INTELLECTUAL CAPITAL MEASUREMENT AND HOLISTIC VALUE APPROACH (HVA)

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INTRODUCTION

Over the past decade, the rapidly growing realisation of the importance of intangible assets and intellectual capital as a whole in the operation of organisations has led to the need to manage companies in a new way and to measure their performance in a new way. With more than 50 books on the subject by various authors, many with incompatible views, what should managers do?

It is not just companies seeking clarity; the effect of changes in business on national life has led to governments taking a keen interest in economic development in the "new economy" (DTI, 1998, 1998). In the markets, it is a well-known argument that the dominating factor in company valuation for most companies now and especially the hi-techs and dotcoms is intellectual capital. In the US, 5% of company capitalization is accounted for by the dotcom companies, that is, about $1 trillion and this valuation is not built upon profit yielding sales or physical capital but on "stories" (Lightman, 2000). Elsewhere it is a similar story and one that will continue over the next decade. It is estimated that over 25% of companies that can be expected to be listed in the FTSE 100 in 2010 do not exist at present and these will be dominated by the dotcoms and hi-techs (Foresight, 2000).

Through most of the 1990s the lack of a common language with which to communicate issues has been one of the most insidious reasons why progress in describing companies' intellectual capital characteristics to others and managing them effectively internally has been slow. The characteristics and potential of people, known as human capital, comprises different things to different people and even at a fundamental academic level, there has been little evidence of clarity. This is not peculiar to intellectual capital management; it also appears in the area of knowledge management. For example, there are at least eight different categories for knowledge in common use (Von Krogh, Roos and Kleine, 1998). Aside from the problems of communicating meaning, management models and the results they give and the subsequent actions managers choose to take also lack the clarity and obvious logic that they might otherwise have. A look at the review documents such as those by the conferencing groups highlights the problems and also shows the development from Balanced Scorecards and Human Resource Accounting to the most recent thinking on managing the "new economy" (Business Intelligence, Skyrme, 1998). Happily, in the last two years or so there has been a steady convergence in categorisation and language onto a single model. Figure 1 shows the emergent definitions.

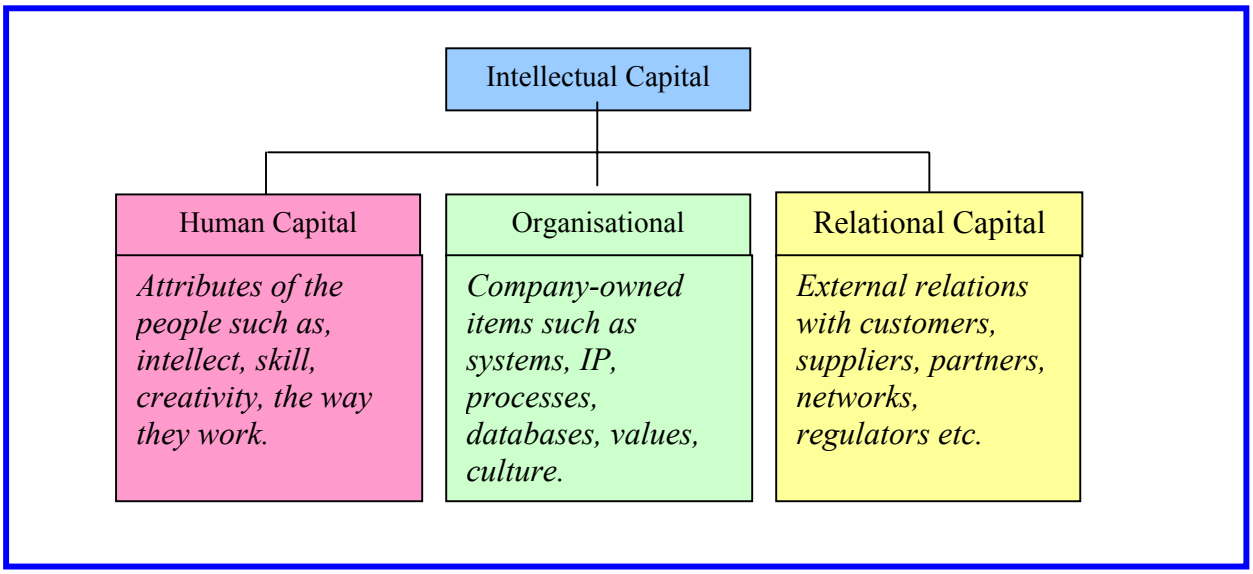

Figure 1 – Categories of intellectual capital (after Roos 1997)

This diagram is only a guide to the components of intellectual capital as the elements combine and interact with each other and with traditional capital elements (physical things and monetary elements) in ways unique to individual companies to create value. In addition, the equation in figure 2, while useful in drawing attention to intellectual capital, is incorrect from more than one point of view and management models and accounting schemes based upon it will necessarily be flawed since the variables are not separable as required by the equation.

Market Value = Book Value + Intellectual Capital

Figure 2 – Intellectual Capital & Market Value

Additionally, the obvious accounting flaw is that the right hand side of the equation does not have a single set of units. Virtual and real money cannot be added to each other (Justice, 1707).

MANAGEMENT AND MEASUREMENT

Through history, man has evolved from being a hunter-gatherer, through agricultural society and industrial society and now into a knowledge-based society. In business, there is a parallel and, as with man, all four forms exist today. See figure 3 for examples.

Business / Society	Attributes	Characteristic statement
Hunter-gatherer	Aggressive, hand-to-mouth, meets local needs, no reserves, mobile, people are expendable.	We are a successful and profitable company. We depend on our first-rate sales force to maintain us but do not have a broad product base. We have a stable core of people to guide company development.
Agricultural	Docile, stationary, has reserves, meets local and some distant needs, people are tools.	We provide a service for customers who are always going to be there and are, in a sense, local. Our staff are broadly but not highly skilled and our procedures are well set out and adhered to. Quality is our watchword.
Industrial	Cost conscious, efficient, meets area needs, many suppliers may own distribution network, people are costs.	The company has thrived and survived recession by careful cost control, process re-engineering and careful attention to customer satisfaction. We are a volume producer with major production plants. We have a network of tied distributors. Our brands are well known.
Knowledge	Creative, agile, knows what it knows, knows customer and values, involved suppliers and distributors, electronic presence, people are assets.	We thrive through our ability to stay at the leading edge of customer needs and product design. To do this we convert our staff's talents as best we can and have an extensive network of partners. Our marketing and electronic presence gives us a global position.

Figure 3 – Evolving business types (after Pike, Rylander & Roos 2000)

Interestingly, as the business society has developed, the key step in value creation has

ascended an intellectual staircase. The key elements have evolved through just being there, to physical capital dominated to organisational capital dominated and now to human capital dominated. It could be argued that agricultural and industrial societies required human capital too, however, in these societies the use of humans tended to be as extensions of machines rather than as assets employing the intellectual capital attributes of humans such as intellectual agility and creativity.

Management models have also evolved but there has been a key difference in the transition to the knowledge economy. The difference is not that yet further items have been added to the balance sheet or recorded as costs in the profit and loss statement but that people are now also assets with an indeterminable value as far as standard accounting is concerned. Furthermore, the knowledge they have embodied into processes has a value that may be known as far as the owning company is concerned but, when traded, has a value dependent on the context of use of the buyer and this varies from buyer to buyer.

One obvious approach to management and measurement is to try to retain as much of the rigour of conventional accounting by adjusting its traditional instruments. Where people believe this to be impossible, they have resorted to measuring new things but retaining the forms of conventional accounting. The alternative to this is to abandon traditional accounting and base measurement and management on the attributes of the value generating processes of individual companies. The question is whether either of these approaches can meet the need in an auditable, useful and secure way. This means a measurement regime that gives managers the levers necessary to guide the business while not instilling unwanted behaviours through measuring the wrong things nor imposing a heavy burden of measurement of people who have better things to do. There are a number of intellectual capital measurement/management methodologies available now (ESPRIT, 2000). To assess the relative effectiveness of different approaches to measurement and management it is necessary to have some criteria by which they may be judged. For example:

1. Is it auditable and reliable?
2. Is it easy to use and does it impose a large measurement overhead?
3. Does it facilitate strategic and tactical management?
4. Does it generate the information needed by shareholders and investors?

AUDITABLE AND RELIABLE

If managers are to make judgements on measurements then they need confidence that the information they have can be relied on. Even if the interpretation of that information may differ from one manager to another, the source must be unimpeachable. Traditional accounting generally offers that quality for monetary capital and, to a considerable extent, physical capital. However, valuations of physical capital are problematic since their intrinsic value is calculated through a depreciation process and this is very hard to recoup at sale and the extrinsic value is inextricably bound up with companies' business processes. With either physical or monetary value, the danger for managers attempting to make business decisions is that the actions they take may be based on extrapolations beyond the zone of validity for the data. A common example is to make some direct link between investments costs, such as for R&D with the value of that R&D.

Intangible assets are not additive in nature and their measurement is open to semantic debate so it is important that a rigorous approach to measurement is taken and measurement theory offers it. Adherence to measurement theory (Krantz, 1971) provides a means by which non-financial measurement systems can attain the same (or better) degrees of rigour as financially based ones. The key requirements are that the measurement system and its constituent elements are:

1. Complete in coverage,
2. Distinct and free from overlaps,
3. Preference independent with respect to one another,
4. Observable,
5. Measurable and
6. Agreeable in that they are an agreed measure of the attribute.

Measurement and the consequent management of intellectual capital based on lists of attributes, which have not been thoroughly subjected to this rigour, carry with them the danger of unexpected and unwanted consequences.

MEASUREMENT OVERHEAD AND EASE OF USE

This is an entirely practical point in that measurement schemes tend to grow uncontrollably.

Two dangers emerge from over measurement. The first is that the cost of data collection far outweighs the benefits of having it and that its collection also causes considerable irritation amongst those doing the measurement and those being measured especially if the redundancy of the measurement is obvious. The second is that management based on over measurement leads to justified accusations of micro-management and the tendency to instil unwanted behaviours. This latter point arises since people tend to want to improve performance and will tend to focus on many trivial elements in an over-elaborate measurement system. In doing this they loose sight of the bigger and more important picture.

STRATEGIC MANAGEMENT

This criterion reaches to the heart of the problem. If a measurement and management scheme is to be of any real value then it must give managers a means of translating their strategic intent into appropriate actions and feedback information showing whether these actions are working or not. Managers can affect the performance of their businesses at two levels. Firstly, at the organisational level where they affect how the processes of value creation in the company are interconnected. The second is that they can encourage improvements in individual or groups of processes at an operational level. Examples of the first are through strategic alliances and positioning while examples of the second are investments in soft assets and conditions.

If measurement is to support management effectively then the measures have to be dominated by those that look forward (Van Buren, 1999). Here lies one of the principle weaknesses of accounting-based methodologies of intellectual capital management. Accounting is based on historical transactions and is thus dominated by lagging measures.

In contrast, methodologies for managing intellectual capital based on a business approach should suffer from none of the intrinsic weaknesses of financially based management methods. There are, however, serious deficiencies that can considerably degrade the usefulness of these approaches. The most common of these is the measurement of stocks of intangible assets in the belief that they constitute value. Stocks represent the potential to create value and unless the measurement of potential is the specific and limited aim (Pulic, 2000) then management will be misguided in using such approaches to manage intellectual capital. Value is created when stock is employed (and degrades when it remains unused) so the attributes that must be measured are either influence if the importance of value creation pathways are the goal or influence and flow if some attempt is to be made at relative or even absolute value. The important distinction here is that what flows is not necessarily of value and what is influential in

creating value might be a small flow of something very important (the concept of flows was introduced by Roos et Roos 1997).

Business based models offer management many insights. Even the simpler stock models have some use in that, in the absence of other complicating factors, levels of stock and consequent performance can be benchmarked between companies. Influence models are particularly powerful since the counterpart of influence is control and control and facilitation are at the heart of management. By employing Hume's fork reasoning (Hume) what is desired in terms of companies strategic intent ("what ought to be") can be compared with the way a company is actually operating ("what is"). The influence diagram that results from mapping the important connections between classes of intellectual capital, usually known as a "navigator", becomes a powerful and visual tool for management to use to determine where real value is created in a company and where it is destroyed. The natural counterpart of control informs management of the changes necessary and possible to improve performance and since strategy is forward looking, so too is the navigator approach. For a practical example of this, see for example the article (Roos G and K. Jacobsen) or the article (Roos, G. and F. Lövingsson).

There are very few influence and flow models at present. A reliable navigator-based approach to business management, which combines both flow and influence, remains the goal for many. The HVA (Holistic Value Added) methodology, a combination of a Navigator and the axiology/measurement theory approach, is probably unique in the influence and flow field.

Having mentioned dotcom companies and hi-tech start-up companies in the introduction, it is worth noting that they require no special treatment as far as intellectual capital management methodologies are concerned. Dotcoms do however represent an extreme situation and hence they are worthy of discussion to demonstrate that intellectual capital measurement and management models extend easily to cover them. In terms of practical measurement, as the intellectual capital elements are the same but with different emphasis, extra care is care is required in defining the measurements necessary to give managers the information needed to guide the performance and development of the company.

SHAREHOLDER INFORMATION

In order to communicate with stakeholders outside the company, you must have information to communicate and that the information is in the form and language that the stakeholder understands. For a long time the only information that seems to have been required by stakeholders to be reported in a standardised form in most companies has been company performance in financial terms. The exception to this has been those companies or agencies involved in delivering public services. For them, financial stability has been a key performance indicator but along with that have been the quality, level and extent of the service that has been provided. In the knowledge era, the concept of stakeholder or even shareholder value extending beyond simple financial performance measures is a crucial change. To communicate with stakeholders now requires a deeper understanding of the attributes of value from the point of view of the stakeholder groups. Internally in the company this means that the management's strategy must be more sophisticated and the levers that management pull to improve their business that much more numerous and complex. For a more in depth discussion on this see for example: (Rylander, A., Jacobsen, K. and G. Roos).

Understanding and being able communicate the attributes of value requires that management and their models have a grounding in axiology, a branch of philosophy that developed in Germany and Austria in the 19th century (Rescher, 1969) and states that within a well-defined context; discussions of value can take place. The key step is to connect the possibilities of axiology with the rigour of measurement theory (M'Pherson, 1996). Managers then have the potential of a methodology, in which the impact of strategic decisions on all stakeholder groups can be assessed in advance of their implementation. This does not mean that the problems are all solved and the future is laid bare. Uncertainty in data and risk introduced by the actions of outsiders such as regulators, suppliers, partners, governments, not to mention the actions competitors all conspire to make the results less than certain. The art of strategic management remains.

These then are the tests and requirements of a truly comprehensive intellectual capital management and measurement scheme. Although some approaches come close to providing a holistic approach, only HVA comes close to providing it. Let us see how the options for management compare using the criteria and then see how HVA works.

MAIN CRITERIA	TEST	Financially based, e.g. EVA	1st generation IC and BBS	2nd generation IC,	3rd generation IC,

				e.g. IC Index	HVA
Auditable and reliable	Data meets a standard	Yes	No	Partial	Yes
	Data addresses looks at the right time frame	Partial	Yes	Yes	Yes
Overhead and ease of use	Low measurement overhead	Yes	Moderate	Moderate	Moderate
	Easy to initiate and use	Yes	Yes	Moderate	Moderate
Strategic management	Allows multi-level management	Partial	Does not allow trade-off decisions	Yes	Yes
	Measures stock, flow and influence	Stock	Stock	Stocks and influence	Stock, flow and influence
Shareholder information	Provides data at all levels in the company	Partial	Yes	Yes	Yes
	Engages all the value attributes of all stakeholders	No	No	Partial	Yes

HVA

As with many problems, the solution has to be found by looking outside the area that created the problem. So it is with the effective management and measurement of intellectual capital. In this case, the solution has come from the engineering field rather than from the fields of the social sciences. Mathematicians and those who deal with the physical sciences live with entities with multi-dimensional attributes as a matter of course and have developed some elegant methodologies to visualise them and deal with them.

The Holistic Value Approach (HVA) combines Göran Roos' (chairman ICS Ltd) IC Index and Philip M'Pherson's (joint R&D Director ICS Ltd) IVM™ (Inclusive Value Management) and draws on substantial contributions from Stephen Pike (Joint R&D Director ICS Ltd.). The HVA model is a based on the view that a narrow asset perspective, using traditional accounting methods without considering the usefulness of these in business performance is of little use for a strategic management tool. HVA acts as an extendible and flexible search framework and

database for financial and intangible assets, also referred to as a 'Business Value Model'. The superimposed IVM™ acts as the "multi-dimensional" accounting system that measures and combines the financial and intangible contributions using the value contexts of all stakeholders individually. Figure 4 outlines the HVA approach in the context of valuing a business.

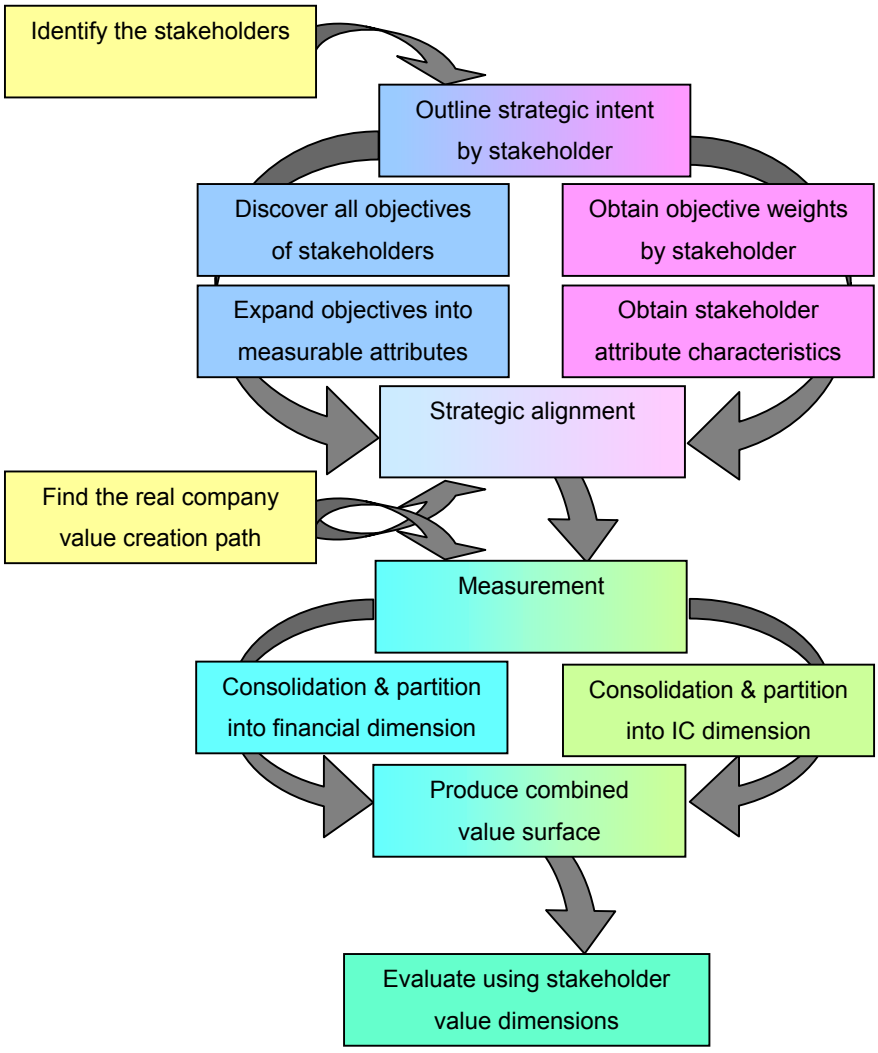

Figure 4 – The HVA

Input from senior management level is required to initially identify key stakeholders and to outline the organizations strategic intent, the role it plays and the values it delivers. The development of the value hierarchy and the measurement of attributes can only be completed by operational staff, as it requires immersion in the day-to-day business operations. This activity

is then used to identify two sets of variables for each stakeholder: one is the set of weights that describe the relative importance of each objective to the stakeholder; the other is the behaviour of the measuring attributes.

Once the attributes of value have been identified, a parallel can be initiated. What is sought is the nature of flows and influences between these attributes, that is, the identification of the value creating pathways in the business. Whereas the early activities derive from the IVM^{TM}, this set derives from the IC Index. The outcome of this process is a navigator that visualizes how value is really created in the organization.

The strategic alignment is the stage when the previous phases are brought together and the indicators are attached to the value-creating path, this means assigning the different key performance indicators to the different stocks and flows in the navigator. This reveals whether the previously articulated strategy, on which the key success factors and key performance indicators are based, are in alignment with the way the organization creates value on a daily basis – the picture displayed in the navigator. In other words, it provides a reality check of both strategy and value creating path.

A model of the business as a value generator is an essential prerequisite for understanding the exchange relationships between the various forms of value and cost. Business models regard the process, activities and outputs of the organisation as value generators and distinguish carefully between the value generated internally by the organisation's activities and the value realised externally. Typically, the organisation generates value internally through:

1. The values and quality of the corporate Governance;
2. Effectiveness of the deployed intellectual capital;
3. Effectiveness of the resulting activities, processes and operations that produce the output of the organization, including essential sub-contracted input and outsourced activities;
4. Quality of compliance with regulatory standards;
5. Costs (negative value) – the inclusive capital and operational costs of all the value generated internally + costs of information to and from the external environment + the costs of negative environmental and social impacts.

The external environment *awards* value through:

1. Revenue from the sale of products and services;
2. Customer value added after purchase (over the life-cycle of use);
3. Employee value added after receipt of salary and financial benefits;

4. Stakeholder value added;
5. Assessments of regulators and professional interests, especially financial analysts;
6. Assessments of the environmental and social impacts resulting from the existence of the organization, its activities, its outputs and discharges;
7. Awareness raising by opinion-formers and special interest groups concerned with ethical and environmental matters;
8. Reports from the media and public opinion.

Internal and external values are then grouped within the definition of Inclusive Value. *Inclusive Value* consists of two main categories: *financial value* and *non-financial value*. The former is completely conventional and uses the net present value of costs or cash flows or the option of costs or cash flows. The non-financial value is divided into the value of the performance achieved with respect to operational objectives and the value resulting from the many assessments of external agencies that judge the system's achievements with respect to their own objectives.

While calculations in the financial dimension is easy since elements are additive in nature, calculations in the value dimension are not. Combinations of intangible value are performed using a standard set of combinatorial rules and practices consistent with measurement theory and axiology normalised in the range [0,1], where 0 means that not one of the intangible feeds has registered any value at its host, and 1 means that all intangible feeds have achieved their targets completely. In between is a proper measure indicating an order-preserving shift for any incremental change in a value feed, or combinations thereof.

The final step is to combine financial and intangible value in a combinatory value space, and then, by back projection into the accountancy space, indicate the financial equivalent of the intangible contributions to a cash flow stream. To visualize the combination we make use of a 3 dimensional space where normalised monetary value defines the y-axis and intangible value defines the x-axis. The overall combined value resulting from the combination is displayed vertically as combined value added (the z-axis). The actual value combination takes place in the form of a canonical combinatorial rule by which the two financial and intangible inputs are joined to provide the combined output. A range of output analyses are possible for example: the relative contribution to value (intangible, financial or combined) of individual elements; return on investment projections, the effects of stakeholder value of development options, value for money and cost benefit analyses.

FINALLY

Summing up, every business generates value in some form or another, otherwise it would not exist. Value, simply stated, is a matter of definition. If it can be defined in its separate parts, it can be measured. The study of axiology shows us that value is defined with reference to an agreed context. Our research has delivered a scientific approach to the measurement of value that, in effect, is a measure for the distance between present achievement and complete achievement. The HVA model is different from all the others in that it is a generic measuring instrument rather than an assessment process. As such, the methodology is more rigorous and complete. The entire process is one that displays the benefits of being transparent, axiomatic, and auditable and yields the same result regardless of who does it. In practical situations, it may sometimes be sufficient with Pareto versions of the formal rigorous approach. These Pareto versions are also developed but are not covered in this paper.

A further advantage of a generic approach is that the tool has a very wide range of applicability. There are a great many documented differences between the ways companies work in the West compared to the East. These differences arise from the culture of the individual, the values of the company, the relationships companies form with other companies and, of course, the local accounting principles. IC makes no prior assumptions about any of these and so it can be applied without special caveats, indeed, if the value context used by the selected IC-tool, e.g. HVA, in an assessment is global in nature then at least the intangible value elements of stakeholders can be compared globally.

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