THE IMPORTANCE OF STATISTICAL ANALYSIS IN ACCOUNTING RESEARCH

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Abstract

In recent years, the use of statistical analysis in academia and enterprises has been developing. Generally, students, professors, workers, and users are usually exposed to statistical analysis at some point. Sometimes, it is difficult to perform this type of analysis. Few people have theoretical knowledge to understand statistical analysis clearly, sometimes even the results given. Often, academic institutions or companies require users to provide reports but do not have time to explore or understand the results or tasks required for optimal data preparation. The statistical methods involved in conducting a study include planning, designing, collecting data, analyzing, deriving meaningful explanations and reporting the study results. The statistical analysis gives meaning to meaningless numbers, thus making life lifeless. Only by using appropriate statistical tests can the results and inferences be accurate. In this work, we provide a statistical overview of some accounting research conducted in various countries to reveal the importance of statistical analysis in completing accounting and finance research.

Keywords: *Statistical Analysis, Accounting and Finance, Financial Analysis.*

1. Introduction

In today's technologically advanced world, it can be access to large amounts of data. The first step in data analysis is to accurately summarize all this data graphically and numerically so that it can be understood what the data reveals (Demir et al., 2019). Being able to use and interpret data correctly is essential to making informed decisions (Budur, 2018; Budur et al., 2018). For example, when an opinion survey on a TV is show, you may be interested in the proportion of people who actually like the TV show (Abdullah et al., 2021; Crump et al., 2020; Rashid, 2017).

Descriptive statistics are used to describe the basic characteristics of data in research. They provide a simple summary of samples and metrics. Together with simple graphical analysis,

they form the basis of almost all quantitative data analysis. Descriptive statistics are usually distinguished from inference statistics (Abdullah and Fatah, 2020; Jaf et al., 2015). With descriptive statistics, you only need to describe what the data is or what the data shows. With inferential statistics, the conclusions you are trying to draw are not limited to immediate data. Descriptive statistics are used to display quantitative descriptions in a manageable form. In the research, we may have many measures. Or we may measure large numbers of people in any way. Descriptive statistics help us simplify large amounts of data in a smart way. Each descriptive statistic reduces large amounts of data into a simple summary. (El Alili et al., 2020; Jaf et al., 2019; Rashid, 2020).

As the name suggests, descriptive statistics are descriptive. They did not summarize the data considered. Descriptive statistics describe what the data shows. Numerical descriptive measures calculated from data are called statistics. The overall numerical descriptive measure is called a parameter. Inferential statistics can be used to generalize the findings of sample data to a wider population (Jaf et al., 2021; Setiyawati, & Doktoralina, 2019; Rashid, 2019).

The purpose of the current study, therefore, is to review and investigate the articles that have been conducted on this issue. Accordingly, it discovered that the majority of the studies that have been completed conclude that statistical analysis has significant effect on accounting research.

2. Accounting and Finance

Glyphosate is an herbicide widely used worldwide. In 2015, the International Agency for Research on Cancer (IARC) reviewed bioassays and human studies of glyphosate cancer and declared that evidence of carcinogenicity of glyphosate is sufficient in laboratory animals. We analyzed 10 glyphosate rodent bioassays using the multi-response replacement program, including those in which IARC found carcinogenicity, which can be adjusted for a large number of tumors that meet the statistical test conditions and provide valid false Probability of positive. The test statistics of these permutation tests are a function of the p-value of the standard value, which is applicable to the dose response trend of each specific type of tumor. We evaluated 3 permutation tests, using the smallest p-value of the dose-response trend in the standard statistical test as the test statistic, and the number of times the p-value of this type of test was less than or equal to 0.05 or 0.01. The false positive probability obtained from the 2 implementations of these 3 permutation tests is: minimum p value: .26, .17; p value ≤ .05: .08,

.12; and p value ≤ .01: .06, .08. In addition, we found that there is more evidence of a negative dose response trend than a positive result. Therefore, we have not found strong evidence that glyphosate is an animal carcinogen. The main reason for the discrepancy between the IARC findings and ours seems to be that IARC did not explain the large number of tumor responses analyzed, and the possibility that some of them accidentally showed statistical significance increased. This work is more comprehensive than previously available data on the carcinogenicity of this important herbicide in animals (Crump et al., 2020).

The purpose of this study is to use cluster data to evaluate the performance and impact of multi-layer model (MLM) and ordinary least squares (OLS) regression in experimental-based economic evaluation. Three thousand data sets with balanced and unbalanced clusters were simulated. The correlation coefficients between cost and effect were −0.5, 0, and 0.5, and the intra-group correlation coefficient (ICC) varied between 0.05 and 0.30. Each case was analyzed using MLM and OLS. Use the bootstrap method to estimate the statistical uncertainty surrounding MLM and OLS estimates. The performance indicators were evaluated and the differences between the methods were compared, including bias, root mean square error (RMSE) and coverage. The difference in cost and effect and its corresponding confidence interval and standard error, the increase in cost-benefit ratio, the increase in net monetary gain, and the acceptability curve of cost-benefit are compared. The cost-benefit results between OLS and MLM are similar. Compared with OLS, MLM generates greater statistical uncertainty, and the coverage probability is closer to the nominal level. The higher the ICC, the greater the impact on the statistical uncertainty between MLM and OLS. The significant cost-benefit results estimated by OLS become unimportant when estimated by MLM. Among all ICCs, the cost-effectiveness probability of MLM is lower than that of OLS, and as ICC increases, this difference becomes greater. Cross-scenario performance indicators and cost-benefit results are similar, and the correlation coefficient between cost and effect is also different. Although OLS produces similar cost-benefit results, it greatly underestimates the amount of data change compared to MLM. To avoid drawing sub-optimal conclusions and possibly wasting scarce resources, it is important to use MLM in experiment-based economic evaluation when clustering data (El Alili et al., 2020).

A large number of accounting studies published in recent years involve statistical testing. Our paper proposes improvements to the quality and execution of such research. We have dealt with the following limitations in the current research, which seem to be ignored or improperly

used in our opinion: (1) Unresolved situational effects caused by model limitations and so-called "data carpentry", (2) Limitations and alternatives, (3) Relying on the calculated "p-value" of the research rather than the economic or behavioral importance of the results to make necessary improvements, and (4) Underestimating the knowledge and knowledge learned from copying The resulting information loss (Dyckman, & Zeff, 2019).

This study aims to determine the impact of the use of information technology and the application of good governance principles on the quality of accounting information. The survey is an explanatory study designed to explain the causal relationship between variables by testing hypotheses. This analysis is used to determine the influence of the independent variable on the dependent variable. This research is based on existing theories and later developed into a research model, aiming to study the impact of the use of information technology and good governance principles on the quality of accounting information. The research aims to re-examine the quality of accounting information in order to answer research questions about the impact of the use of information technology and the impact of good governance principles on the quality of accounting information. The benefit of this research is that it contributes scientifically to financial accounting and public sector science and attempts to solve the problems faced by stakeholders in performing tasks related to the quality of accounting information. The research results show that the use of information technology will affect the quality of accounting information, and the application of good governance principles will also affect the quality of accounting information. The significance of this research will help raise awareness of the importance of the Indonesian regional government's integrity in the accounting reporting system (Setiyawati and Doktoralina, 2019).

The purpose of this research is to understand the brand, brand equity, brand knowledge and its impact on consumers, especially on consumer products. To achieve this goal, we first analyze the concept of brand equity; then analyze how brand knowledge and its elements attract consumer goods consumers to choose or evaluate brands, and then further explain the brand environment and demographics (age, gender) and brand knowledge in Bangladesh Interaction with brand preferences. The concept of brand equity emerged in the early 1990s. From the perspective of individual consumers, brand equity can be viewed as management concepts, financial intangible assets, relationship concepts or customer-based concepts. Previous research has shown that brand knowledge may be affected by company and consumer characteristics (such as consumer personality). Significant differences were found in usage,

gender and age. Because brand knowledge and associations are used for positioning, the results of open-ended questions will suggest whether companies engaged in marketing activities should strengthen or change these associations and elements to highlight product types and their attachment to age and gender preferences. Marketing strategies, including promotion or communication strategies, should further specifically screen brand knowledge associations in the target market before formulating a marketing plan (Yamin, 2020).

This study empirically studies the value correlation of earnings measured by EPS and book value per share (BVPS) when predicting the market price of stocks. The findings of this paper are based on processing secondary data from 68 companies from four different industries, namely banks; pharmaceuticals and chemicals listed on the Dhaka Stock Exchange (DSE) in Bangladesh, telecommunications and services, and real estate. This article mainly develops the valuation model of Basic Ohlson (1995) to preserve the influence of accounting variables on stock market prices. The value relevance of accounting information is tested through the estimated regression coefficients of accounting variables (BVPS and EPS) and the adjusted (R^2). The findings of the study state the significant prominent capacity of book value per share (BVPS) and earnings per share (EPS) in projecting the share prices. In comparison of the individual explanatory power between BVPS and EPS, it is also evident that EPS has more descriptive power in projecting the market price of shares than that of book value per share. Hence, EPS has more value relevance and been mostly considered by both the existing and potential investors in projecting the market price of shares (Saha, & Islam, 2020).

The power and energy industry are one of the current successful cases. The reason for this is that targeted measures have been taken in the past decade to get rid of the power crisis in the country. According to the CPD (Moazzem and Ali, 2019), the industry is moving towards the long-term goal of ensuring energy sustainability: 27,400 MW (2030) and 51,000 MW (2041) (PSMP, 2016). It's time to review the achievements. The main purpose of this article is to analyze the external and internal forces of the sample companies, formulate different strategies and propose some appropriate strategies. Based on the analysis of external factors, we prepared the EFE matrix for the company. Through internal analysis, we found that the energy industry has many advantages and disadvantages. We have selected the main advantages and disadvantages of the United Power Generation and Distribution Company. Based on the analysis of internal factors, we prepared an IFE matrix for UPGDCL. We also prepared a SWOT matrix, in which we formulated UPGDCL's strategy by matching strengths,

opportunities, threats and weaknesses. We have formulated five strategies that UPGDCL can adopt. Among these strategies, we recommend three strengthening strategies for the company, namely expanding market business, attempting to increase its share in the renewable energy market, and attempting to increase market share through marketing. We also suggested a diversification strategy. Therefore, we suggest that the company should be linked to a diversification strategy. Therefore, intensive and diversified strategies can be applied simultaneously (Luna and Lina, 2020).

Clinical trials of chronic obstructive pulmonary disease (COPD) designed to evaluate the therapeutic effect of acute attacks often suffer from early discontinuation of random treatment. Discontinuation of treatment means loss of information and should ideally be considered in the statistical analysis of trial results, especially when discontinuation is related to the disease or treatment itself. Here, we explore this issue by studying (1) whether there is an association between the risk of exacerbation and discontinuation of treatment in COPD clinical trials, and (2) whether ignoring this association will lead to bias in the evaluation of the effect of exacerbation treatment. We focus on the estimation of hypotheses, that is, if all subjects completed the trial as planned, the effect of the treatment would have been observed. The data of five phase III-IV COPD clinical trials were analyzed by applying the combined fragility (random effects) model (which can analyze multiple types of related events at the same time) to analyze the association between exacerbation and withdrawal risks. Specifically, by comparing the treatment hazard ratio of the joint weakness model with the ratio/hazard ratio of two related statistical models (negative binomial and shared fragility model), the association's influence on the estimation of the worsening treatment effect is evaluated. It has nothing to do with the outcome of the trial. The models were also compared using simulated data. In all trials, there was a statistically significant ($p < 0.0001$) positive correlation between the risk of exacerbation and withdrawal. Importantly, the simulation confirmed that-in the case of such an association-a model that ignores the associated risk can produce biased results (hazard/ratio difference> 5 percentage points). For the treatment comparison in some clinical trials, the difference in treatment effect between the joint weakness model and other models is estimated to be as high as 10-15%. This difference is affected by the strength of the aggravation-discontinuation combination, the heterogeneity of the population at increased risk, and the difference in discontinuation rates between treatment groups. In five COPD clinical trials, we have determined the association between aggravated and discontinued treatment risks. We recommend that when evaluating the effects of acute exacerbation treatment, especially when

considering hypothetical estimates use the joint weakness model to illustrate this association (Król, et al, 2020).

3. Statistical Analysis

The use of CO2 for enhanced oil recovery (CO2-EOR) is a promising emission management technology, because CO2-EOR can be significantly reduced without an emission policy that encourages carbon capture and storage Storage cost. This research developed a multi-scale statistical framework for carbon dioxide accounting and risk analysis in the EOR environment of Farnsworth, Texas (FWU). A set of Monte Carlo simulations based on statistics was carried out, and the overall sensitivity analysis of CO2, oil and gas, water flow and transportation in the Morro formation was carried out, and the following main risk indicators were statistically analyzed: CO2/water injection/oil production Amount, cumulative net CO2 storage, cumulative oil and gas production and carbon dioxide breakthrough time. Estimate the median and confidence interval to quantify the uncertainty range of the risk measure. An economic model based on the response surface has been derived to calculate the CO2-EOR profitability of the FWU site with the current oil price, which shows that about 31% of the 1,000 implementations can be profitable. If government carbon tax credits are available, or if oil prices rise or carbon dioxide capture and operating expenses decrease, then more monetization will be profitable. The results of this study provide valuable insights into understanding the potential of CO2 storage and the corresponding environmental and economic risks of commercial-scale CO2 storage in depleted reservoirs (Dai et al., 2020).

The statistical techniques currently used in musculoskeletal research usually cannot effectively explain the relationship between paired limb measurements or measurements obtained from multiple areas of the limb. This study compares three commonly used analysis methods with the mixed model method, which appropriately considers the association between limbs, regions, and trials, and utilizes all available information from repeated trials. Four analyses were performed on an existing data set containing foot pressure data, which was collected from seven covered areas on the left and right feet in three trials in three participant groups. Methods 1-3 average the data in the experiment and analyze the right foot data (method 1), randomly selected foot data (method 2), and the average of the right and left foot data (method 3). Method 4 uses all available data in the mixed effects regression, which takes into account repeated measures taken for each foot, foot area, and trial. The width of the confidence interval for the average difference between the groups of each foot area is used as a standard for comparing

statistical efficiency. The average pressure difference between groups is similar between the methods for each foot area, and the confidence interval width of method 4 is always smaller. Method 4 also showed significant group differences that were not detected by methods 1-3. The mixed-effect linear model method has improved efficiency and power by generating more accurate estimates, while the alternative method is to discard information while considering paired limb measurements. It is recommended to use this method to produce more clinically meaningful and statistically efficient research results (Stewart, 2018).

Most economic growth and development viewpoints emphasize the role and importance of investment in the process of community economic growth and development. Due to the lack of investment resources, it is necessary to determine the relative advantages of a country to best allocate investment resources to stimulate economic growth, and to use effective restrictive resources to accelerate economic growth by directing investment resources to the most productive sectors. Considering the limited financial resources, in addition to the investment development of the Tehran Stock Exchange, improving investment efficiency is also a very important issue. This research explains the impact of accounting information quality on investment efficiency and focuses on the role of auditors' expertise in the industry. This study was conducted using 2014-2017 data, using a systematic screening method to select a sample from 143 companies. Regression analysis shows that auditors' expertise in the industry has a significant and positive impact on investment effectiveness and the quality of accounting information on investment efficiency. Finally, the results of the third hypothesis test show that the expertise of auditors in the industry has no significant impact on the relationship between the quality of accounting information and investment efficiency (Moradi et al., 2019).

In this article, we have adopted triple bottom line (TBL) accounting and considered the threats to cyber security from natural gas and global supply chain sustainability. The global supply chain is a wide variety of contingent claims contracts and relationships all over the world. It contains both risks and benefits. In this study, the balance of consequences was considered. We propose a sustainable economic model that retains the positive dynamics of capitalism and accounting principles, while improving the collaboration between the industry, landowners and environmentalists to optimize the company's profit return to the land. The owner provides royalties and meets the earth's environmental concerns. Our TBL approach supports the need to maintain the best quality of free enterprise and market-driven regulatory profits, while also providing social and environmental benefits. The method we propose is novel and may be

helpful to decision makers in all sectors from public to private. We strive to make sufficiently objective and appropriate conclusions to guide how the model can be used in other departments or other decision makers. This review has several purposes. First, we aim to understand the technical application of TBL optimization and use it in conjunction with mathematical and statistical analysis. Secondly, we propose a fuzzy comprehensive language operator weighted average application to better understand TBL and strengthen the argument for its use. Finally, we debated the issues inherent in this type of analysis of stakeholder perspectives and objectivity (Rodger, & George, 2017).

Heavy metal soil pollution is related to potential toxicity or ecotoxicity to humans. Scholars are increasingly using the combination of geographic information science (GIS) and geostatistics and multivariate statistical analysis techniques to examine the spatial distribution of heavy metals in the soil within a region. A review of this type of research indicates that most soil sampling procedures are based on grid patterns and composite sampling methods. Many programs are designed to characterize various soil types and land use types. The most commonly used sampling depth interval is 0–0.10 m or 0–0.20 m below the surface. The sampling density is 0.0004 to 6.1 samples per square kilometer, with a median of 0.4 samples per square kilometer. The most widely used spatial interpolators are distance inverse distance weighted interpolation and ordinary cringing. The most commonly used multivariate statistical analysis techniques are principal component analysis and cluster analysis. The review also identified several decisive and related factors for the distribution of heavy metals in the soil, including soil type, soil pH, soil organic matter, land use type, iron, and aluminum and heavy metal concentrations. It has been found that the main natural and anthropogenic sources of heavy metals come from digenesis, roads and transportation, atmospheric deposition, wastewater and runoff from industrial and mining facilities, fertilizer applications, livestock manure and sewage sludge. This review argues that the full potential of integrated GIS and multivariate statistical analysis in assessing the distribution of heavy metals in soils on a regional scale has not yet been fully realized. It is recommended that future studies be conducted to map multivariate results in GIS, to identify specific human sources, analyze time trends outside of the spatial pattern, optimize modeling parameters, and extend the use of multivariate analysis tools beyond principal component analysis (PCA) and cluster analysis (CA) (Hou et al., 2017).

This article deals with statistics and historical statistics written by employees of statistical agencies and statistical teachers in the nineteenth century. Special attention includes K.F. Herman Asseniev. The materials they compiled made it possible to identify the reasons for the formation of a national statistical agency. In the context of the development of "academic statistics" that influences the development of statistical institutions as part of the management system, the interrelation and mutual influence of statistical theories in statistical work practices are considered, and vice versa. I.A. E.F. Zyablovskiy's work Geim D.P. Zhulavsky (V.S.) Pooching (D.A.) Militia has been independently reviewed. In the work of A. B. Bushmen, the activity of the national statistical agency is to determine its reliability and reliability in the process of forming statistical data consider representativeness. In general, these exercises laid the foundation for the further development of statistics, because it has been isolated from the national statistical accounting system and has become a science, which can be traced back to the sociology of Russian academic statistics, Russian philosophy and mathematics, etc. direction. And other content based on mathematical calculation methods (Skopa, 2018).

At present, domestic universities pay more and more attention to publishing research papers in foreign journals. Therefore, understanding the structural characteristics of writing top English journal papers is very important for writing English research papers (Hu, 2007). This article uses John Swale's mobile pace analysis method. In the past three years (2016-2018), 110 papers from authoritative Chinese accounting journals "Accounting Research" and "Accounting and Economics" (one of them) The introduction was adopted. Three major American accounting journals are selected as the research objects and the length of the introduction, the frequency of use of each step and the differences in writing are compared and analyzed. The results show that there are significant differences in the number and structure of Chinese and English introductions. Compared with English introduction, Chinese introduction has fewer words and no specific writing steps. The research results of this article are of great significance for writing citations of accounting papers, developing English Chinese contraceptive linguistics, and enriching text structure research (Qiao, & Hao, 2019).

4. Conclusion

This work reviewed 15 articles among different countries about the importance of statistical analysis in accounting research. Most of them recommend that statistical analysis can play a significant role in conducting and improving accounting research in the entire world. Hence,

statistical analysis can be depended on for approving accounting and financial data in the academic research.

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