Final Report AFAANZ Grant 2017

The project has been completed and has produced two journal papers, one book chapter and forthcoming, a conference paper for the upcoming AFAANZ conference in 2019. A related project looking at the psychological aspects of Japanese culture has been pursued by two of the researchers who received an invitation to publish in an edited book to be published by Springer, tentatively in 2019.

The researchers are very grateful to AFAANZ for the funding of the research.

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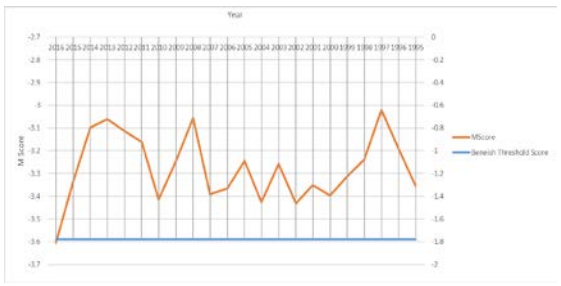
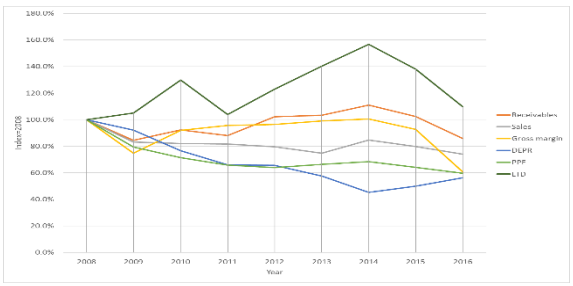
Project Title: A Two-Stage Analysis of financial statements' misstatements using Benford and Beneish's Models

Updated Project Summary (500 words)

The main aim of the study is to use two mathematical analysis tools, Benford's Law Digital Analysis and Beneish M-Score model, to detect accounting irregularities in Toshiba's financial reporting during the 14 years studied [pre-fraud (2002-2008) and post-fraud (2010 - 2016). Firstly, the Beneish M-Score mathematical model was used to flag Toshiba as a manipulator. Toshiba exceeded the Beneish M-Score threshold since 1995 up until 2016 just before fraud revelations in 2015 which then the Independent Investigation Report was issued, and the financial statements were restated. Beneish model was also used to detect the accounts that had been manipulated since 2009 when Toshiba was reported to start its fraudulent accounting practices (Figure 2).

Figure 1: Toshiba M-Score	Figure 2: Manipulated Accounts (the Year 2008 is used as the reference point)
	

Next, we applied Benford's Law Digital Analysis to test if the digital analysis can detect the manipulated accounts as detected by the Beneish model. The first-digit test is used to test the overall reasonableness of the Income Statement and Balance Sheet data. The general rule is that if the first digit test was a weak fit to Benford's Law, it is a signal that the data set might contain abnormal duplications and abnormalities. The most significant deviations and the associated (most significant) Percentage Unit Deviation (PUD[1]) for Income Statement and Balance Sheet accounts are as shown in Table 1 below.

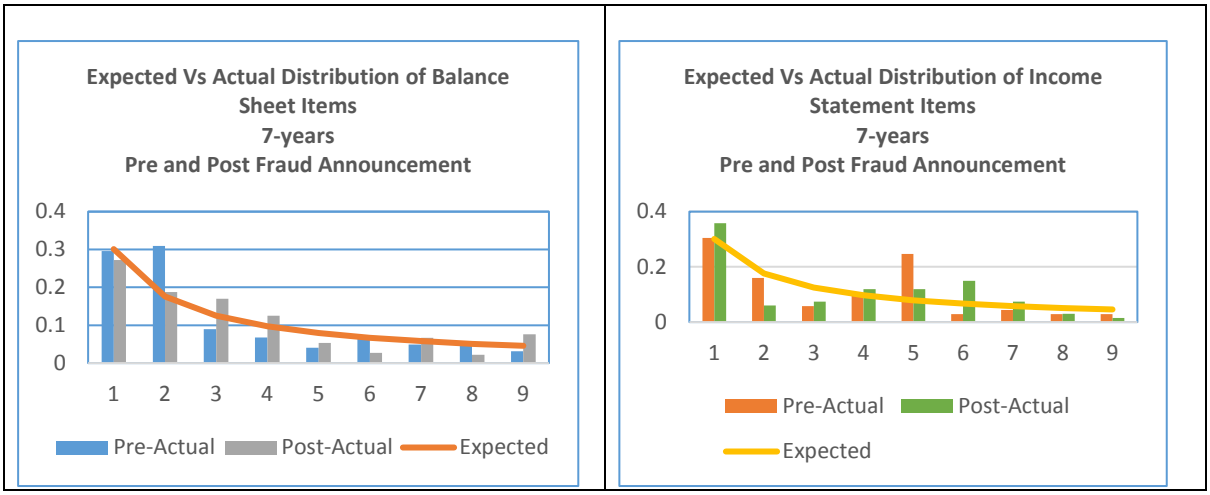
Table 1: Income Statement and Balance Sheet Items and PUD (Pre Vs. Post Fraud)

	Pre-Fraud (2002-2008)	Post-Fraud (2010-2016)
Income Statements accounts		
Sales & Other Incomes	+21%	+36%
Non-operating Expenses – income taxes	+42%	+21%
Operating Expenses	z-statistic not significant	+20%
Balance Sheet accounts		
Equities	+37%	+27%
Long-term receivables	+25%	-25%
Property, Plant & Equipment	+25%	+22%
Long-term Liabilities	-25%	+28%
Other Assets	z-statistic not significant	+23%
Total Current Assets	z-statistic not significant	+17%
Current Liabilities	z-statistic not significant	+16%

Table 1 indicates that the income statement accounts have been manipulated upward (+21% and +36%) and expenses accounts were also adjusted in the same directions to reflect those manipulations for both pre- and post-fraud revelations. Equity and long-term liabilities accounts contain a higher level of divergence from Benford's Law distribution. The long-term receivables upward manipulation pre-fraud was neutralized by the downward manipulation in post fraud revelation period. The decrease in PUD for the Plant, Property and Equipment account was consistent with the upward trend of depreciation, as highlighted in Figure 2. The total current assets, other assets, and current liabilities were manipulated upward, but they were significant only post-fraud period. Overall results show that income statement accounts recorded the greatest divergence from Benford's Law as compared to the Balance Sheet accounts as shown in Figure 3 below.

Figure 3: Expected Vs. Actual Distribution of Balance Sheet and Income Statement Items

[1] Percentage Unit Deviation: The deviation from the distribution as predicted by Benford's Law.



We conclude that both the Beneish M-Score model and Benford's Law Digital Analysis are consistent in detecting the accounts manipulated by Toshiba. **(493 words)**

Funds Granted: **AUD$4,500 (NZ**$4,870.18)

Account Number RM20370 (as per Massey University's Research Information Management System)

Detailed Report on Expenditure of Funds against Budget Items, with variations explained.

	Item	Budgeted (NZ$)	Actual (NZ$)	Variance (NZ$)	Explanation
1	Casual Wages Academic	$2,540.18	1,651.90	888.10	This amount will be used for the relief for marking this semester 2 2018 (undergoing)
2	Contracted Services	$2,330	280.00	2,050.00	Proofreading services for completed papers and the revisions due to publication process yet to be charged.
	TOTAL	4,870.18	1,931.90	2,938.10	

Outcomes, for example, working papers, presentations and publications (give full details, including abstracts)

1. ***Journal submissions:***
   1.1. **Benford's Law and Earning Numbers Manipulation in Good Governance Countries submitted to the International Journal of Accounting**

Using Benford's Law digital analysis, we examine ten years of reported net incomes by 5,040 firms (44,636 firm-years) in 10 countries ranked as having the best corporate governance quality to assess their reported net incomes. The observed frequency of second digits abnormally exceeds the level predicted by Benford's Law, which results in a higher frequency of the number zero and an abnormally low occurrence of the number nine in the second digit of the reported income numbers. A reversal pattern occurs for reported net losses, with higher nines and lower zeros. Therefore, our analysis reveals the practices of rounding up phenomenon in countries ranked in the top ten in the good

governance rankings. This rounding is higher than expected for the net losses. The results also show that the practice co-varied with some institutional factors; in particular, the rule of law and government effectiveness has significantly influenced the rounding behaviour. The findings would be of interest to standard setters and policymakers to enhance their understanding of the implication of discretions in accounting principles that permit managers to indulge in rounding up earnings numbers. Also, cautioning the investors the reported earnings numbers might have been cosmetically made up even by firms from a country known to have a good governance system.

1.2. Strategic Camouflage: Toshiba's Deception Tactics and Benford's Law Digital Analysis submitted to the International Journal of Accounting

Toshiba Corporation had a financial scandal involving the use of inappropriate accounting procedures, which was revealed in 2015. This paper offers insights as to how Toshiba's fraud is perpetrated and concealed by the management using Theory of Deception. It also provides evidence of whether Benford's Law (BL) digital analysis, if used, has potential in identifying manipulated accounts earlier than the fraud year, 2009. The analysis revealed that Toshiba employed mainly dissimulation strategies through masking, repackaging and dazzling tactics to camouflage the actual revenues. Some of the tactics were so unjustified that they were almost impossible for auditors to detect. However, this analysis of 14 years' financial statements data using BL revealed abnormalities and irregularities in various accounts starting from 2002 and continued after the fraud was announced to the public. The digital analysis also red-flagged the upward and downward manipulation of various accounts, as reported in the IIC report. This paper is the first that combines the quantitative aspect of the digital analysis with the qualitative aspect of the IIC report and triangulates the findings by using a theory borrowed from the social psychology literature to examine and understand how the fraudulent schemes were played out in a real fraud case.

2. Book chapter: Forensic auditing tools in detecting financial statements' irregularities: Benford's Law and Beneish Model in the case of Toshiba in, Organizational Auditing and Assurance in the Digital Age accepted on 18th October 2018 by IGI publishing

This chapter illustrates a three-stage analytical procedure to examine and detect the likelihood of financial statements manipulation and identify the accounts that were manipulated by Toshiba. It applies the Beneish model and Benford's Law to Toshiba's Balance Sheet and Income Statement from 2002 to 2016. The results show significant deviation from Benford's Law in the pre-fraud period in equity, long-term receivables & property, plant & equipment, long-term liabilities and, in the post-fraud period in the long-term liabilities, equity, long-term receivables, and total current assets. The results provide evidence of the usefulness of Beneish and Benford Law as forensic auditing tools for detecting financial statements' irregularities and fraud that would be useful for the audit planning and sampling procedures.

3. ***Other Related Project (book chapter): Cultured Crime of Obedience and Fraudulent Financial Reporting in Time of Crisis, in Transcending Cultural Boundaries, (Eds.) to be published by SpringerLink (accepted 30th July 2018)***

Motivated by "Inability thesis," this paper aims to understand the role that culture plays in human behaviour. In this pursuit, a cultural approach is undertaken to examine evidence of fraudulent financial reporting of a Japanese multinational corporation struggling with deteriorating performance. Culture has always been blamed for corporate financial crimes, but there is a lack of understanding of the context in which the business decisions are rationalized in time of crisis. Our study shows how the culture was used and abused in an environment where ethical decisions were replaced with the need to portray business as usual when in fact, the corporation as a group, was collapsing. In Toshiba's case, the top management institutionalized various inappropriate accounting treatments directly and indirectly through their subordinates' understanding (and misunderstanding) of what was expected of them in the situation through the crime of obedience. The motivation of the President and the subordinates for surviving the situation was cemented based on their understanding of the unspoken language of group mode behaviour. While we believe that cultural limitation and cultural upbringing do not exempt individuals from their responsibilities, the understanding of how the "local" managers place cultural importance in decision-making could offer the "international" managers culturally-attuned strategies in managing global corporations, especially in a time of crisis.

Future Intentions for this project (give full details)

4. ***Conference submissions:*** **Theory of Deception and Accounting Number, to be submitted to 2019 AFAANZ Conference, Brisbane (work in Progress)**