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**NAVAL
POSTGRADUATE
SCHOOL**

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

Intellectual Capital

**By: Clint B. Fondo,
Darren B. Wright
December 2004**

**Advisors: Bill Gates,
Mary Malina**

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INTELLECTUAL CAPITAL

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Submitted in partial fulfillment of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

from the

**NAVAL POSTGRADUATE SCHOOL
December 2004**

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ABSTRACT

The purpose of this MBA Project was to investigate and provide a comprehensive overview of the historical and current efforts directed at valuing intellectual capital (IC). This project was conducted with the sponsorship and assistance of the Office of Military Base Retention and Reuse (OMBRR), of the California Business, Transportation and Housing Agency. The goal of this project was to identify and document both the history of valuing IC, and the models currently in use throughout the private sector. Additionally, an effort was made to develop a definition that would be appropriate for use in a governmental setting and to develop a working model that can be used to manage IC within the Department of Defense (DoD).

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I. INTRODUCTION

The purpose of this MBA Project was to investigate and provide a comprehensive overview of the historical and current efforts directed at valuing intellectual capital (IC). This project was conducted with the sponsorship and assistance of the Office of Military Base Retention and Reuse (OMBRR), of the California Business, Transportation and Housing Agency. The goal of this project was to identify and document both the history of valuing IC, and the models currently in use throughout the private sector. Additionally, an effort was made to develop a definition that would be appropriate for use in a governmental setting and to develop a working model that can be used to manage IC within the Department of Defense (DoD).

The impetus for the project was a desire by the OMBRR to develop a means of measuring and managing IC in order to defend DoD institutions within the state of California during the Base Realignment and Closure (BRAC) process. The measurement of IC has a particular appeal when defending DoD institutions such as the Naval Postgraduate School (NPS) and the Defense Language Institute (DLI). Educational institutions such as these have developed a large cadre of assets that can not be adequately described by current accounting practices. Ideally, the identification and valuation of these assets would provide a meaningful advantage for the state of California during the BRAC process.

The transition from the industrial era to the information age created a need to manage assets in ways that was not been previously explored. Today's Generally Accepted Accounting Principles (GAAP) do not adequately reflect the intangible assets that provide many companies with competitive advantage in today's marketplace. While GAAP does allow for some valuation of intangible assets, such as the use of goodwill and patent valuation, there is no accepted measure of IC. An increasing number of private firms have developed a means of measuring and managing IC, a commonly ignored component of intangible assets, in an effort to increase their profitability.

Obviously, not all firms need to develop sophisticated models for the management of IC. A company like Microsoft that is very dependent on IC for competitive advantage

will benefit much more from its management than a bricks and mortar company in a mature industry that still operates in an assembly line environment with minimal change and no real dependence on research and development.

The DoD is also operating in an environment that depends in a large part on IC. Much of the advantage that the American military holds in the battlefield stems from our dominance in the arena of information management. A key component of IC is information technology, which is closely associated with information management. Therefore, it may be possible for the DoD to realize real gains from the proper management of IC in the same way that private firms do. The measurement and management of IC may not be of equal benefit to all DoD organizations. It seems intuitive that a training organization such as NPS may have more to gain from the management of IC than an organization such as the Defense Finance and Accounting Service (DFAS), where tasks are indistinguishable and innovation is less important than standard operating procedures.

This project closely follows the historical evolution of IC, beginning with the efforts of Sir William Petty in 1691, and briefly describes the work of Adam Smith, William Farr, and others in a methodical manner leading up to the development of valuing IC in the 1960s. A continuation of the history is provided up to contemporary efforts in the area.

This paper also examines various definitions of IC and presents a specific definition for use in a governmental or not for profit setting. Additionally, a thorough examination of models currently in use throughout the private sector is presented, and a specific working model is developed for use within the DoD.

Four methods of measuring intangibles are specifically discussed. They are the Direct Intellectual Capital methods (DIC), Market Capitalization methods (MCM), Return on Assets methods (ROA), and Scorecard methods (SC). Of the four, the SC methods show the most promise for use within the DoD.

Finally, a SC method model, based on the Skandia Navigator, has been refined for use within the DoD. A comprehensive list of possible metrics is thoroughly discussed and an example financial statement addendum has been provided.

II. THE HISTORY OF VALUING HUMAN CAPITAL

What is the value of a human being? The idea of comparing measurable wealth to the intangible value of a human being is attractive, but elusive. The recent widespread interest in the subject could lead to the erroneous conclusion that the question and theories on the subject are new. They are not. In 1691, Sir William Petty postulated that labor should be included in any estimate of national wealth. He used the concept of human capital to explain various economic conditions and phenomenon, including the economic effects of migration, the value of a human life destroyed in war, and the power of England (Wykstra, 1971). “Petty estimated the value of the stock of human capital by capitalizing the wage bill to perpetuity, at the market interest rate; the wage bill he determined by deducting property income from national income” (Wykstra, 1971). Not only was this method one of the first used to estimate the value of human capital, it is a method that has displayed exceptional staying power.

In 1776 Adam Smith discussed the value of labor extensively in what is perhaps the seminal work on economics in modern times, *The Wealth of Nations*. He went as far as to assign an exact value to a human in North America (£100) (Smith, 1991). He also clearly demonstrated that the value of human capital in one area is not equal to the value of human capital in another; pointing out that while having children in industrialized England would drain the resources of a family; a large family in the largely agrarian society of North America marked an increased capacity for wealth creation (Smith, 1991).

William Farr used a method similar to Petty’s to value human capital in 1853. He attempted to determine the net present value of a human by estimating all future income, using actuarial tables to approximate future earnings. Farr “advocated the substitution for the existing English income tax system of a property tax that would include property consisting of the capitalized value of earning capacity” (Wykstra, 1971).

Historically, the only competing theory for human value estimation has been the cost-of-production method put forth by Ernst Engel in 1883. Engel acknowledged Petty’s view, but decided that the method was inadequate to estimate the value of a

superior mind. “Since, however, their rearing was a cost to their parents, it might be estimated and taken as a measure of their monetary value to society” (Wykstra, 1971).

Engel developed a mathematical formula for estimating the value of a person, based on age and class level. His efforts were continuously refined, most notably by Dublin and Lotka, life-insurance executives in the 1930s, who used a complex formula to determine how much life insurance a man should carry (Wykstra, 1971).

The leap from the valuation of human capital to the management of intellectual capital is more recent. “The notions of intellectual capital were first advanced by economist John Kenneth Galbraith who wrote the following to fellow economist Michael Kalecki in 1969: I wonder if you realize how much those of us the world around have owed to the intellectual capital you have provided over these last decades” (Bontis, 2000).

Thomas Stewart, in a ground-breaking cover-story in 1991 Fortune Magazine entitled “Brainpower”, is credited with providing the main impetus for a new world of intellectual capitalists (Bontis, 2000). In particular, his article helped launch the career of Lief Edvinsson at Skandia. A few months after publishing the article, Stewart received a call from Edvinsson who was coming to New York from his office in Sweden at Skandia. He wanted to meet and discuss the subject of IC. “In my office he handed me a business card. Lief Edvinsson, it read, Director, Intellectual Capital. I was floored. Lief explained that he had been interviewing for a job with Jan Carende, head of Skandia’s Assurance and Financial Services Division, and had shown ‘Brainpower’ to him, saying, ‘This is what your company should do: Manage intellectual capital.’ Carende agreed, and said: ‘You do it’” (Stewart, 1997).

III. DEFINING INTELLECTUAL CAPITAL

Managing IC is an increasingly important part of running a successful business; yet defining it is a difficult proposition. The increasing use of the term suggests that industry has determined that some sort of correlation exists between the ability to manage these assets and the creation of competitive advantage. Many descriptions of IC in the relevant literature are quite specific and created by individuals for use within a specific industry or company.

Skandia, an insurance conglomerate based in Stockholm, Sweden, and leading pioneer in the area of knowledge management, describes IC as an integral part of the corporation's market value. Figure 1 illustrates the Skandia vision of IC.

In this figure, Human Capital is defined as the combined knowledge, skill, innovativeness, and ability of the company's individual employees that provide the company with a competitive advantage. It also includes the values, culture, and philosophy of the corporation. Human capital is differentiated from Structural Capital in that it cannot be owned by the company.

The Structural Capital is comprised of everything else of organizational capability that supports those employees' productivity - in other words, everything that gets left behind at the office when employees go home. Structural capital also provides customer capital, the relationships developed with key customers. Unlike human capital, structural capital can be owned and thereby transferred from one employee to another.

In the Skandia philosophy, IC equals the sum of human and structural capital. According to Edvinsson and Malone (1997), IC encompasses the applied experience, organizational technology, customer relationships and professional skills that provide Skandia with a competitive advantage in the market.

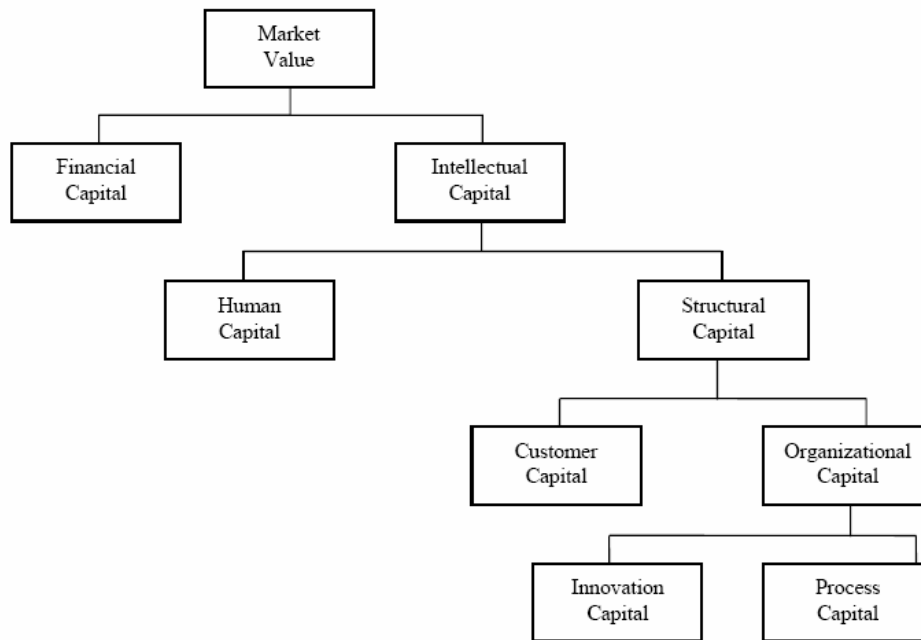


Figure 1 Skandia's Value Chain (Bontis, 2000)

Other characterizations abound. “Stewart (1997) defines intellectual capital as intellectual material – knowledge, information, intellectual property and experience – that can be put to use to create wealth” (Bontis, 2000). These descriptions have a decidedly private enterprise slant, and are not broad enough for DoD use.

OMBRR has suggested the following definition for IC: “the value/cost of replacement (if possible) of individual/collective pools of intellect, educational systems, corporate experience, synergistic interface (corporate-private-public collaboration) and new technologies that contribute to DoD mission accomplishment and cutting edge research, design, test and evaluation (RDT&E) in support of US Defense priorities” (OMBRR). This version incorporates the key idea of synergistic interface and addresses several possible settings for IC development, but it neglects alternative measurements of IC. Any definition proposed should be broad enough to be applied to any DoD entity, yet specific enough to accurately capture the varied aspects of this complex concept.

Incorporating the idea of providing a competitive edge is particularly problematic because this concept does not translate easily into governmental and non-profit terms. This notion is essential to the definition of intellectual capital, however, and so some equivalent must be devised. Mission success is comparable, but this term has too many connotations to allow it to be used as a defining metric.

Relevance is a more useful term. Defined as “pertinence to the matter at hand” (www.dictionary.com, Sep 2004) or “Applicability to social issues” (www.dictionary.com, Sep 2004) this term is better used in the DoD environment as a means to evaluate an institution. When describing governmental or educational institutions, relevance is the ability of an organization to provide value that cannot be economically achieved in other ways.

This definition of relevance leads to an improved definition of IC that incorporates the most useful parts of the above descriptions, as applied to DoD specific entities: IC is the value associated with the knowledge, applied experience, organizational technology, synergistic interface (corporate-private-public collaboration), and professional skills that provide an organization with relevance within the DoD.

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IV. MEASURING INTELLECTUAL CAPITAL

A. WHY MEASURE INTELLECTUAL CAPITAL

If the management of IC is a relatively new occurrence, why are we seeing an increase in the number of private firms and public institutions taking an interest in the subject? The answer lies in what these firms and institutions can gain from the measurement and management of IC. In a world economy that is transforming from a manufacturing based system into an information based one, IC management can lead to increased efficiency and improved productivity. In an effort to either foster or sustain a competitive advantage in the marketplace, many firms are exploring the management of IC because it can improve processes and harness underutilized human resources.

According to Manish Chandra and Sandeep Biswas, professors at the Academy of Higher Education, Greater Noida, India and the Institute for Integrated Learning in Management at New Delhi, India, IC is rapidly becoming a very important measure of a company's future performance. If the approximation of IC is an important indicator of future earnings, then it is vital that its indicators and measures are developed and used for the strategic space in the competitive horizon of the company. The rapid change in the world economy has made knowledge the new engine of corporate development. Today, the success of any firm is measured in terms of continuous innovation, a function of new technologies, skills and the knowledge of employees rather than tangible assets such as property, plant, and equipment (Chandra).

In other words, private firms measure IC as a means of increasing competitive advantage. Similarly, a non-profit organization might measure IC as a means of providing better value to its customers. In addition, DoD entities might measure and manage IC to improve war fighting capabilities within an information centric battlefield and increase their relevance. As these entities, both public and private, make strides in the area of IC measurement, they will become more effective at managing IC, an asset that is becoming more and more important in the world economy.

B. MEASURING INTELLECTUAL CAPITAL

Estimating the value of IC at an institution is a very difficult proposition. IC varies in value from location to location, as discussed by Adam Smith; therefore, developing a comprehensive tool for comparing the value of IC at various institutions is problematic.

A comprehensive examination of the literature on the subject leads to the conclusion that the measurement of IC within an institution, especially at set intervals over some period, can prove to be an effective management tool; however, it is not helpful when attempting to compare two institutions, even similar institutions.

Despite the fact that measuring IC is a very difficult proposition, private firms and public entities around the world are spending more and more resources to develop methods of measuring and managing IC. Table 1 displays the extensive efforts in both the public and private sectors to develop an effective means of measuring and managing IC. This speaks to the importance of the subject in creating competitive advantage for private corporations and providing a means of developing relevance for public institutions.

Over the past 10-15 years, many systems have been devised for measuring and managing IC. The various methods can be categorized into four main methods (Pike 2004). They are:

1. **Direct Intellectual Capital methods (DIC)**: Estimate the dollar value of intangible assets by identifying its various components. Once these components are identified, they can be directly evaluated, either individually or as an aggregated coefficient.

2. **Market Capitalization methods (MCM)**: Calculate the difference between a company's market capitalization and its stockholders' equity as the value of its intellectual capital.

3. **Return on Assets methods (ROA)**: Average pre-tax earnings of a company for a period of time are divided by the average tangible assets of the company. The result is a company ROA that is then compared with its industry average. The difference is multiplied by the company's average tangible assets to calculate an average annual

earning from the IC. Dividing the above-average earnings by the company's average cost of capital or an interest rate creates an estimate of the value of its intangible assets or intellectual capital.

4. Scorecard methods (SC): The various components of IC are identified and indicators and indices are generated and reported in scorecards or as graphs. SC methods are similar to DIC methods; expect that no estimate is made of the dollar value of IC. A composite index may or may not be produced.

This table is a useful starting point for any manager interested in the various methods available.

Table 1 Adaptation of Sveiby's Compilation of IC Valuation Methods

| Year | Name | Category | Description of Measure |
|------|------------------------------|----------|--|
| 2004 | Topplinjen/Business IQ | SC | A combination of four indices; Identity Index, Human Capital Index, Knowledge Capital Index, Reputation Index. Developed in Norway by consulting firm Humankapitalgruppen. |
| 2003 | Danish guidelines | SC | A recommendation by government-sponsored research project for how Danish firms should report their intangibles publicly. Intellectual capital statements consist of 1) a knowledge narrative, 2) a set of management challenges, 3) a number of initiatives and 4) relevant indicators. |
| 2002 | IC Rating™ | SC | An extension of the Skandia Navigator framework incorporating ideas from the Intangible Assets Monitor; rating efficiency, renewal and risk. |
| 2002 | Value Chain Scoreboard™ | SC | A matrix of non-financial indicators arranged in three categories according to the cycle of development: Discovery/Learning, Implementation, Commercialization. |
| 2002 | Meritum guidelines | SC | An EU-sponsored research project, which has yielded a framework for management and disclosure of Intangible Assets.: 1) define strategic objectives, 2) identify the intangible resources, 3) actions to develop intangible resources. Three classes of intangibles: Human Capital, Structural Capital and Relationship Capital. |
| 2001 | Knowledge Audit Cycle | SC | A method for assessing six knowledge dimensions of an organization's capabilities in four steps: 1) Define key knowledge assets. 2) Identify key knowledge processes. 3) Plan actions on knowledge processes. 4) Implement and monitor improvement, then return to 1). |
| 2000 | The Value Explorer™ | DIC | Accounting methodology proposed by KMPG for calculating and allocating value to 5 types of intangibles: (1) Assets and endowments, (2) Skills & tacit knowledge, (3) Collective values and norms, (4) Technology and explicit knowledge, (5) Primary and management processes. |
| 2000 | Intellectual Asset Valuation | DIC | Methodology for assessing the value of Intellectual Property. |

| | | | |
|------|--|-----|--|
| 2000 | Total Value Creation, TVC™ | DIC | A project initiated by the Canadian Institute of Chartered Accountants. TVC uses discounted projected cash-flows to re-examine how events affect planned activities. |
| 1999 | Knowledge Capital Earnings | ROA | Knowledge Capital Earnings are calculated as the portion of normalized earnings over and above expected earnings attributable to book assets. |
| 1998 | Inclusive Valuation Methodology (IVM) | DIC | Uses hierarchies of weighted indicators that are combined, and focuses on relative rather than absolute values: combined Value Added equals Monetary Value Added combined with Intangible Value Added. |
| 1998 | Accounting for the Future (AFTF) | DIC | A system of projected discounted cash-flows. The difference between AFTF value at the end and the beginning of the period is the value added during the period. |
| 1997 | Market-to-Book Value | MCM | The value of intellectual capital is considered to be the difference between the firm's stock market value and the company's book value. |
| 1997 | Economic Value Added (EVA™) | ROA | Calculated by adjusting the firm's disclosed profit with charges related to intangibles. Changes in EVA provide an indication of whether the firm's intellectual capital is productive or not. |
| 1997 | Calculated Intangible Value | ROA | Calculates the excess return on hard assets then uses this figure as a basis for determining the proportion of return attributable to intangible assets. |
| 1997 | Value Added Intellectual Coefficient (VAIC™) | ? | Measures how much and how efficiently intellectual capital and capital employed create value based on the relationship to three major components: (1) capital employed; (2) human capital; and (3) structural capital. |
| 1997 | IC-Index™ | SC | Consolidates all individual indicators representing intellectual properties and components into a single index. Changes in the index are then related to changes in the firm's market valuation. |
| 1996 | Technology Broker | DIC | Value of intellectual capital of a firm is assessed based on diagnostic analysis of a firm's response to twenty questions covering four major components of intellectual capital. |
| 1996 | Citation- Weighted Patents | DIC | A technology factor is calculated based on the patents developed by a firm. Intellectual capital and its performance is measured based on the impact of research development efforts on a series of indices, such as number of patents and cost of patents to sales turnover, that describe the firm's patents. |
| 1994 | Skandia Navigator™ | SC | Intellectual capital is measured through the analysis of up to 164 metric measures (91 intellectually based and 73 traditional metrics) that cover five components: (1) financial; (2) customer; (3) process; (4) renewal and development; and (5) human. |
| 1994 | Intangible Asset Monitor | SC | Management selects indicators, based on the strategic objectives of the firm, to measure four aspects of creating value from 3 classes of intangible assets labeled: People's competence, Internal Structure, External Structure. Value Creation modes are: (1) growth, (2) renewal, (3) utilization/efficiency, and (4) risk reduction/stability. |
| 1992 | Balanced Score Card | SC | A company's performance is measured by indicators covering four major focus perspectives: (1) financial perspective; (2) customer perspective; (3) internal process perspective; and (4) learning perspective. The indicators are based on the strategic objectives of the firm. |
| 1990 | HR statement | DIC | A management application of HRCA widespread in Finland. The HR profit and loss account divides personnel related costs into three classes for the human resource costs: renewal costs, development costs, and exhaustion costs. 150 listed Finnish companies prepared an HR statement in 1999. |

| | | | |
|--------|--|-----|--|
| 1989 | The Invisible Balance Sheet | MCM | The difference between the stock market value of a firm and its net book value is explained by three interrelated "families" of capital: Human Capital, Organizational Capital and Customer Capital. The three categories first published in this book have become a de facto standard. |
| 1988 | Human Resource Costing & Accounting (HRCA) | DIC | Calculates the hidden impact of HR related costs, which reduce a firm's profits. Adjustments are made to the P&L. Intellectual capital is measured by calculation of the contribution of human assets held by the company divided by capitalized salary expenditures. |
| 1970's | Human Resource Costing & Accounting (HRCA) | DIC | The pioneering work on HR accounting. A number of methods for calculating the value of human resources. |
| 1950's | Tobin's q | MCM | The "q" is the ratio of the stock market value of the firm divided by the replacement cost of its assets. Changes in "q" provide a proxy for measuring effective performance or not of a firm's intellectual capital. Developed by the Nobel Laureate economist James Tobin in the 1950's. |

The various methods offer different advantages and disadvantages. They are either qualitative or quantitative and can be used for the continuous scrutiny of information from various sources to provide a conception of IC.

The DIC method often provides a dollar amount as the final output. Unfortunately, because the approach is holistic, the dollar values are superficial and of no significance other than as a management tool and may present a false sense of concrete value.

The MCM offer dollar valuations and are useful in merger and acquisition situations and for stock market valuations. They also can be used for hypothetical comparisons between companies within the same industry and are useful when illustrating the financial value of IC, a feature that tends to get the attention of the CEOs. Unfortunately, because they communicate everything in dollar terms they tend to be superficial and may give a false sense of concrete value. Also, the MCM methods will not work for any institution that does not offer stock.

The ROA methods are also useful for illustrating the financial value of IC, however, they are of limited use for non-profit and public organizations because these organizations do not utilize many of the financial figures that these methods are based on. ROA is inappropriate for any entity that is not earnings based. Also, the ROA methods are very sensitive to interest rate and discounting rate assumptions.

The SC methods can create a more comprehensive picture of an organization's health than financial metrics and they can be easily applied at any level of an organization. Since they do not measure in financial terms they are more useful for non-profit organizations, internal departments and public sector organizations. The main drawback of these indicators is that the metrics they use are specific to each organization, making comparison very difficult. Additionally, these methods are relatively new and not readily accepted by financial analysts and managers who are used to seeing everything from a purely financial perspective.

V. PROPOSED MODEL

A. CHOOSING A METHOD

A careful analysis of the four distinct methods was conducted to determine the most applicable approach to valuing and managing intellectual capital within a DoD organization.

The DIC methods are insufficient based on the difficulties associated with converting intangible assets to tangible assets. A heuristic method of converting intangible assets to tangible ones negates the intrinsic value of this method. A rule of thumb method simply does not accurately portray the value of intangible assets within an institution. The real problem with this method is that as time goes on managers may come to assume that the dollar value associated with IC as developed by the DIC actually represents the worth of IC at the institution, rather than recognizing it as a notional figure that can be used to manage IC.

MCM and ROA methods are obviously inappropriate given the nature of government entities. They can be essentially ignored as they are fundamentally based on financial figures that do not exist for most government entities. Furthermore, ROA approaches tend to be based on industry comparisons.

The SC methods yield more dependable results because they use natural measurement scales for each indicator, rather than converting everything into monetary figures. Additionally, IC scorecard methods tend to group indicators in consistent groups that are intuitive and logical. The SC method is a pragmatic approach developed by brainstorming that is easily integrated with the Integrated Process Team (IPT) concept so often utilized within the DoD.

Several initiatives, such as the Army's Balanced Score Card, already exist within the DoD that utilize various forms of the SC method. Although, these initiatives are not specifically IC related, the approach is familiar to many DoD managers, making the introduction of the IC SC method an easy transition.

Taking into consideration the difficulties of measuring IC, the strengths and weaknesses of the various methods, the nature of educational, not for profit, and

governmental institutions, the scorecard method seems best suited for analysis at these types of institutions.

B. THE SKANDIA NAVIGATOR

Skandia is considered the first large company to have made a truly coherent effort at measuring knowledge assets (Bontis, 1996; Huseman and Goodman, 1999). In 1985, Skandia developed its first internal IC report. In 1994, they became the first company to issue an IC addendum accompanying their traditional financial report to shareholders.

Leif Edvinsson, the chief architect behind the Skandia Navigator, developed the IC reporting model with five areas of focus: financial, customer, process, renewal and development, and human capital. This new classification sought to identify the roots of a company's value by measuring hidden dynamic factors that underlie the visible company of buildings and products (Edvinsson, 1997).

Skandia's value scheme contains both financial and non-financial components that combine to provide a more accurate vision of the company's market value. This allows Skandia to represent both financial and non-financial aspects of the company and visualize its intellectual capital. This ties Skandia's strategic vision to the company's core competencies and reflects knowledge-sharing technology and knowledge assets beyond intellectual property, better reflecting its market value (Bontis, 2000).

Many of the initiatives in valuing IC have relied extensively on Skandia's SC model, the Navigator. The various methods currently in use are all derivatives in whole or in part of the Skandia Navigator. This is because the Navigator can be easily tailored to any organization. An advantage of this method is that it intentionally requires upper management at any entity employing the system to pare down the metrics to a set that is not only useful, but also readily obtainable. This inherent flexibility and broad applicability gives the Navigator the most appeal among the various SC models.

C. SKANDIA NAVIGATOR MODEL MECHANICS AND APPLICATION

The Skandia Navigator seeks to quantify the value of IC for internal management purposes. It divides IC into five focus areas. Those areas are Human Focus, Financial Focus, Customer Focus, Process Focus, and Renewal & Development Focus. Each focus contains a series of metrics.

The Human focus area is perhaps the most important of the five focus areas. Without a successful human dimension to a private corporation or public entity, none of the rest of the value creation activities will work, no matter how sophisticated the technology (Edvinsson, 1997). This focus area is largely comprised of metrics that reflect the leadership and diversity of the workforce.

The financial focus reflects many of the tangible assets associated with an organization. This focus consists of a set of metrics that reflect in some way the net book value of a firm. These metrics are the historic centerpiece of corporate record keeping, but in the analysis of IC, they may constitute only a fraction of the whole picture.

The customer focus area represents the organization's commitment to their customers. This focus is comprised of metrics that indicate how well an organization is utilizing resources to keep customers satisfied. This focus area is important because it represents the company's ability to translate both tangible and intangible resources into customer satisfaction.

The process focus represents an important part of the structural capital of an organization. This focus is comprised of metrics that seek to codify the valuation of the organization's modus operandi. These metrics measure not only process performance specifications but also actual value contribution to productivity.

The renewal and development focus represents an organization's commitment to the future. The metrics in this area include measures of effective training and attitudes of employees, knowledge base improvement and innovation. These metrics are often diametrically opposed to financial metrics, which focus on where the organization is today. The renewal and development focus is more concerned with how well a company is prepared for future opportunities.

The Skandia Navigator's basic model is comprised of 112 metrics in the five different focus areas. These metrics are very broad in nature and are designed to encompass all the various facets of a corporation. The numeric values of the metrics are obtained from questionnaires, surveys, raw financial data, and the formation of ratios using the various other metrics. A visual representation of the basic model is illustrated in Figure 2.

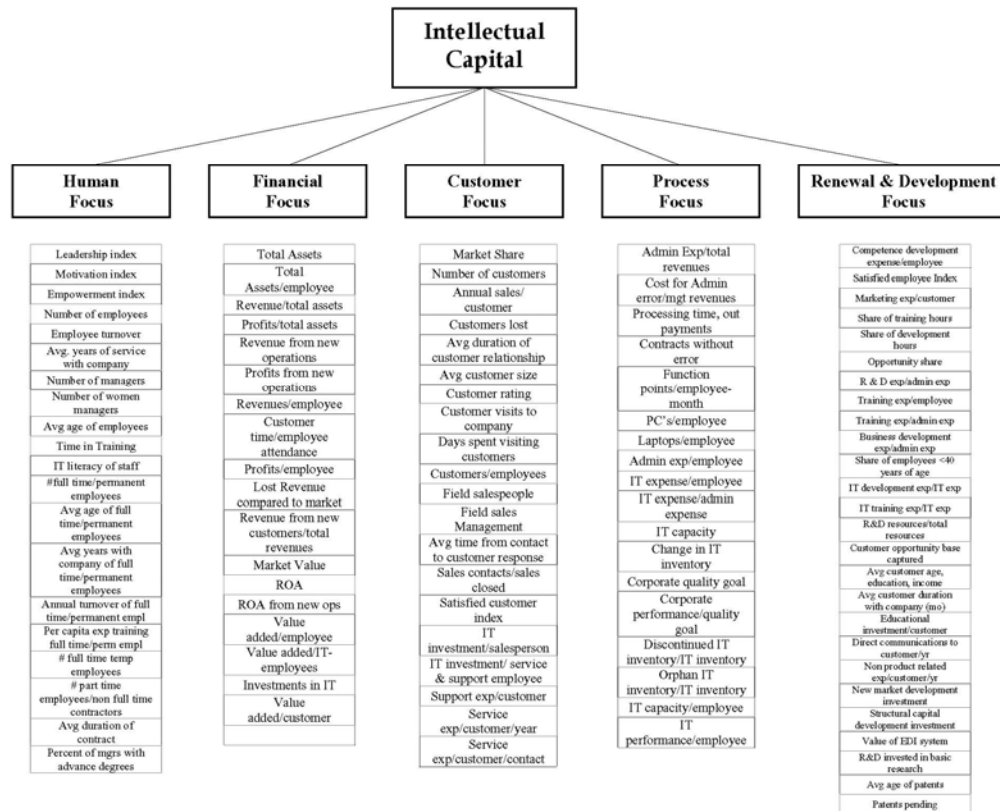


Figure 2 The Skandia Navigator Basic Model

Incorporating all 112 of these metrics would be impractical from several standpoints. Many of the metrics are redundant and using them repeatedly would diminish their value in the model. Other metrics could not be reasonably obtained, or would be cost prohibitive. Some just do not apply to all organizations.

Skandia constructed an Integrated Process Team (IPT) at each business unit to develop appropriate metrics for internal use that would best capture the value of IC within each sub-organization. Metrics that could not be easily obtained were discarded, along with measures that were redundant or did not apply. Metrics utilized in the final model were those that could be measured in a consistent manner from year to year.

The value in this model's use was not derived from the value of any metric in a single year, but rather in the observation of trends over a distinct period of time. In the model used by America Skandia the 112 original metrics were distilled by the IPT into 18 manageable measures, roughly three to four in each focus area.

Each of Skandia's business units repeated the process and the results were calculated and tracked over a four-year period. The results were included as an addendum to Skandia's 1998 financial reports. Skandia America's final product is depicted in Figure 3.

| America Skandia | | | | |
|---|---------|---------|--------|--------|
| | 1997 | 1996 | 1995 | 1994 |
| FINANCIAL FOCUS | | | | |
| Return on capital employed | 21.9 | 27.1 | 28.7 | 12.2 |
| Operating result | 1,027 | 579 | 355 | 115 |
| Value added/employee | 2,616 | 2,206 | 1,904 | 1,666 |
| CUSTOMER FOCUS | | | | |
| Number of contracts | 189,104 | 133,641 | 87,836 | 59,089 |
| Savings/contract | 499 | 396 | 360 | 333 |
| Surrender ratio | 4.4 | 4.4 | 4.1 | 4.2 |
| Points of sale | 45,881 | 33,287 | 18,012 | 11,573 |
| HUMAN FOCUS | | | | |
| Number of employees, full-time | 599 | 418 | 300 | 220 |
| Number of managers | 88 | 86 | 81 | 62 |
| Of whom, women | 50 | 27 | 28 | 13 |
| Training expense/employee | 2.7 | 15.4 | 2.5 | 9.8 |
| PROCESS FOCUS | | | | |
| Number of contracts/employee | 316 | 320 | 293 | 269 |
| Adm. exp./gross premiums written (%) | 3.5 | 2.9 | 3.3 | 2.9 |
| IT expense/admin. expense (%) | 8.1 | 12.5 | 13.1 | 8.8 |
| RENEWAL & DEVELOPMENT FOCUS | | | | |
| Share of gross premiums written from new launches (%) | 0.9 | 23.7 | 49.2 | 11.1 |
| Increase in net premiums written (%) | 31.9 | 113.7 | 29.9 | 17.8 |
| Development expense/adm. exp. (%) | 9.8 | 9.9 | 10.1 | 11.6 |
| Share of staff under 40 years (%) | 76 | 78 | 81 | 72 |

Figure 3 America Skandia Addendum (Skandia, 1998)

This model provides an assessment of the metrics that best reflects IC at America Skandia. The metrics were considered suitable because they were applicable, easily obtained, and measurable over an extended period of time. These metrics, when viewed over a period of four years, provide important insight into trends that can help managers identify desirable and undesirable developments that might not otherwise be apparent.

D. DOD IC MANAGEMENT MODEL MECHANICS AND APPLICATION

The Skandia Navigator can easily be converted for use within the DoD. The same focus areas will apply; however, the metrics used by Skandia, an insurance conglomerate,

will not all easily translate for use in a DoD organization. For use in the DoD, the metrics must be modified to reflect data more useful and readily obtainable in the defense environment.

To construct a model useful in the DoD, all metrics deemed inappropriate in the Skandia Model were discarded (~~struckthrough~~). Next, financial focus metrics were refocused with an emphasis on budget rather than profit, as well as several other types of metrics that required slight modification to pertain to DoD (*italicized*). Several additional metrics were then added that may have additional relevance to DoD (**bolded**). Lastly, many common metrics that might be applied to any organization remain unchanged (normal text). The final suggested list of metrics is illustrated in Figure 4.

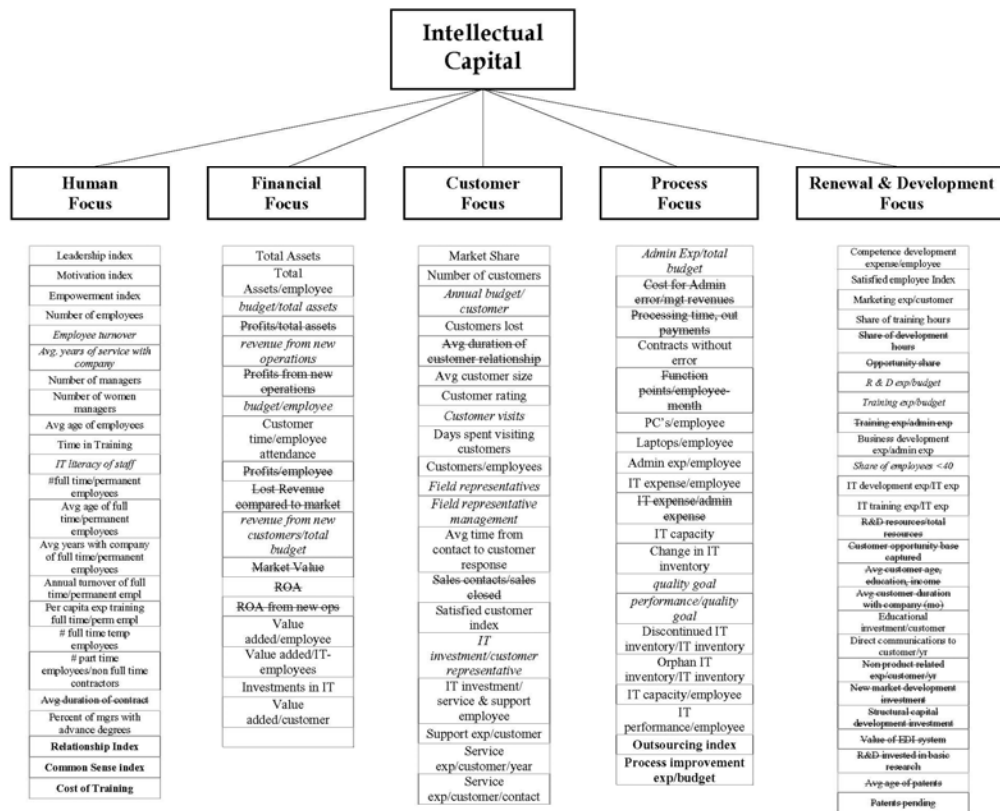


Figure 4 The DoD IC Manager Model

The DoD, and Governmental institutions in general might use a set of metrics like these listed below to begin their analysis. These metrics are intended to be all encompassing; however, if these do not capture IC within an organization, then new metrics may need to be fashioned. Likewise, these metrics can be modified and measured as desired. What actually captures IC within a specific organization is the important thing to consider, and then choose the appropriate technique to measure metrics and do this in a consistent manor from year to year. For instance, satisfied customer index might be a percent of total customers who are satisfied, or an average numerical value from a survey. Each organization must determine which metrics to use and how to measure them.

Human focus

Leadership Index: Measures individual abilities within an organization through the use of questionnaires, and evaluations.

Motivation Index: Measures satisfied customers, motivation and competence of staff, and quality and effectiveness of administrators. Measured through the use of internal polls, questionnaires, and evaluations

Empowerment Index: Determines how much control employees feel over their daily work. Might be measured through the use of polls, questionnaires and evaluations.

Relationship Index: Synergistic value is created by the relationships employees develop over time.

Number of Employees: A numerical count utilized in the formation of other ratios such as budget/number of employees and as a stand alone metric indicating efficiency.

Employee Retention: High turnover rates can be an indicator of lowering intellectual capital reserves.

Avg. Years of Service: High turnover rates can be an indicator of lowering intellectual capital reserves.

Number of Managers: An indicator of efficiency that can also be used in the formation of ratios.

Number of Woman Managers: At first glance, this may appear to be simply one more manifestation of political correctness, a concession to interest groups. But the fact is that any organization, with diverse management needs, will require personality types, life experiences, and management styles that are unprecedented in the middle corporate ranks. Thus, diversity, more than just an end in itself, may prove to be a vital competitive factor.

Percent of Managers with Advance Degrees: This metric is valuable enough to stand alone as an indication of intellectual capital.

Average Age: This metric is closely tied to experience levels.

Time in Training: It is important that training is effective or this metric could give a false impression of intellectual capital formation.

Cost of Training: An indicator of effort levels in the formation of intellectual capital.

IT-Literacy: The ability of employees to effectively utilize organizational capital that contributes to overall relevance within the organization.

Common Sense Index: Internal questionnaires, polls, and interviews can be used to quantify the ability of individuals to simplify complex tasks.

Financial Focus

Total Assets: An indicator of effective use of resources, especially when paired with other metrics to form ratios.

Total Assets/Employee: An indicator of effective use of resources.

Budget/Total Assets: An indicator of effective use of resources.

Revenue from new operations: This is a good indicator of innovation in the organization.

Budget/employee: An indicator of effective management and employee utility.

Customer time/employee attendance: This metric indicates an organizations commitment to customer related activities.

Revenue from new customers/total budget: This is a good indicator of innovation in the organization.

Value added/employee: A multidimensional, multivariable image of how the employees add value to an organization.

Value added/IT-employee: A multidimensional, multivariable image of how the employees and the information technology of the firm work together to add value to an organization.

Investments in IT: This metric indicates an organization's level of commitment to developing assets that will facilitate efficiency.

Value added/customer: This metric indicates how effectively an organization is developing its customer base.

Customer Focus

Market share: Though market share alone is not a sufficient measure of an organizations success with its customers, it is certainly a critical one. The organization that gains and holds market share against the competition is obviously doing something that pleases customers.

Number of customers: Although it can be somewhat difficult to identify all customers, this metric is a component to many other metrics.

Annual budget/customer: An indicator of effective use of resources.

Customers lost: The metric can indicate the level of commitment an organization holds to customer service.

Average customer size: This metric may provide an indication of how effectively an organization is developing its customer base.

Customer rating: The metric can indicate the level of commitment an organization holds to customer service. Measured through the use of polls, questionnaires and evaluations.

Customer visits: The metric can indicate the level of commitment an organization holds to customer service.

Days spent visiting customers: The metric can indicate the level of commitment an organization holds to customer service.

Customers/employees: The metric can indicate the level of commitment an organization holds to customer service and indicates the effective use of resources.

Field representatives: The metric can indicate the level of commitment an organization holds to customer service.

Field representative management: The metric can indicate the level of commitment an organization holds to customer service.

Average time from contact to customer response: The metric can indicate the level of commitment an organization holds to customer service.

Satisfied customer index: This metric is designed to capture the quality of relationships an organization maintains with its customers. Might be measured through the use of a statistical survey of customers to gauge their overall satisfaction dealing with the company.

IT investment/customer representative: The metric can indicate the level of commitment an organization holds to customer service.

IT investment/ service & support employee: This metric indicates an organization's level of commitment to developing assets that will facilitate improved customer relations.

Support expense/customer: The metric can indicate the level of commitment an organization holds to customer service and indicates the effective use of resources.

Service expense/ (customer/year): The metric can indicate the level of commitment an organization holds to customer service and indicates the effective use of resources.

Service expense/ (customer/contact): The metric can indicate the level of commitment an organization holds to customer service and indicates the effective use of resources.

Process Focus

Admin expense/total budget: An indicator of effective use of resources.

Outsourcing index: This metric can indicate a loss of intellectual capital as core competencies are lost within the organization.

Process improvement expense/budget: This is a good indicator of the commitment to innovation within the organization.

Contracts without error: An efficiency metric.

Computers/employee: This metric indicates an organization's level of commitment to developing assets that will facilitate efficiency.

Laptops/employee: This metric indicates an organization's level of commitment to developing assets that will facilitate efficiency.

Administrative expense/employee: This metric indicates an organization's level of commitment to developing assets that will facilitate efficiency.

IT expense/employee: This metric indicates an organization's level of commitment to developing assets that will facilitate efficiency.

IT capacity: A measure of overall IT system performance.

Change in IT inventory: This is the amount the organization invests in new IT equipment over the course of a specified period.

Quality goal: The metric can indicate the level of commitment an organization holds to customer service.

Performance/ quality goal: The metric can indicate the level of commitment an organization holds to customer service and provides a measure of efficiency.

Discontinued IT inventory/IT inventory: Indicates a measure of commitment within the institution to revitalize efficiency with respect to computing capability.

Orphan IT inventory/IT inventory: This is an overall look at the organization's technological vulnerability

IT capacity/employee: This metric indicates an organization's level of commitment to developing assets that will facilitate efficiency.

IT performance/employee: A measure of how much processing power resides in the hands of each employee and the effectiveness of training programs.

Renewal & Development Focus

Competence development expense/employee: A measure of an organization's commitment to the effective training of employees.

Satisfied employee index: A measure of the employee attitudes and motivation based on qualitative reviews.

Marketing expense/employee: This metric captures an organization's commitment to marketing.

Share of training hours: A measure of an organization's commitment to improving employee's knowledge base.

Research & Development expense/budget: This is a good indicator of innovation in an organization.

Training expense/budget: A measure of an organization's commitment to improving employee's knowledge base.

Business development expense/admin expense: A measure of an organization's commitment to improving the size of its customer base.

Share of employee less than 40 years of age: This metric can indicate the innovation, or knowledge loss within an organization.

IT development expense/IT expense: This metric is an indicator of commitment to improving computing capacity and overall structural capital.

IT training expense/IT expense: This metric is an indicator of commitment to improving computing capacity and overall structural capital.

Educational investment/customer: A measure of an organization's commitment to improving employee's knowledge base.

Direct communications to customer/year: This metric can indicate an organization's commitment to its customer base.

This model can be tailored for use at any DoD entity in the same way that Skandia tailored the Navigator for use at individual business units. For instance, to apply this

model to the Naval Postgraduate School (NPS) in Monterey, California, an IPT might be formed to develop an appropriate set of metrics.

While it is important to select metrics that are clearly suitable for this institution, it is key to identify metrics that can be measured in a consistent manner from year to year. The selected metrics should reflect the most salient measurements of IC that are readily available and measurable over an extended period of time.

What needs to be done first with this new universal IC reporting standard is to cut out the redundant and less important indices, as well as those in which the cost to collect would exceed the benefit from measuring, so that a list that is appropriate to the organization remains. The excluded metrics can be preserved for future elaboration as the measurement systems become more sophisticated.

An assessment of the metrics that best reflect IC at NPS was performed. The following metrics were deemed most suitable because they were applicable, easily obtained, and measurable over an extended period of time. These metrics, when viewed over a period of four years, as in Figure 5, can provide an important insight into trends at NPS. These trends can help managers identify desirable and undesirable developments that might not otherwise be apparent. The final version of the model for NPS might look something like Figure 5.

| Naval Postgraduate School | | | | |
|--|------|------|------|------|
| | 2004 | 2003 | 2002 | 2001 |
| FINANCIAL FOCUS | | | | |
| Budget/total assets | % | % | % | % |
| Budget/employee | \$ | \$ | \$ | \$ |
| Revenue from new operations | \$ | \$ | \$ | \$ |
| CUSTOMER FOCUS | | | | |
| Number of customers | # | # | # | # |
| Annual budget/customer | \$ | \$ | \$ | \$ |
| Satisfied customer index | % | % | % | % |
| HUMAN FOCUS | | | | |
| Leadership index | % | % | % | % |
| Relationship index | % | % | % | % |
| Average years of service | # | # | # | # |
| PROCESS FOCUS | | | | |
| Admin expense/total budget | % | % | % | % |
| PC's/employee | # | # | # | # |
| IT expense/employee | \$ | \$ | \$ | \$ |
| RENEWAL & DEVELOPMENT FOCUS | | | | |
| Satisfied employee Index | # | # | # | # |
| Training expense/budget | % | % | % | % |
| IT development expense/IT expense | % | % | % | % |

Figure 5 The NPS IC Manager Model

VI. SUMMARY

While it may not be possible to quantify intangibles like IC in ways that allow us to compare the value of the assets between one institution and another, it is nevertheless important to track and manage these assets within an institution. The deliberate management of knowledge assets in an economy that is becoming more and more knowledge based is sound management. The true value of measuring IC is in the time-based management of IC as a means of increasing either competitive advantage or relevance.

Many corporations in America and around the world have found that measuring and managing IC can provide them with a competitive advantage. Governmental entities can expect to reap similar benefits if they apply the same concepts. The difference in a government institution is that the goal is to improve relevance vice profits.

The four main approaches for measuring IC (Market Capitalization, Scorecard, Return on Assets, and Direct Intellectual Capital) have various advantages and disadvantages. Overall, the Scorecard method seems the most appropriate method for a government entity, and a modified version of the Skandia Navigator may be the best method for governmental institutions to use when tracking and managing IC while trying to increase their relevance.

Any effort by DoD managers to improve their operations will necessarily improve their relevance. Managing IC accomplishes this. The more value these managers provide within the DoD the better their chances of withstanding a BRAC process, or increasing lethality in the battlefield. The process of measuring and managing IC will not provide a way to monetarily compare units, even similar units like NPS and the Air Force Institute of Technology. It will however increase the ability of managers to monitor and manage the assets that are becoming a more important part of the information-aged world.

Many of the managers within the DoD are already accomplishing the goals that are associated with managing IC. Those that are tracking and managing the items that reflect IC should not spend additional time developing a system like this model. DoD

managers that are not adequately tracking their IC should make the effort to systematically manage this important asset. Despite the inherent advantages that monitoring IC provides, many of today's commanders may well find that the metrics utilized here are already tracked in another manner. If an adequate job is being done of managing these assets than the development of a model at the unit level may not provide any real benefits. It may in fact waste valuable resources that could be put to better use.

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