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Justyna Fijałkowska
University of Social Sciences

Value Added Intellectual Coefficient (VAIC™) as a Tool of Performance Measurement

Abstract: Measurement of the performance of organization is crucial for proper economic decisions. Traditionally, it was focused mainly on financial indicators, that in the Information and Knowledge Era are no longer sufficient and do not reflect in a transparent, complete and cohesive way the multi-dimensional outcomes of business units activities. With the increase of knowledge and other intangibles as the sources of competitive advantage and future viabilities of business units, the performance measurement process must be enlarged by new approaches and new indicators.

This aim of this article is to outline the evolution of the concept of measuring the companies' performance and to present one of the methods for evaluation of enterprises' performance – VAIC™ – which by the definition of its author should satisfy the requirements of the New Economy [Pulic 2000, pp. 702–771]. This article focuses on highlighting the characteristics of this method and the algorithm of its calculation. It also attempts to assess the VAIC™ method, indicating its validity and usefulness. The practical example of VAIC™ calculation and interpretation in Polish media sector companies is used, covering the period of analysis of 2007–2011.

Key-words: VAIC, performance measurement, tools, accounting.

Introduction

Proper performance measurement depends on what we define as the objective of the company. In today's economy surely not only the profit is an indicator of the company's success. Managers notice that it is vitally important to create value for shareholders and to make business go in the difficult times of crises. This is to large extent dependent on investment in human resources, information technology, research and development, and advertising; this factors help to maintain a competitive position and ensure the future viability [Canibano, *et al.* 2000, pp. 102–30; Nakamura 1999, pp. 15–30, Goldfinger 1997, pp. 191–220]. Investment in this resources or fields of business activity concern usually high expenses that lower the short-time profit but contribute to

the long-term success of company. Therefore, apart from profit analysis and basic financial ratios companies should take into consideration more complex measures of their performance. The proper measurement determines efficient management, therefore is crucial for any company. With the rise of knowledge management and intellectual capital the traditional tools of success measurement are no longer sufficient to analyze the impact of technology and human resources on the performance of organizations [Yang 2004, pp. 118–260]. The traditional measurement of companies performance based only on financial indicators is the subject of criticism in the literature [e.g. Johnson and Kaplan 1987; Kaplan and Norton 2002]. An answer to some of this criticism could be a performance measurement model developed by Pulic [1998, 2000, pp. 702–714; 2004, pp. 62–68] called Value Added Intellectual Coefficient (VAIC™).

In the first part of the paper we highlight the challenges of the knowledge-based economy to the management and accounting and then we shortly present the development of performance measurement methods, from the simple financial indicators to complex approaches taking into consideration non-financial outcomes of companies. Later, we focus particularly on VAIC™ method, indicating it as a tool of companies success evaluation. We analyze the applicability of this approach, its pros and cons, and interpretation of results.

In the second part of the paper we conduct an empirical analysis, following the prior studies on firm performance valuation based on VAIC™ method [Chen, *et al.* 2005, pp. 159–176; Shiu 2006, pp. 356–365, Ting and Lean 2009, pp. 588–599; Chan 2009, pp. 22–39; Chu, *et al.* 2011, pp. 249–276; Clark, *et al.* 2011, pp. 505–530; Komnenic and Pokrajcic 2012, pp. 505–530]. We adopt VAIC™ in order to measure performance of selected companies in Poland. The contribution of this study is the evaluation of performance of the Polish biggest media sector companies. It is believed that it is the first study on the media sector performance measurement in Poland based on VAIC™ method. This study contributes to the knowledge on performance measurement research and has practical implication important in the face of the Polish Stock Exchange attempts to encourage listed companies to include non-financial measures of business success to the information that they disclose.

The challenges of the knowledge-based economy and the evolution of performance measurement

The main concern of accounting measurement process are economic activities and financial results of business units. Today, the performance of a company may be understood as the degree to which a business unit completes its business objectives. This is a wide definition that goes beyond traditional understanding of a company success measured only in terms of income disclosed in the profit and loss account, calculated on an accrual bases and in some cases never physically collected. In today's world concepts as Intellectual Capital and Corporate Social Responsibility are the main issues of management and accounting [Sulkowski, Fijałkowska 2013a, pp. 60–75; 2013b, pp. 174–188].

Traditional measures, which were the focus of managers attention in the past, were based mainly on the financial results of entities such as net profit, gross profit, EBIT, profitability ratios (ROE, ROA, ROS), the amount of cash flow or income from sales. The use of these measurements is associated with a number of drawbacks and limitations. They restrict the term "performance" of companies, overlooking in the assessment many important aspects of business activities. They are therefore considered not adequate and not meeting the needs of modern market. They do not satisfy the information needs of neither internal nor external stakeholders of the organization. The proper measurement of the businesses' performance depends also on what is defined as the principle target of business running. In today's economic realities surely the net profit cannot be treated as the only success indicator. Managers note that it is important to invest into intangible resources of company: in human resources, information technology, research and development – which determine the image of the company on the market, its growth and success and give a chance to the company to achieve a competitive advantage and ensure long-term financial success [Canibano, *et al.* 2000, pp. 102–30; Nakamura 1999, pp.15–30; Goldfinger 1997, pp. 191–220]. These investments involve large expenditures, which often result in a decrease of the current financial result (traditionally treated as an indicator of the achievements of the company), but contribute to the long-term profits of the enterprise. Hence, apart from data concerning the current financial outcomes it is crucially important to adopt a wider perspective of the business outcomes and introduce new measurements of business performance. Nowadays, current development of the business performance measurement concept extends measurement range to application of the quantitative but non-financial measures and the qualitative assessment (descriptive, narrative, evaluating for example customer satisfaction, quality of products or services).

Generally we may distinguish three phases in the development of the performance measurement approaches that closely follow the phases of management and managerial accounting development:

1. The first phase – the measurement of economic results of business units based exclusively on singular indicators, this used to be common in the initial period of the development of the capitalist system, characterized by a simple legal and organizational forms of economic units and mass production of uniform products. At this stage accounting focused mainly on the measurement of the financial income of the company and the calculation of the basic financial indicators, profitability and the realization of budgets.
2. The second phase – the measurement based on the use of different categories of financial ratios. It is typical to the period of advanced industrial capitalist development, greater international movement of capital, higher importance of capital markets, enlarged size of companies, increased customer requirements. Accounting in this phase focuses on measuring the effectiveness of invested capital and on the liquidity issues. The performance measurement is based on a complex systems of financial indicators, such as the Altman and DuPont indicator systems.

3. The third phase – the measurement is based on the diversified measurements. It is typical to the period of globalization of markets, very high capital mobility, the rapid flow of information, complex and rapidly changing organizational structures, short product life, high demands from the customers. In that conditions we may generally indicate three different approaches to the performance measurement that reflect the three concepts of the main aim of the business unit:
 - shareholders value measurement concept (EVA, SHV, economic profit),
 - stakeholders value measurement concept (balanced scorecard, EFQM model),
 - Intangibles value measurement (including VAICTM method).

The literature review provides several categories of the performance measurement methods; approach based on the economic concept of the production function [Lim and Dallimore 2004, pp. 181–194], methods that use a combination of financial and non-financial data, e. g. the Balanced Scorecard [Kaplan and Norton 1992, pp. 71–79], Intangible Assets Monitor [Sveiby 1997], Skandia Navigator [Edvinsson and Malone 1997]. These methods are often criticized for the difficulty of access to data for their preparation. They are generally only useful to those who are inside the company (management) and have free access to internal information. Investors, analysts and other external users of enterprises information that has to focus on the data disclosed by companies are not able to take advantage of these methods. In addition, these methods are time-consuming, complex and provide descriptive information, so difficult in interpretation and in making comparisons. As an answer to this criticism Value Added Intellectual Coefficient (VAICTM) method may be proposed.

The VAICTM Method

The Value Added Intellectual Coefficient (VAICTM) method was developed by Alen Pulic, professor at the University of Zagreb and Graz, the Austrian founder of Intellectual Capital Research Centre. This method is assumed to measure the effectiveness of key resources in the enterprise. It was also used to measure the efficiency of regions in Croatia.

Pulic [2000, pp. 702–714] assumes that the traditional accounting is based on cost control, while today it is necessary to focus on value creation and value management. Business should concentrate on the long-term growth. In order to manage value, first it must be measured. Traditional indicators of business success, such as revenue growth, cash flow, profit, market share and market leadership, do not provide information about whether the company actually creates value for the shareholders / owners. The ability to create value for the company has become a new criteria of success. Moreover, the main field of investments for companies are usually intellectual resources. Tangible effects of value creation process (profit, higher price per share) are dependent on the intangible forms of value creation (increased speed and efficiency of communication, better relationships with customers, ability to

create and maintain good reputation, investment in human resources). VAIC™ indicator is a performance measurement that is assumed to be able to meet the requirements of modern economy, measuring the effectiveness of key resources in the enterprise.

The VAIC™ method relies on the concept of value added as the measure of performance, relative to intellectual capital [Laing *et al.* 2010, pp. 269–283]. It consists of the sum of three component ratios, i.e. human capital efficiency (HCE), structural capital efficiency (SCE), which embraces both internal and relational capital efficiency, and capital employed efficiency (CEE) which includes physical and financial capital efficiency. HCE and SCE constitute intellectual capital efficiency (ICE). Therefore, in order to arrive to the final measure, the VAIC™ model involves the calculation of several variables and coefficients, embracing seven steps that are presented in the table below.

Table 1. VAIC model

Steps	Variable	Formula	Variables operationalized
1	Value added (VA)	$VA = OP + EC + D + A$	OP = operating profit EC = Employee Costs D = Depreciation A = Amortization SC = Structural Capital HC = Human Capital SC = VA – HC CE = Book value of net assets
2	Intellectual capital (IC)	$IC = EC + SC$	
3	Human capital efficiency (HCE)	$HCE = VA / HC$	
4	Structural capital efficiency (SCE)	$SCE = SC / VA$	
5	Intellectual capital efficiency (ICE)	$ICE = HCE + SCE$	
6	Capital employed efficiency (CEE)	$CEE = VA / CE$	
7	Value added intellectual coefficient (VAIC™)	$VAIC = ICE + CEE$	

Source: Own work.

VAIC™ indicator may be perceived as the determinant of the company's success. It measures the efficiency with which a firm uses its physical, financial and intellectual capital to enhance stakeholders value. The higher its value, the more favorable it is for the enterprise and the greater the ability to create value. Aggregated VAIC™ helps to understand the total business efficiency and indicates its "intellectual capacity". It measures how much of the new value has been created with the resources invested in monetary units. The high rate of VAIC is associated with a high level of value creation through the use of corporate assets, including intangible resources.

The process of calculation, initially presented by Pulic [2000, pp. 62–68] was later reaffirmed by Kujansivu and Lonnqvist [2007, pp. 72–87] and additionally advanced by Nazari and Heremans [2007, pp. 595–609]. In the empirical part the original Pulic was applied.

Assessment of VAIC™ method – validity and usefulness

The VAIC™ model uses the data from traditional financial statements to analyze value creation efficiency. According to Andriessen [2004, p. 184] this makes this method a better tool for analyzing intellectual capital primarily because the data is publicly available. Moreover, the data is quantitative and not based on judgment as in case of qualitative data frequently used in other performance measurement methods. The data used is externally verified by an independent auditor that gives more credibility to the entire approach [Williams 2001, pp. 192–203; Firer and Williams 2003, pp. 1–18], provides a far more objective and verifiable results and leaves not much place for the subjectivity that is a frequent accusation against many other performance valuation concepts. VAIC™ is built on basic data collected in a simple way. Schneider [1998] argues that the more sophisticated the procedures to collect and process the data, the higher the danger that data collection and processing become ends in themselves. He maintains that VAIC™ is the result of simplifying process that enables cross-sectional comparisons. VAIC™ allows the comparison between companies and gives a chance of a quick identification of the companies with the greatest potential to value creation in the analyzed sample. The use of principles and propositions concerning this concept of performance measurement should broaden the general applicability of VAIC™. This as a result could support process of management in companies.

However, it should be also taken into consideration, that there are some shortcomings and disadvantages concerning VAIC™ method. One of the weaknesses is concerned with too far-reaching simplification of the definition of human capital valuation at the labor costs that leads to an underestimation of its value, compared with other methods. In addition, it is possible that the company is using its resources inefficiently, but it is masked by the more efficient use of other inputs, leading in effect to similar levels of total VAIC™ indicator. The VAIC™ method cannot be performed on firms which disclose a negative book value or negative profit, as in that cases the input is higher than its output, resulting in incorrect productivity. Chu *et al.* [2011, pp. 249–276] indicate also the problem of inverse relation between HC and SC that can cause difficulty to establish the exact weight of each element when calculating the overall IC valuation. Andreissen [2004, p.186] criticises some of the methodological issues concerning VAIC™. Among other things, he disagrees with the treatment of all expenses related to employees as assets (value of human capital). Assets of the company are related to the achievement of future benefits and all the elements that will not work for future benefits should be expensed in the income statement. He point out that some of the costs associated with employees can be a source of benefits in the future (e.g. those related to training and development of employees), but a large part of this expenses should be directly placed in the income statement. He adds that even if we treat all the costs associated with employees as assets, the majority of them should be immediately (in the same accounting period) amortized as there is no reason to assume that they will benefit in future periods. Andriessen also challenges the validity of the calculation of intellectual capital as the residual value of two values: the value added and human capital. This ap-

proach means that for example when operating result is negative, the structural capital of the company shall be negative as well, which is inconsistent and illogical. The frequent criticism of this methods concerns also the assumption that VAIC™ value is a result of summing up of partial indicators. This may lead in some situation to illogical results. Stahle *et al.* [2011, pp. 531–551] carry logical and empirical analysis of VAIC™ method and as a result he undermines some of its assumptions and highlights certain too far reaching simplifications. Therefore, while applying this method one should be aware of its weaknesses but also of the fact that there is no perfect way to capture, measure and disclose the complexity of business organization.

VAIC™ method as a performance measurement of Polish media sector

The sample selection for the empirical research involved identification of companies operating in the media sector. Only listed public companies listed on the Warsaw Stock Exchange (WSE) were taken into consideration as the access to their data is free and easy. The empirical study is restricted to the four biggest companies from the media sector in Poland that should work as a practical example of VAIC™ calculation and interpretation of results. The restricted number of companies may be a limitation of the generalization of results, however the analyzed companies are the major players in the Polish media market. This four companies together account for 94,31 % of the whole media sector on the WSE. The research covers a period of 2007–20011. Media sector was chosen because it is assumed highly based on intangible resources. We investigate empirically the value of VAIC™ in the analyzed companies. We calculate the value of VAIC™ following the steps presented in the table 1 that can be also summarized as it presented in the figure 1.

Figure 1. Overview of the VAIC™ model

Source: Laing, et al. 2010.

The table below (table number 2) presents the elements of VAIC index value for the sample of companies in analyzed years.

Table 2. Calculation of the elements of the VAICTM index in 2007–2011 in the four biggest Polish companies of media sector

Name of the company	Variable	2007	2008	2009	2010	2011
Cyfrowy Polsat	OP	145857	323538	277335	948391	309388
	HC	39755	59554	69862	76616	94041
	VA	185612	383092	347197	1025007	403429
	SC	145857	323538	277335	948391	309388
	CE	62436	296336	327815	1059036	2503076
	IC	185612	383092	347197	1025007	403429
	HCE	4,668897	6,432683	4,969755	13,3785	4,289927
	SCE	0,785817	0,844544	0,798783	0,925253	0,766896
	ICE	5,454714	7,277227	5,768537	14,30375	5,056823
	CEE	2,972836	1,292762	1,059125	0,967868	0,161173
TVN	VAIC	8,42755	8,569989	6,827662	15,27162	5,217996
	OP	447559	107267	686679	549573	1607964
	HC	96806	132320	127047	158091	149639
	VA	544365	239587	813726	707664	1757603
	SC	447559	107267	686679	549573	1607964
	CE	2503076	2503076	2503076	2503076	2503076
	IC	544365	239587	813726	707664	1757603
	HCE	5,623257	1,810664	6,404921	4,476308	11,74562
	SCE	0,822167	0,447716	0,84387	0,776602	0,914862
	ICE	6,445424	2,25838	7,248791	5,25291	12,66048
Cinema City International	CEE	0,217478	0,095717	0,32509	0,282718	0,702177
	VAIC	6,662902	2,354097	7,573881	5,535627	13,36266
	OP	76640	-2004	120876	145396	98916
	HC	68552	81284	84820	95224	123904
	VA	145192	79280	205696	240620	222820
	SC	76640	-2004	120876	145396	98916
	CE	617052	640104	719236	867200	908800
	IC	145192	79280	205696	240620	222820
	HCE	2,117983	0,975346	2,425088	2,526884	1,798328
	SCE	0,527853	-0,02528	0,587644	0,604256	0,443928
Agora	ICE	2,645836	0,950068	3,012732	3,13114	2,242256
	CEE	0,235299	0,123855	0,285992	0,277468	0,24518
	VAIC	2,881136	1,073923	3,298725	3,408607	2,487436
	OP	58500	37500	43500	55537	814
	HC	233369	256802	215125	222117	232345
	VA	291869	294302	258625	277654	233159
	SC	58500	37500	43500	55537	814
	CE	1107400	1058500	1084500	1131816	1134829
	IC	291869	294302	258625	277654	233159
	HCE	1,250676	1,146027	1,202208	1,250035	1,003503
	SCE	0,200432	0,12742	0,168197	0,200022	0,003491
	ICE	1,451108	1,273447	1,370405	1,450057	1,006995
	CEE	0,263562	0,278037	0,238474	0,245317	0,205457
	VAIC	1,714671	1,551484	1,608879	1,695374	1,212452

Source: Own work.

On the bases of this data we may summarize the results concerning the value of VAIC™ index in the analyzed period in the form of the graph number 1.

Graph 1. VAIC™ index in the four biggest Polish media sector companies

Source: Own work.

The graphical presentation of the results of calculations shows clearly the trend of the VAIC™ index in the analyzed period and the differences between companies. It indicates a leader of the group in the particular year. VAIC™ index is a measure of the success of businesses. The higher the value, the more favorable it is for analyzed enterprise. In 2011 the highest score was achieved by TVN company, it accounted for 13,36. It means that every 1 PLN invested in this company creates 13,36 PLN of additional value. The higher the index, the greater the ability of the company to create value and the better the efficiency of the resources utilization. In all analyzed companies in the sample the VAIC™ indicator reached a positive value. Also the media value for the sector is high. It indicates generally high intellectual capacity of the companies in the sample. Two companies – TVN and Cyfrowy Polsat place themselves almost in the whole analyzed period above the media of the whole sector, however it is worth noticing that Cyfrowy Polsat that was a leader of the sector in the last year observed a sudden sharp decrease in its value. Anyway this company still maintains a high level of the index and every 1 PLN invested in it created more than 5 PLN of additional value.

Conclusions

The value of companies is nowadays based on more than physical assets. The success of the companies is determined by the creation and management of intangibles. Therefore, in the Knowledge Era it is necessary to extend the toolbox of performance measures with non-financial measurement approaches. VAIC™ seems to be an important proposal of this measures. It can

be treated as an significant supplement to the traditional approaches in the analysis of financial statements and performance evaluation. The VAIC™ concept presents a robust tool for performance judgment. It can be used by management to assess the efficient use of companies' resources and outcomes of strategic and tactic actions of a business. As the data is publicly accessible it can also be a very useful indicator for outside stakeholders while taking economic decisions. Some weaknesses and shortcomings are associated with this method and we surely cannot state that this is a perfect approach to complete and absolutely correct performance measurement of companies in today's business conditions. Surely, however, this method significantly extends the range of analysis of companies' performance, involves a wider spectrum of variables to be taken into a consideration and in this way can be accepted as an additional useful tool of assessment of business outcomes.

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