3. RESEARCH METHODOLOGY

3.1 Model Analysis

To test the hypothesis in this study, the relationship between variables will be tested according to the following figure:

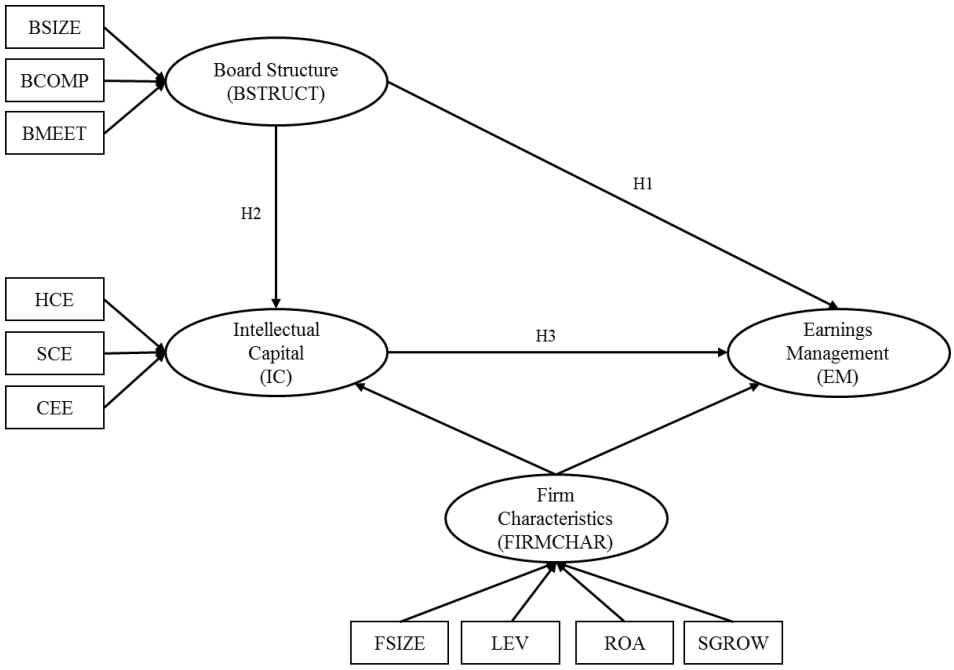

Figure 3.1 Model Analysis

Based on the model analysis in Figure 3.1, the structural equation for this model can be formed as follows:

$$EM = \alpha + \beta_1 BSTRUCT + \beta_2 VAIC + \beta_3 FIRMCHAR + \varepsilon \quad (3.1)$$

$$IC = \alpha + \beta_1 BSTRUCT + \beta_2 FIRMCHAR + \varepsilon \quad (3.2)$$

Notes:

EM = Earnings management

BSTRUCT = Board Structure

IC = Intellectual Capital

α = Constant coefficient

β_1-β_3 = Regression coefficient

ε = error estimate

3.2 Operational Definition and Measurement Scale of Variables

3.2.1 Independent Variable

Below is list of the independent variables used in this study:

Table 3.1 Independent Variables

Variables	Operational Definition	Scale of Measurement
Board Size (BSIZE)	• Board size is the total number of executive and non-executive directors in the board. (Dibia & Onwuchekwa, 2014) • Both Indonesia and Malaysia corporate governance code do not regulate the required number within the board as long as it is appropriate for the benefit of the company (OECD, 2015; Securities Commission Malaysia, 2012). • Considering the two-tier-board system used in Indonesia, calculation of the board size between BOC and BOD will be separated. • Board size is measured as (Xie et al., 2003; Rahman & Ali, 2006; Board Size = ∑ Board members	Nominal
Board Composition (BCOMP)	• Agency theory believe that agency conflict could be reduced if the board is comprising of a majority outside directors as they stipulate an effective monitoring tool for the board (Fama & Jensen, 1983). • Independent directors are board who are not involved in the day-to-day running of business but monitor the executive activity	Ratio

	and contribute to the development of strategy (Yang et al, 2008). • In Indonesia, at least 30% of BOC should be independent commissioners; while for the BOD, at least one independent directors must be presence. In Malaysia, one-third of its board should be independent directors. (International Finance Corporation Advisory Services in Indonesia, 2014; Securities Commission Malaysia, 2012) • Considering the two-tier-board system used in Indonesia, calculation of the board composition between BOC and BOD will be separated • Board composition is measured as (Rahman & Ali, 2006; Alves, 2011): $Board\ Composition = \frac{\sum Independent\ directors}{\sum Board\ member}$	
Board Meeting (BMEET)	• The more directors meet in the board meetings; the more likely financial performance is improved as the outside directors stay well-informed of the corporate affairs. (Vafeas, 1999) • Frequent board meetings might be a testament of highly committed and active board members (Haji & Ghazali, 2013) • Board meetings are measured as (Xie et al., 2003; Gonza´lez & Garcı´a-Meca 2014): Board meeting = ∑ meetings held during the year	Nominal

3.2.2 Mediation Variables

Table 3.2 Mediating Variables

Variables	Operational Definition	Scale of Measurement
Value Added Intellectual Capital (VAIC)	• VAIC is a measurement of how efficient their resources in creating value added for the companies. The higher VAIC value means the higher value creation through the use of its resources (Pulic, 2008). • The formula used is as follows: VA = P + A + D + EC HCE = VA / HC SC = VA – EC SCE = SC / VA ICE = HCE +SCE CEE = VA / CE VAIC = HCE + SCE + CEE	Ratio

3.2.3 Dependent Variable

Table 3.3 Dependent Variables

Variables	Operational Definition	Scale of Measurement
Earnings Management	• Earning management is an action done by manager to increase or decrease the current reported earnings of the company which is not in accordance with the real condition of the company by utilizing the accounting accrual concept (Fischer & Rosenzweig, 1995) • Earning management can be measured using a cross-sectional regression of the Jones	Ratio

	mode, where total accruals are the basis for the measurement of discretionary accruals. Total accrual can be broken down into two components which are non-discretionary and discretionary accrual. (Dechow et al, 1995) 1. To calculate total accruals: $TA = NI - CFO$ 2. Calculating coefficient: $\frac{TAit}{Ai,t-1} = \alpha 1\left(\frac{1}{Ai,t-1}\right) + \alpha 2\left(\frac{(\Delta REVit - \Delta RECit)}{Ai,t-1}\right) + \alpha 3\left(\frac{PPEit}{Ai,t-1}\right) + \varepsilon$ 3. Calculating non-discretionary accruals: $\frac{NAit}{Ai,t-1} = \alpha 1\left(\frac{1}{Ai,t-1}\right) + \alpha 2\left(\frac{(\Delta REVit - \Delta RECit)}{Ai,t-1}\right) + \alpha 3\left(\frac{PPEit}{Ai,t-1}\right)$ 4. Discretionary accruals: $DACCit = TAit - NDAit$	

3.2.4 Concomitant Variable

Below is the list of concomitant variables used in this study:

Table 3.4 Concomitant Variables

Variables	Operational Definition	Scale of Measurement
Firm Size (FSIZE)	• Firm size indicates the categorization of large and small companies. Larger companies are more likely to be associated with earnings management to achieve specific earnings targets. (Alzoubi, 2016) • Firm size is measured as (Xie et al., 2003; Swastika, 2013; Abbadi et al., 2016; Alzoubi, 2016): Firm size = log of total assets	Ratio

Leverage (LEV)	• Leverage provides information regarding the composition of debt and equity of the company. • Managers in high leveraged company are motivated to manipulate the earnings in order to comply with the debt covenants. Alves, 2011) • Firms tend to use debt capital to finance IC-related investments since lenders interpret IC as a firm's commitment to the product market (Appuhami & Bhuyan, 2015). • Leverage $= \frac{\text{Total Debt}}{\text{Total Asset}}$	Ratio
ROA	• Return on assets (ROA) is widely used as the indicator to measure the profitability of a company (Alzoubi, 2016; Hashim & Devi, 2015; Rahman & Ali, 2006) • $ROA = \frac{\text{Net Income}}{\text{Total Asset}}$	Ratio
Sales Growth (SGROW)	• Company with high sales growth are less likely to be engage in earnings management practices due to their benefit from a strong market share. (Abbadi et al., 2016) • $SGrowth = \frac{\text{Total Sales (t)} - \text{Total Sales (t-1)}}{\text{Total Sales (t-1)}}$	Ratio

3.3 Type and Source of Data

This study uses quantitative data from secondary sources. The details data needed for the variables' computation and its sources are as follow:

Table 3.5 Data Sources

Variable	Source of Data

Board Size	Published annual report in Indonesia and Malaysia Stock Exchange' website
Board Composition	Published annual report in Indonesia and Malaysia Stock Exchange' website
Board Meetings	Published annual report in Indonesia and Malaysia Stock Exchange' website
Firm Size	Bloomberg
Leverage	Bloomberg
ROA	Bloomberg
Sales Growth	Bloomberg
Discretionary Accruals	Bloomberg

3.4 Instrument of Data Collection

This study uses documentation method for data collection. Secondary data needed is collected from annual reports of consumer good listed companies published in IDX and Bursa Malaysia from the year 2010 to 2015.

3.5 Population

Total population of this study is 159 consumer goods sector's companies listed in Indonesia Stock Exchange(IDX) and *Bursa Malaysia* (37 Indonesia; 122 Malaysia) respectively from the year 2010 to 2015. The sub-sector of consumer goods in IDX comprises food and beverage, cigarette, pharmacy, cosmetics and household goods. Meanwhile, the sub-sector of consumer goods in *Bursa Malaysia* comprises food and beverage, apparel and shoes, automobiles and parts, and personal and household goods.

3.6 Sample and Sampling Technique

This study uses purposive sampling technique which the sample is chosen based on criteria determined. The sampling criteria used for this study are as follow:

1. Companies of consumer goods sector's sector listed in the Indonesia Stock Exchange(IDX) for Indonesia companies; and *Bursa Malaysia* for Malaysia companies,

2. Launched Initial Public Offering (IPO) and listed before 2010.
3. Published a complete financial statement and annual report for the year 2010 to 2015
4. Companies with positive return on asset (ROA)

3.7 Unit Analysis

Unit analysis in this study is 795 firm-year, comprising 185 firm year of Indonesia (37 companies for 5 years) and 610 firm year of Malaysia (122 companies for 5years) in the consumer goods sector listed in the Indonesia Stock Exchange and *Bursa Malaysia* during the year 2010 to 2015.

3.8 Data Analysis Technique

This study is a quantitative research aims to test the relationship between corporate governance towards intellectual capital and earnings management. The influence of *formative latent* variable of corporate governance which comprises of indicators namely board size, board composition and board meeting towards earnings management through VAIC as the mediation is also tested. Concomitant variables used in the study are firm size, leverage, ROA, and sales growth. Below are the steps in analyzing the data:

1. Data gathering

   Data needed for the study is obtained from financial statement and annual report published in the IDX and *Bursa Malaysia* from the year 2010 to 2015. Other figures needed for the variables computation are retrieved from Bloomberg.
2. Conducting the calculation of dependent variables (earnings management using the modified Jones method); concomitant variables (firm size, leverage, ROA and Sales growth); and mediation variable (VAIC by Pulic).
3. Conducting data testing

   This study uses WarpPLS 5.0 for data analysis as well as the classical assumption test. WarpsPLS 5.0 is chosen due to its ability to provide classic partial least square (PLS) algorithms together with factor-based

PLS algorithms for structural equation modelling (SEM). Factor-based PLS algorithms generate estimates of both true composites and factors, fully accounting for measurement error (Kock, 2015). Below are the steps in testing the data in WarpPLS 5.0:

- Step 1: Designing the structural model (inner model)

  The structural model among the latent variables is designed based on the problem formulation or proposed hypothesis in order to be able to depict the relationship among variables included in the hypothesis.

- Step 2: Designing the measurement model (outer model)

  Outer model describes the relation between the latent variable with its indicators. In WarpPLS, the design of measurement model is crucial since it requires proper indicator classification whether it is a *reflective* or *formative*. Theories and empirical research may be used as the references in determined the characteristic of the indicators. In *reflective* model, all indicators are expected to be highly correlated not only to one another but also with the latent variable itself. Whereas in *formative* model, even though indicators are expected to measure certain attributes of the latent variable, they are not expected to be highly correlated with the latent variables itself. Inappropriate identification of the indicators characteristic in the measurement model may result in bias result. Thus, using the operationalization definition of the variable as the reference, this study uses formative model indicator.

- Step 3: Constructing the path of diagram

  As the inner and outer model has been designed in the step 1 and step 2, next it will be constructed into a model analysis diagram as depicted in figure 3.1.

- Step 4: Converting the Path diagram into the structural equation

  i. *Outer model* describes the relationship between the latent variable with its indicators, hence, it's also known as the outer relation or

measurement model. In formative model, the equation is constructed as follow:

$$\xi = \Pi_{\xi} X_i + \delta_x$$

$$\eta = \Pi_{\eta} Y_i + \delta_y$$

Where X and Y are the indicator for exogenous latent (ξ) and endogenous latent (η). Π_x & Π_y are the coefficient of double regression from latent variable towards the indicators; and δ_x & δ_y as the residual of the regression.

ii. *Inner model* describes the relationship of latent variables (structural model) among one another, hence it is also known as inner relation. The regression model for inner model is constructed as follows:

$$\eta = \beta\eta + \Gamma\xi + \zeta$$

Where, η is the dependent exogenous variable; ξ is the vector of endogenous latent variable; ζ is the unexplained variance. Since PLS is designed for a recursive model, it is assumed that all latent variables are dependent and have *causal chain system.* Thus, the equation is constructed further as follows:

$$\eta_j = \Sigma_i \beta_{ji} \eta_i + \Sigma_i \gamma_{jb} \xi_b + \zeta_j$$

Where, γ_{jb} is the coefficient that connect endogenous latent variable and exogenous latent variables; β_{ji} is the coefficient that connect between endogenous variables; and ζ_j is the inner residual variable.

iii. Weight relation describes the estimated value of the latent variables got form estimation process done by the PLS.

- Step 5: Estimating the outer and inner model

  Hypothesis model must be first determined before the data analyzing process is done by WarpPLS. Basically, outer and inner model estimation are based on the data calculation from latent variable which originated from its indicators. In WarpPLS, the outer algorithm for the formative model indicator is PLS mode B. While

for the inner model, there are three types of algorithm which are linear, U curve (Warp 2), and S curve (Warp 3)

- Step 6: Goodness of Fit testing

  Several criteria need to be fulfilled in assessing and determining whether it's a fit model or not. Goodness of fit is the index and measurement regarding the relationship aiming latent variables (inner model). Below are the quality indices:

Table 3.6 Model Fit and Quality Indices

No	Model fit & Quality Indices	Fit Criteria
1.	Average Path Coefficient (APC)	$p < 0.05$
2.	Average R-squared (ARS)	$p < 0.05$
3.	Average adjusted R-squared (AARS)	$p < 0.05$
4.	Average Block VIF (AVIF)	Acceptable if ≤ 5, ideally ≤ 3.3
5.	Average full collinearity VIF (AFVIF)	Acceptable if ≤ 5, ideally ≤ 3.3
6.	Tenenhaus GoF (GoF)	Small ≥ 0.1 Medium ≥ 0.25 Large ≥ 0.36
7.	Sympson's paradox ratio (SPR)	Acceptable if ≥ 0.7, ideally = 1

- Step 7: Hypothesis testing

  The hypothesis formulated is tested using T-test. T-test aims to examine whether the independent variables have an impact towards the dependent variable individually. If the significance level of the T-test is < 5%, it means that the independent variables individually affect the dependent variable.

4. Analysis and conclusion of the hypothesis result

Analysis and conclusion will be based on the result of the regression tested. It will explain the relationship between independent, intervening and dependent variable of this study.