge-based economy, the main purpose of this study is to investigate the role of intellectual capital and its components (efficiency of capital used, efficiency of human capital, and efficiency of structural capital) as criteria of intangible assets on forecasting the financial crisis. To test hypotheses, the accuracy of financial ratio-based models, and models utilizing both financial ratio and intangible assets measures was compared by using data of a sample of 200 financially distressed firm-years and 200 non-distressed firm-years. The empirical data was collected from listed companies in the Tehran Stock Exchange, over the ten years of 2006 to 2015. The major results of this study showed that the accuracy of combined models is significantly more than financial ratio-based models in both Boosting and Bagging methods. That is, intangible assets proxies improve the ability of financial ratio-based models to predict financial distress. Also, the findings of the present study revealed that the more the time between prediction years and financial distress occurrence, the more the effect of intangible asset measures on the accuracy of financial distress prediction models.</p>
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### 1- Introduction

Today, with the increasing competition in business, the possibility of failure has increased. Due to the increase in the competition and also the growing importance of intangible assets, the importance of intellectual capital increases more than before. Accordingly, it is expected that a lack of sufficient attention to the intellectual capital causes the removal of companies from the competition and becoming bankrupt. In other words, intellectual capital can create a competitive advantage and be a factor for success in business and

better financial performance; accordingly, it can prevent financial distress in a competitive market and knowledge-based economy.

The Iranian financial distress literature shows a high number of financial distress prediction models that are generally based on financial ratios, but not on the nonfinancial causes of failure. In fact, despite the importance of intangible assets in the success and failure of companies, these studies ignore the influence of these nonfinancial factors.

Our research attempts to fill the gap described above. Therefore, the main purpose of this study is to investigate the contribution of intellectual capital and its components as proxies of an intangible asset in financial distress prediction.

## **2- Hypotheses**

Based on the preceding theoretical framework regarding the role of intellectual capital and its components in financial distress prediction, research hypotheses were developed as follows:

**H1:** *Including intellectual capital in financial distress models improves their predictive ability.*

**H2:** *Including components of intellectual capital in financial distress models improves their predictive ability.*

## **3- Methods**

Our study is a quantitative research that uses the scientific method and empirical evidence. The empirical data was collected from listed companies in the Tehran Stock Exchange, over the ten years of 2006 to 2015. Ensemble classifiers (Boosting and Bagging) were used as prediction methods for constructing financial distress prediction models. To test hypotheses, the accuracy of financial ratio-based models, and models utilizing both financial ratio and intangible assets measures (value-added intellectual coefficient, human capital efficiency coefficient, and structural capital efficiency coefficient) was compared by using data of a sample of 200 financially distressed firm-years and 200 non-distressed firm-years.

## **4- Results**

The major results of this study show that the accuracy of combined models is significantly more than financial ratio-based models in both Boosting and Bagging methods. That is, intangible assets proxies improve the ability of financial ratio-based models to predict financial distress. Also, the findings of the present study reveal that the more the space between prediction years and financial distress occurrence, the more the effect of intangible asset

measures on the accuracy of financial distress prediction models.

#### **5- Discussion and Conclusion**

The findings of the study support our conceptual framework about the effect of intellectual capital and its components on the performance of financial distress models. That is, these findings imply that intangible assets (intellectual capital, human capital, and structural capital) are indeed valuable for financial distress prediction, so that adding these variables to financial-based models improves their performance in predicting financial distress. Also, our findings are consistent with the resource-based view, transaction cost theory, and empirical evidence on the role of intellectual capital, human capital, and structural capital in business success. In sum, based on these findings, it can be concluded that intellectual capital and its components (human and structural capital) play an important role by improving performance in preventing financial distress.

**Keywords:** Ensemble Classifiers, Financial Distress, Intellectual Capital, Tehran Stock Exchange