The Audit Risk Model, the Signal Detection Theory, and the Information Manipulation Theory

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The Audit Risk Model

The Statement of Auditing Standard (SAS) 99, 107, and International Standards on Auditing (ISA) 240, 315, and 330 require auditors to assess fraud risk factors and materiality level (risk of material misstatement) in a client's financial statements(Bhattacharjee, Maletta, & Moreno, 2016). It further requires auditors to gather sufficient appropriate audit evidences in order to provide reasonable assurance whether the client's financial statements are free of material misstatements (Bhattacharjee, Maletta, & Moreno, 2016). The auditors have to assess the effectiveness of a client's internal control over the financial reporting, thereby plan the nature, timing, and the extent of their audit procedures to assess the fraud risk in a client's financial statements (Burton, Wilks, & Zimbelman, 2013). The SAS 107 provides a model for audit risk, in which, audit risk (AR) = inherent risk (IR) X control risk (CR) X detection risk (DR). The inherent risk is the susceptibility for an account or assertion to be materially misstated, whereas the control risk is the risk that an entity's internal controls fail to detect financial reporting misstatement. The detection risk is the risk that substantive and analytical audit procedures fail to detect misstatements in the financial reporting. However, this model does not address the influence of sociological, organizational, and ethical factors on the management fraud and does not account for type I and type II audit errors risk, which is the risk to reject fairly presented financial reporting (false negative), and the risk to accept fraudulent audit report (false positive) respectively.

The Signal Detection Theory

As an alternative to the audit risk model, the current study suggested the use of signal detection theory (SDT) to test the efficiency and effectiveness (sensitivity) of the audit procedures in detecting fraud risk signals. The SDT is a useful analytical tool especially in events of uncertainty and risk, as it separates sensitivity (signal) from bias (noise) (Lynn & Barrett, 2014). The SAS 106 requires auditors to gather sufficient appropriate evidences to assess misstatement risk for account-level assertions and financial statements as a whole based on their professional judgment. The auditor ensures classes of transactions pertain to the entity, have occurred, recorded and classified correctly in the correct period. Similarly, the auditor must confirm that all assets, liabilities and equity accounts have actually existed, belonged to the entity (rights and obligations), valued and recorded properly; and disclosures are accurate, understandable, and complete**.**

According to SDT, auditors accept an account balance (assertion) when finding no signal for the management fraud (called noise), and reject it when finding signal for the management fraud (Honeycutt & Eldredge, 2015). According to SDT, auditors have four possible judgment regarding management fraud: the first, an auditor may notice a signal for the management fraud (S) when it is actually a management fraud (MF) (Pr (S|MF), called hit) (Honeycutt & Eldredge, 2015). The second, an auditor may not notice a signal (called noise) for the management fraud (nS) when it is actually a management fraud (MF) (Pr (nS|MF), called Miss (type II error) (Honeycutt & Eldredge, 2015). The third, an auditor may notice a signal for the management fraud (S) when it is not actually a management fraud (nMF) (Pr (S|nMF), called false alarms (type I error). The fourth, an auditor may not notice a signal for the management fraud (nS) when it is not actually a

management fraud (nMF) (Pr (nS|nMF), called correct identification) (Honeycutt & Eldredge, 2015). A summary of these judgmental possibilities is depicted in figure 1 below.

The audit procedures are effective when the hit rate Pr (S|MF) and correct identification Pr (nS|nMF) is close to one and ineffective when it is close to 0.5. Audit procedures are ineffective when there is misses Pr (nS|MF) and inefficient when there is false alarms Pr (S|nMF). According to SDT, auditor make decision whether an event is a fraud signal or a noise (not a fraud signal) by comparing the likelihood ratio to the criterion value, thereby accept (reject) the event as a signal (noise) If likelihood ratio is lesser (greater) than the criterion value (beta) (Karim & Siegel, 1998). Likelihood ratio = Hits rate (Pr (S|MF) divided by False alarms rate (Pr (S|nMF), whereas criterion value (beta) = K (constant of proportionality) X Pr (MF)/Pr (nMF) (Karim & Siegel, 1998).

Auditor Judgment	**Management fraud (MF)**	
	Yes (MF)	*No (nMF)*
Fraud Signal	Hits rate: Pr (S|MF)	False alarms rate: Pr (S|nMF)
Noise (no Signal, nS)	Misses rate: Pr (nS|MF)	Correct identification rate: Pr (nS|nMF)

"S" means there is fraud signal supported by audit evidence "nS" means there is no fraud signal supported by audit evidence "MF" means there is an actually management fraud
"nMF" means there is no actually management fraud "Pr" means the probability

Figure 2. Possibilities of auditor judgment based on SDT

The Information Manipulation Theory

The current study extended the application of the information manipulation theory (IMT) to management fraud. The IMT is referred to McCornack (1992) who related the IMT to interpersonal communication by focusing on the content (quality, quantity, relation, and manner) of a message transmitted

deceivably from a sender to a receiver in order to give a false impression to a receiver (figure.3) (McCornack, Morrison, Paik, Wisner, & Zhu, 2014). The IMT relates the degree of deceptiveness to four dimensions of conversational maxims (quality, quantity, relation, and manner) (McCornack, Morrison, Paik, Wisner, & Zhu, 2014). The quantity relates to the reasonable amount of information included in a message, quality relates to the truthfulness of information included, relation relates to relevancy of information included, and manner relates to the way information presented (McCornack, Morrison, Paik, Wisner, & Zhu, 2014). In other words, quantity relates to the amount of disclosed information, quality relates to the authenticity of disclosed information, manner relates to the way that disclosed information is expressed, and relation relates to the relevancy of disclosed information (McCornack, Morrison, Paik, Wisner, & Zhu, 2014). Similarly, a company management prepares their company's financial statements (message) and file it with the SEC for their intended users. A summary of the information manipulation theory is depicted in figure 2 below.

According to the IMT, deception take places when any of the IMT conversational maxims (quality, quantity, relation, and manner) is violated, as the theory presumes that individuals communicate cooperatively in an honest, relevant, clear, and informative way (McCornack, Morrison, Paik, Wisner, & Zhu, 2014). Similarly, fraudulent financial reporting can be viewed as a violation of the IMT conversational maxims of quality (untruthful financial reporting due to misrepresentation of material facts), quantity (uninformative financial reporting due to the omission of material facts), relation (irrelevant financial reporting), and manner (ambiguous and unclear financial reporting). The financial statement fraud takes place when the financial statements (message)

contains an intentional misrepresentation or omission of material facts (amounts or disclosures) to deceive the users (Goel & Gangolly, 2012). Therefore, fraudulent financial reporting (as a message) can be viewed as a deceptiveness to the four dimensions of conversational maxims (quality, quantity, relation, and manner) (McCornack, Morrison, Paik, Wisner, & Zhu, 2014). The mmanagement may opportunistically manipulate financial reporting (message) of their company for various motivations such seeking bonus, job security, or to benefit shareholders as well (Sun & Liu, 2016). IMT was criticized for lacking formal, testable, falsifiable propositions (Walczyk, 2014); therefore, McCornack, Morrison, Paik, Wisner, and Zhu (2014) proposed Information Manipulation Theory 2 instead.

Information Manipulation Theory			
Quality	**Quantity**	**Relation**	**Manner**
Truthfulness of information included	Reasonable amount of information included	relevancy of information included	Way information presented
Fraudulent Financial Reporting			
Quality	**Quantity**	**Relation**	**Manner**
Untruthful financial reporting due to misrepresentation of material facts	Uninformative financial reporting due to omission of material facts	Irrelevant financial reporting	Ambiguous and unclear financial

Figure 3. IMT and fraudulent financial reporting

The current research study adds to the fraud-detection literature by analyzing five potential fraud risk indicators and testing their efficacies in differentiating fraudulent and non-fraudulent firms. To my knowledge, these five potential fraud-risk factors have not been evaluated collectively, and therefore the current study sought to evaluate them and

adds to the fraud-detection literature. The current study suggested an integrated conceptual framework for the management fraud-risk assessment. The conceptual framework integrated the personality factors, the ethical/moral factors, and the social/organizational factors into one conceptual model (fraud risk-assessment model). The goal was to add to the understanding and interpretation of the FSF. The study proposed the application of fraud risk matrix and signal detection theory as tools to analyze financial statements' fraud risk factors. Additionally, the current study tested the efficacy of the Benford's law, the decision tree model, and the neural network model in differentiating the fraudulent financial reporting from the non-fraudulent one.

In summary, the study theoretical framework articulated multiple theoretical foundations for FSF including agency theory, a fraud-triangle theory, a theory of planned behavior, decision theory, criminology theory, moral and ethics theory, signal detection theory, and information manipulation theory. The study proposed a fraud risk-assessment model, which attributed the probability of the management fraud to three factors: fraud motivations, fraud opportunities, and fraud controls. The study analyzed five potential perceived pressures and incentives to commit a fraud: financial performance indices, financial health indices, management efficiency indices, accounting practices, and corporate governance indices. The perceived fraud opportunities include weak internal controls, weak corporate governance, and strong management capabilities. Whereas, the perceived fraud controls factor include societal, organizational, personal, and ethical controls. The model considered the likelihood and severity of fraud motivations and opportunities simultaneously, as a tool for auditors to assess the probability of fraud risk, thereby adjust the nature, timing, and extent of their audit procedures. The goal is to

obtain sufficient, appropriate evidence that enables them to furnish a sound opinion/audit report whether the financial statement free of material misstatement due to error or fraud.

References

Bhattacharjee, S., Maletta, M. J., & Moreno, K. K. (2016). The Role of Account Subjectivity and Risk of Material Misstatement on Auditors' Internal Audit Reliance Judgments. *Accounting Horizons, 30*(2), 225-238. doi:10.2308/acch-51363

Burton, F. G., Wilks, T. J., & Zimbelman, M. F. (2013). How auditor legal liability influences the detection and frequency of fraudulent financial reporting. *Current Issues in Auditing, 7 (2),* 9-15. doi:10.2308/ciia-50566

Elsayed, A. A. (2017). *Predictability of financial statements fraud-risk* (Order No. 10271451). Available from ProQuest Dissertations & Theses Global. (1901803774). Retrieved from https://search-proquest-com.contentproxy.phoenix.edu/docview/1901803774?accountid=3581

Honeycutt, J. M., & Eldredge, J. H. (2015). Applying game theory and signal detection theory to conflict escalation: A case study of a police investigator viewing a domestic argument. *International Journal of Mathematics, Game Theory, and Algebra, 24*(1), 13-23.

Karim, K. E., & Siegel, P. H. (1998). A signal detection theory approach to analyzing the efficiency and effectiveness of auditing to detect management fraud. *Managerial Auditing Journal, 13*(6), 367-375.

Lynn, S. K., & Barrett, L. F. (2014). Utilizing signal detection theory. *Psychological Science, 25*(9), 1663-1673. doi:10.1177/0956797614541991

McCornack, S. A., Morrison, K., Paik, J. E., Wisner, A. M., & Zhu, X. (2014). Information manipulation theory 2: A propositional theory of deceptive discourse production. *Journal Of Language And Social Psychology*, *33*(4), 348-377. doi:10.1177/0261927X14534656.

Sun, J., & Liu, G. (2016). Does analyst coverage constrain real earnings management? *The Quarterly Review of Economics and Finance, 59,* 131-140. doi:10.1016/j.qref.2015.03.009

Walczyk, J. J. (2014). A Commentary on Information Manipulation Theory 2: Its Place in Deception Research and Suggestions for Elaboration. *Journal Of Language & Social Psychology, 33*(4), 424-430. doi:10.1177/0261927X14535395