

Lecture Notes in Networks and Systems 278

Leonard Barolli
Kangbin Yim
Tomoya Enokido *Editors*

Complex, Intelligent and Software Intensive Systems

Proceedings of the 15th International
Conference on Complex, Intelligent
and Software Intensive Systems
(CISIS-2021)

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Leonard Barolli · Kangbin Yim ·
Tomoya Enokido
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Complex, Intelligent and Software Intensive Systems

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Conference on Complex, Intelligent
and Software Intensive Systems (CISIS-2021)

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Welcome Message of CISIS-2021 International Conference Organizers

Welcome to the 15th International Conference on Complex, Intelligent and Software Intensive Systems (CISIS-2021), which will be held from July 1 to July 3, 2021, at Soon Chun Hyang (SCH) University, Asan, Korea, in conjunction with the 15th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2021).

The aim of the conference is to deliver a platform of scientific interaction between the three interwoven challenging areas of research and development of future ICT-enabled applications: software intensive systems, complex systems and intelligent systems.

Software intensive systems are systems, which heavily interact with other systems, sensors, actuators, devices, other software systems and users. More and more domains are involved with software intensive systems, e.g., automotive, telecommunication systems, embedded systems in general, industrial automation systems and business applications. Moreover, the outcome of web services delivers a new platform for enabling software intensive systems. The conference is thus focused on tools, practically relevant and theoretical foundations for engineering software intensive systems.

Complex systems research is focused on the overall understanding of systems rather than its components. Complex systems are very much characterized by the changing environments in which they act by their multiple internal and external interactions. They evolve and adapt through internal and external dynamic interactions.

The development of intelligent systems and agents, which is each time more characterized by the use of ontologies and their logical foundations, builds a fruitful impulse for both software intensive systems and complex systems. Recent research in the field of intelligent systems, robotics, neuroscience, artificial intelligence and cognitive sciences is a very important factor for the future development and innovation of software intensive and complex systems.

The CISIS-2021 is aiming at delivering a forum for in-depth scientific discussions among the three communities. The papers included in the proceedings cover all aspects of theory, design and application of complex systems, intelligent systems and software intensive systems.

We are very proud and honored to have two distinguished keynote talks by Dr. Jayh (Hyunhee) Park, Myongji University, Korea, and Dr. Antonio Esposito, University of Campania “Luigi Vanvitelli”, Italy, who will present their recent work and will give new insights and ideas to the conference participants.

The organization of an international conference requires the support and help of many people. A lot of people have helped and worked hard to produce a successful CISIS-2021 technical program and conference proceedings. First, we would like to thank all the authors for submitting their papers, the program committee members and the reviewers who carried out the most difficult work by carefully evaluating the submitted papers. We are grateful to Honorary Co-Chairs Kyoil Suh, Soon Chun Hyang (SCH) University, Korea, and Prof. Makoto Takizawa, Hosei University, Japan, for their guidance and advices.

Finally, we would like to thank Web Administrator Co-Chairs for their excellent and timely work.

We hope you will enjoy the conference proceedings.

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CISIS-2021 Keynote Talks

Asking AI Why: Explainable Artificial Intelligence

Jayh (Hyunhee) Park

Myongji University, Yongin, Korea

Abstract. In the early phases of AI adoption, it was okay to not understand what the model predicts in a certain way, as long as it gives the correct outputs. Explaining how they work was not the first priority. Now, the focus is turning to build human interpretable models. In the invited talk, I will explain why explainable AI is important. Then, I will explain an AI model. Through this invited talk, I will discuss models such as ensembles and neural networks called black-box models. I will deal with the following questions.

- Why should we trust your model?
- Why did the model take a certain decision?
- What drives model predictions?

Coevolution of Semantic and Blockchain Technologies

Antonio Esposito

University of Campania “Luigi Vanvitelli”, Aversa, Italy

Abstract. Semantic technologies have demonstrated to have the capability to ease interoperability and portability issues in several application fields such as cloud computing and the Internet of things (IoT). Indeed, the increase in resource representation and the inference capabilities enabled by semantic technologies represent important components of current distributed software systems, which can rely on better information interoperability and decision autonomy. However, semantics alone cannot solve trust and reliability issues that, in many situations, can still arise within software systems. Blockchain solutions have shown to be effective in this area, creating data sharing infrastructure where information validation can be done without the necessity of third-party services. A coevolution and integration of semantic and blockchain technologies would at the same time enhance data interoperability and ensure data trust and provenance, creating undeniable benefits for distributed software systems. This talk will focus on the current state of the art regarding the integration of semantic and blockchain technologies, looking at the state of their coevolution, at the available and still needed solutions.

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Tax Avoidance and Performance: Initial Public Offering

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Abstract. The financial statements of companies that conduct initial public offering (IPO) will be more conservative (12.J. Account. Econ. 45:324–349). This study aims to analyze the impact of the Initial Public Offering (IPO) on the level of tax planning. In addition, this study also analyzes the level of tax planning before and after the initial public offering (IPO). The population of this research is manufacturing companies in Indonesia and purposive sampling is used for the sampling technique so that a sample of 14 companies is obtained with 56 data processed for 2 years. The results showed that this study was unable to prove that there were differences in the level of tax avoidance before and after the Initial Public Offering (IPO). However, the results showed that there were differences in performance before and after the implementation of the IPO.

AQ1

AQ2

Keywords: Tax avoidance · Initial public offering (IPO) · Performance · Tax planning

1 Introduction

Several studies have been conducted on the factors that influence tax avoidance. Tax avoidance is an effort to avoid taxes through loopholes in taxation provisions so as to save the amount of tax costs that must be paid. Therefore, tax expense is one of the objects of tax avoidance. Tax costs are also a part of management's opportunistic behavior in carrying out earnings management [1]. This is because tax costs are a deduction from the last cost in the financial statements so that management can behave opportunistically in calculating the amount of tax costs.

One of the tax planning strategies that can be done is tax avoidance. Tax avoidance is defined as a part of a tax management strategy that is not prohibited because it is done by exploiting loopholes in taxation regulations [2]. In general, tax avoidance is characterized as an explicit tax reduction that does not violate the rules for the purpose of financial reporting [3]. According to [4] tax avoidance is the use of legal tax planning methods to reduce the income tax paid.

Tax avoidance actions that are carried out effectively can have a positive impact on the company, one of which is an increase in company performance. Company

performance is the company's ability to implement policies and company business management. Company performance indicators can be seen through the company's stock price. If the company's performance shows good prospects, investors will be interested in the shares and the price will increase. In order to achieve these goals, managers will try their best to improve company performance through tax avoidance. By doing tax avoidance, it means that managers have tried to make tax savings so that they can optimize the amount of profit. Additional income after tax arising from tax avoidance can encourage company growth and increase profitability which helps expand the market value of the company [5]. The company's performance will be better when the company conducts an initial public offering (IPO).

Initial Public Offering (IPO) is the shares or bonds of a company that are first released to be offered or sold to the public or the public. The motivation of the company to make initial public offerings (IPO) is to improve the company's reputation [6]. Furthermore, through an initial public offering (IPO), investors can easily assess the company. The most important factors such as the level of company profits are of course the main consideration for investors in investing, the goal is that the investment made can provide additional wealth. However, when the company gets high profits, the tax borne by the company is also higher according to the increase in company profits. This high tax obligation will certainly reduce the amount of profit after tax and the rate of return received by shareholders on their investment. This condition motivates managers to manage earnings through tax avoidance around initial public offerings (IPOs). Through tax avoidance, the manager will try to minimize the tax burden paid to the state treasury so that it can increase the profit after tax and the rate of return received by shareholders. This is in line with the results of [7] study which states that tax avoidance can have an impact on rising stock prices, especially for companies with good transparency.

Shareholders of course also strive to keep the company's share price at its maximum by employing professionals as commissioners or managers in managing and making policies so that shareholder prosperity can be achieved. The relationship between the shareholder (principal) and the manager (agent) is called the agency relationship [8]. Based on agency theory, if the principal and agent have the same goal, the agent will support and carry out everything ordered by the principal. In this case, through tax avoidance, the manager as the agent is morally responsible for optimizing the benefits of shareholders (principal). By doing tax avoidance, managers can transfer value from the company to shareholders [9]. If the prosperity of shareholders can be achieved, the shareholders will be satisfied so that the compensation received by the manager will also be higher.

The purpose of this study was to analyze whether tax avoidance as an effort to reduce the corporate income tax burden that affects company performance is used by managers as a decision making in conducting an initial public offering (IPO) or not. The research was conducted on manufacturing companies that carried out an initial public offering (IPO) or listing on the Indonesian Stock Exchange (IDX) during the period 2015 to 2019.

2 Literature Review and Hypothesis Development

2.1 Initial Public Offering (IPO) and Tax Avoidance

Initial public offering (IPO) can provide many benefits for companies, including providing competitive advantage for business development, increasing going concern ability, increasing company reputation and value. Initial public offerings (IPO) are defined as the process of selling shares of a company to the public in the capital market for the first time [10]. According to [10] the factors that influence managers' decisions in making initial public offerings (IPOs) are the advantages of having a publicly observable share price and increased company credibility.

The fundamental reason a company conducts initial public offerings (IPO) is to show that the company is performing well. In order to achieve these goals, managers will try their best to improve performance through tax avoidance. Tax avoidance is an effort to save tax burden and transfer value from the state to shareholders [9]. Companies that undertake tax avoidance prior to the initial public offering (IPO) will minimize the amount of tax paid to the minimum with the aim of increasing profits at the initial public offering (IPO). The increase in profit after tax as a result of tax avoidance has an impact on the increase in the rate of return received by shareholders. Based on the explanation above, the following is the research hypothesis:

H1: Tax avoidance before the initial public offering (IPO) is higher than after the initial public offering (IPO).

2.2 Company Performance, Initial Public Offering (IPO) and Tax Avoidance

Company performance is the company's ability to operate effectively and efficiently. Company performance indicators can be seen through the performance of the company's shares. Stock performance is a measure of the return on shares over a certain period of time. Assessment of company performance before and after becoming a public company is very important. By knowing the results of the assessment of company performance, investment decision making can be done better. The fact that the company's profit and growth is relevant evidence to show the company's business existence and as an indicator to measure performance [11]. Performance can also be defined as stakeholder satisfaction. Therefore, in order to achieve these goals, managers try to improve company performance, through tax avoidance. Tax avoidance is an effort to save tax burden and transfer value from the state to shareholders [9]. Based on agency theory, if the principal (shareholder) and agent (manager) have the same goal, the agent (manager) will support and carry out everything ordered by the principal (shareholder). If the prosperity of shareholders can be achieved, the shareholders will be satisfied so that the compensation received by the manager will also be higher.

In a study by [10], it is explained that company performance is poor for three to five years after the initial public offering (IPO), this happens if we compare it to a broad market index. Based on the explanation above, the following is the research hypothesis:

H2: The company's performance after the initial public offering (IPO) is lower than before the initial public offering (IPO).

3 Research Design

The population of this study includes all manufacturing companies that meet the research criteria and are listed on the Indonesian Stock Exchange (IDX) during the period 2014–2017. In this study, using data from manufacturing companies because manufacturing companies have financial transaction complexity so that the opportunities for tax avoidance also tend to be greater. The sample in this study was obtained using purposive sampling method.

3.1 Operational Definition and Variable Measurement

3.1.1 Tax Avoidance

Tax avoidance is a tax saving action taken by taxpayers with the aim of reducing the income tax paid and not including violating tax laws. In this study, tax avoidance is proxied using the calculation of the Effective Tax Rate (ETR). Effective Tax Rate (ETR) is the ratio between the total tax paid and the total income of the taxpayer (Graham and Tucker 2006). The following is the formulation of the Cash Effective Tax Rate (Cash ETR); Current Effective Tax Rate (Current ETR); GAAP Effective Tax Rate (GAAP ETR).

$$GAAP\ Effective\ Tax\ Rate = \left(\frac{\text{Worldwide total income tax expense}}{\text{Worldwide total pre tax accounting income}} \right) \times 100\% \quad (1)$$

$$Cash\ Effective\ Tax\ Rate = \left(\frac{\text{Worldwide cash taxes paid}}{\text{Worldwide total pre tax accounting income}} \right) \times 100\% \quad (2)$$

$$Current\ Effective\ Tax\ Rate = \left(\frac{\text{Worldwide current income tax expense}}{\text{Worldwide total pre tax accounting income}} \right) \times 100\% \quad (3)$$

3.1.2 Initial Public Offerings (IPO)

Initial public offerings (IPO) are measured using a dummy variable for companies that do Initial public offerings (IPO) are given a scale of 1, while 0 for companies that do not make Initial public offerings (IPO).

3.1.3 Company Performance

In this study, company performance indicators can be seen through the company's stock performance. Stock performance is a measure of the return on assets (ROA) over

a certain period of time. The company's performance is proxied using the return on assets (ROA). The formula for the return on assets (ROA) is as follows:

$$ROA = \left(\frac{EARNING\ BEFORE\ TAX}{Assets} \times 100\% \right) \quad (4)$$

3.1.4 Analysis Technique

First, a descriptive test was carried out and continued with hypothesis testing. Hypothesis testing using the mean difference test method for two paired samples (paired sample t-test or Wilcoxon). This different test model is used to analyze the pre-post or before and after research models.

4 Research Results and Discussion

4.1 Hypothesis Test

Based on the data entered, the data normality test was carried out. The results of the data normality test are presented in Table 1 below. Based on the table, it shows that the data for the GAAP ETR meet the requirements for a different test with the pair sample T test because the significance level is above 0.05, the data is normal. As for the Cash ETR and Current ETR data, the Wilcoxon t test is used because the significance value is below 0.05, so the data is not normal. After the normality test is carried out, the research hypothesis testing is carried out.

4.1.1 Cash Effective Tax Rate (Cash ETR)

Based on Table 1, it shows that the Z value is -1.412 with a significant value (2-tailed) of 0.158 which is higher than 0.05, so H_0 : is accepted and H_a : is rejected. This means that there is no difference in the level of tax avoidance (Cash ETR) before and after the IPO. The rejection of this hypothesis shows that company management does not do tax avoidance (Cash ETR) in the context of IPO to improve company performance through tax planning (tax avoidance/Cash ETR).

4.1.2 Cash Effective Tax Rate (Cash ETR)

However, if you use a confidence level of 90% or a significance level of 10% with 1-tailed, then the significant value is 0.084 which is lower 0.10 then H_0 : is rejected and H_a : is accepted. This shows that there are differences in the level of tax avoidance (Cash ETR) before and after the IPO. This means that management carries out tax planning through tax avoidance (Cash ETR) in order to increase good proforma during the IPO.

4.1.3 Current Effective Tax Rate (Current ETR)

The results of tax avoidance analysis with the measurement of Current Effective Tax Rate (Current ETR) are presented in Table 1. The results of the hypothesis test analysis are presented in Table 1. Based on the table, it shows that the Z value is -0.296 with a significant value (2-tailed) of 0.767, higher than 0.05, so H_0 : is accepted and H_a : is

Table 1. Hypotheses test

	After cash ETR - before cash ETR	After current ETR - before current ETR	Before GAAP ETR - after GAAP ETR	After ROA - before ROA
Z – Value/t-value	-1.412 ^b	-0.296 ^b	0.322	-3.310 ^b
Sig. (2-tailed)	0.168	0.769	0.750	0.001
Conclusion	Rejected	Rejected	Rejected	Accepted

rejected. This means that there is no difference in the level of tax avoidance (Current ETR) before and after the IPO. Rejection of this hypothesis shows that company management does not do tax avoidance (Current ETR) in the context of IPO to improve company performance through tax planning (tax avoidance/Current ETR).

4.1.4 General Accepted Accounting Principle (GAAP) ETR

The results of tax avoidance analysis using GAAP Effective Tax Rate (GAAP ETR) are presented in Table 1. The results of the analysis of hypothesis testing using different test pairs sample t test are presented in Table 1. Based on the table, it shows that the t value is 0.322 with a significant value (2-tailed) of 0.750 which is higher than 0.05, so H_0 : is accepted and H_a : is rejected. This means that there is no difference in the level of tax avoidance (GAAP ETR) before and after the IPO. Rejection of this hypothesis shows that company management does not do tax avoidance (GAAP ETR) in the context of IPO to improve company performance through tax planning (tax avoidance/GAAP ETR).

4.1.5 Company Performance (ROA)

The results of the data normality test showed that the data were not normally distributed, so hypothesis testing was carried out using the Wilcoxon test. The performance analysis as measured by ROA is presented in the Table 1. Based on Table 1, it shows that the Z value is -3.310 with a significance level of 0.001 below 0.05, so H_0 is rejected and H_a is accepted. This means that the performance of the company before and after the IPO is very different. This is supported by descriptive data from the performance of the sample companies which show that the average company performance before the IPO is higher than after the IPO. This indicates that it is true that the company has carried out tax planning through tax avoidance in order to improve the company's proforma during the IPO.

5 Discussion

Based on hypothesis testing, there are several findings that can be discussed in this study. First, the results of the tax avoidance hypothesis testing show that there is no difference in tax avoidance as measured by Cash ETR before and after the IPO. However, based on the results of the rank test (Table 2) shows that there were 10 sample companies that experienced a decrease in the value of tax avoidance with an

average of 14.10 and a total decrease of the 10 companies a total of 141.00. This shows that there are 10 sample companies that have carried out tax planning through tax avoidance in the context of implementing an IPO, thus showing good company performance. On the other hand, 18 sample companies experienced an increase in their tax avoidance value with an average increase of 14.72, so that the total increase was 265. The increase in the value of tax avoidance shows that the sample companies have carried out tax planning with compliance with tax payments, which is indicated by the value of tax avoidance the higher it is.

Table 2. Rank test

		N	Mean rank	Sum of ranks
After Cash ETR	Negative ranks	10 ^a	14.10	141.00
Before Cash ETR	Positive ranks	18 ^b	14.72	265.00
After CURRENT ETR	Negative ranks	15 ^a	14.40	216.00
Before CURRENT ETR	Positive ranks	13 ^b	14.62	190.00
Before GAAP ETR	Negative ranks	15 ^a	14.27	214.00
After GAAP ETR	Positive ranks	13 ^b	14.77	192.00
After ROA	Negative ranks	26 ^a	16.96	441.00
Before ROA	Positive ranks	6 ^b	14.50	87.00

Second, the results of the tax avoidance hypothesis testing show that there is no difference in tax avoidance as measured by Current ETR before and after the IPO. However, based on the results of the rank test (Table 2) shows that there are 15 sample companies that experienced a decrease in the value of tax avoidance as measured by Current ETR with an average of 14.40 and the total decline of the 15 companies a total of 216.00. This shows that there are 15 sample companies that have carried out tax planning through tax avoidance as measured by Current ETR in the context of implementing an IPO. This shows that the company has carried out tax planning through tax avoidance in order to show a good company proforma before the IPO. On the other hand, there were 13 sample companies that experienced an increase in their tax avoidance value with an average increase of 14.62, so that the total increase was 190. The increase in the value of tax avoidance shows that the sample companies have carried out tax planning with compliance with tax payments, which is indicated by the value of tax avoidance measured by Current ETR which is getting higher.

Third the results of the tax avoidance hypothesis testing show that there is no difference in tax avoidance as measured by GAAP ETR before and after the IPO. However, based on the results of the rank test (Table 2) shows that there are 15 sample companies that experience a decrease in their tax avoidance value as measured by GAAP ETR with an average of 14.27 and the total decline of the 15 companies is 214.00 in total. This shows that there are 15 sample companies that have carried out tax planning through tax avoidance as measured by GAAP ETR in the context of implementing an IPO. This shows that the company has carried out tax planning through tax avoidance in order to show a good company proforma before the IPO. On the other

hand, there were 13 sample companies that experienced an increase in the value of tax avoidance with an average increase of 14.77, so that the total increase was 192. The increase in the value of tax avoidance shows that 13 sample companies have carried out tax planning in compliance with tax payments, which is indicated by the value of tax avoidance measured by GAAP ETR which is getting higher.

Fourth, the results of the performance hypothesis testing show that there is difference in performance before and after the IPO that there are 26 sample companies that experienced a decline in performance as measured by ROA with an average of 16.96 and the total decline of the 26 companies was 441.00. This shows that there are 26 sample companies that have experienced a decline in performance (ROA) prior to the implementation of the IPO. In contrast, there were only 6 sample companies that experienced an increase in performance during the IPO with an average increase of 14.5 and a total of 87.00. This shows that the company actually had a poor performance prior to conducting the IPO, but in order to improve proforma at the IPO, the company carried out tax planning through tax avoidance. Meanwhile, there were only 6 sample companies that had really good performance at the time of the IPO.

6 Conclusion, Limitation and Future Research

Based on the results of data analysis that have been presented and described in previous chapters, the conclusions of this study can be presented as follows: (1) The company has carried out tax planning through tax avoidance prior to conducting an IPO in order to improve performance before conducting an IPO. Although in research it is not sufficient to prove statistically, descriptive data leads to this. (2) The company has a better performance before the IPO than after the IPO. This indicates that the company has carried out tax planning to improve performance in the context of implementing an IPO. (3) Management uses tax planning through tax avoidance in order to show that management performance was good at the time of the IPO.

There are several limitations in this study, including the following: (1) This study only obtained very few research samples due to the limited number of companies conducting IPOs in certain years. (2) This research has not been able to statistically prove that there are differences in the level of tax planning before and after the IPO, however the descriptive data shows that there are differences even though they are small.

Based on the above limitations, there are several suggestions for future research that can be carried out in the context of developing accounting knowledge, especially regarding tax avoidance. First, Further research is expected to be able to increase the number of research samples so that the research results can prove statistically that there is a difference in the level of tax avoidance before and after the IPO. Second, the results of this study add to the literature on tax avoidance research. Third, this research can have implications for policy makers in the context of implementing a company's IPO, to always pay attention to management behavior at certain times. The results of this study have implications for government policies regarding taxation, the need for continuous tax audits of corporate taxpayers.

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AQ2	As Per Springer style, both city and country names must be present in the affiliations. Accordingly, we have inserted the city name in the affiliations. Please check and confirm if the inserted city name is correct. If not, please provide us with the correct city name.	
AQ3	Please provide a definition for the significances of [b and a, b] in the ‘Tables 1 and 2’.	
AQ4	Kindly provide volume number for the Ref. [3], if applicable.	