

# **The Value of Measuring Intellectual Capital (IC) In Higher Education – A New Challenge of Our Days**

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### **Abstract**

Higher education-- colleges and universities -- represent the ultimate knowledge organizations. These institutions of learning embody centers of knowledge creation, knowledge acquisition, sharing and ultimately, application for innovation. Students flock to these knowledge centers for learning and application of knowledge. Faculty and staff similarly invest their human capital in learning, applying, and creating new knowledge to benefit society and the world in many creative ways. A faculty also uses their unique expertise to transfer their knowledge to students in the classroom. Thus, it is intuitive that colleges and universities have extraordinary and vast resources in intellectual capital. Universities establish strategic plans to achieve their goals. However, these plans may not be successful if the needed resources are not available. Arguably, the most valuable resources in any University are the expertise of its faculty and staff; it's intellectual capital. Therefore, if a University effectively measures and manages these valuable resources, it can more effectively create and deploy strategies to achieve its goals. This paper explores methods to effectively measure the intellectual capital in a university. It examines methodologies in the for-profit sector, creates analogies in the academic world, and then seeks to develop classifications which are meaningful in an academic environment. The employees working in these organizations don't care that much anymore about having a job that implies working formally at the same desk; these persons are able to meet all the requirements in several work places; today, in a work place, the importance of traditional specifications of tasks to be performed has greatly diminished, as well as respecting a rigid time table, with exact hours.

**Keywords:** strategic plan, high level education, new technologies, human capital.

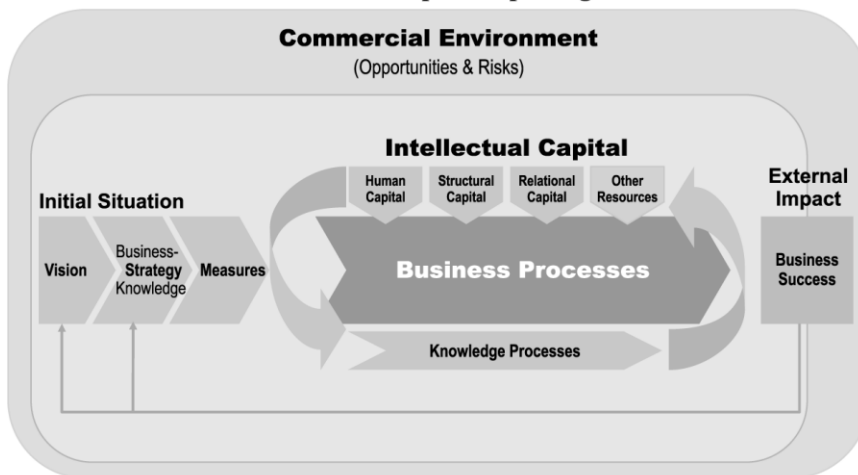
### **1. Introduction: Intellectual Capital And Higher Education**

Over the past decade, the rapidly growing realization of the importance of intangible assets and intellectual capital as a whole in the operation of organizations has led to the need to manage companies in a new way and to measure their performance in a new way. In the business world where most of the organizational value is based on intangible assets, the ability to recognize and estimate the sources of this value has become vital for companies. In order to be able to manage intellectual assets we have to recognize where this value is coming from and how it is created in an organization. It has become very popular to define and study intellectual capital, and several authors have tried to define it in a unique way and propose their own measurement methods.

Though the definitions of intellectual capital are all very similar, describing more or less the same source of intellectual assets, the approaches to measure them differ substantially. They differ primarily in the purpose of the measurement, where some methods are more appropriate for external communication and some for internal use. But what is common to all the methods is their difficult implementation in practice. There are several problems with the implementation of different measurement methods, such as the lack of necessary data, of accounting standards for intellectual capital, and of detailed method descriptions. Some of these limitations can be overcome by approximation, by subjective evaluation or simply by choosing a different method.

The key elements have evolved through just being there, to physical capital dominated to organizational 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.

#### The Intellectual Capital Reporting Model



Source: AK-WB, [www.akwissensbilanz.org](http://www.akwissensbilanz.org)

Figure 1: The IC Reporting Model

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.

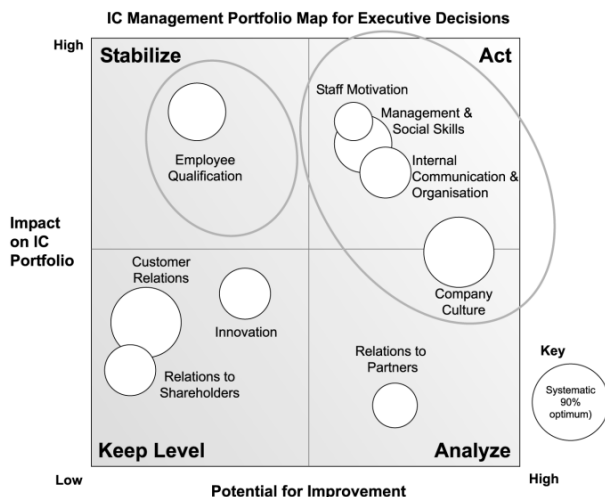
One obvious approach to management and measurement is to try to retain as much of the rigour of conventional accounting by adjusting its traditional instruments. Where people believe this to be impossible, they have resorted to measuring new things but retaining the forms of conventional accounting.

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 behaviors through measuring the wrong things nor imposing a heavy burden of measurement of people who have better things to do.

The strategic management 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 organizational 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.



Source: EnBW AG (2005) and Fraunhofer IPK, Berlin

Figure 2: Management Portfolio Chart

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.

For-profit organizations compete on product differentiation or cost efficiency, using their core competencies to improve market share and profit margins. For-profit organizations measure and monitor their core competencies to maintain a competitive advantage. Traditionally, this has focused on financial and physical measures. However, recently, many for-profit organizations have realized that the expertise of their employees represents their most valuable resource or core competency. The rationale is that expertise, if used properly, leads to innovation in products and services, and improved customer satisfaction. Therefore, they have recently focused on measuring intellectual capital in the firm. Similarly, higher education institutions compete for students, faculty, and funding. In contrast to many for-profit organizations, their major product is their intellectual capital, making its measurement and management even more crucial to organizational effectiveness.

By understanding and measuring their intellectual capital, higher educational institutions can better understand where their core competencies lie, thus potentially allowing a better allocation of resources, potential synergies, and ultimately, achievement of strategies and goals. This potentially translates into greater student and faculty acquisition, retention, and achievement of research or teaching goals. Furthermore, by maximizing the efficiency of intellectual capital via teaching or research using a “production possibilities frontier” economics approach, colleges and universities can potentially significantly improve the quality and effectiveness of their endeavors in teaching and research. Liu reported a study showing the relationship of human capital as a value creation indicator that can be used to help formulate organizational strategy, provide some evaluation base, and allocate some resources in the context of Universities.

While this paper discusses evaluation of intellectual capital in academic organizations, these organizations are not the only institutions whose primary function is knowledge creation. Both private sector and government research and development centers have a similar focus.

## **2. Measuring Intellectual Capital: Common Measures**

In today’s knowledge economy, it is often not the financial and tangible assets that drive company success and value, but rather intangible elements such as employee expertise, customer loyalty, operational effectiveness or innovation. And, these factors depend ultimately on employees, the ability to measure employees’ knowledge and skills, and to align them with an organization’s mission and goals. Some argue that measuring intellectual capital more accurately reflects the true value of a company and provides insights into core competencies which create sustainable competitive advantage.

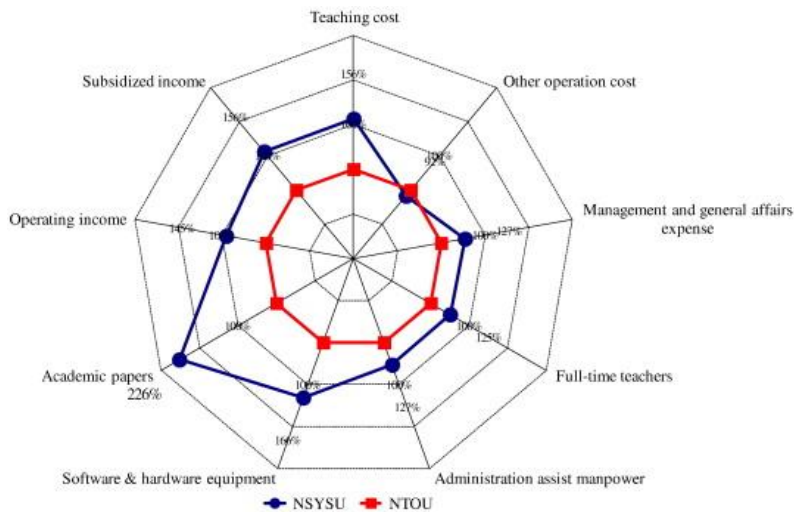


Figure 3: Measuring cost and teaching and research performances

Furthermore, it can be argued that a knowledge firm, such as a University, has several basic and essential functions: knowledge creation, knowledge extraction, and knowledge transmission. The ability to identify and measure the intellectual capital represents a way to allocate and develop it as well as to institutionalize the effective management of it. In terms of universities specifically, competition to attract talented faculty, staff and students remains significant. The ability to identify and manage strategic intellectual capital to respond to changing needs in local, state, national and international economies and societies represents an important method to sustain or improve the competitive advantage of the firm.

Tom Stewart's Ten Principles for Managing Intellectual Capital:

1. Companies don't own human and customer capital. Companies share the ownership of human assets with employees. They share ownership of customer capital with suppliers and customers. An adversarial relationship with employees destroys wealth.
2. To create human capital it can use, a company needs to foster teamwork, communities of practice, and other social forms of learning.
3. To manage and develop human capital, companies must unsentimentally recognize that some employees, however intelligent or talented they are, aren't assets. Invest in proprietary and strategic knowledge workers; minimize all other costs.
4. Structural capital is most easy to control because companies own it, but customers are where the money comes from.
5. Structural capital serves two purposes: to amass stockpiles of knowledge that support the work customer's value, and to speed the flow of that information inside the company. Just-in-time knowledge is more efficient than knowledge stored in the warehouse.
6. Substitute information and knowledge for expensive physical and financial assets.
7. Knowledge work is custom work. Mass production does not yield high profits.

8. Analyze your value chain to see what information is most crucial. The knowledge work is generally downstream, close to the customers.
9. Focus on the flow of information, not the flow of materials. Information once supported the real business; now it is the real business.
10. Human, structural and customer capital work together.

Therefore, there has been a strong movement over the past few decades to not only measure a firm's physical assets, but also their intangible intellectual assets. In the next section, we review only two of the more popular models that have been developed in the business world to measure intellectual capital (Bontis, Leitner, and Van den Berg).

## **2.1 E-Learning as a Knowledge Management Approach for IC Utilization in Adult Education**

Knowledge is commonly distinguished from data and information. Data represent observations or facts out of context, and therefore not directly meaningful. Information results from placing data within some meaningful context, often in the form of a message.

Knowledge is that which we come to believe and value based on the meaningfully organized accumulation of information (messages) through experience, communication or inference. Knowledge can be viewed both as a *thing* to be stored and manipulated and as a *process* of simultaneously knowing and acting - that is, applying expertise. As a practical matter, universities need to manage knowledge both as object *and* process.

Knowledge can be *tacit* or *explicit*:

- Tacit knowledge is subconsciously understood and applied, difficult to articulate, developed from direct experience and action, and usually shared through highly interactive conversation, story-telling and shared experience.
- Explicit knowledge, in contrast, can be more precisely and formally articulated.

Therefore, although more abstract, it can be more easily codified, documented, transferred or shared. Explicit knowledge is playing an increasingly large role in organizations, and it is considered by some to be the most important factor of production in the knowledge economy. Imagine an organization without procedure manuals, product literature, or computer software.

Knowledge may be of several types, each of which may be made explicit. Knowledge *about* something is called declarative knowledge. A shared, explicit understanding of concepts, categories, and descriptors lays the foundation for effective communication and knowledge sharing in organizations.

Shared explicit causal knowledge, often in the form of organizational stories, enables organizations to coordinate strategy for achieving goals or outcomes.

Knowledge in a university environment, specially the academic knowledge, can take the above three types of knowledge, and therefore make it hard for the universities to manage it properly.

Knowledge also may range from general to specific (R. M. Grant 1996). General knowledge is broad, often publicly available, and independent of particular events. Specific knowledge, in contrast, is context-specific. General knowledge, its context commonly shared, can be more easily and meaningfully codified and exchanged,

especially among different knowledge or practice communities. Codifying specific knowledge so as to be meaningful across a university requires its context to be described along with the focal knowledge.

Effective performance and growth in knowledge-intensive organizations requires integrating and sharing highly distributed knowledge. Although tacit knowledge develops naturally as a by-product of action, it is more easily exchanged, distributed, or combined among communities of practice by being made explicit. However, appropriately, explicating tacit knowledge so it can be efficiently and meaningfully shared and reapplied, especially outside the originating community, is one of the least understood aspects of knowledge management. Yet organizations must not shy away from attempting to explicate, share and leverage tacit, specific knowledge. This suggests a more fundamental challenge, namely, determining which knowledge *should* be made explicit and which left tacit. The issue is important, as the balance struck between tacit and explicit knowledge can affect competitive performance.

Knowledge may be inherently tacit or may appear so because it has not yet been articulated, usually because of social constraints. Articulating particular types of knowledge may not be culturally legitimate, challenging what the firm knows may not be socially or politically correct, or the organization may be unable to see beyond its customary habits and practices.

And of course, making private knowledge public and accessible may result in a redistribution of power that may be strongly resisted in particular organizational cultures. Knowledge also may remain unarticulated because of intellectual constraints in cases where organizations have no formal language or model for its articulation.

### 3. What Is Intellectual Capital?

OECD (1999) defines intellectual capital as the economic value of two categories of intangible assets of a company: organizational ("structural") capital; and human capital. Structural capital refers to things like proprietary software systems, distribution networks, and supply chains. Human capital includes human resources within the organization and also customers and suppliers of the organization. Often, the term "intellectual capital" is treated as being synonymous with "intangible assets" or "knowledge assets." However, OECD considers 'intellectual capital' as a subset of overall 'knowledge assets' and this study propose an identical perspective.

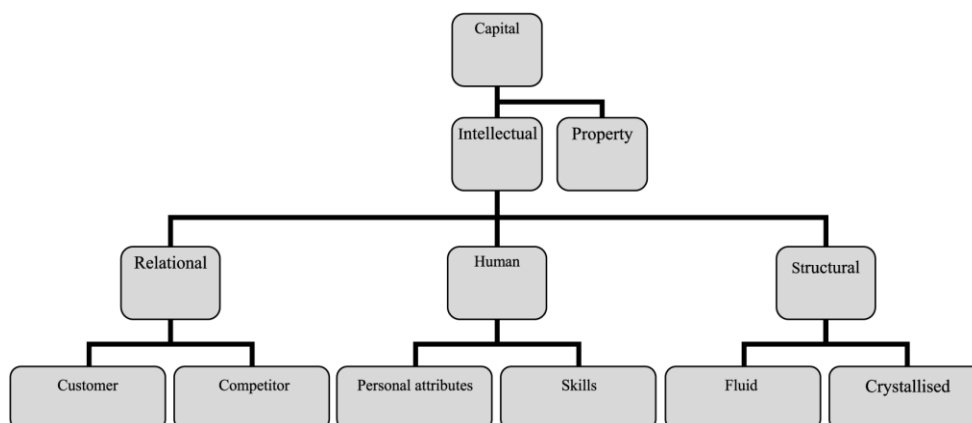


Figure 4: Common representation of the structure of IC

Stewart (1997) defines intellectual capital (IC) as "the intellectual material -- knowledge, information, intellectual property, experience - that can be put to use to create wealth". Alternative definitions (at firm level) interpret IC as the difference between the firm's market value and the cost of replacing its assets. Existing conceptualizations of IC and its various models share some common overall characteristics while maintaining substantive differences in details of implementation (Malhotra 2003c). Some of the more popular measurement frameworks and models used for assessing firm level and national knowledge assets are discussed later. The differences between the current models arise from their effort at managing the complexity of measuring the intangibles. Some models focus primarily on financial metrics and offer a restricted notion of knowledge assets. Others take a more holistic view but require subjective judgment in determining a composite index that may be used for objective comparisons.

#### **4. Measuring and Improving Performance: Changing Institutional Capacity, Culture, and Behavior**

To instill a culture of measuring and improving performance, institutional leaders need to:

- develop performance measurement and improvement strategies that nurture an action analytics culture and behavior;
- examine and reinvent existing business practices and processes that incorporate analytics;
- execute these performance strategies in an expeditionary manner, adapting to changing conditions and opportunities; and
- navigate and lead a change process to build organizational *capacity*, change the organizational *culture*, and foster new *behaviors* that both enable and reflect evidence-based decision-making and action.

The last area—changing institutional capacity, culture, and behavior—encompasses four capabilities: technology; information; analytics; and innovation. Most colleges and universities have achieved the greatest sophistication in changing technology capability, with lesser levels of sophistication and achievement in information, analytics, and innovation capabilities. At any time, institutions are likely to be developing all four of these capabilities simultaneously, following intertwined paths. The field of Knowledge Management (KM) has rapidly gained popularity both in academia and in industry. From practical point of view, KM encompasses processes and techniques for the creation, collection, indexing, organization, distribution, access to and evaluation of institutional knowledge for *reuse*. An important feature of KM is to show and highlight the importance of the *tacit knowledge*. This is one of the main objectives of this research paper. Since Knowledge is the core asset of any university, we will focus on the "*Intellectual Capital-IC*" that is the knowledge embedded within the university academic environments. Figure: 1 shows a module of IC utilization at the university environment.



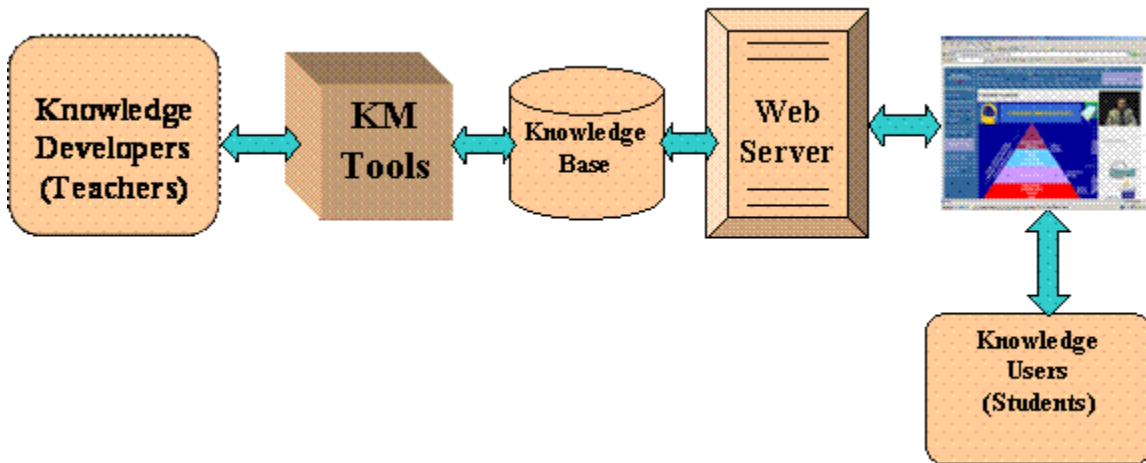


Figure 5: Intellectual Capital Utilization

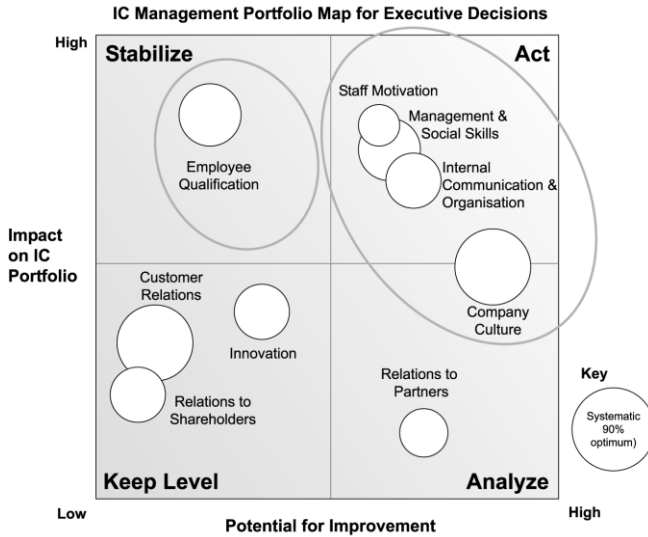
To develop the knowledge management process in academic institutions that includes all these aspects, it is important to consider cultural and human resource issues as well as intelligent systems that facilitate IC knowledge (teachers) to perform their teaching duties. With regard to such systems, current practice concentrate on e-learning systems that extensively depends on search engines and database techniques, and hence looking forward to adopts the potential benefits that Artificial Intelligence (AI) techniques (Russell & Norvig, 2003) might deliver for core knowledge management activities like knowledge discovery, indexing, organization, and knowledge fusion. In order to address the above priorities, e-learning systems that can be developed under the umbrella of Knowledge Based Systems (KBS) aims to address the use of AI techniques in any KM processes. Many approaches were used to find a solution for this problem. Below are some of themes:

- Knowledge integration processes using Intranets/Extranets
- Intelligent Agents for Knowledge Discovery and Sharing
- Intelligent indexing mechanisms for multi-media
- Framework for measuring the benefits of KM
- Natural language understanding for context management
- Human Computer Interaction processes in KM

To develop e-learning systems, *Knowledge Engineering (KE)* is the way that aims for the processes involved in building e-learning systems: planning, knowledge acquisition, system implementation, system installation, and system evolution.

For systems that embedded academic material, KE involves the following steps.

Figure 6: IC Management Portfolio for Executive Decisions

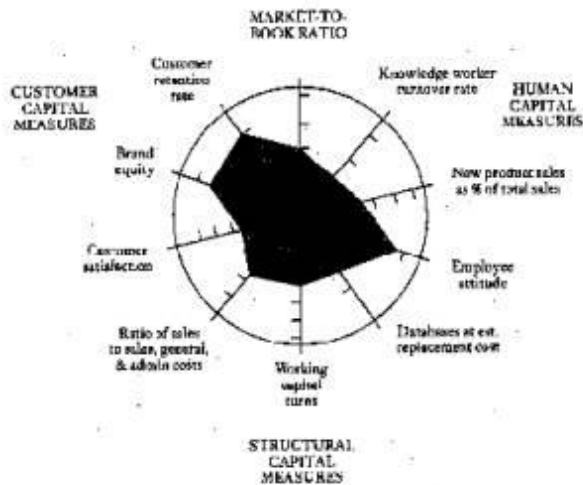


Source: EnBW AG (2005) and Fraunhofer IPK, Berlin

Measuring intellectual capital is a growing area of interest in the knowledge management field. Metrics are being developed and applied by some organizations, but there needs to be more research throughout the international community to better define these measures. One limitation of the current measures is that they do not necessarily address the “knowledge level” and the types of value-added knowledge that individuals obtain.

### 5. Intellectual Capital In Higher Education

Faculty and staff represent knowledge workers since they work with ideas, explicit, and tacit knowledge for knowledge creation, knowledge transfer, and the effective use of knowledge. This occurs in every discipline; from the sciences to the humanities to the professional and social sciences (Gould, 2006). As universities and colleges compete and seek to differentiate themselves, they must understand their core competencies in terms of their intellectual capital.



## 5.1 Measuring Intellectual Capital In Higher Education

There has been little research on measuring intellectual capital in higher education. However, it makes sense to do so because institutions of higher education can gain a competitive advantage by *identifying its intellectual capital and integrating it with its strategies and goal*. While students and the state represent several important stakeholders, it did not make sense to examine their satisfaction for the purposes of this study, which was to simply measure the intellectual capital of the University. Therefore, our measurements focused almost exclusively on the human capital component that was very similar in the two models presented above.

The common measurements in the human capital component include:

- Balanced Scorecard: Innovation and learning: patents, new products (would potentially translate into publications in academics)
- Skandia Navigator: Human Capital (Educational degrees, cross-training, training per employee, attendance at seminars) and Innovation Capital; similar to Balanced Scorecard.
- Technology Broker: Human Assets (employee expertise, academic degrees) and intellectual property assets: similar to innovation above.

The third millennium society has workers who are valuable because of what they know. Intellectual capital is the term given to the combined intangible assets which enable the company to function efficiently.

The components of intellectual capital are:

- Market assets are those which are derived from a company's beneficial relationship with its market and customers.
- Intellectual property assets include know-how, trade secrets, copyright patents and various design rights.
- Human-centered assets comprise the creative and problem-solving capability, leadership, entrepreneurial and managerial skills embodied by the employees of the organization.
- Infrastructure assets are those technologies, methodologies and processes which enable an organization to function efficiently on the long run.

## 6. Conclusion: Invest in Education

Managers all over the world are making capital investment decisions. It is necessary that the employees should have an adequate education so that the managers could thus appreciate them at their right value. The amount of education acquired by workers has an important impact on their earnings, these two elements being equally important. The more education individuals acquire, the better they are able to absorb new information, acquire new skills, and familiarize themselves with new technologies, thus their earnings being considerably higher.

Another aspect worth mentioning and which is closely connected to education is represented by the quality of our life. Persons with higher levels of education tend to have better health than those with lower levels, because they have made an investment in themselves, an investment that they protect by taking preventive measures to increase the probability of better health.

The contribution of education to economic growth occurs through two mechanisms. The first, and most highly publicized, is through the creation of new knowledge, known as Schumpeterian growth. More highly educated individuals will translate into more scientists, and investors working to increase the stock of human knowledge through the development of new processes and technologies. This leads us to the second way that education affects economic growth and this happens through the diffusion and transmission of knowledge.

In his 1962 classic "Capitalism and Freedom" Nobel laureate Milton Friedman described some of the effects associated with education: „A stable and democratic society is impossible without a minimum degree of literacy and knowledge on the part of the citizens and without widespread acceptance of some common set of values. Education can contribute to both.”

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