

2.2. Financial Reporting and Investors' Judgments and Decisions

2.2.1. Financial Statement Analysis and Performance Assessment Judgments (PAJ)

As depicted in Figure 2.2, prior literature suggests that the investors usually engage in a 7-step process when they perform financial statement analysis to assess firm's financial performance, financial position, and future prospects (see Elliott et al., 2005, an earlier version of Elliott et al., 2007).

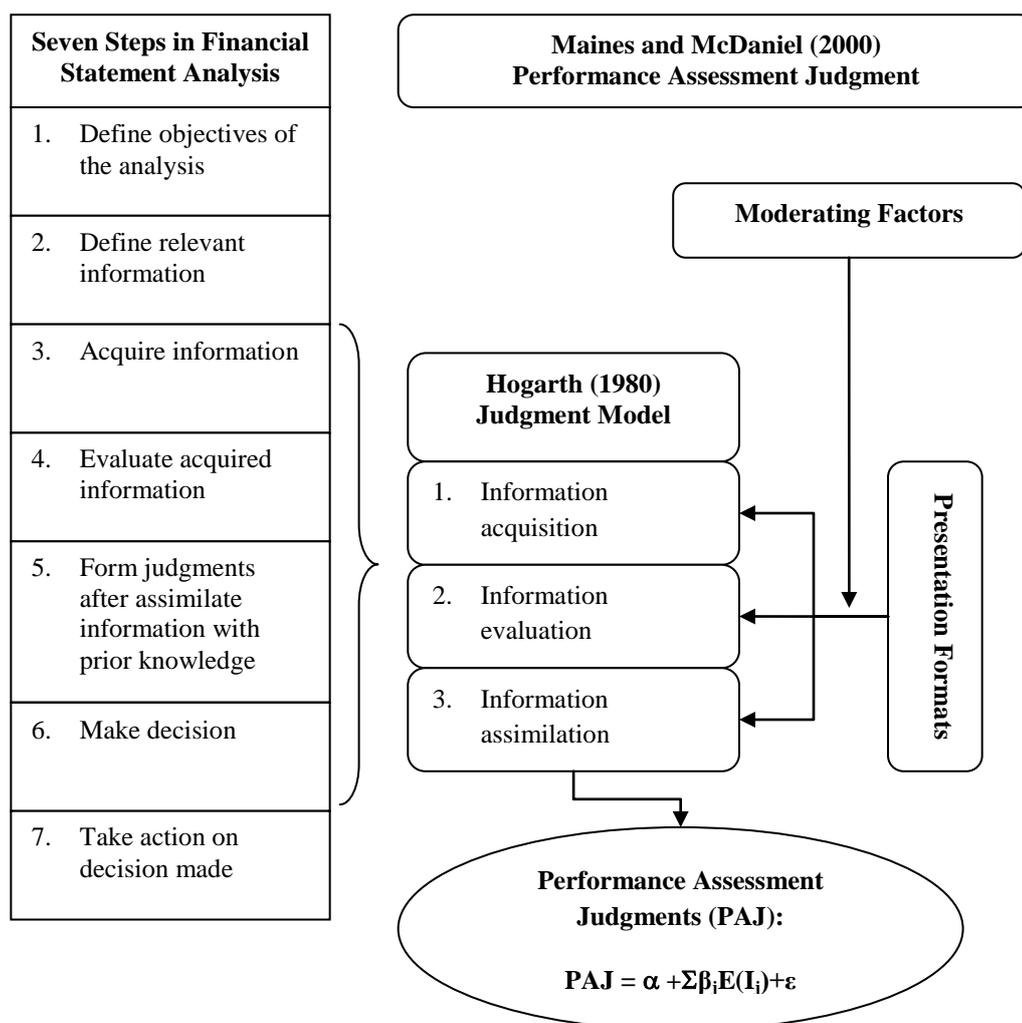
First, the investors must set objectives of the analysis or set frame of study when they would like to perform financial statement analysis. Second, they must define a set of relevant financial information needed to be obtained from relevant data sources that are publicly available to them. Third, the investors must acquire the relevant information defined from various sources of information that are available to them such as financial statements, press release, corporate news, and etc. Forth, they must evaluate the financial information retrieved. Fifth, the information acquired and evaluated must be integrated or assimilated with prior knowledge to form judgments pertaining to the firm performance. Sixth, the investors will then make financial and credit decisions based on their established judgments. Lastly, the investors will take actions as a result of judgments and decisions reached.

Numerous judgment and decision-making (JDM) studies in accounting focus on step 3 – step 6. To be precise, they center their attention on information acquisition, information evaluation, and assimilation of information or information weighting and their impacts on the judgments of financial statement users.

Maines and McDaniel (2000), for example, use the psychology framework to study performance assessment judgments (*PAJ*). The *PAJ model* viewed performance assessment judgment as a weighted linear combination of cues or financial statement items; i.e., $PAJ = \alpha + \sum \beta_j E(I_j) + \varepsilon$; where Cues $E(I_j)$ are investor's evaluation of financial statement information (I_j), which are outputs of information acquisition and evaluation stages and β_i is weight assigned to specific information item when forming judgments. In sum, the performance evaluation

judgments are influenced by the financial information; its impact is contingent on the importance placed on each piece of information.

Figure 2.2: Financial Statement Analysis and Judgment Model



In addition, Hogarth (1980) describes that the judgment model encompasses (a) information acquisition, (b) information evaluation, and (c) information assimilation. Information acquisition is when individual investor identifies and reads a piece of financial statement information and store that piece of information in the memory and can later recall²⁶ the information correctly. Information evaluation is

²⁶ The recall tests can be utilized to assess whether the investor acquires information when presented in a different setting (see for example, Maines and McDaniel, 2000).

when the individual investor can assess certain characteristics of that piece of information acquired such as consistency, pattern of information, magnitude, and presentation location. Information weighting or assimilation of information is the importance or weights assigned to specific piece of information when individual form judgments. Additionally, in some studies, information evaluation and assimilation of information are merged together to form information integration (see for example, Elliott et al., 2007 and Krische, 2005). The ability of individuals to integrate information to form judgments and make decisions is a function of integrative complexity of the task performed, which is an ability to interrelate or link distinct characteristics of information set to reach judgments (Elliott et al., 2007.) As depicted in the aforementioned figure, presentation format is an important factor influencing information acquisition, evaluation, and assimilation. The Incomplete Revelation Hypothesis, discussed in details in the following section, provides an explanation as to why presentation format can influence investors' judgments.

2.2.2. Incomplete Revelation Hypothesis and Financial Reporting

2.2.2.1. Discussion on Incomplete Revelation Hypothesis

Prior literature suggests that information location and presentation format of financial information influence financial statement users' judgments and decisions. In fact, according to *Efficient Market Hypothesis* or *EMH*, how information is presented should not have any impacts on the decision-making process of investors because they would be able to see-through and understand its content and be able to integrate information that is publicly available in a variety of sources to reflect the true value of a firm. Stated differently, controlling for information content, investors would not assign any additional value to the differences in presentation formats (as well as presentation locations). However, psychology research indicates that information would affect judgments and decisions only when it is *saliently* available to the decision makers and when it is presented in the form that is readily processible (Krische, 2005 and Maines and McDaniel, 2002). The investors usually engage in

availability heuristics and salience biases²⁷ (Kahneman et al., 1982). That is to say, to be relevant to the decision making process, the information must be clearly presented to the decision makers (Hirst and Hopkins, 1998). Thus, the format does matter. In fact, the presentation format could play a critical role whether the financial information is used in the decision process at all. This is consistent with the “*Incomplete Revelation Hypothesis*” or *IRH*, proposed by Bloomfield (2002).

The IRH is formally stated below:

***“THE INCOMPLETE REVELATION HYPOTHESIS:
Statistics that are more costly to extract from public data
are less completely revealed by market prices. This
association is driven by the following causal chain:***

- *Statistics that are more costly to extract from publicly-available information drive less trading interest.*
- *Statistics that drive less trading interest are less completely revealed by market prices”* (Bloomfield, 2002).

The IRH suggests that the prices are not fully revealed the information that is more costly or more difficult to extract from publicly-available data. The extraction costs play central role in explaining the over-reactions as well as the under-reactions of investors to a certain set of information. The extraction costs include (1) *cash costs of searching, collecting, integrating information as well as opportunity cost of doing so*, and (2) *cognitive cost associated with cognitive effort exerted to acquire, evaluate, and disseminate information*. The IRH provides explanations to many phenomena, which are inconsistent with EMH, such as the price drifts, the presence of financial analysts, the management’s financial reporting behavior, strategic benchmark disclosure, and the financial reporting regulations.

²⁷Availability heuristic is when the ease with which instances or associations come to mind influences one’s estimation of frequency or probability of those events. Salience biases are when distinctive stimuli disproportionately influence judgments of an individual (Kahneman et al., 1982).

IRH provides numerous implications to financial reporting environment. First, not only the IRH explains the price reactions resulting from financial information announcement, but also it further predicts that price would react more strongly to the information that is more easily extracted. Second, the IRH also provides explanation to price drift observed in empirical studies (Ball and Brown, 1968, Bernard and Thomas, 1989 and 1990). IRH proposed that the harder the information to extract, the greater price drift is expected to be observed.

Third, usually, there are not many investors who are willing to exert cognitive effort and to spend cash cost to extract information. However, with the presence of finance professionals, the extraction costs associated with financial analysis would be dramatically reduced. The investors would be more willing to trade with a reduced extraction cost. The stock recommendations and financial advices provided by financial analysts boost the information collection of investors. Besides, investors with more capital endowment and less risk aversion would be more willing to invest to collect information because they are expected to gain more benefits from trade.

Fourth, the IRH also provides justifications describing management's financial reporting behaviors. Prior literature on management strategic reporting and benchmarking suggests that managers tend to present or disclose information that they would like to conceal in a less salient way to make it more difficult to be extracted by investors; thus, it would not have a strong impact on stock price (Hirst and Hopkins, 1998, Schrand and Walters, 2000, and Krische, 2005). The practice of announcing pro forma earnings with the objective of expectation management also provide empirical evidence supporting the IRH (Frederickson and Miller, 2004 and Elliott, 2006). What's more, the IRH could also explain the classification shifting observed in McVay (2006) with the purpose to obscure the "real" earnings of the firm.

Finally, financial reporting regulation and accounting authoritative guidance influence the level of information extraction costs. The IRH proposes that the more the financial reporting transparency and the more salient the information presentation, the less extraction cost incurred in collecting information and the stronger effect of information on stock prices. In most cases, the management would lobby against the more transparent accounting alternatives (Deakins, 1989). Note that the more-informed traders who have informational advantages would gain trading benefits from

trading with less-informed traders. Bloomfield (2002) also caution against protecting less-informed traders or noise traders because doing so would lose the opportunity to develop a more rigorous financial analysis model.

2.2.2.2. Incomplete Revelation Hypothesis and Presentation Format and Presentation Location

Prior literature has empirically and experimentally presented the effect of information presentation format on the investors' judgment and decision making. Consistent with aforementioned IRH, the variation in presentation format imposes differential level of extraction costs to acquire certain statistics that can be used in investment and credit decisions. Prior literature on presentation format and investors' judgment and decision making explore three different settings: (1) same set of information that is presented in different financial statements, (2) same set of information that is presented in different classification of the same financial statement, and (3) same set of information that is recognized as opposed to disclose in the notes to financial statements.

In the first setting, Hirst and Hopkins (1998) and Maines and McDaniel (2000) explore the impact of information presentation of comprehensive income on the different financial statements on both professional and non-professional investors. The result reveals that clear display of comprehensive income on performance statement enhances information visibility and information relevance. Moreover, Hirst and Hopkins (1998) suggest that presentation of comprehensive income on the performance-related statement (i.e., income statement) facilitate earnings management detection. Maines and McDaniel (2000) employ psychology-based framework in testing the impact of information location on the investor's information acquisition, evaluation, and weighting processes. The presentation location does not affect whether information is acquired or evaluated but it affects how investors weight comprehensive income.

In the second setting, Hopkins (1996) suggests that the impact of issuance of financial instrument that includes both debt and equity characteristics on the stock price judgment depends on the balance sheet classification that the financial

instrument is presented. As suggested by psychology research, financial statement users mentally retrieve knowledge of equivalent or related situations when making the decisions. Moreover, the classification of decision-relevant information can influence the knowledge that is retrieved. In other words, the investors use their prior knowledge on the impact of straight debt issuance and equity issuance on stock price when they evaluate the stock price for a company classifying the financial instrument on different balance sheet classification. The research has not been explored experimentally on the matter of the impact of different income statement classification on the stock price or firm's value.

Lastly, in the third setting, Libby, Nelson, and Hunton (2006), Belzie et al. (2006), and Nelson and Tayler (2007) explore reliability of disclosed information in comparison to the recognized information. They suggest that the reliability of disclosed amount might be lower than the amount recognized and presented on the face of financial statements because the auditors permit more misstatement in note disclosure than in recognized amount. The evidence suggests that the auditors make these decisions intentionally despite more client resistance because they consider recognized amount as more material. Thus, the information location can influence the reliability of information which is one of the factors determining the information quality that is presented to investors.

2.2.2.3. Cognitive Limitations and Costs in Processing Financial Information

As suggested by IRH, the manner by which the financial information is presented and disclosed can certainly influence investors' judgments when they evaluate the financial performance and future prospects of a given firm.

According to the psychological framework employed in Krische (2005), the cognitive process influencing investors' judgments in evaluating firm's performance comprises (a) *availability*, (b) *integration*, and (c) *inferences and corrections*. The financial information would influence judgments only when it is made available and when it is integrated by the financial statement users in their investment-related decisions. Holding the information content constant, different inferences drawn might result from different information forms or structures revealed.

Prior literature suggests that presentation formats have an impact on weights assigned to particular financial statement items (Maines and McDaniels, 2000) due to differential cognitive costs. The weights assigned would, certainly, influence the usefulness of the financial statement items in performing financial statement analysis. Consistent with the IRH, cognitive cost is one of the vital factors in determining how and whether the financial information impacts judgments and decisions. Cognitive costs incurred are contingent on several factors such as placement, labeling, linkage, isolation, and aggregation.

If the information presentation (both in terms of placement and label) is salient, the probability that the information is acquired or can be recalled from memory is increased. The impact of that information on the judgments would be increased (Hogarth, 1980). If the information is presented in such a way that make the linkage among different pieces of information easily noticeable, the understandability would be improved and, consequently, that information has a greater impact on judgment and decision made. Moreover, different labels may lead to different subsequent decisions and actions. Consistent with Levin et al. (1982), Koonce et al. (2005), and Reingen and Bearden (1983), the labels placed on individuals or items do impact the expectation of evaluators and influence risk judgments of individuals.

In case of isolation and aggregation, if the information is mixed with other relevant/irrelevant information, not presented in isolate statement or section, the cognitive costs incurred to process information simultaneously and to separate relevant information from irrelevant information tremendously increased (Maines and McDaniels, 2000).

Information pursuit or transformation requires additional cognitive efforts to process information. Moreover, information pursuit has a bearing on weights assigned to a particular piece of information (Nelson and Tayler, 2007). Note that information pursuit influences information weighting, controlling for the information content and usefulness of the information. The fact that the investors choose to pursue or transform information forces them to designate more weights on

transformed information. This is consistent with Festinger's theory (1957)²⁸ (cited in Nelson and Tayler, 2007) in that the individuals would alter belief to avoid cognitive dissonance²⁹.

An individual must exert more cognitive effort (more extraction cognitive costs) when they are presented with inconsistent information both in terms of content and presentation. The inconsistent information both in terms of content and format can also induce cognitive dissonance. Recall that the Festinger's (1957) cognitive dissonance³⁰ evolves when an individual comes across two or more conflicting or contradicting ideas, cognitions³¹, or actions.

In conclusion, presentation format diversity influences financial statement users' judgments due to cognitive information processing limitations and cognitive costs incurred, irrespective to investor types or investor's level of sophistication. Presentation format affects whether the information is actually acquired as well as how information acquired is weighted by the financial statement users. The format may signal the level of importance and usefulness of that particular information by presenting the item on the face of the main financial statements or using the key terms, like income or profit, to describe the item. Likewise, the format may heighten

²⁸ Cognitive dissonance is discomfort feeling induced by having two contradictory ideas and/or actions simultaneously. People tend to exert cognitive effort to reduce the possibility of cognitive dissonance by adjusting their belief, declining or downplaying one of the conflicting views, and/or seeking information consistent with their own views or hypothesis (i.e. consonant evidence) (Hogarth, 1980).

²⁹ The cognitive dissonance evolves if the individuals find that the transformed information is not useful or is having low information weight when they exerted their cognitive efforts in pursuing the information.

³⁰ Snow (2005) summarizes several paradigms of cognitive dissonance, namely, free-choice paradigm, belief-disconfirmation paradigm, effort-justification paradigm, induced-compliance paradigm, and selective exposure paradigm that give rise to uneasiness. Under the free-choice paradigm, individuals are more likely to rate their chosen alternative as more favorable than the abandoned alternative to reduce the possibility of cognitive dissonance. For belief-disconfirmation paradigm, people tend to alter their beliefs so that they are more consistent with the newly acquired information to mitigate the discomfort resulting from cognitive dissonance. Effort-justification paradigm suggests that if the perceived quality of goal is high, the individuals would try to justify their choice in engaging in distasteful activities to reduce internal conflicts resulting from those unpleasant activities. In some cases, consistent with the induced-compliance paradigm, people might try to justify their conflicting behavior if they are motivated or forced to comply with certain set of rules or regulations. More commonly, under the selective exposure paradigm, the individuals would usually select the information that is consistent to confirm or support their belief and behavior to ease discomfort from conflicting evidence.

³¹ Cognition is the mental process involving perception, attention, memory, language, problem solving, reasoning, and making decision (Goldstein, 2008). Perception is defined as "conscious experience that results from stimulation of the senses." Attention is a focus on particular aspect of an event or an object. Memory is about the retention, retrieval, and usage of specific information on an event or an object when the information is no longer presented. Language is the means through which an individual used to communicate and express ideas. Problem solving is when an individual tries to resolve the problem or penetrate the barrier prohibiting one from reaching the goal. Reasoning is the process by which an individual utilizes information presented to them to reach certain conclusions. Decision making is choosing among various viable alternatives.

the cognitive costs incurred if it requires further calculations to disaggregate the aggregated information before the information can be used (Nelson and Tayler, 2007). Moreover, inconsistency usually induces cognitive dissonance³².

2.2.2.4. *Incomplete Revelation Hypothesis and the Development of Hypothesis 1:*

Consistent with IRH (Bloomfield, 2002) discussed earlier, the mixed format financial statements, as opposed to proposed working format financial statements, would induce more cognitive cost because the information is not consistently and cohesively presented in every financial statement. The mixed format financial statements comprise (1) proposed format income statement, (2) traditional format balance sheet, (3) traditional format statement of changes in stockholders' equity, and (4) traditional format statement of cash flows. The working format financial statements present the new format proposed by the Boards. The non-cohesive financial statement presentation format, *mixed format financial statements*, is presumably worsening investors' judgments due to the fact that investors might cognitively suffer from cognitive dissonance. Inconsistent information presented might induce a feeling of uneasiness and dissonance which needs to be resolved. Thus, the investors with working format financial statements, as opposed to mixed format financial statements, are hypothesized to be better off when they evaluate firm's operating performance. This leads to H1a.

Mixed format financial statement (MFS) is manipulated to provide the evidence supporting or undermining the decision of the Boards not to amend the performance reporting statement independently. Again, the mixed format financial statements would present new format of income statement together with other traditional financial statements. Recall that working format income statement presented in mixed format financial statements presents clearly the operating profit on the face of the financial statements. Consistent with Kriche (2005) and Koonce et al

³² Note that, in the paradigms for cognitive dissonance, inconsistency can sometimes be valuable as discussed in Snow (2005). Put succinctly, in the area of music, art, and humor, inconsistency induces attentiveness and increases appreciation of the individuals. As a result, inconsistent information may have positive effects like the feeling of happiness, calmness, satisfaction. Uniqueness and creativity play a major role in this incident.

(2005), when the labels saliently presented and isolated from other pieces of information, that information would have more impact on investors' judgments. Compared to traditional financial statements, mixed format financial statements are hypothesized to improve the operating performance evaluation because operating performance measure is saliently presented. This leads to H1b.

According to the proposed working principle, the Boards require that each and every financial statement should be presented in a cohesive manner at a line item level if at all possible. The investors are expected to comprehend and notice the linkage and interrelations among the financial statements. They would not suffer any cognitive dissonance induced by inconsistency (Festinger, 1957.) Moreover, under the proposed format of financial statements, the operating profit is made available to the investors and it is isolated presented as one of the subtotals in income statement (Kriche, 2005 and Koonce et al., 2005). Consistent with Bloomfield (2002), the proposed working format financial statement presentation is hypothesized to be associated with less extraction cost; thus, the use of proposed financial statements, as opposed to traditional financial statements, would improve the investors' judgments when they evaluate operating performance of the firm. This leads to H1c.

Hypothesis 1 on financial statement format is formally stated below.

H1:

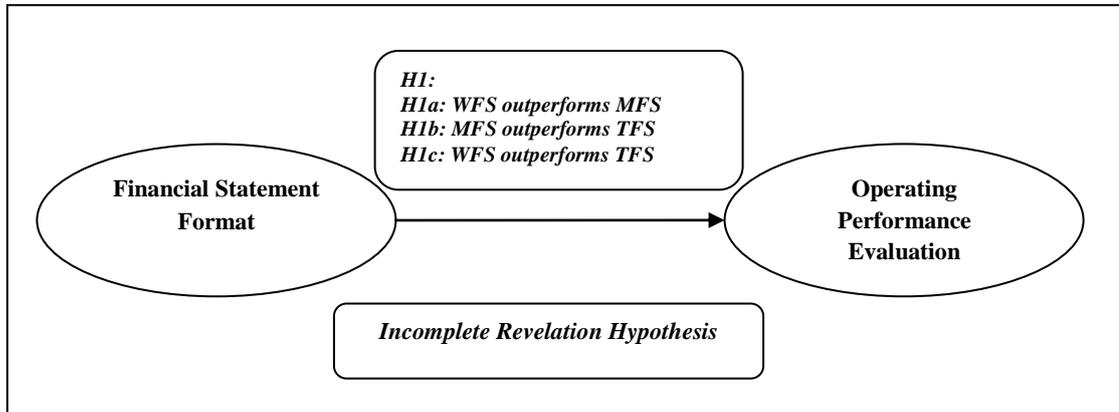
H1a: Proposed format financial statements improve investors' operating performance evaluation judgments when compared to mixed format financial statements.

H1b: Mixed format financial statements improve investors' operating performance evaluation judgments when compared to traditional financial statements.

H1c: Proposed format financial statements improve investors' operating performance evaluation judgments when compared to traditional financial statements.

Figure 2.3 presents research framework with financial statement format as independent variable.

Figure 2.3: Research Framework with Financial Statement Format as Independent Variable (H1)



2.2.3. Human Information Processing and Financial Reporting

2.2.3.1. Discussion on Human Information Processing

According to Human Information Processing (HIP) literature³³, ability of an individual to utilize information to form judgments depends on one's level of conceptual structure³⁴. An individual with ability to handle multi-dimensional information in a complex system is said to have an *abstract* conceptual structure; while an individual with limited ability to process information is considered to have a *concrete* conceptual structure. The conceptual level determines the possible levels of complexity observable in perceptions and decisions of an individual.

Input complexity is a crucial determinant of system complexity and quality of judgments (Driver and Streufert, 1969 and Lindsay and Norman, 1977). There are three input-complexity determinants; namely, *information load*, *eucity*, and *noxiety*³⁵. Prior literature suggests that information load is a significant determinant of system

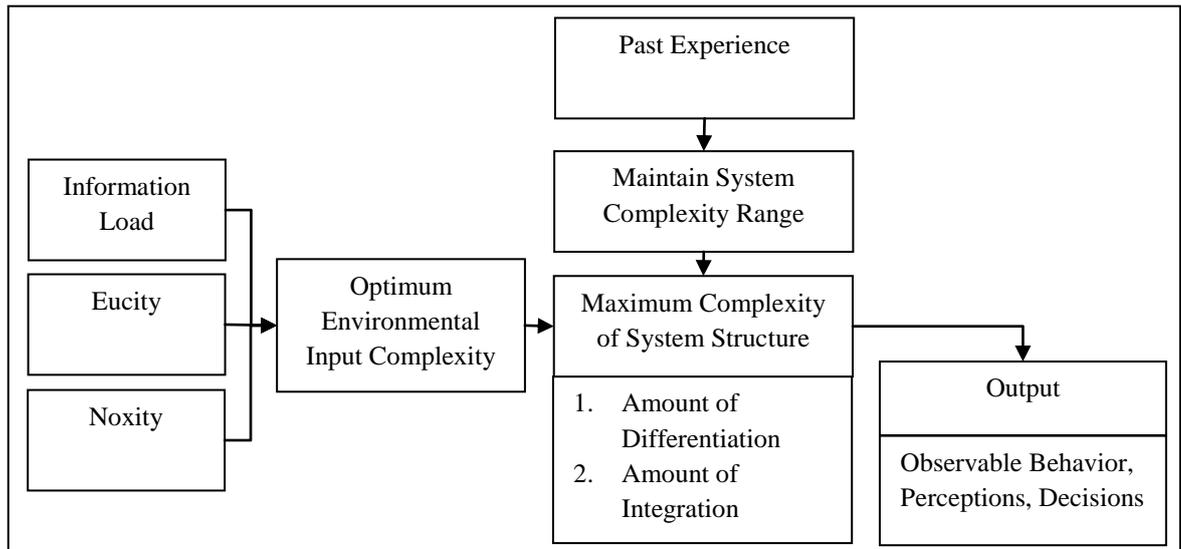
³³ Human information processing (HIP) literature defines (1) *information* as "something which reduce uncertainties in a receiver", (2) *system* as "complex of elements in mutual interaction", (3) *input* as "any condition initially external to a system which upon contact with a system produces observable change in the organization or behavior of a system", and (4) *processor* as "the one who carries out or operates the system" (Driver and Streufert, 1969 and Lindsay and Norman, 1977).

³⁴ *Conceptual structure* is defined as "an individual's potential to generate new attributes of information and discriminate between stimuli as the number of dimensions one perceives increases" (Miller, 1972).

³⁵ The eucity is defined as rewards or pleasantness received by an individual and the noxiety is just the opposite (i.e. it is basically threats or unpleasantness perceived by an individual in a given information processing system).

input complexity (Miller, 1972). The quality of judgments can be characterized by (1) differentiation, and (2) integrative complexity³⁶ (Driver and Streufert, 1969). Figure 2.4 depicts human information processing system.

Figure 2.4: Flow Diagram of Integrative Complexity Model



Source: Driver and Streufert (1969)

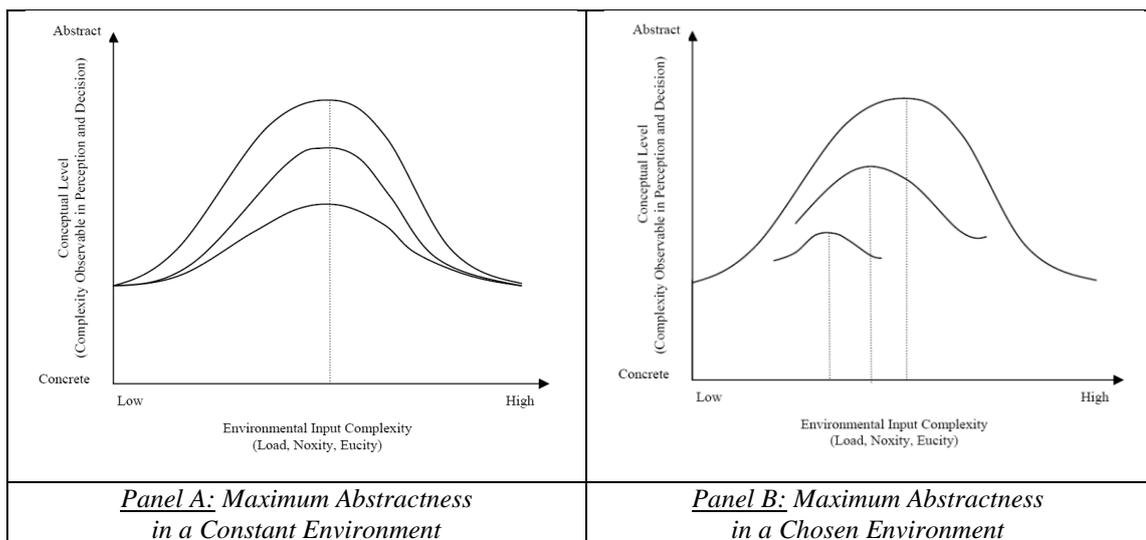
The optimal level of input complexity must be determined and achieved to maximize the system productivity, which is depicted by maximum level of abstractness of an individual or a group that constitute a system (Miller, 1972). Panel A and Panel B of Figure 2.5 compare maximum abstractness or system output complexity in a *constant* environment and in a *chosen* environment, respectively. The curvilinear line represents the level of integrative complexity of a person at varying levels of information presentation (Schroder et al., 1967). The ability of a person to integrate information and make use of information first increases with amount of information presented or level of input complexity and then decreases when too-much information or too-complicated information is presented. In a chosen environment, an individual with varying levels of conceptual structure and processing capability would request for information uniquely and differently. However, in a constant environment, a maximum point of abstractness is constant for every person.

³⁶ Differentiation is number of different information units and parts and integrative complexity is amount of interconnection among several pieces of information.

Moreover, the abstractness of a person can be improved in a given information environment, as depicted in the curvilinear line above the other lines at a given level of information load or input complexity in Panel A.

To state another way, a person can learn from another person in the same informational environment to maximize the usefulness of information presented. The issue of interest is about the appropriate level of input complexity in a certain environment that would maximize output complexity or productivity. In sum, the optimal level of information load provided (with the balance of eucity and noxity) would maximize the information usefulness and information utility.

Figure 2.5: Maximum Abstractness and Environment Complexity of Human Information Processing System



Source: Miller (1972)

2.2.3.2. Data Aggregation Level in Financial Reporting

According to Miller (1972), information load is amount of information content and the number of information items presented to an individual that can alter the probability or uncertainty related to a certain event. In financial reporting, the information load closely relates to data aggregation level. If the information is disaggregated into several sub-components, the number of information items presented would certainly be increased (i.e. information load is increased.) Again, the

standard setters and regulators should take the matter of data aggregation level into account when they outline authoritative guidance on financial statement presentation so as to maximize the usefulness of accounting information presented to the financial statement users. Indeed, determining appropriate level of data aggregation in financial reporting context is a challenge to the Boards as well as other regulators.

In a matter of aggregation, earnings are among one of the aggregate measures used in financial reporting to efficiently communicate the financial performance of the firms in a single time period. Hirschleifer and Teoh (2003) suggest that the extent to which the financial data are aggregated influences trades and investment decision; even if the investors have enough information to disaggregate those data by themselves.

Prior literature on level of aggregation of financial reporting and decision quality reveals conflicting results. One argues that users of aggregated data are expected to perform better, to make decision properly, and to be more efficient in making decisions (See Schmelzle et al., 2004, for an example). This might be because the summarized information portrays and reflects the firm performance better than lengthy information presentation and requires less cognitive efforts in processing the information.

On the other hands, the others might argue that users receiving disaggregated (i.e., more detailed, expanded) data perform better (See Barefield, 1972, for an example). Essentially, the decision usefulness can be enhanced by disaggregation of information or via data expansion. However, Revsine (1970) argues that “*beyond some point additional information, no matter how relevant, reduces rather than enhances conceptual abstractness*”³⁷, which reduces the quality of decision making. This is consistent with the concept of “*information overload*” and the findings in Hirshleifer and Teoh (2003), which imply that providing more information might not result in a better outcome due to the limited attention of the information processors. The fact that an individual may not process all relevant data and rely on just aggregated measures may be due to high cognitive costs incurred when performing

³⁷ Abstract conceptual structure is the ability to generate multidimensional units of information from perceived stimuli, whereas concrete conceptual systems are less complex and adhere to a set of fixed rules and often inflexible (Revsine, 1970).

the judgmental tasks. However, if the information is highly salient, the chance of using and processing the information is expected to be higher.

Living in a complex environmental context, the financial statement users are compelled to have a certain level of abstract conceptual skills and fundamental business and accounting knowledge so as to perceive and develop the complex relationships among variables necessary for effective decision making. In order to model the desired formats of the financial reports, the informational needs and conceptual structure of decision makers must be known. Recall that the aim is to identify the informational needs of the most abstract processors (i.e. financial analysts) in the financial reporting environment. Providing appropriate level of data disaggregation to financial analysts would enhance the information usefulness and maximize the learning and the information transfer in the capital market (Driver and Streufert, 1969, and Chewning et al, 2004). However, the financial analysts' informational needs are very difficult to identify. Hence, preparing a series of specific purpose reports is impractical. The balance between disaggregation and aggregation must be achieved within the general purpose financial statements to improve decision usefulness of the information presented.

The effect of data aggregation hinged on how much of the information is condensed and whether the information content is lost in the process of aggregation. Otley and Dias (1982) discuss different levels of data aggregation in financial reporting. Information aggregation can be categorized into 2 types: (1) **Aggregation Type I**, and (2) **Aggregation Type II**. Aggregation Type I condenses information presented to decision makers without reducing information content of that data; that is, Type I aggregation reduce the amount of data but not the value of the data. However, Aggregation Type II diminishes the information content of the data while aggregating the information presented. Decision-making performance is inevitably influenced by level of information aggregation.

2.2.3.3. Human Information Processing Literature and the Development of Hypothesis 2

HIP literature emphasizes that the standard setters should take into consideration the fact that the usefulness of information can be enhanced if the amount of information is suitably presented and/or disclosed to the financial statement users (See Miller, 1972). Barefield (1972) stated that more detailed or more expanded data can improve the investors' decisions. This implies that providing investors with by-nature information (disclosed in the notes or presented on the face of the statement) can improve the investors' operating performance judgments when compared to those investors with no such information. Recall that by-nature information renders more detailed, disaggregated data on important expense items to the financial statement users. This leads to H2a and H2b, which hypothesize that by-nature information is useful, regardless whether the information is disclosed in the notes or presented on the face of financial statements.

As discussed earlier, Otley and Dias (1982) propose that curvilinear relationship exists between the level of aggregation and decision-making performance. In particular, decision-making performance would be improved as long as the aggregation is Type I. Conversely, once the aggregation is converted into Type II, the decision performance is then deteriorated. Disaggregation or data expansion is not without cost. Consistent with Revsine (1970) and Otley and Dias (1982), different levels of data aggregation can have either positive or negative impact on investors' judgments depending on whether the aggregation is of Type I or Type II. Likewise, the presentation of by-nature disaggregation on the face of income statement can either positively or negatively affect investors' operating performance evaluation judgments. Recall that the Boards do not require the presentation of by-nature disaggregation on the face of performance reporting statement; rather, the Boards leave an option of disclosing by-nature disaggregation in the notes to financial statements for a firm to decide. The HIP literature in conjunction with IRH suggests that presenting the by-nature information on the face of income statement is associated with lower cognitive costs in processing and searching for the information. Thus, H2c hypothesizes that presenting by-nature information on the face of income

statement helps the financial statement users in evaluating financial performance, especially the operating performance, comparing to disclosing the information in the notes to financial statements.

This leads to hypothesis 2 on data aggregation level.

H2:

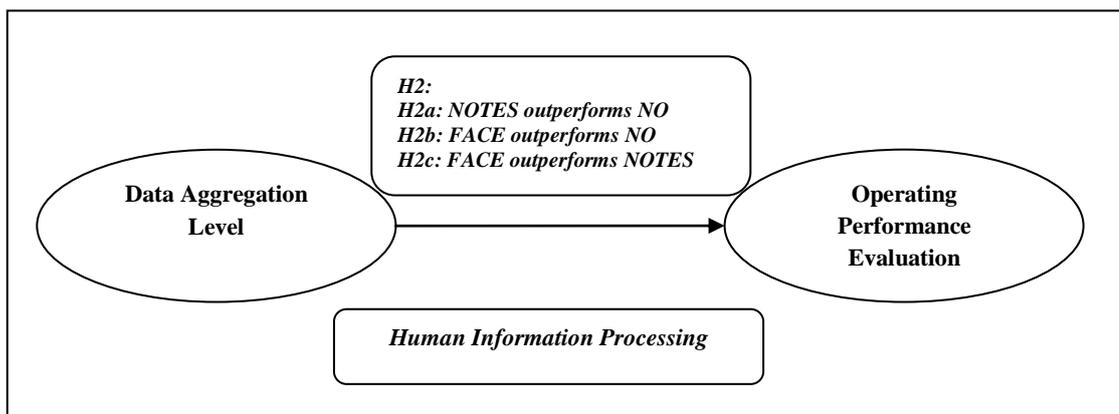
H2a: Proposed format financial statement with disclosure of by-nature information in the notes to financial statements improves investors' operating performance evaluation judgments when compared to those without by-nature information.

H2b: Proposed format financial statement with presentation of by-nature information on the face of income statement improves investors' operating performance evaluation judgments when compared to those without by-nature information.

H2c: Proposed format financial statements with presentation of by-nature information on the face of the income statement improves investors' operating performance evaluation judgments when compared to those with disclosure of by-nature information in the notes to financial statements.

The research framework with data aggregation level as independent variable is presented in Figure 2.6.

Figure 2.6: Research Framework with Data Aggregation Level as Independent Variable (H2)



2.2.4. *Sophistication and knowledge of Investors and Financial Reporting*

Prior studies propose that level of sophistication and knowledge of investors influences investors' performance evaluation judgments and decisions. Based on the level of sophistication of the investors, the investors can be categorized into 2 groups: (1) *professional (or well-informed or more-sophisticated) investors* and (2) *non-professional (or less-informed or less-sophisticated) investors* (Hodge and Pronk, 2006, Elliott et al., 2007, Maines and McDaniel, 2000, Bloomfield et al., 1999, Belzile et al., 2006, Hirst and Hopkins, 1998, and Tarca et al., 2008).

As a matter of fact, the non-professional investors are more diverse and heterogeneous in their knowledge and characteristics than professional investors. Professional investors are more likely to get formal accounting and finance training and more familiar with using financial information in evaluating investment decisions. Professional investors idiosyncratically differ from non-professional investors in several ways.

Informational search strategies³⁸ employed by professional investors differ from those utilized by non-professional investors. According to Hogarth (1980), individual's perception of information is selective, not comprehensive; i.e. "*people see what they want to see*". The search strategies can be categorized into (1) *directional search*, and (2) *sequential search*. Under directional search, investors specifically look for and acquire particular pieces of information from a given set of information, whereas under sequential search, investors examine the information pieces in order as they appear.

Hunton and McEwen (1997) suggest that less-experienced financial analysts tend to use sequential search strategy because they do not have well-defined valuation model or decision frame, whereas more-experienced financial analysts tend to use

³⁸ Information search is part of the cognitive process which comprises perception, attention, memory, language, problem solving, reasoning, and making decisions (Goldstein, 2008). The informational search strategies are difficult to observe or, in most of the cases, are not observable at all. Understanding different informational search strategies is beneficial in improving the quality of judgments and decisions. The informational search strategies can be explored by verbal protocols (i.e. think-aloud procedure). However, in some cases, this verbal protocol might interrupt or alter the normal course of activities that an individual usually does and that individual might not be aware or cannot describe what is going on in his/her mind. Hunton and McEwen (1997) use an eye-movement computer technology called "*Integrated Retinal Imaging System (IRIS)*" to observe information searching procedures engaged by the financial analysts.

directive search strategy (i.e. more focused search) to find the relevant information for their well-defined valuation model³⁹. Consistent with Hodge and Pronk (2006), experts tend to *frame*⁴⁰ the problem to predefine the informational needs before the actual search and non-experts tend to react to the information as they encounter that information⁴¹. The information overload cognitive state may result in the case of sequential search due to massive amount of information presented in the annual reports and press releases.

Many researchers as well as regulators concern more on the impact of information presentation on non-professional investors because they have informational disadvantage and have less formal knowledge and experience compared to professional investors (see Maines and McDaniels, 2000, Frederickson and Miller, 2004, Elliott et al., 2007, Pinsker, 2007, Belzile et al., 2006, Elliott et al., 2008, Sharma, 2006, Kaplan and Mauldin, 2008, for example).

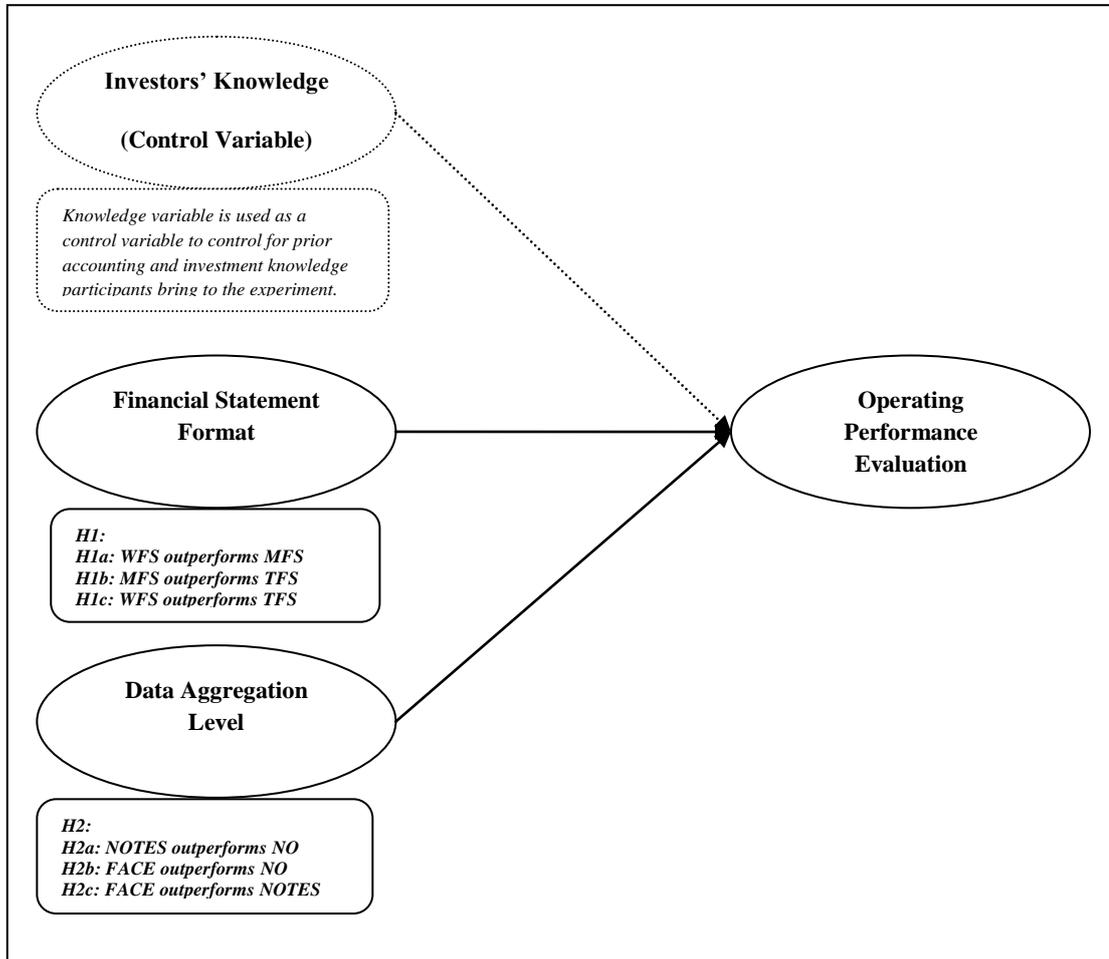
In sum, prior literature on investors' sophistication and knowledge suggests that different level of investors' sophistication and knowledge affects how the investors acquire and utilize the financial information presented in the financial statements. Thus, the prior knowledge level is included in the analysis to control for accounting and investment knowledge the participants bring to the experiment. Figure 2.7 depicts the research framework with investors' knowledge as a control variable in the study.

³⁹ The empirical results of Hunton and McEwen (1997) are generalized to the context of professional and non-professional investors in Maines and McDaniels (2000), Belzile et al. (2006), and Hodge and Pronk (2006).

⁴⁰ *Framing effect* refers to how the choice is illustrated (Barth et al., 2004). Individuals usually fixate on the decision frame and have difficulty to change that given decision frame. Consequently, the decision frame or how decision is stated is influenced decisions made (Goldstein, 2008).

⁴¹ The less knowledgeable investors tend to assimilate acquired information in a relatively unstructured manner; also, they tend to have relatively lower level of understanding on relationship among various financial statements and on perceived importance of specific financial statement items (Hodge and Pronk, 2006). However, for professional investors, they tend to have "*functional fixation*" on specific accounting numbers, like net income, earnings before interest and taxes, for instances, and to ignore other information that are irrelevant to their well-defined valuation models (Belzile et al., 2006).

Figure 2.7: Research Framework with Investors' Knowledge as a Control Variable



Next, Chapter 3 discusses the research design, variables of interest, as well as the case materials used in the experiments.