ICKM 2009

The University of Hong Kong

Workshop

on

Intellectual Capital

Datasheet for computing VAIC indices

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Introduction to VAIC

The fundamental concept of VAIC™ is premised on how we view employees in an organisation and the definition of IC. If we accept that knowledge is the key driver in today's business, then the employees who are the main carriers and repositories of knowledge in companies may need to be treated as the most important asset in organisations. It follows that any expenditure by companies on employees may then be viewed as investment instead of costs, be it fixed or variable. This is consistent with both the stakeholder view and the resource-based view (Barney, 1991; Donaldson & Preston, 1995; Fahy, 2000). Furthermore, in the context of VAIC™, IC is defined as consisting of human capital and structural capital, which is consistent with many the working definitions of IC, which is one of the key premises or underlying assumptions of VAIC™ (Chan, 2009a, 2009b; Edvinsson, 1997; Edvinsson & Bounfour, 2004; Pulic, 2002). The computation of VAIC™ involves five steps, each of which has its associated assumptions (Chan, 2009a; Kujansivu & Lönnqvist, 2005; Pulic, 2000; Shiu, 2006), which are provided below:

- Firstly, the computation of a company's value added:

$$VA = Output - Input,$$

where VA = valued added; Output = total income; Input = cost of bought-in material, components and services. It is important to note that in evaluating a company's performance, the stakeholder view requires a broader measure of VA, which includes not only investment in employees, but also taxes paid to the government, dividends for shareholders, interests paid to lenders and contributions from society (Chen, Cheng, & Hwang, 2005; Riahi-Belkaoui, 2002). Therefore, VA may be expressed as:

$$VA = R + DD + T + EC + D + A,$$

where R = retained earnings; DD = dividend; T= taxes; EC = total employee expenses viewed as investments; D + A = depreciation and amortisation. Note that R + DD is net income after tax under the clean surplus assumption (Chen, et al., 2005; Felthan & Ohlson, 1999). After adding taxes to net income, R + DD + T may be viewed as operating profits (Kujansivu, 2005; Kujansivu & Lönnqvist, 2005; Pulic, 2004).

$$VA = OP + EC + D + A,$$

where OP = operating profits, EC = total employee expenses viewed as investment; D + A = depreciation and amortisation.

- The second assumption is in the computation of human capital efficiency (HCE). Treating the total expenditure on employees as investment that captures the total human effort in the company in value creation is an assumption of this methodology. According to Pulic (2000, p. 707), the inventor of this methodology, human capital (HC) may be calculated as "payroll costs". Therefore, HCE may be expressed as the amount of value added generated per money unit invested in employees:

$$HCE = VA / HC,$$

where HCE = human capital efficiency; VA = value added; HC = human capital, which is calculated from total employee expenditure for the company.

HCE is an indicator of the efficiency of value added by human capital employed, which forms part of intellectual capital efficiency.

- The third step is the computation of structural capital efficiency (SCE). Structural capital refers to the tangible elements of an organisation such as proprietary computer systems, routines and procedures, which remain in the organisation after the employees go home at night (Jashapara, 2004; Petty & Guthrie, 2000). According to the methodology, structural capital (SC) is viewed as the contribution in the value creation process for a given period, which may be obtained by subtracting the human capital from the amount of value added. Therefore,

$$SC = VA - HC,$$

where SC = structural capital; VA = value added; HC = human capital. Note that SC and HC are in reverse proportion with respect to VA. That is, the more HC participates in value creation, the less SC is involved. Structural capital efficiency (SCE) is reflected by the share of SC in the total value created, which is:

$$SCE = SC/VA,$$

where SCE = structural capital efficiency; SC = structural capital; VA = value added. SCE is an indicator of the efficiency of value added by structural capital employed, which forms part of intellectual capital efficiency.

- The fourth assumption is in the computation of IC efficiency. In the context of VAIC™, intellectual capital is assumed to consist of human capital and structural capital. Therefore, intellectual capital efficiency is obtained by the summing of the two partial efficiencies of human and structural capital:

$$ICE = HCE + SCE,$$

where ICE = intellectual capital efficiency; HCE = human capital efficiency; SCE = structural capital efficiency. ICE is an indicator of the efficiency of value added by the amount of IC employed.

- The final step in computing VAIC™ involves first calculating the capital employed efficiency (CEE). According to the methodology, IC cannot operate independently and so needs to function in concert with financial and physical capital in order to create value for a company. CEE can be obtained by:

$$CEE = VA/CE,$$

where CEE = capital employed efficiency; VA = value added; CE = book value of the net tangible assets of company. Finally, VAIC™ is the composite sum of ICE and CEE:

$$VAIC™ = ICE + CEE,$$

where ICE = intellectual capital efficiency; CEE = human capital efficiency; SCE = structural capital efficiency.

VAIC™ represents an aggregate indicator of the *overall intellectual ability in value creation* for a company. A higher coefficient indicates that more value is created using the company resources of physical and intellectual capital (Pulic, 2004).

Noted advantages

One of the main considerations in choosing the method of measuring IC, in my opinion, is that industry and management professionals may readily apply the selected method with relative ease, and the results and indicators obtained may also command respects from fellow IC practitioners as well as from industry professionals. Necessarily, the verifiability of the data gathered for the measurements and compilation of the indicators is likely to receive as much attention as the general acceptability of the conceptual model and derivation on which the methodology is based. For example, all the data needed for the computation of VAIC™ may be found in a company's audited financial reports. This enhances the objectivity of the computation, and is easily verifiable. The justification for adopting the VAIC™ methodology may be summarised below (Chan, 2009a) :

- It produces quantifiable, objective and quantitative measurements without the requirement of any subjective grading and awarding of scores or scales. It aids further computation and statistical analysis by using a large sample size that may run into thousands of data items collected over a period of time.

- It provides indicators that are relevant, useful and informative to all stakeholders, but not just shareholders, and with which they may also identify and compare the key components of IC in order to assess company performance.

- It uses financially oriented measures so that any indicators, relations or ratios computed may be used for comparison along with traditional financial indicators commonly found in business, which are based on monetarily derived units or measures.

- It uses very simple and straight forward procedures in the computation of the necessary indexes and coefficients, which may be simple to understand, especially for management and business people who are accustomed to traditional accounting information.

- It produces a form of standardised measurement. The indicators or indexes computed may be consistently applied to and used for comparison across divisional, company, industry and national level. In other words, benchmarking may therefore be possible.

- It makes use of public or published financial data so that it may enhance the reliability of the measurement, and improve data availability.

- It provides an IC measurement system that is consistent with the stakeholder view and resource-based view by using a value added approach.

- It treats human capital or employees as the most important source of IC, which is consistent with all major IC definitions found in the literature.

- It has a track record in deployment and application in IC research and listed companies in many countries, to which researchers may refer in reviewing published papers. Furthermore, the availability of prior studies in other countries in the Asian region comparable with Hong Kong, such as Taiwan, Malaysia and Singapore, add further credibility to the methodology.

Sample datasheet

	Hong Kong Company A		
	2005 (millions)	2004 (millions)	2003 (millions)
Operating profit	HKD 7,216	HKD 4,492	HKD 3,064
Depreciation & Amortization	HKD 166	HKD 202	HKD 116
Total investment in employees	HKD 649	HKD 615	HKD 620
Total physical capital employed	HKD 216,227	HKD 205,636	HKD 199,986

	Hong Kong Company B		
	2005 (millions)	2004 (millions)	2003 (millions)
Operating profit	HKD 1,764	HKD 2,445	HKD 1,255
Depreciation & Amortization	HKD 126	HKD 113	HKD 103
Total investment in employees	HKD 824	HKD 736	HKD 732
Total physical capital employed	HKD 106,094	HKD 93,776	HKD 85,118

Hong Kong
Company A

	2005	2004	2003
VA			
HCE			
SCE			
CEE			
ICE			
VAIC			

Hong Kong
Company B

	2005	2004	2003
VA			
HCE			
SCE			
CEE			
ICE			
VAIC			

Some useful terms

Corporate intellectual ability: It is an important concept in the VAIC™ methodology. It refers to the total value creation efficiency due to both IC and physical capital functioning together in a business environment, and illustrates that IC cannot operate independently without the support of, for example, financial and physical capital, which need to be functioning together in order to create value. It follows that the VAIC™ coefficient, is an indicator of the overall efficiency or ability of an organisation to use the total resources of IC and physical capital in creating value for the company (Chan, 2009b; Pulic, 2002; Seetharaman, Low, & Saravanan, 2004; Tseng & Goo, 2005). This is consistent with the Resource-based view (RBV) which may be regarded as the theoretical bedrock of IC (Barney, 2001; Chan, 2009a; Fahy, 2000; Marr, Gray, & Neely, 2003; Prahalad & Hamel, 1990; Roos, 1998; Teece, 1998).

Intellectual capital (IC): For the purposes of this handout, IC is defined as consisting of human capital and structural capital, the efficiency of which may be measured as a component of the VAIC™ coefficient (Guthrie, Petty, & Johanson, 2001; Jashapara, 2004).

Human capital (HC): This refers to the employees who encapsulate a company's knowledge including those human resources that maintain relations with external organisations including suppliers and customers. HC efficiency may be measured as a component of the VAIC™ coefficient known as HCE (Chan, 2009a; Jashapara, 2004; Petty & Guthrie, 2000; Pulic, 2002).

Structural capital (SC): The tangible elements of an organisation such as proprietary computer systems, strategy, routines and procedures. Simply stated, "it is what gets left behind in an organisation after the members of staff go home at night". SC efficiency may be measured as a component of the VAIC™ coefficient known as SCE (Bontis, 2001; Edvinsson, 1997; Jashapara, 2004; Petty & Guthrie, 2000; Pulic, 2000).

Physical capital (CE): All the material and financial assets of a company. CE efficiency may be measured as a component of the VAIC™ coefficient, known as CEE (Pulic, 2000).

About the speaker

Kin H Chan (B Eng, DIS, MSc, MBA, DBA, MIAP, CWM^{TM})

Dr Chan received a Doctor of Business Administration from University of Newcastle, Australia, and earned his MBA from University of South Australia. He holds a Master of Science in Computer Data Processing and Bachelor of Engineering from University of Ulster, Northern Ireland, UK. He has developed a strong interest in intellectual capital and knowledge management, and is the author of the papers *"Impact of intellectual capital on organisational performance: an empirical study of companies in the Hang Seng Index (Part 1 & 2)",* published in 'The Learning Organisation' in January 2009. He also speaks regularly in China on entrepreneurial development and strategic management for the hi-tech and intellectual property related industries. Besides management research, he is also interested in artificial intelligence as well as design techniques for relational databases. Until recently, he was Corporate VP and Managing Director for Greater China of DTS Inc., USA, which is an intellectual property company specialised in entertainment technology. He also served as CEO of a world-renowned company in business technology optimization, and was previously CEO of a PRC network security technology company. He is currently a part-time LLM student in Arbitration and Dispute Resolution at Faculty of Law, The University of Hong Kong, and can be reached at kinhchan@hku.hk.

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