5. The VAIC™ Model:-

The VAIC™ model was proposed by Pulic in 1993 (Pulic, 2004). It measures the efficiency of Intellectual Capital and its components by using accounting data of a firm. In VAIC™, two components of IC have been envisioned—Human Capital (HC) and Structural Capital (SC). In addition, efficiency of physical and financial capital of a firm has also been estimated through the inclusion of Capital Employed (CE) in the model. In VAIC™, ‘Value Added’ (VA) has been used as a benchmark of success of a business entity. This indicator has been estimated as follows:

\[ VA = OP + EC + D + A \]  \hspace{1cm} (1)

Where, \( OP \) = Operating Profit;

\( EC = \) Employee Cost;

\( D = \) Depreciation; and,

\( A = \) Amortization

Pulic (2008) asserts that in knowledge economy, measures / indicators of business performance / success have changed. Hence, he advocates reinterpretation of the accounting data to capture the changing economic realities of a firm. Accordingly, he does not treat salaries and wages as a part of expenses. Rather, they are considered as investment by a firm. Therefore, in VAIC™, Employee Cost of a firm has been taken as a representation of its Human Capital. Further, Structural Capital is a dependent indicator in the equation. It is obtained as the difference between Value Added and Human Capital of a firm. This is because,

\[ \text{Value Added (VA)} = \text{Human Capital (HC)} + \text{Structural Capital (SC)} \]

Therefore,

\[ SC = VA - HC \]  \hspace{1cm} (2)

The final equation is:

\[ \text{VAIC™} = \text{ICE + CEE} \]  \hspace{1cm} (3)
Here, $VAIC^{TM} =$ Value Added Intellectual Coefficient;

$ICE =$ Intellectual Capital Efficiency Coefficient; and,

$CEE =$ Capital Employed Efficiency Coefficient

$VAIC^{TM}$ is the new value that has been created by investing a unit of money in each of the resources. Higher the coefficient, higher is the value creation by a particular resource (Pulic, 2008). $CEE$ represents the efficient use of financial and physical capital in creating new value for firm. According to Pulic (2004), what productivity meant for a manual worker in the industrial age; $ICE$ happens to be for a knowledge worker in the knowledge economy. Now, $ICE$ is the summation of the efficiencies of HC and SC. Hence,

$$ICE = HCE + SCE$$  \hspace{1cm} (4)

On replacement of this value of $ICE$ in eq. (3) we get,

$$VAIC^{TM} = HCE + SCE + CEE$$  \hspace{1cm} (5)

Pulic (2004) derives the values of these variables in following manner:-

$$HCE = \frac{\text{Value Added (VA)}}{\text{Human Capital (HC)}}$$  \hspace{1cm} (6)

$$SCE = \frac{\text{Structural Capital (SC)}}{\text{Value Added (VA)}}$$  \hspace{1cm} (7)

$$CEE = \frac{\text{Value Added (VA)}}{\text{Capital Employed (CE)}}$$  \hspace{1cm} (8)

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{VAIC_model.png}
\caption{$VAIC^{TM}$ model of Ante Pulic (2004)}
\end{figure}
5.1. Critical commentary on VAIC™ Model

Ante Pulic’s VAIC™ model has definite merit over other methods of measuring Intellectual Capital. While most of the IC measurement models suffer from the problem of subjectivity, VAIC™ is free from it. This is because its computation is based on audited financial data which is publically available. Hence, apart from managers internal to the organization, external stakeholders desirous of assessing Intellectual Capital efficiency can also use this model. Since VAIC™ model facilitates objective measurement of variables; there is greater validity of results obtained. Moreover, it is simple to apply and interpret and can be used for cross-sectional comparisons as well (Mehralian et al., 2012; Clarke et al., 2011; Chan, 2009; Firer and Williams, 2003).

Irrespective of its popularity, VAIC™ model has been facing criticism on certain grounds. Some of the limitations of this model have been indicated by Chu (2011) and Mehralian et al., (2012). They contend that this model does not produce useful results for the firms having negative values of ‘Value Added’. This apart, the reverse relationship between Human Capital and Structural Capital is theoretically problematic. Another weakness of this model is that the interaction effect between the components of IC has not been discussed. In addition to these inadequacies, Ståhle et al. (2011) point out that Relational Capital has not been included in the model. Further, the authors criticize the case of perfect superimposition between Human Capital and Structural Capital. Iazzolino and Laise (2013) also validate this theoretical position taken by Ståhle et al. (2011).
5.2. Rationale and merits of the proposed model:

This dissertation addresses some of the criticisms of VAICTM by presenting an extended and modified variant of the model. It has been termed as E-VAIC. The present research should be viewed as an improvement over other studies using VAICTM model. Criticisms of VAICTM notwithstanding, most of the scholars have applied this model in its pure form. Only the geographical locations and industry settings have changed. The shortcomings of the model have remained largely unaddressed in such research studies.

Few researchers (such as Chang, 2010; Chang and Hsieh, 2011; Chen et al., 2005; Phusavat et al., 2011) who have attempted to expand VAICTM by adding new variables like Research and Development (R&D) Expenditure, Advertising Expenditure and Intellectual Property Rights, have done so by merely measuring these new variable alongside other variables of the model. The original equation has been kept unaltered. Therefore, issues such as non-inclusion of Relational Capital and interdependency between HC and SC have remained unresolved. Among these studies, the one by Chen et al., (2005) is worth mentioning. In their work, the authors have attempted to measure Relational Capital in addition to the other components of IC. Advertising Expenditure has been used as a proxy for RC. However, analogous to other studies, the basic equation of VAICTM model has been left undisturbed in this case as well.

Apparently, the work of Chen et al., (2005) is closest to the present study. If it were taken as a reference point to elucidate the novelties of the E-VAIC model presented in this dissertation, three noticeable differences could be observed. First, in contrast to Chen et al., (2005), this research does not treat Relational Capital as an add-on to the
original VAICTM model. Rather, RC has been incorporated in the overall schema of E-VAIC which has ultimately extended the basic equation. It has been estimated by using the aggregate of Advertising, Marketing, Selling and Distribution expenses.

The second noticeable difference is that the E-VAIC model does not present any case of conceptual interdependency and perfect superimposition between Human Capital and Structural Capital as seen in VAICTM. There is no presupposition that IC is sum of HC and SC only. Rather, each component of IC has been represented by a suitable proxy (as suggested by IC literature) to compute its value. A linear and additive relationship has been assumed between the efficiencies of Intellectual Capital and its components. This has helped in removing the problem of mutual dependency among variables and has made it possible to incorporate new variable, Relational Capital, in the original VAICTM model. Hence, E-VAIC is accommodative in approach. In comparison, Chen et al., (2005) have not endeavoured to resolve this criticism of VAICTM.

Another conspicuous lead provided by this thesis is regarding the computation of variables in the model. VAICTM model uses the concept of ‘Value Added’ to calculate the efficiencies of IC and its components. All the variables of this model are in the form of ratios. Tied to his proposition of inverse relationship between HC and SC, Pulic (2004) uses Value Added (VA) as numerator for calculation of Human Capital Efficiency and as denominator for computing Structural Capital Efficiency. Nevertheless, the concept of efficiency is best described by the ratio of output to input. Hence, in the proposed model, Value Added always appears as the numerator (output) quantity.