Value Added Intellectual Co-efficient (VAIC™): A Selective Thematic-Bibliography

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Abstract

Purpose - This paper provides a selective thematic-bibliography of published journal articles that pertain to the use of the VAIC™ model.

Design/methodology/approach – Searches were conducted on the EBSCO Host, ProQuest, and Google Scholar databases to identify papers that had employed the model or addressed aspects of the development of the model. The thematic bibliography is separated into two main categories - theory and model development and comparative research. Comparative research is then separated into six sub-categories - financial performance, market value, capital gains, corporate board structure, longitudinal studies and life cycle studies.

Implications - The information presented in this paper is intended to facilitate further research and awareness of the literature pertaining to the application of the VAIC™ model.

Keywords: Value added intellectual co-efficient, VAIC™, thematic-bibliography.
Introduction

Intellectual capital has increasingly been recognised as an important strategic asset to achieve a sustainable corporate competitive advantage (Chen, Cheng & Yuchang, 2005). The growing awareness and acceptance of the importance of intellectual capital as a source of competitive advantage has in turn led to the need for an acceptable measurement model, given that traditional financial tools do not address the necessary concepts of intellectual capital (Campisi & Costa, 2008; Nazari & Herremans, 2007. The need for an appropriate measurement method lead to the development by Pulic (1998, 2000) of what has become arguably the most popular method for measuring the efficiency of value adding to corporate intellectual capital known as the value added intellectual coefficient (VAIC™). VAIC™ was designed to provide a means by which to measure the efficiency of three types of inputs: physical and financial capital, human capital, and structural capital (Firer & Williams, 2003; Montequin, Fernandez, Cabal & Gutierrez, 2006; Pulic, 2000).

The model has, since its inception, been explored and explained by various approaches to the research application of the model in various stages of the literature. Chen, Zhu and Xie (2004) provided a perspective on the design of qualitative indices pertinent to the model (see Figure 1).

Figure 1. Intellectual Capital Elements Inter-relationship

A further development and extension to the understanding of the model came from the use of the model in research seeking to make links between intellectual capital and the relative performance of firms. Wang and Chang (2005) provided the impetus for such research by extending the application of the model to examining the impact of the VIAC elements on the performance of the business and in doing so highlighted the relationships between the elements refer to Figure 2.
Figure 2.
Intellectual Capital Elements Relationship to Performance

A further development in the understanding of the model came about when Laing, Dunn and Hughes-Lucas (2010) provided a broader perspective of the model by encompassing the VIAC elements and their underlying constructs delineated into three the stages of the procedure for application of the model. In this way they highlighted the relationship between the constructs and elements with emphasis on the relevant role each plays in evaluating the contribution to the growth in capital. The detailed overview is presented in Figure 3 below.

Figure 3.
Overview of the VAIC™ model

Since the inception of the model the research has grown steadily into a sound body of knowledge and the use of the model has evolved accordingly. This paper is aimed at providing a review of those areas of the research that have shown to different
directions that the model can be applied to and this should provide guidance for future research.

**Method**

Analysis of the literature was undertaken by conducting literature searches through the databases ProQuest, EBSCOHost, and Google Scholar. The findings were restricted to published journal articles as this was deemed to represent the most objective form of validation that the papers had undergone an appropriate review process. This form of ‘thematic-bibliography’ is intended to ascribe a set of categories that best fit the characteristics of the journal papers identified as forming the basis of the literature pertinent to the VAIC™ model. Subsequently, the papers were divided into three categories: theory and model development, comparative research models, and application of VAIC™. These categories were considered to best represent the particular aspects of the research conducted. The articles are presented in the following manner: the first category is in date order as this consistent with the contribution to the development of the model. The categories are identified with the total number of papers for each category in Table 1.

**Table 1**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Number of journal articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory &amp; Model Development</td>
<td>18</td>
</tr>
<tr>
<td>Comparative Research:</td>
<td></td>
</tr>
<tr>
<td>Sub-category “A” – Financial Performance</td>
<td>10</td>
</tr>
<tr>
<td>Sub-category “B” – Market Value</td>
<td>11</td>
</tr>
<tr>
<td>Sub-category “C” – Capital Gains</td>
<td>1</td>
</tr>
<tr>
<td>Sub-category “D” – Corporate Board Structure</td>
<td>4</td>
</tr>
<tr>
<td>Sub-category “E” – Longitudinal Studies</td>
<td>1</td>
</tr>
<tr>
<td>Sub-category “F” – Lifecycle Studies</td>
<td>1</td>
</tr>
</tbody>
</table>

These categories were selected on the basis that they best represent the key aspects of the model and the literature which has developed. This thematic-bibliography does not provide annotated abstracts but rather is concerned with providing succinct details pertinent to the categorisation being employed. For example, the number of citations which indicates the relative importance of the paper, the key attribute made to the model development this highlights the contribution that the paper made in terms of the significant aspect in its evolution, and the actual co-efficient value which provides some degree of insight into the variation between results. The citations listed were current as at the 30th June 2012.

**Theory and Model Development**

The model was initially presented by Pulic (1998; 2000) however there have been a number of refinements and expansions made to the model. The papers which provide the most significant enhancements and discussions regarding the model and its potential for application are summarised in the following list.

**Contribution** - an extrapolation on the theory of reasoned action with additional variables leading to an action theory model of consumption.

**Citations** – 177.


**Contribution** - an extrapolation on the theory of reasoned action with additional variables leading to an action theory model of consumption.

**Citations** – 669.


**Contribution** – provided an introductory overview and justification for the model referring to various other methods such as balanced score card and the economic value added methodology.

**Citations** – 177.


**Contribution** – provided an extrapolation of the application of the VAIC model as a means for measuring value creation in a business.

**Citations** – 31.


**Contribution** – classifies intellectual capital into four elements – human capital, customer capital, innovation capital and process capital and relates these elements to performance of the firm.

**Citations** – 31.


**Contribution** - provided a guide to employing the VAIC(TM) model and a method for interpreting the results.

**Citations** – 9.


**Contribution** – provided a historical review of former approaches to evaluate human capital (Plexus) and thus introduced elements for consideration in the VAIC construction of intellectual capital value.

**Citations** – 28.


**Contribution** - described the VAIC calculation formulae and measures - discussed conceptual confusions with regards to the lack of consistency in earlier VAIC results due to confusion of capitalized and cash flow entities in the calculation of structural capital and potential misuse of intellectual capital concepts. Raised questions regarding validity of the application technique in prior research.

**Citations** – 3.

**Contribution** - found a significant relationship between the scores of the four IC elements and the business performance of firms, proved evidence of the validity and rationality of the VAIC model and the qualitative index system.

**Citations** – 218.


**Co-efficient** – provided a historical background of the origins of the concept of intellectual capital and identified different models and methodologies that had evolved.

**Citations** – 9.


**Contribution** – focused on an intellectual capital score sheet approach and potential inclusion of additional components in the formulation.

**Citations** – 3.


**Contribution** - provided empirical evidence of the value and efficiency of IC as it related to Finnish companies.

**Citations** – 22.


**Contribution** - provided more intellectual capital sub-construct measures than had been initially dealt with in the VAIC model.

**Citations** – 30.


**Contribution** - provided a succinct summary of the seminal works on the VAIC model.

**Citations** – 40.


**Contribution** – initiated the use of the VAIC model at a micro level and made comparisons with the value added chain matrix.

**Citations** – 34.


**Contribution** - an extrapolation on the theory of reasoned action with additional variables leading to an action theory model of consumption.

**Citations** – 0.


**Comparative Research**

Whilst the VAIC™ model has been readily adopted in the literature with regards to the evaluation of intellectual capital, there have been some limited attempts to make comparisons between the VAIC™ results and other methods of evaluating aspects pertaining to intellectual capital. This body of literature is important because it provides a means of testing the relative outcomes against other forms of analysis, some of which have a longer history and arguably a more solid theoretical background. Papers which have undertaken such research are identified in the following sub-categories.

**Sub-category “A” – Financial Performance**

Firer, S. & Stainbank, L. (2003). Testing the relationship between intellectual capital and a company’s performance: evidence from South Africa, *Meditaria Accountancy Research*, 11(1), 25-44. **Comment** – empirical findings were that there was a relationship between intellectual capital and both productivity and profitability but not market value. **Citations** – 18.

Firer, S. & Williams, S. (2003). Intellectual capital and traditional measures of corporate performance, *Journal of Intellectual Capital*, 4(3), 348-360. **Comment** – empirical analysis of correlation and linear multiple regression analysis indicated that the association between the efficiency of VA by a firm’s major resource components and the three traditional dimensions of corporate performance was limited and the results were mixed. **Citations** – 213.

- the results of the study support the notion that companies that actively nurture and increase their IC are likely to experience superior performance.
- supports those theories and practices that place value on IC;
- also suggests that the VAIC model provides companies with a simple approach to measuring IC.
**Citations** – 89.

**Comment** – found that there was a time lag between the benefits from investment in intellectual capital on productivity and profitability.

**Citations** – 5.


**Comment** – found that intellectual capital efficiency had a significant contribution to a firm’s profitability.

**Citations** – 1.


**Co-efficient** – ning.

**Citations** – 3.


**Comment** – found a correlation between intellectual capital efficiency and earnings per share.

**Citations** – 1.


**Comment** – reported that components of the VAIC model were predictors of variance in business performance.

**Citations** – 2.

**Sub-category “B” – Market Value**


**Comment** – intellectual capital has a positive impact on market value and financial performance, and may be an indicator for future financial performance by empirically testing the relationship between firms’ intellectual capital and market-to-book value ratios.

**Citations** – 202.


**Comment** – found a positive relationship between intellectual capital and corporate market value employed a survey for additional analysis and utilised a structural equation model.

**Citations** – 101.

**Comment** – used VAIC to establish intellectual capital performance and then tested the effect on profitability using Data Envelopment Analysis – finding that IC is a more important factor than physical capital for banks.

**Citations** – 30.


**Comment** – investments in IC were found to be related to the company’s stock price.

**Citations** – 21.


**Comment** – provides a discussion and extrapolation of the research method and regression method employed in the study.

**Citations** – 36.


**Comment** – the empirical results indicated a significant relationship between human capital efficiency (from the VAIC model) and ROE.

**Citations** – 10.


**Comment** – focused on Technology Efficiency as the dependant variable to compare against the variables in the VAIC model.

**Citations** – 0.


**Comment** – did not find a strong relationship between the VAIC model variables and the market value.

**Citations** – 0.


**Comment** – only human capital efficiency was found to be correlated with financial performance and market value.

**Citations** – 0.
Sub-category “C” – Capital Gains


**Comment** – found a positive relationship between intellectual capital and capital gains on the value of shares.

**Citations** – 16.

Sub-category “D” – Corporate Board Structure


**Comment** – nging.

**Citations** – 41.


**Comment** – significan relationship between board structure and intellectual capital performance.

**Citations** – 4.

Sub-category “E” – Longitudinal Studies


**Comment** – Used a simple regression to establish the adequacy of the variables predictive powers - results indicated a perfect fit of both the independent variables with the dependent variable over the period of study.

**Citations** – 66.

Sub-category “F” – Lifecycle Studies


**Comment** – the paper examined the dynamics of intellectual capital from the perspective of an organizational life cycle.

**Citations** – 1.

Summary

The use of VAIC™ has been prominent in the literature with one journal particularly concerned with publishing research pertaining to intellectual capital, the *Journal of Intellectual Capital*. The details of the papers are addressed in the list. The number of papers that have applied the VAIC model indicate that the approach has overcome some of the problems associated with obtaining data by the use of the financial
information that is readily available from financial annual reports. Using the framework provided by the model enables research to be undertaken on organisations in a manner which would otherwise be difficult to obtain. The categories employed in this paper are intended to provide a general overview of the literature and in keeping with the thematic-bibliography provide information for future research.

While this thematic-bibliography of the literature has shown that there is a potential for a diversity of uses in the application of VAIC™ to analyse the impact of intellectual capital there are aspects which may be further explored. The selective nature of this paper was intended to provide a general introduction and is not an exhaustive coverage of the literature.

Reference List


Pulic, A. (1998), Measuring the performance of intellectual potential in knowledge economy, paper presented at the 2nd World Congress on Measuring and Managing Intellectual Capital, McMaster University, Hamilton.
