AHONEN, GUY (ED.)

INSPIRED BY KNOWLEDGE IN ORGANISATIONS

ESSAYS IN HONOR OF PROFESSOR KARL-ERIK SVEIBY ON HIS 60th BIRTHDAY 29th JUNE 2008
Inspired by Knowledge in Organisations:
Essays in honor of Professor Karl-Erik Sveiby on his 60th birthday 29th June 2008

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PREFACE

This book is in honor of our friend and colleague, Karl-Erik Sveiby, reaching the age of 60. It has been my pleasure to ask the writers of this book to contribute with a text relating to the theme which Karl-Erik has become World famous – Knowledge Management.

At the time of his 60th birthday Karl-Erik is Professor of Knowledge Management at the Swedish School of Economics and Business Administration (Hanken) in Helsinki, Finland. He is also Honorary Professor at Griffith Graduate School of Management, Brisbane, and at Macquarie Graduate School of Management, Sydney. He is also adjunct professor at The Hong Kong Polytechnic University.

Karl-Erik does not fit into the picture of a normal Professor in management. His interest was for a long time, and still is, in doing business instead of just studying business. Until the mid-90s he worked mainly as a manager and owner in Swedish media business, where he gradually started wondering about role of knowledge in business. In 1986 he wrote *Kunskapsföretaget* (The Knowledge Company), which is one of the first books to talk in terms of modern Knowledge Management. After this book have followed eleven other books, most of them in Swedish. In 1997 he became world famous when his *The New Organizational Wealth: Managing and Measuring Intangible Assets* was published. For many of us this book opened the eyes for the importance of intangibles in business. It not only pointed out the types and nature of intangible assets that contribute to the creation of value, but also the fact that business creates intangible revenue in addition to financial revenue. This notion and its implications are still obscure for most academics and practitioners of business.

Having understood how knowledge gets created and transferred, Karl-Erik early stopped believing in the effectiveness of written and spoken messages. He therefore engaged strongly in creating interactive games, in which the financial logic of knowledge would become obvious. *Tango*, *TangoNet* and *Interplay* are nowadays known business simulation games all over the world, promoted by Karl-Erik’s global business associates.

Although Karl-Erik is a truly cosmopolitan person, his closest group of academics, the *IC Group* at Hanken, is proud of counting him as a Finn nowadays. Having been born in Sweden and spent nine years in Australia, he settled down in Helsinki in 2002. There is no doubt that his wife Kati being born in Finland had something to do with this. The IC Group consists of a group of doctoral and post-doctoral researchers pursuing research in knowledge management under the supervision of Karl-Erik and myself. The range of

In the current book, some of the scholars who have, in one way or the other, worked with Karl-Erik over the years, present their ideas about themes which are central to Karl-Erik’s thinking. Many of the contributions include interesting details about Karl-Erik’s professional life, which I will not repeat here. Below only a brief glimpse of the contributions.

In Knowledge navigation and the cultivating eco system Leif Edvinsson presents his personal account of the history of the concept of Intellectual Capital. In his contribution Edvinsson gives a detailed presentation of the synchronic and structural aspects of knowledge based on his extensive experience in the field. He points out Karl-Erik’s central role in identifying the structure of intangible assets and the way in which knowledge affects the business logic.

In Management control, apathy and blurring of university borders Ulf Johanson describes how a bureaucratic attitude and behavior can push out the creation of new knowledge from the universities. By this he accords with a theme that has recently inspired also Karl-Erik, the disabling context of organizations. Like Edvinsson, Ulf Johanson describes many details of Karl-Erik’s professional career. He particularly congratulates Karl-Erik for having introduced the invisible balance sheet. Finally, he refers to the importance of Treading Lightly, which Karl-Erik recently published together with Tex Scuthorpe.

In The Hidden Wisdom: a Sustainability Vision of Karl-Erik Sveiby James Guthrie and Christina Boedker elaborate on the concept of sustainability, which has been at the heart of Karl-Erik’s thinking lately. In their account Guthrie and Boedker particularly applaud the Sustainability World Monitor concept. They point out that Karl-Erik possesses a rare combination of executive, consultancy and scholarly skills. This all has led to a genuine respect for life.

In Intellectual Capital and the Production of Organisational Knowledge: the Antecedents to Corporate Capabilities and Competencies Jan Mouritsen argues that traditional management science has treated factors of competitiveness as a black box, which Karl-Erik has participated in opening. Like Karl-Erik, Jan Mouritsen has been actively engaged in promoting new, multidimensional corporate reporting concepts. He uses a Danish company as a case for showing how Intellectual Capital statements allow reflexivity of knowledge organizations to occur. He concludes by saying that knowledge produced by such statements is knowledge about knowledge.

In The Very Human Dynamics of Knowledge and Value Conversion Verna Allee elaborates on the dynamics of value creation. She points out the importance that Karl-
Erik has had in her understanding of how business networks create value. According to Allee value conversion occurs when one form of value is converted to another. This relates strongly to the Knowledge based strategy, initially defined and presented by Karl-Erik. In her contribution Allee argues that Value network analysis provides the missing link between Intangible assets, management, the organization chart, process management and social network analysis.

In The Principles of Intellectual Capital Efficiency - A Brief Description Ante Pulic maintains that the amount of knowledge determines value. In agreement with Karl-Erik he argues that only people can produce knowledge. He describes his VAIC concept, in which value added plays a central role, and which was originally inspired by Karl-Erik’s research. He particularly elaborates on the role of value destruction in the efficiency of organizations. Like Karl-Erik, Pulic maintains that the intangible based reporting and measurement concepts provide a new interpretation of existing reality.

In National Intellectual Capital as an Economic Driver - Perspectives on Identification and Measurement Pirjo Ståhle analyses the preconditions for measuring Intellectual Capital on a macro level. Like Karl-Erik, Ståhle has been active in identifying ways to measure intangible assets. She argues that IC research could at best both make a significant contribution to the strategic steering of knowledge economies and act as a support for national foresight. The main challenges are to find reliable methodologies through which to identify IC and its economic impact.

In On the Relationship between Innovation, Intellectual Capital and Organizational Unlearning Rongbin W.B. Lee elaborates on a phenomenon which has been very important to Karl-Erik. Lee refers to Karl-Erik’s descriptions of how he has had to use a big part of his professional life to unlearning what he learned at the university. He argues that innovation can be institutionalized as a part of IC. Important parts of organizational learning can be transformed into structural capital but innovation capital is basically located in human capital. Thereby, he adheres to Karl-Erik’s view of the supremacy of human capital among the elements of IC.

In Human Resource Reporting and Management in the Finnish State Sector Veli-Matti Lehtonen and myself describe and analyse the use and usefulness of human resource information collected in the Finnish state administration. The article is based on Veli-Matti Lehtonen’s PhD thesis, which was co-supervised by Karl-Erik. In the analysis the usefulness of HR information is examined as a part of the so-called Personnel process-based strategic management concept used in the Finnish state sector. The analysis supports the idea that it makes sense to collect human capital data, and thereby supports Karl-Erik’s view that efficient management of knowledge based organizations is not possible with financial data alone.

The views presented in the chapters below are all somehow related to the ideas of the role of knowledge in organizations, which Karl-Erik initiated decades ago. The authors have all developed these ideas in their own directions. Together they do not, of course, form a totally coherent body of knowledge. They may even contradict each other. Common to them all is, however, that they all assume that organizations cannot anymore be managed without an understanding of how knowledge is converted into intangible assets of organizations. They also assume that traditional measurement and
reporting concepts are inadequate and need to be replaced by knowledge-based concepts. I thank Katja Peltola for helping with checking the language of the contributions written by non-English authors, and Barbara Cavonius for struggling with technical details of the manuscript. I also thank Hanken for including this Festshrift in its publications series.

Karl-Erik, we all share your inspiration over knowledge in organizations, and congratulate you on your 60th birthday.

Helsinki 29.6.2008

Guy Ahonen
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1 KNOWLEDGE NAVIGATION AND THE CULTIVATING ECOSYSTEM FOR INTELLECTUAL CAPITAL

LEIF EDVINSSON

1.1. Introduction

Let us look at 2 professional tennis players. One of them is serving. The other one is just preparing for the counter strike. Is this player then looking at the ball or the counter player?

Does it make a difference? What does it imply to focus on the ball versus the one who is serving the ball? Will this make a difference, e.g. by this shift in focus to be able of anticipating the path of the ball and then at an earlier time choose a suitable counter strike? The trained perceptive brain is doing precisely this, grasping and hedging what is to happen, a kind of Strategic Knowledge Navigation.

Knowledge Navigation is a complex and compounded challenging issue, especially when the global knowledge flow, like multiple waves at the sea is rolling in on the beach every 24 hours.

At Lund University the late professor Stefan Dedijer inspired a starting point for the subject on *Quizzics* - The art and science of questioning. This is a fundamental dimension for both the navigation in the Knowledge Based economy as well as the future. A good question triggers the brain to develop new connections or synapses. A good question might be more focused on whom than what, i.e. relationship rather than object.

In my practice of Knowledge Leadership it has become a part of the pedagogic to use images. One of the very first images, but still very valid, is the tree of knowledge. It is used to illustrate the holistic perspective and eco system of *Intellectual Capital*(IC) as well as its hidden dimensions. In this symbol of the tree, the fruits are highlighted as assets, based on a flow through the tree of nutrition based on the capabilities of the roots. The soil is the enabling cultural context for continuous renewal and knowledge growth.

However, to this can be added 2 major dimensions related to the Knowledge Era; a timeline as well as the logic. The time line is the present surrounded by the past and the future. The logic is based on, among others, the research of Professor Karl-Erik Sveiby, on *Human capital, Organizational capital and Relational capital*.

Furthermore, if the perspective is to prepare for the future, then the tree dimensions might be turned upside down to amplify the strategic perspective shift of this cultivating ecosystem, as illustrated below.
1.2. IC of Nations

Some years ago I started to look for an enlarged perspective on how to view Intellectual Capital - IC of nations. Especially if we take a perspective of future earnings, i.e. a future outlook and capabilities view, this becomes very challenging.

Among others, Nick Bontis in Canada followed up on this. Later on, Carol Lin at TICRC - Taiwan Intellectual Capital Research Centre and her colleagues started to do interesting research on this. One of the most recent benchmark reports from 2007 list the following as the top 10 countries regarding Intellectual Capital:

- Sweden
- Finland
- Switzerland
- Denmark
- USA
- Norway
- Iceland
- Singapore
- Netherlands
- Canada

This leads to many interesting questions. How sustainable is such an IC of nation position? What kind of knowledge policy is needed? Why are so many of these listed ones from Northern Europe? Is there a reason behind why many of them are rather small scale nations? Why is not the USA on the top? And where is IC of China? What are the emerging IC trends?
The quizzics is still to be elaborated by much more research. But some emerging patterns indicate that island nations are scoring higher. Furthermore, the density of human capital as knowledge workers is a critical issue. But even more so is the surrounding infrastructure and structural capital.

For the further development of more refined Agenda of Knowledge Era Politics a group of knowledge oriented volunteers have gathered in the name of The New Club of Paris. See www.the-new-club-of-paris.org/

Such Knowledge Era Politics dialogues have taken place in, among others, Finland, Morocco, and soon Austria and Singapore. It indicates the growing interests among national leaders and institutions to investigate how to prepare for the challenging knowledge economy issues. Denmark was one of the first countries to have a special Competence Council already in the early 1990’s. Finland has also been in the forefront. One of the more recent consolidated ones are the AKEA- Arab Knowledge Economy Alliance, initiative in Middle East. See www.akeame.com

METI in Japan is also addressing these new economic dimensions. And recently PRC-Peoples Republic of China has started to address them. This large part of the world has in terms of IC of Nations

- Human Capital 1.3 billion or about 20% of world population, and expected 2015 to supply 5 million University graduates annually at the same volume as USA and EU together;

- Relational Capital , a growing proportion of world trade, and is now soon the largest exporter in the world, with an impact on among others, trade flows, currency reserves, and investments flows, and

- Structural Capital, still in progress, but today with the largest harbors in the world, as well as the nation with the most Internet users in the world, more than 210 million.

The aspirations are high. In December 2008 an IC Summit is planned to be held in Beijing, with academicals, business and political representation. To this can be added that PRC is now planning for a start of some 5 IC centers, with Hong Kong as the starting hub. There The Hong Kong Polytechnic University has taken a lead in pioneering initially KM Research as well as now Asia Intellectual Capital Alliance, together with HKSTP-Hong Kong Science and Technology Park.

1.3. Knowledge Longitude

With a time line and the navigation metaphor it might be easy to think of the Longitude. This is a special dimension, actually a third dimension beyond altitude and latitude to describe position. The unit of measurement is time. So it is a relative 3 dimensional position. Could it be that knowledge is of the similar character?
If knowledge is not in our heads or an object, but seen as a relationship, we need to discover new ways for navigating into the unknown, to be able to develop a universe of not value chains but value stars, as stated by late R. Normann.

**The Past - Some observations with a 60 years perspective**

What were some of the major events in the baby boom year 1948? One of them was of course the birth of Karl-Erik Sveiby. He later grew up to become a world leading pioneer in the subject of Knowledge organizations. Some other notable points from 1948

- WW2 is over and the Soviet Union starts a blockade of West Berlin, and a new air bridge is born
- BRD-Bundes Republik Deutschland is created
- Declaration of Israel’s independence
- Andrew Lloyd Webber is born as well as the famous soccer coach Sven Göran Eriksson
- T. S. Eliot gets the Nobel Prize in literature
- The United Nations launches the Universal Declaration of Human Rights
- WHO – the World Health Organization is being established
- Harry S. Truman is elected President of the USA

With an even longer perspective it is now 500 years since Amerigo Vespucci drew his discovery map of the new continent, later called America, following the female name tradition. In the same way globalization discovery has been at the forefront both by China and Portugal.

**The present - Some observations**

On a Google search for the name Karl-Erik Sveiby there are today about 15 900 hits and on Yahoo 46.100 hits. KM has become an overwhelming and most mature subject. Karl-Erik Sveiby was one of the very first PhDs on the subject. Today they are numerous. Dr. Sveiby and Dr. D. Amidon were among the early pioneers in the late 1980s.

Today in every corner of the world there is something going on with a relationship to the Knowledge Era, research, education, consulting, networking, seminars, conferences, projects, and enterprises.

For the intensified flow of knowledge there is the evolution of internet and media online. It is not only the mobile phones, but now smart phones and mobile media devices. The www is still a youngster, but is having a great impact on the networking of brains and thoughts.
How will this impact the Knowledge Era dimensions? Will the phenomena of blog and wiki, as knowledge sharing tools, lead to a new level? The well-acknowledged Professor Dave Snowdon, earlier at the IBM Knowledge Management Center and Cynefin, now on Cognitive Edge, sees blogging as a social global knowledge sharing tool, resulting in improved knowledge productivity. See www.cognitive-edge.com

The Future - some observations

What are some of the emerging signals to look for and perceive? What kind of updated mapping and deepening compass system do we have for our Knowledge Navigation?

Will the Knowledge Era be replaced by some other era? Early signs indicate that we are moving towards more and more intangible perspectives. So the next era might be called the Mind Era, according to Professor Csaba Varga, at the Institute of Strategic Research in Budapest, Hungary.

Will there emerge on the National level some new dimensions of Knowledge democracy? Emerging research and prototyping is already under way in Hungary, Croatia, the UK and many other places.

In Second Life, shaped in 2003, a new virtual economy is emerging. Is this reality or actuality? The economics is there as well as the currency exchange to Linden dollar. See www.secondlife.com

1.4. Culture and Values

A deeper and more intangible ecosystem dimension of the Knowledge Era is presented by culture and values. Are culture and values the soil or context for value creating activities as well as standard of living? Which culture or context will then shape future well-being and sustainable wealth?

A special and very interesting mapping has been designed and elaborated by Inglehart and Welzel from the World Values Surveys. See the map below (Figure 2) or at www.worldvaluessurvey.com
What they found is that 70% of cross national differences is described by evolution in the dimensions of traditional/secular values versus survival/self expression values. This might imply a shift from the tangible Survival economy to the culture of intangible Knowledge Relational Economy dimensions. Societies ranked high on self-expression are also ranking high on interpersonal trust, tolerance and political moderation. This is said to shape a culture of high individual freedom and with self-expression values for participation in environmental protection, tolerance of diversity and rising demand for participation in decision-making in economic as well as political life.

It is very interesting to find nations such as Sweden, Norway, Denmark, and The Netherlands and to some extent Finland as well as Japan and Hong Kong in top ranking positions. It seems to correlate with the earlier mentioned study of IC of nations as well as more common economical wealth statistics. Another interesting observation can be made related to the position of China versus the USA on the map.

If the above map is relevant for nations, could then the same values dimensions be relevant for enterprises? If so, then the management and leadership in the Knowledge Era need a much more refined management approach of value creation based on culture and values. The traditional economics approach will be too narrow. Something that Dr. Charles Savage, since long, has been elaborating, now on the www.kee-inc.com

The difference in values is also what the recent work of D. Andriessen and M. van den Boom is looking into, with a special focus on West versus East. In short the Asian perspective is more focused on the relationship dimensions while the West is focused on the object and intellectual property or copyright dimension.

Furthermore, it looks from work by Ruut Veenhoven’s World Database of Happiness that happiness has been raising in many of the top listed countries.
Could this be a signal for a new type of reward system, based on a more intangible dimension? Here the Neuro Science will navigate us to more understanding around the dopamine and serotonin dimensions for the Mind Satisfaction.

From this follows many different approaches to the Knowledge Navigation, Knowledge Management and Knowledge Leadership. A new bottom line approach will emerge. See more on www.bottomline.se

For board of directors it will require a closer look at the past as well as present culture, but also take culturally oriented leadership actions on these intangible mapping dimensions for a new actuality.

1.5. IC Accounting and Measurement

One of the starting areas for the KM movement was the measurement of Invisible Balance Sheet and the pioneering work of Professor Karl-Erik Sveiby in a project group in Sweden called Conrad Group. This was some 20 years ago. Now this has grown into a world community of measuring intangibles, Intangible Assets and IC. Some of the early important contributions are around IC efficiency and the work of both Ante Pulic on VAIC, Nick Bontis on IC value dynamics, Jan Mouritsen on Knowledge Reporting and Goran Roos on the IC index.

Some of the recent developments are among others the following ones.


In Germany started a special, now very successful, project in 2004 called Wissensbilanz Made in Germany, under the leadership of BMWA - Bundesministerium fur Wirtschaft und Arbeit. It has now evolved to incorporate small as well as large German enterprises, both public and private. It has resulted in open software that can be downloaded on www.akwissensbilanz.org, By now more than 20,000 enterprises in Germany have downloaded the software.

This work is a pioneering work as it goes from reporting IC as a position to a process view of the interaction between the components to shape value. It has a lot of benefits from leadership viewpoint. This systems dynamics approach is also described in articles and research papers, among others in Journal of Intellectual Capital 2007, Vol 8, and No 3. IC or Wissensbilanz Process – Some German Experiences

Another EU project called InCas-Intellectual Capital Statements made in Europe 2007 was launched s a follow up on these. It focuses on expanding the learnings from the German Wissensbilanz project to 5 countries with a target for 50,000 EU SME’s to be using InCaS knowledge tools and techniques by the end of the project dissemination phase (Dec 2008). Since January 2008, a “Wiki”, or special InCapedia, has been under
development at LSE within the InCaS project. It provides an emerging interactive encyclopaedia about anything to do with Intellectual Capital and Intellectual Capital Statements. See www.incas-europe.org


In Asia there is also a lot of progress, especially in Japan with METI – Ministry of Economy, Trade and Industry. But also South Korea, Malaysia, and China have work in progress on the measurement and reporting of IC/Knowledge Capital. Australia is of course, in the forefront based on early input from Professor Karl-Erik Sveiby and Professor Goran Roos.

Accounting and measuring has since long been an instrument of and for knowledge. The core of this measuring might be refined to a dynamic navigational dimension, measuring, meaning to be on the right track with the right direction and speed. In other words much more of systems dynamics eco process view of value creation.

1.6. Networking and Relational Capital

One of the core dimensions for the Knowledge Era seems to be in the Relational Capital. If we are looking upon knowledge as an interactive issue, and put networking and contactivity into the forefront of knowledge leadership, then new types of relational capital mapping emerge. In CMM – Center for Molecular Medicine, at Karolinska Institute in Stockholm, Sweden, this is being done and reported in its annual IC report.

![Figure 3. Publication patterns of the CMM research group.](www.cmm.ki.se)
CMM is a leading research group and community of scientist, ranked as number two in the world in its field. A special structural capital model is shaped for the around 400 in-house scientist, of which around 50% are Ph.D graduates. However it is the networking between the scientists that shape different kinds of productivity, illustrated by the map above. Next step is to start going deeper into this internal perspective and then add the external perspective. Especially since the knowledge flow is done on a global base in more and more virtual networking enterprises.

The traditional economical tools are too limited to capture the flow of knowledge, the impact of the flow and value creating dimensions over time. For the Knowledge Era this kind of Social Network Analyses is becoming more and more used as a tool. Especially for Science and R&D communities this seem to be a good starting point for understanding knowledge flow as well as getting a base for further investigation and investment.

1.7. Knowledge Innovation and Future Centers

Knowledge innovation has recently become a very elaborated concept. It started among others with Dr. Debra Amidon as a concept 1993. It is now a registered trademark of Entovation International Ltd with the following distinction – *The creation, exchange and application of new ideas into goods and services*, as stated in her book *The Innovation Super Highway* (2003). It has been refined into many dimensions. See www.entovation.com.

In my work in Skandia we also launched in 1996 an arena for such knowledge innovation, called Skandia Future Center. It became one of the world’s first prototyping labs for Organizational Capital. We were focusing on the innovation dimensions as an organizational issue. In this work we also collaborated with Dr. Debra Amidon. The critical question became how to build a bridge between brains inside, called Human Capital, and brains outside the enterprise, called Relational Capital. This bridge, as Organizational Capital, was and is the channel for flow of knowledge. So the Renewal and Innovation dimensions of Organizational Capital became a very essential ecosystem perspective.

After us came many other similar places, however with different context and aspirations, such as ABB Future Center. Sweden, EON Future Center, Sweden, Minc for Malmö City, Sweden, Mindlab, Denmark, Future Center, Norway, Mobilion/LEF and many more in the Netherlands, Innovation Lab for Royal Mail, UK, Scottish Intangible Asset Centre, the UK, Beér Sheva in Israel, Mind Tree in India. Today there are more than 30 such hubs for knowledge innovations and more in progress among others in Asia. The most recent one was launched in November 2007 by ABN Amro Bank as a special hub for dialogue, learning, prototyping and incubators. See www.dialogueshouses.nl

The learning is now being captured in a European Commission funded project called Open Futures, describing the operating systems of such Hubs. The project report will be available in the early autumn 2008. See www.open-futures.net.
Some of the learning is related to the following aspects

- in sourcing of outside intelligence;
- experiential Knowledge Exploration;
- dialoguing across disciplines and generations;
- reduction of fear for collaboration and meeting the future;
- location, space design and furniture;
- psychosocial architecture, and;
- icons for the timeline past –present-future.

The usage of some old artefacts of the past gave perspective, harmony and some aha’s. For example this little trolley, used 100 years ago (Figure 4), to move Knowledge from one office room to another, in the shape of the general ledgers, as big heavy accounting books. It was the Wi-Fi of that time or Skype…

**Figure 4. A 100 years old trolley.**

Today Google has designed its new European HQ in Zurich (Figure 5) with many of such dimensions. Among others, the flow of human capital, seen below. See also http://picasaweb.google.com/zurich.office.images. It is said to be related to a kind of management style and culture within Google that nurtures artful exploration and innovation.
Figure 5. Google’s European HQ in Zurich

Close to this is also the Japanese concept of BA, developed by Professor I. Nonaka. BA is a special place that bridges the sharing of information and knowledge. BA means context, circumstances and connections in which knowledge is created, shared, utilized and stored. A BA is an arena where knowledge becomes “visible”. Different types of BA exist related to the famous SECI model, to originate dialogue, systematize and apply or internalize knowledge. The concept is now used for workplace design in for instance Hitachi.

Based on the research of professor I. Nonaka the famous SECI model below (Figure 6) can be related to the various types of area for knowledge creation, as has been done by Y. Yoshimoto. It highlights among others different models for different focus and context.

As Noburo Konno writes, closely collaborating with professor Nonaka, most enterprises today have designed their offices for administrative work, based on old paradigms and inadequate understanding of knowledge creation. Now it is time to look for cognitive design, social knowledge dimensions and knowledge campus models. So we might learn from another type of ecosystem that is less adequate for for administrative functions and more apt for knowledge innovation. In Japan this is also referred to as a BA.
1.8. Knowledge Innovation Zone

On an aggregated level such spaces are now emerging. KIZ has a special meaning as an area, or larger space for knowledge innovation. In the global development of knowledge economy this becomes very important. The definition by Dr. D. Amidon is as follows:

A Knowledge Innovation Zone (KIZ) is a geographic region, product/service/industry segment or community of practice in which knowledge flows from the point of origin to the point of need or opportunity. In short, focus is on the flow of knowledge, not finances or technology per se (Amidon 2003).

For a long time there has been a search for intelligent zones for enterprising and society wealth creation. Besides the famous area of Silicon Valley, another interesting and successful one can be found in Malaysia, The Super Multimedia Corridor. Famous European areas are the Science Park Sophia Antipolis, outside Antibes in France and Ideon in Lund, Sweden, and both the 22@ and the Forum in Barcelona. Many more are now in progress. See www.inthekzone.org.

A recent interesting example is Shenzen, China. This is a city on the borderline close to Hong Kong. This city had some 20 years ago about 40,000 citizens. Today its population is over 12 million. It was selected as the very first prototyping city, region or area for transforming China, as a Special Economic Zone - SEZ. Shenzen was later followed both by Shanghai and Tianjin as SEZ. Now they are looking for how to upgrade an integrated Shenzen and Hong Kong to become more of a KIZ.
These areas are characterized by for instance city leadership focus in combination to a larger context, attraction of talents, special economical incentives, refined infrastructure and architecture.

But the challenge for the future might be even more of a SIR – societal intelligent region, as a knowledge ecosystem.

*SIR is characterized by being both a KIZ but also by social renewal in a creative way, based on societal intelligence and high degree of consciousness, energized by volunteering human capital, leveraged by a digital infrastructure and collective self governance, thereby bridging local society and global opportunities.*

Such new regions or zones are of course challenging the traditional models of governance and public administration. According to the work by C. Varga and E. Ugrin, we are heading for a civil society and *globnatil* (global and national) regions. They are said to have more social consciousness and activated social engagement, among others based on IT, with promotion and conversation of knowledge into social capital. Such a prototyping city is Aba in Hungary with an intelligent city program. Intellectual Capital is said to play a vital role for the co operative mixing of its fragmented components, based on a triple process of combining global, national, and local sphere – *globnatil*. See www.strategiakutato.hu.

Innovating social and societal organizations becomes critical for the collective wealth and well-being. For this work a special framework has been developed and described by Bennet, in the book *Knowledge Mobilization (KMb)* in the Social Sciences and Humanities. It is about how to bring knowledge, people and actions together to create value streams and social improvement. As once Peter Drucker also pointed out, it is about committing current actions with future value outcomes.

1.9. **Brain and Neuro Science as part of the Knowledge Eco system**

Einstein once said “Imagination is more important than knowledge”. Today we know that one of the more central parts of future research of the knowledge subject is related to emerging insights from brain research and neuroscience. It is evolving rapidly in the medical field, but less rapidly in the connection to social science and management. However work is in progress for instance in Japan, France and Sweden at Stockholm Brain Institute, for integration of neuroscience and cognitive behavior with our social behavior. But still most of it is unchartered territory yet to be discovered, especially related to the ecosystem of the knowledge era.

A grown up brain has some 100 billion brain cells. The brain is said to store about 1 million such new connections every second of our life, resulting in 100-500 trillion such synapses or connections in a mature brain. These synapses are the bridges for information transfer. By exploring the context a young brain adapts its connectivity and continuously improves its network, by keeping only the essential links.
Chemicals are important for our creativity and functioning of synapses or connections in our brain. One such chemical signal is dopamine, perhaps one of the strongest as reward system, also for knowledge workers. Recently it was released by British research that the volatility of the stock exchange could be linked to the hormones of testosterone for upside movements and cortisole for downside movements.

For the release of new thoughts and creativity it appears that the frequency of brain waves in terms of Hertz units will give different outcomes. The frequency of 4-12 Hz seems to be a good frequency to release our creativity. So we need to find the mindful context for that frequency in both office planning as well as urban planning.

The global information flow as well as our understanding is increasing and with a humble approach we can find new patterns for a better well-being. A well being that is based on new interactive patterns between billions of brains with a continuously growing larger societal perspective. A recent book is even talking about the Political Brain.

What we started to prototype at the Future center has now more and more verified that context and culture, as knowledge ecosystem, have a great fertile impact on our brain and thinking and human relationships for the future as an asset.

So with these thoughts and perspectives I want to salute Dr. Karl-Erik Sveiby for being the Great Pioneer, inspiring so many Brains, Projects and Learning around the World.

Happy Birthday!

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2 MANAGEMENT CONTROL, APATHY AND BLURRING OF UNIVERSITY BORDERS

ULF JOHANSON

2.1. Creation of apathy rather than knowledge—two cases

Some weeks ago, I spoke over the phone to a research colleague—a highly talented researcher with a bright future. She was slightly disturbed and was contemplating leaving the university owing to administrative bureaucracy. Recently, after obtaining a new toner for her printer, she submitted the receipt (approximately 10 euros) at the administrative department and was informed that the university could not reimburse the amount. Before she was recruited to the university she had successfully obtained research grants. She brought these grants to the university and her present as well as few future terms are being completely financed by various external research grants. Returning to the topic of administrative bureaucracy, she was informed that the overhead costs did not include reimbursement for a toner bought for her personal printer. On requesting the administrator to charge it to one of the accounts maintained for her personal projects since the printer is mostly used for these externally funded projects, she was notified that obliging to such a request was against the university rules, but an exception was possible at the behest of the funding organisation. This incident compelled her to consider relocating to a fairly independent research hotel belonging to another university. The administrative fees at this well-recognized research hotel are comparatively lower and provide her the freedom to independently decide how to use the funds.

A couple of weeks later, an ambitious and talented colleague from another university stated that he wished to prepare a budget for an educational programme in order to obtain better alternatives with respect to educational strategies. He required certain figures that he believed could be found in the preliminary overall budget for the department. On requesting for these figures, he was notified that the figures were confidential until the university board arrived at a decision on the budget.

Both these cases are significant instances of a management practice that could create resentment or, even worse, apathy among the university’s knowledge workers. Such management practices disable initiatives, ambitions, and finally knowledge sharing and knowledge creation, which are the fundamental ideas behind the existence of a university.
2.2. The blurring borders of universities

According to Catasus and Kristensson Uggla (2008), at least metaphorically, universities run the risk of becoming hotels that provide basic administrative services to researchers. They question whether bureaucratised and hierarchical universities can still host intellectual capital and promote knowledge creation. The two cases mentioned above describe a situation wherein the administrative functions actually set up barriers for creative knowledge workers. Since the establishment of the first universities in Europe, although society has undergone a dramatic change, the faculties regulated by the order of academic disciplines remain the same (Ibid). With respect to the above two cases, the question of whether expertise required for a constantly changing society can ever be located in a specific institution of this type (Ibid) seems relevant.

Further, Catasus and Kristensson Uggla believe that researchers are facing the issue of increased specialisation that cannot be easily disregarded. Together with globalization and a ‘publish or perish’ milieu, this specialization contributes to the creation of “…a community of practice where careers are formed by combining specific discourses in particular publications with certain colleagues…” (Ibid, p 65). The excellence of knowledge is defined by peers all over the world. This increases the possibility of researchers, particularly those studying social sciences, narrowing their observation to the outlook of their community. Since all researchers make observations based on a certain culture (Henningsson, 2008), i.e. they observe different phenomena through the lens of their own culture, instead of encouraging researchers to be open-minded, flexible and creative and ensuring that the university develops as place where knowledge is created, a ‘ba’ (Nonaka and Takeuchi, 1995), there is a risk that universities present the risk of producing narrow-minded and rigid researchers as well as research. Furthermore, given that knowledge is no longer created specifically in universities, Catasus and Kristensson Uggla suggest that the financial resources allocated exclusively to universities are no longer sacred. Today, the borders of universities are eroding (Novotny et al, 2001) at the same time as knowledge creation, both cross-disciplinary and practical, is increasing in importance (Polanyi, 1967; Schön, 1983; Nonaka and Takeuchi, 1995).

All institutions comprise ‘…cognitive, normative, and regulative structures and activities that provide stability and meaning to social behaviour…’ (Scott, 1995, p 33). In some institutions and situations, strict formal rules may have a strong influence on an individual’s behaviour. However, in other institutions and situations, apart from the formal rules, common values, norms or routines may also influence an individual’s actions. These values, norms and routines are developed and affected by social forces (Henningsson, 2008). The stricter the formal rules and bureaucratised institutions, the less is the scope for development of an individual’s ideas and interpretations (Selznick, 1957). Note that (1) it is often difficult to change these evolutionary developed routines (Nelson & Winter, 1982) and (2) they have been developed as a defence mechanism against threats to create stability and order. Even the learning patterns may have been cemented, which makes it difficult to understand new emerging phenomena—for example, blurring university borders and changing roles of management control. The spaces for knowledge creation, which Nonaka (2000) termed as ‘ba’, become important in these types of interaction processes. Ba is defined by Nonaka and Nishiguchi (2001, p 19) as ‘…a platform where knowledge is created, shared, and exploited. The most
important aspect of ba is interaction. Knowledge is created not just by an individual but also through interactions among individuals and with the environment’.

According to Nonaka & Toyama (2005), the neoclassical theory of a firm does not take into account the subjective elements of management. Further, it does not consider the firm as a dynamic entity. This holds true even in the case of universities. Knowledge creation occurs as a result of interactions between people. It is a self-transcending process wherein people share their subjective thoughts with each other. Ba encourages people to share and synthesize their subjective thoughts (Ibid). The concept of Ba provides a platform for knowledge to be created, shared and exploited. It is not merely a physical space but also ‘… a specific time and space, including interpersonal relations’ (Nonaka & Nishiguchi, 2001). Further, it is a context in motion that harbours meaning (Nonaka & Toyama, 2005). To participate in ba means to transcend one’s own limited perspective.

2.3. Knowledge creation and Karl-Erik Sveiby

I first met Karl-Erik in the early 1970s when both of us were employed at Unilever. At the time, he was a management accountant and I held a position at the human resource department. While his job was mainly of a financial nature, my job involved non-financial tasks. Ten years later, we held opposite perspectives. While he was in favour of considering non-financial indicators in the management control process (Sveiby, 1989), I opined that human resource management would benefit from the use of a financial framework (Gröjer and Johanson, 1991).

Karl-Erik has had a successful career as an entrepreneur. He was prompt in identifying new problems relevant to firms and knowledge creation. For instance, in 1986, long before knowledge-intensive firms became a common concept, he authored a book on knowledge companies (Sveiby and Risling, 1986). He initiated the development of a non-financial reporting model—the invisible balance sheet—which was quite similar to balanced scorecard and intellectual capital, several years before these concepts were introduced (Sveiby, 1990; 1997). In recent times, he spent some years in close contacts with aborigines, the Nhunggabarra people, in Australia in order to understand the aboriginal culture (Sveiby and Skuthorpe, 2006).

Karl-Erik’s career manifests an understanding of the changing role for knowledge creation, researchers and universities. He has held positions both inside and outside academia. His work does not represent narrow-minded discipline. His books and articles consider both practitioners and researchers as target groups. While some articles were published in international scientific journals, most were intended to be sold to the broad managerial public. His works are often both practical and cross-disciplinary. He has even dared to test his ideas commercially. Given his ideas, it can be said that Sveiby does not regard earning money as the primary target (Sveiby, 2007). Rather, for him, it has been a matter of curiosity and knowledge creation. Instead of spending most of his time in the academic ivory tower, he has been getting practical knowledge in order to be inspired, to get access to data, to share knowledge, to create tools and language for understanding and developing and to ‘walk the talk’.
His knowledge creation has not primarily been regulated by peer reviews but rather by testing his own normative ideas. His discussions and proposals have always been provided some years before peer review articles on the same issue appeared in scientific journals edited by university professors. Karl-Erik is a good example of the statement that the actual business of knowledge exists outside the universities (Catasus and Kristensson Uggla, 2008).

In 2007, I had the opportunity to listen to Karl-Erik thrice in a short period when he spoke about his experience from and understanding of the Nhunggabarra aboriginal culture (Sveiby and Skuthorpe, 2006). It was wonderful to listen to his views. He conveyed his interpretations from his close contacts with different individuals and their society in a manner that destroyed the ordinary scepticism of several people in the audience. The usual criticisms and objections to what was being stated did not seem relevant and gradually faded away. Inside the auditorium, Karl-Erik established a new space for knowledge creation. He expressed his views in a calm and respectful manner, without any hint of academic snobbism or normative suggestion for individuals or society. Rather than arguing or convincing people, he invited them to reflect on, and succeeded in presenting a view that invited observers to relate to, the life of the aborigines. Thus, he created a space for knowledge sharing.

Karl-Erik discusses the concept of knowledge in one of his latest publications—Disabling the Context for Knowledge Work—The Role of Managers’ Behaviour (2007). Like many others, Sveiby has criticised the conceptualization of knowledge as an object. In his opinion, knowledge should be understood as ‘a capacity to act in a context’ (Sveiby, 1997). This implies that it is meaningless to make attempts to ‘manage’ knowledge per se (Sveiby, 2007). Instead, the managerial efforts should be directed towards the context where knowledge is created (Nonaka and Takeuchi, 1995) and shared and applied (Sveiby and Skuthorpe, 2006). Inspired by the Japanese philosopher Nishida’s concept of ba (Nonaka & Takeuchi, 1995), Karl-Erik suggests using the concept of collaborative climate as a mental space where knowledge sharing and creation takes place in an organisation (Sveiby & Simons, 2002). The collaborative climate comprising behaviour, attitude and atmosphere can be divided into three levels—individual, work group and organisation. A collaborative climate requires individuals to distinguish between task-oriented and context-building information and knowledge. While the former concept is primarily technical and is required to accomplish the tasks at hand, the latter is required for an individual to relate to the organisation beyond his/her immediate tasks. Task-oriented knowledge helps people to understand ‘how’ they can perform a task, and context-building knowledge helps them know ‘why’ work needs to be conducted. In other words, it is important for both managers and subordinates to have a common understanding of visions and strategies as a guiding context for agreements on objectives.

In his study, Karl-Erik performs a content analysis of 691 free-text comments on the climate for knowledge sharing provided by 8484 employees, primarily knowledge workers in 92 business units. He finds the following three main issues that prevent knowledge sharing: apathetic managers who do not actively encourage organisational information, hypocritical managers who do not walk the talk and lack of organisational context-building information and knowledge. In his opinion, it is important that management behaviour encourages creating space for knowledge sharing. Apathy is
disabling as it communicates an implicit value statement that issues are unimportant and not worthy of attention. Apathy disables the collaborative climate and thereby also the context for knowledge work. Karl-Erik concludes his paper by addressing managerial implications. Based on his study, he states the six most common instances of improper behaviour that should be avoided with respect to context building: ‘not walking the talk’, treating managers and staff differently, not actively encouraging knowledge sharing, being averse to risks, not listening to opposing opinions and not being willing to change.

In the book *Treading Lightly. The hidden wisdom of the worlds’ oldest people* (2006) Karl-Erik and Tex Skuthorpe write about how the Nhunggabarra people transmitted and shared knowledge. Knowledge is closely related to responsibility and it should never be used for individual benefit. Rather it should be shared for two reasons; to avoid other individuals to become dependent and to prevent from disappearing when someone died. Even if the situation with the universities is not as dramatic as with the aborigines the importance of transmitting and sharing knowledge by means of context building information is also a matter of a long-term survival for at least small and young universities. Karl-Erik’s statements (Sveiby, 2007; Sveiby and Skuthorpe, 2006) sharply contradict with the symbolic actions against a collaborative climate that the above two cases represent. Universities have plenty to learn from Karl-Erik as a person as well as from his research.

### 2.4. Universities, management control and conditions for a collaborative climate

Catasus and Kristensson Ugglä question whether we actually need universities when teaching, learning and even research is not exclusive to universities. On the other hand, Novotny et al (2001) state that there is a need for a new mode with respect to knowledge production at universities characterised by transdisciplinary and team-based systems, where knowledge is produced and validated through its practical use. However, according to Catasus and Kristensson Ugglä, following the view of Novotny et al would imply giving up and letting universities be ‘victims of society’ (Ibid, p 70). Instead, they argue that universities should be organised for accepting failures, supporting playfulness, initiating experiments, inviting locals to global discussions and ceaselessly discussing knowledge. To achieve this position, universities need to focus on both global participation and local excellence, refocus from being projectified and flexible to forming a culture of reflexivity that nurtures creative as well as critical thinking, reconsider the conflict between cross-disciplinary social science research problems and career paths that mainly follow disciplinary borders, focus more on vision and innovations instead of control and rules; and reinvent the university as a ‘mysterious’ place where reflection stimulates seriousness and playfulness alike (Ibid).

Catasus and Kristensson Ugglä do not make any more specific prescriptions. However, in my view, if the ideas from Catasus and Kristensson Ugglä should have any possibility to be achieved there is a great need to reinvent a stimulating ba and a collaborative climate at the same time as it is urgent to reconsider the manner in which the management control system works.
Over the last two decades, both practitioners and researchers (Johnson and Kaplan, 1987; Johnson, 1992) have criticised management accounting and control practices and their lack of relevance and usefulness. It has been proposed that the perceptions of the tools and techniques of management accounting and control have changed. Previously considered as instruments for supporting the top management in making complex organisational activities and transactions more intelligible to managers, the tools are now regarded as instruments for separating the top management from the organisation by way of being highly abstract (Johnson, 1992), short-sighted (Miller, 2003), money-oriented (Johnson and Kaplan, 1987) and simplified (Johnson, 1992).

Another important argument in the criticism concerns the different approach to organisational value creation, where industrial logic has been challenged (Normann and Ramirez, 1993). Industrial logic and the traditional tools of management accounting and control do not lend themselves to the visualisation of crucial value-creating aspects, including intangible resources such as knowledge and customer relations (Flamholtz, 1985; Sveiby and Lloyd, 1987). These intangible resources have been cited as the only truly sustainable competitive advantages for a single firm (Mouritsen et al, 2001; Guthrie et al, 2001).

Various types of organisations have realised that the traditional means of control, which often involved mutually isolated financial and non-financial measures, objectives and targets, can no longer be legitimised. These organisations recognise that not only the form of management control but also the target for management control needs to be changed. In many firms, new management control routines have evolved with a strong emphasis on intangibles (Johanson et al, 2001a; 2001b). These firms recognise that in the post-industrial era, or more commonly termed knowledge society, employees can no longer be regarded as objects. There is a need to address people’s motivation, competence, health and personal development needs (Johanson et al, 2007). Concepts like creativity, freedom and mastering your own work have become more common. Organisations cannot be managed by command any longer. There is a need for mutual attraction between the employer and employees (Mouritsen and Johanson, 2005). Management styles must be, and have been, changed; this will continue in the future, too. Consistent with this, accounting and management control systems are subject to change. The role of accounting and management control is no longer that of a detailed tool for the inspection of the degree of obedience. It is more a matter of (1) learning how different organisational actions can be coordinated and (2) encouraging people inside and outside the organisational entity to accomplish the organisation’s visions and strategies. Further, even the borders of the organisation change. It is sometimes extremely difficult to determine who is inside and outside these borders. This also affects the accounting and management control systems. For example, by trying to incorporate relational resources, contemporary management control systems include suppliers and consumers as well.

The changing conditions for management control are summarised by Johanson & Skoog (2007). They argue that traditional management control practises are focused excessively on tangible resources instead of intangibles, historical events instead of the future, financial figures instead of non-financial figures and texts, preciseness in measurements instead of understanding, orderliness instead of mobilising action and not accepting a constructivist approach. As opposed to earlier proposals of Anthony (1965),
Emmanuel et al (1990) and Simons (1995), who focus on the formal elements of management control, Johanson and Skoog (2007) hold that there is a need to broaden the definition of management control to comprise formal as well as informal elements and to cover the processes of understanding, communication and encouraging action, in accordance with the vision and strategies of the organisation. To facilitate learning and adapt action, constant follow-up is essential. Further, it is necessary to use indicators in figures or as narratives (Roslender et al, 2007) relevant to the task of supporting understanding, communication, action and follow-up.

2.5. Conclusion

When university borders blur and competition increases, universities have to be alert. There is considerable potential for improving management control in universities in order to realise the wishful thinking of a collaborative climate and a knowledge sharing organisation where playfulness, experiments, reflexivity and constant discussions on knowledge are held (Catasus and Kristensson Uggla, 2008).

Similar to leadership, the design of management control comprises values and norms. Although management control could encourage and mobilise individuals, it could also convey messages of apathy, disable a collaborative climate and hinder knowledge sharing and creation. The cases mentioned at the beginning of this paper are good examples of disabling the collaborative climate. Compared to what is being performed in some observant firms (Johanson and Skoog, 2007), the management control in universities normally represent the characteristics that were subject to criticism above.

Some universities, mainly in Austria, have attempted to develop new ways of dealing with management control by preparing intellectual capital reports. In Austria, it is mandatory to submit an intellectual capital report comprising the activities, social goals and self-imposed objectives and strategies of universities; their intellectual capital classified into human, structural and relationship capital; and the process set out in the performance agreement, including their outputs and impacts (Leitner, 2004). Altenburger et al (2005) argue that the Austrian governmental model is not capable enough to cover the diversity in especially big universities.

The impact of intellectual capital reporting on the management of the Austrian universities appears to be overestimated. Focusing on reporting is not sufficient. The focus should rather be on the development of new management control practises that are established for and encourage the evolution of a where knowledge sharing prospers. However, the management control practises have to comprise informal elements that encourage managers at different levels to walk the talk as well as contribute to the context-building communication (Sveiby, 2007). There is a need for a management practise that encourages the same respectfulness that Karl-Erik demonstrates in his work on the Nhunggabarra culture and the same audaciousness that he demonstrates when he tests his ideas in the market. There is a need for a collaborative climate that is free from apathy and filled with energy, curiosity and respectfulness. This brings us to the question of whether an open and respectful approach to a new type of management control practise can be a lever for improving the management of universities and
thereby reinvent the universities as a competitive knowledge creating place. I certainly hope so.

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3 THE HIDDEN WISDOM: A SUSTAINABILITY VISION OF KARL-ERIK SVEIBY

JAMES GUTHRIE & CHRISTINA BOEDKER

3.1. Introduction

Professor Karl-Erik Sveiby is known as a founding father of knowledge management and its related concept intellectual capital. A contemporary review of the literature and of Google scholar indicates that his many books and articles have had significant influence on contemporary thinking and practice.

Internationally, there is a growing concern about the social and environmental (SE) impact of organisational activities, including those of governments. As a consequence there has been an increase in reporting on social and environmental issues by major corporations (Gray, 2006). Recently, it has been observed that organisations have begun to use the term ‘sustainability’, rather than ‘social and environmental’ (Adams and Larrinaga-González, 2007). In line with this thinking, Karl-Erik has also contributed to discussions about sustainability. But his approach is unique. He uses his experiences and observations of the Australian aboriginal Nhunggabarra society, which has existed over thousands of years, to draw out valuable lessons for contemporary society. Karl-Erik spent nine years in Australia before moving back to Europe. He currently keeps in touch with Australia, as an Honorary Professor at Griffith Graduate School of Management, Brisbane, and at Macquarie Graduate School of Management, Sydney.

This focus on sustainability encompasses the idea that a better quality of life is related to an economic progress in which the natural environment and the development of social society are respected (NZBCSD, 2002). Sveiby believes this focus needs to be embraced by private and public organisations because they should act in the public interest, rather than in their own interests: ‘Acting in the public interest recognises the critical interrelationship among the natural, social and economic system’ (Dillard, 2007, p. 48).

Sveiby brings a unique mix of executive, consultancy, and scholarly skills and expertise to the table, having held positions respectively as a researcher, author, board member and consultant to knowledge organisations across the world. He started out as an auditor in 1972, followed by six years as a manager in Unilever. He then joined the Affärsvärlden Group as a partner and member of the management team, followed by executive positions, both managerial and editorial, serving also as the group’s Executive Chairman. It was during this time that Sveiby started his journey into intellectual capital with a mission to help Swedish managers unlearn what the American management gurus tried to teach them! During this time, he became the co-founder and editor of Sweden’s first management magazine, Ledarskap, and also Sweden’s first newsletter.
covering the consulting industries, Konsultvärlden. Upon selling Affärsvärlden Group, the company had grown to 160 people, a testimony to the success of the organisation and the intellectual capital agenda more broadly.

Sveiby later founded Sveiby Knowledge Associates (SKA). SKA helps corporations and other organisations to transform themselves from traditional industrial era organisations into businesses that create high value from their intangible assets. Ultimately, the SKA’s mission is “To make Organisations Better for People”, reflecting Sveiby’s strong concern for the wellbeing of the individual and desire to turn upside-down traditional American models of shareholder value. Among other things, the SKA teach clients to implement knowledge-based strategies and to use the SKA portfolio of tools and methods that support them in the process. The SKA tools have been taken up by a variety of organisations worldwide, ranging from Siemens and Microsoft to Nedcor South Africa, Queensland Rail in Australia and China Light and Power in Hong Kong.

Sveiby’s work has also influenced management thinking and practice around the world in more indirect ways and travelled through global networks, aided by academic friends and others. In Australia, his tripartite model of intellectual capital has, for example, inspired the work of the Society for Knowledge Economics. The SKE Guiding Principles (Boedker, 2005) outlines methods for identifying, measuring and reporting on knowledge intensive resources, using Sveiby’s triangular classification of intellectual capital. The Principles have been adopted by the Australasian Reporting Award Association, sponsored by CPA Australia, to create a new reporting category on knowledge capital. In 2007, seven Australian organisations submitted annual reports to the Knowledge Capital Reporting Award, a number which increased to nine in 2008. Interestingly, the entry organisations come from a variety of industries, ranging from banks (such as Westpac and National Australia Bank), resource and mining companies (such as BHP Billiton and Rio Tinto), to the public sector (such as Australian Rural Industries Research and Development and the New South Wales Department of Lands).

Sveiby’s work has also travelled to America, via the SKE submission to the US Enhanced Business Reporting Consortium (see, Boedker et al, 2008). In August 2007, the US Securities and Exchange Commission established the Advisory Committee on Improvements to Financial Reporting (Pozen Committee) to examine the US financial reporting system and to provide specific recommendations as to how unnecessary complexity in that system could be reduced and be made more useful to investors. The US Enhanced Business Reporting Consortium was invited to present to the Subcommittee on Information Delivery on February 15 2008, in Washington, DC. Specifically, the objective of this presentation was to discuss key performance indicators (KPIs) and enhanced business reporting (EBR) for publicly traded US corporations. The Australian Society for Knowledge Economics provided an international perspective on Enhanced Business Reporting. Inspired, in part by Sveiby’s work, a submission on measuring and reporting intellectual capital was prepared by the SKE to the EBRC in 2008 (see, Boedker et al, 2008).

While Sveiby’s work in the corporate sector has been innovative, it is his work on sustainability that is truly groundbreaking. For that reason this chapter focuses on the contribution of the research in Sveiby & Skuthorpe (2006) in the book, Treading
Lightly. The chapter has two main aims. First, to review and critique Sveiby’s recent work on sustainability matters. Second, to draw out some lessons for contemporary discussion about sustainability, extended performance reporting, and its intercession with intellectual capital.

Section two below provides background to Karl-Erik’s time in Australia. Section three reviews the content of his recent work on sustainability. Section four highlights contemporary trends in current extended performance reporting, whilst the final section provides a conclusion to the chapter.

3.2. Background to Karl-Erik’s time in Australia

“Australian Aboriginal society’s model for sustainability has the longest proven track record on earth” (Sveiby and Skuthorpe, 2006).

Karl-Erik’s journey of discovery on this topic started back in 1999 when he asked Tex, his later co-author: “What is the word for knowledge in your Aboriginal language?” “We don’t have a word for it,” Tex replied. Living in Australia and travelling the continent, Karl-Erik developed a connection with the blue skies, sandy beaches, the bush and the outback. Being immersed in the Australian society for nearly a decade meant that he could not ignore the issue of the importance of the Aboriginal society to Australia’s past; he saw a possibility in their society that could, at least in part, answer some of the questions about sustainability and the future of the planet that he had begun to explore.

There was, in particular, one issue that gradually took hold of Karl-Erik and which, in the end, became the topic of the book: Australian Aboriginal society’s model for sustainability has the longest proven track record on earth (Sveiby and Skuthorpe, 2006).

The main thesis of the book is that while societies outside Australia emerged, prospered and went under, Aboriginal society withstood and proved its sustainability over tens of thousands of years of dramatic events, until the Europeans’ arrival in 1788.

Karl-Erik believes that this is an extraordinary achievement, especially considering that this is something humanity is now struggling with: the way to build a truly sustainable society on this earth. He asks a number of questions including: How did the Aborigines do it? How did they organise for sustainability? What type of leadership did it require? They must have had a ‘recipe for success’. What was it? Could we reconstruct it?

The struggle he had was how to reconstruct something that was lost 200 years ago? As will be shown in the next section, he was able to do this by focusing on one source: the Nhunggabarra stories. Karl-Erik’s co-author, Tex Skuthorpe, provided in words and paintings what he had learnt from the elders of his people. Tex’s role was to learn, record and teach the traditional stories that contain the Nhunggabarra Law. Figure 1
shows a painting by Tex which is titled: *Vision for a sustainable planet: our actions on lands and rivers*.

**Vision for a sustainable planet**

![Painting](image)

The painting shows how our actions on the land and rivers are also felt in the ocean, where the river meets the sea. The painting features the sea turtle and the freshwater turtle. The oceanscape is contained within the freshwater turtle and the riverscape within the sea turtle, to show the connectedness and interdependence of everything.

*We do not know whether the Nhunggabarra built the first sustainable society, but we are reasonably sure they built the longest lasting society. It is now up to us to not let ours be the last.*

**Figure 1. Vision for a sustainable planet (Tex Skuthorpe)**

In the foreword to the book (Sveiby and Skuthorpe, 2006, p.xi), Karl-Erik expresses his indebtedness to the Nhunggabarra Ancestors, “who kept their wisdom alive for countless generations. Thank you for the Knowledge.”

### 3.3. Karl-Erik Sveiby’s sustainability vision

This section provides a brief overview of the content of Sveiby’s recent work on sustainability and several of the themes from Sveiby and Skuthorpe (2006). While societies outside Australia emerged, prospered and went under, Aboriginal society withstood and proved its sustainability over 40,000 – 60,000 years of dramatic events, until the Europeans’ arrival in 1788.

*Treading Lightly* examines how the Nhunggabarra people of Australia organised their society to survive for so long and is based on a selection of Nhunggabarra law stories as told by their custodian, Tex Skuthorpe. The content and interpretation of the stories
form the core of the data, and written sources, interviews and site visits complement the stories. Karl-Erik takes these stories and ideas and applies them to a modern day industrial world and the problems of sustainability.

The story told in the book is one where the Nhunggabarra society was in delicate equilibrium with checks and balances and reinforcing loops. Their economy was dominated by intangible production and consumption. The farming methods were built on intimate knowledge of the ecology of the land. Individual know-how was the decisive power factor; keeping a tight rein on men’s ego-drive spread leadership roles; building community also outside one’s own country kept peace and increased survival rates. Their spiritual belief was that ‘all are connected’, the core value ‘respect’ for all life, so care for the ecosystem was not only a matter of immediate survival, but also the purpose of humanity: to ‘keep all alive’.

There are two main strands to this work. First, the Principles for a Sustainable Society as derived from his observations about the Nhunggabarra society. Second, an attempt to build a National Sustainable Wealth model inspired by the Nhunggabarra.

**Lessons About Sustainability**

The Nhunggabarra, and most likely, other Australian Aboriginal societies, had achieved something the industrialised world is still struggling with: a sustainable society on earth. The Nhunggabarra law stories reveal a set of rules that – taken together and if people conformed – constitute a model for society in which we can distinguish economic, ecological, social and spiritual elements. The model provides a set of principles for sustainability, which can be used as starting point for a discussion about a model that fits our times.

A striking feature of the Nhunggabarra society is an economy dominated by intangible production and consumption. A predominantly intangible economy plus nomadic life ensured that the ecological pressure of the economy was kept low and Sveiby (2007) illustrates this in the following figure (see, Figure 2).
Aboriginal farming methods were designed with the purpose of keeping all alive, and were built on intimate knowledge of the ecology of the land. The methods were indistinguishable from nature itself (carefully managed fires to create grazing habitats, fish traps in all rivers, wild-life sanctuaries protected by law, etc). Consequently, the methods have been dismissed as ‘primitive’ both by arriving settlers and by scientists into our day.

*The Sustainable World Monitor*

Karl-Erik Sveiby (2006), in his essay on “Accounting for a Sustainable World: The Sustainable World Monitor”, uses his considerable knowledge about intangibles and adds to this his understanding of the Nhunggabarra to focus on an important issue. That is national sustainability in contemporary times. He constructs a Sustainable World Monitor, informed by his original Intangible Asset Monitor and inspired by the Nhunggabarra (see, Sveiby, 2006).

Karl-Erik indicates that the Nhunggabarra did not need measurement. The Western world, on the other hand, requires numbers for decision making and accountability. The trouble is that we measure more than we can, but not what matters.
Here follows an idea for a Sustainable World Monitor, inspired by the Nhunggabarra. He distinguishes four available resources: Human Capital (the people); Structural Capital (the physical and social infrastructure); Natural Capital (the ecosystem); and Financial Capital (that of companies and the public sector) (see, Figure 3).

**Figure 3: The Sustainable World Monitor**

Figure 3 shows that a country has four generic ways to generate wealth from this capital: by growing, by innovating, by utilising efficiently and finally, by increasing the stability (reduce risk). The four value generating modes come from traditional stock/flow analysis in accounting theory. The four resources are the stocks, and the flows between the stocks generate the four modes of value creation.

The indicators must as far as possible be standardised and comparable. Also, crucial is to report the flow, (i.e. the change between indicator levels). A common mistake is to measure only the stock. Flow is measured as the change between two observations in a stock.

The first version of a monitor for a sustainable society was created during a workshop in which Karl-Erik participated and which discussed what indicators New Zealand should
follow to become a sustainable knowledge society. The indicators that were established during that discussion are discussed in more detail below. They demonstrate the way in which Karl-Erik has been able to synthesise his experiences in the corporate and academic worlds, with a philosophical approach as seen in his work in *Treading Lightly*.

**Human Capital Indicators**

A simple indicator to measure growth in Human Capital is the growth in number of people, but more sophisticated indicators should capture the growth in competence level, for instance through the education level of the population. This indicator is comparable. An even better option is to use the regular international scoring of students that is made by, for instance, PISA.

Innovation can be tracked by patent applications. An interesting option is diversity as measured in terms of the standard deviation in the population’s origin. Diversity has been shown to be positively correlated with creativity. Literacy and internet connections are not innovation metrics as such, but they measure a population’s access to vital information.

Utilisation is best measured by the proportion of the population in the workforce. Unemployment is also an alternative. Both measure flows. Stability can be measured as the total crime rate, which is the risk perceived by the population. Emigration plus immigration levels indicate the turnover of the population. A high number suggests instability.

**Structural Capital Indicators**

Growth in physical infrastructure can be measured by increase in roads, rail and air routes. A combination index of teachers per pupil and doctors plus nurses per patient, give an impression of the functionality of the two most important social infrastructure: education and health. ICT infrastructure growth can be measured as total ICT traffic. A good indicator for growth in social capital is harder to define.

Innovation level in social infrastructure can be measured as proportion of accepted patents and the proportion of new songs and films produced in the country per 100,000 residents. Royalty and licence income per 100,000 residents is also an indicator of the level of innovation activity in structural capital. Utilisation of the physical infrastructure can be measured as internet traffic per 100,000 residents. An indicator of rail traffic in proportion of total traffic is also an option, since it shows a more ecologically acceptable alternative for transport. Number of cars per km of road is the non-ecological alternative.

Utilisation of the ICT infrastructure should ideally be measured as total ICT traffic / total theoretical capacity in the ICT networks, however, it is not an easy indicator to
measure. Utilisation of social capital would be an alternative, but it is even harder to define.

Stability and risk indicators in the physical infrastructure can be the proportion of total accidents per 100,000 residents. Traffic accidents (car, rail, air) in proportion of total traffic volume are also a good indicator of the health of the physical infrastructure.

Stability in the ICT infrastructure could be measured as downtime in terms of electricity blackouts, for instance # of households * blackout hours. An attitude index indicates whether the population is generally happy or not, a good stability indicator for social capital. Participation level in elections is also an alternative; however in some countries elections are mandatory.

**Natural Capital Indicators**

This is the most challenging area partly because it is where the Western world is deteriorating and partly because there is so much we should and could measure. One must not give in to the temptation to add lots of indicators. Two in each cell is a maximum, or else the overview is lost. Growth: how does one best measure growth in natural capital? One alternative is to measure how the areas of protected land in the form of national parks and similar are growing. Innovation can be measured in terms of how much energy is coming from alternative resources.

Under utilisation we would measure the impact our utilisation of natural capital has on the ecosystem in terms of a pollution index. Stability would ideally be measured in the stability of the total ecosystem. A new metric may have to be designed.

**Financial Capital Indicators**

There are two primary areas to cover: the business world and the state / public sector finances. There already exists a proliferation of economic indicators in this area. Innovation level in an economy is commonly measured as total R&D spending in percent of GDP, which however, is an input metric. It does not measure what we get from the resources. What we need is an indicator that measures the net innovation rate (i.e. after the negative effects, such as added/reduced pollution, and after indirect society effects). This is quite difficult to calculate on a national level, so an alternative might have to be found. Here we could also add an indicator that shows the birth rate of new companies.
Utilisation of financial capital is normally measured as return on capital. A proxy for the corporate sector as a whole could be the total profit generated by the companies listed on the stock exchange divided by market capitalisation. Utilisation of public sector capital is a much more difficult indicator to define. GDP per person is one of the most common metrics, but it is notorious for including as positive values anything that is produced in a nation (i.e. also production that compensates for non-sustainable practices such as pollution clean-up, car smash repairs and crime prevention). We would need to construct a net GDP/person, i.e. after such costs, which is not an impossible task.

This discussion of indicators provides an illustration of how Sveiby’s contemporary Sustainable World Monitor is drawing on his earlier work into knowledge management. Not only do we see that the framework he is using is based on over 20 years of research and experience, but also how he arrives at the indicators and measurement, around his theme of a nation’s sustainability. We can draw a line from his early work, starting at his original work with Swedish companies in 1980s, through his tripartite model of intellectual capital, including his work in Aboriginal Australia, to the culmination of a lifetime of academic enquiry and the Sustainable World Monitor.

3.4. Contemporary Trends and Linkages to Current Frameworks

As well as Sveiby’s Sustainable World Monitor, there are currently a plethora of alternatives for sustainability reporting, such as Intellectual Capital (IC), Global Reporting Initiative (GRI), Triple Bottom Line (TBL), Balanced Scorecard (BSC), and many others (see, for instance, ICAEW, 2003; Boedker et al, 2007; 2008, forthcoming; Ricceri, 2008; Ricceri and Guthrie, 2008). Several observations can be made about the contemporary intersect between sustainability and intellectual capital.

First, there is a significant literature on social, ethical and environmental management, accounting and reporting (Gray and Guthrie, 2007; Yongvanich and Guthrie, 2006; Gray, 2006; Frost, and Seamer, 2002) and also a growing concern about organisations’ sustainability accountability (United Nations, 2007, p.1). ‘Sustainable development can only become a reality if corporate responsibility becomes a mainstream concern for individual companies and the business community as a whole’ (United Nations, 2007, p. 1). Sustainable accountability has to be taken into account (GRI, 2005; Gore, 2006; Flannery, 2007) as traditional financial accounting and reporting frameworks do not provide an account of an organisation’s SE activities (Gray et al., 1993).

Second, many studies have identified disclosure practices internationally (e.g. Adams and McPhail, 2004, Gray, 2006). Whilst prior studies offer insights into the nature and extent of corporate and public sector voluntary disclosure, prior research into SE reporting has mostly explored disclosures by organisations and there has been relatively little research into world or national level monitoring of these matters.

Clearly the contemporary work of Karl-Erik can make a substantial contribution to these areas. Current models differ significantly from his Sustainable World Monitor. What do we learn from his model that is not featured in contemporary thinking? He incorporates areas not previously considered, for instance, protected land per person and natural
capital. He also considers sources of intangible innovations (see Sveiby and Skuthorpe, 2006 p. 142) to indicate how spiritual and intangible innovations can drive transformation.

3.5. Conclusion

Karl-Erik states that it is an extraordinary achievement that the Nhunggabarra stories and the Australian Aboriginal society’s model for sustainability has the longest proven track record on earth, especially considering that this is something humanity is now struggling with: the way to build a truly sustainable society on this earth. Karl-Erik explores this in-depth by asking: How did the Aborigines do it? How did they organise for sustainability? What type of leadership did it require? What was their ‘recipe for success’? Can we reconstruct it?

We can draw many lessons into our contemporary lives and ‘ways of living’ from the Nhunggabarra people, most notably, their care for the ecosystem and core value and belief in ‘respect’ for all life.

References


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4 INTELLECTUAL CAPITAL AND THE PRODUCTION OF ORGANISATIONAL KNOWLEDGE: THE ANTECEDENTS TO CORPORATE CAPABILITIES AND COMPETENCIES

JAN MOURITSEN

4.1. Introduction

The advances allowed by ideas of knowledge, capabilities and competencies in the area of strategic management are tremendous theoretically and practically. Seeing the firm as a bundle of resources, Barney (1986, 1991) says that companies that are able to accumulate valuable, rare, non-inimitable and non-substitutable resources will outperform others (Barney, 1986, 1991; Teece et al., 1997; Grant, 1991 and many others). This is true – perhaps even a truism and a definition – but it can be criticised for its company-level approach which to a certain extent makes the activities involved in producing such competitiveness a black box. Knowledge, capabilities and competencies appear to be in place at the end of the process of acquiring them. There is little analysis of the process that gave rise to them – the process of managing them before they have been pointed out to be competencies, capabilities and knowledge.

What, then, can be the antecedents to capabilities and competencies, given that these cannot be know before they are in place? In a sense, these antecedents require attention to the process or sequence of activities that bring the competencies and capabilities about. And in a sense, resource-based theories have been more concerned with developing classifications of what exists at the end of their production rather than to the process that produces these classifications. The strength of a resource-based theory lies in its recognition that history matters as competencies are built over time. Yet less concern has been invested in describing and theorising how competencies emerge in actual situations, where those charged with a developing strategy are in the process of doing this. In short, resource-based theory has developed a credible proposition on the nature of the firm but a less credible theory of how the firm becomes resource based and, thus, how managers sort out what their resources are or should be ex ante.

One way to approach this concern is to look at cases where somehow knowledge and capabilities have been ‘at stake’: to analyse what happens when knowledge, competencies and capabilities are thrown up to be of managerial interest. They do this in many situations, but perhaps a particularly important one is when managers debate how they can make sense of their stock of knowledge and its effects; and how they can intervene to change the value of knowledge (Sveiby, 1997). In some firms, to develop a managerial tool to manage knowledge, such as an intellectual capital statement will be an occasion where such an agenda is in place. This is a situation where managers have to sort out how much knowledge the firm has; how they invest in knowledge; and what its
effects are. This may be no grand strategic situation; it is actually quite a mundane situation where taking stock on knowledge can appear to be a clerical task. However, studying such processes it quickly becomes interesting to see that this task is rarely one of mere description and representation. It typically involves a series of displacements where one version of knowledge is translated into another one, and the search for a description of knowledge soon becomes very cumbersome. This is because the notion of knowledge itself is highly ambiguous. It does not have only one referent: it is not possible to be merely knowledgeable, one has to be knowledgeable about something. This ties knowledge together with the object it attempts to control – knowledge is related to the possibilities of intervening into corporate affairs and developing strategy; possibly to transform the strategic course of the firm.

Looking at knowledge as a practical affair allows us to think about micro-macro relations in a new way because it is possible to dissolve it completely. Practices are neither micro nor macro (Czarniewska, 2004). They are actions related to other actions, and the sense of their comprehensiveness is the length of relations they are part of. Taken as a starting point that there is practice – that there are actions – then the analytical problem is to figure out how such actions are related and how they build up to what corporate competencies and capabilities are. In a sense the sequence of practices build corporate competencies. This is why studying the sequences in which knowledge is (a) found in firms and (b) transformed into relevant actions can be a way to identify what competencies comprise. This is a historical study; it takes decision-makers seriously; it does not, though, a priori exclude certain types of decision makers and priorities of only top management; it is concerned with the tedious task of finding the emergence of strategy through work of people who are engaged in this activity. This will allow competency to be an empirically founded concept rather than an ‘afterthought’ when the process is finished.

This paper undertakes to analyse an example of how a firm deals with its competencies. Studying the case of COWI’s development and use of a tool to report and manage knowledge – its intellectual capital statement – the paper seeks to find practices that describe and develop the firm’s competencies. It does not claim to uncover all the activities that make up the firm’s competencies (which probably cannot be done) but it illustrates how firms struggle to find and develop their competencies.

In order to do this, the paper draws on social theories that are designed to overcome the micro-macro dualism. When Czarniawska (2004) pays attention to action nets, her analytical tool is to look for action first, and then see how this is connected to actors, calculations, interests and strategies by taking seriously that action has to be connected with competencies, capabilities, strategies etc. but by finding them in their concreteness while they are on-going rather than after the fact when they are clear but also stand out as rationalisations of the past.

The aim of this paper is modest here: it shows how resource strategies are being made but not through the ingenious invention of new paths of the future. Rather it shows that they can be understood as the effect of the work to discover what relevant knowledge and resources are while there is uncertainty about what they should be. Therefore, choosing to look at how competencies, capabilities and resources are made sense of during a process of making them manageable by representing them in management tools
such as an intellectual capital statement, this paper, in effect, looks at how firms make resources manageable so that they become strategic competencies.

### 4.2. The case of COWI

COWI is a Northern European consulting group that provides services within the fields of engineering, environmental science and economics. COWI has about 3400 employees of whom approximately 2100 are graduate engineers, planners, sociologists, biologists, doctors, agronomists, economists and other university graduates.

**Knowledge management practices**

COWI is a knowledge- and people-intensive consulting firm. The firm integrates various types of expertise, symbolised by a diversity of employees towards clients’ needs. Management has adopted the official policy depicted in Figure 1. Here we see a precise idea of what knowledge management concerns. As the *first principle* COWI heralds the primacy of employees. It is suggested that development goes through employees who therefore have to be motivated and engaged. This would be a challenge to the pre-knowledge-society-organisation with its focus on stabilising knowledge since it favours an organisational space constituted by a more networked organisation, where dialogue and collaboration are central. This is why the managers are put under scrutiny to conduct a particular type of work, and the manager – not primarily the employee – is called to accountability.

The manager has to sustain a development focus through particular kinds of investments whose objectives are to communicate values, to secure sharing of knowledge, to make relevant information available, to ensure that corporate development and personal development are conducted simultaneously. Such ambitions put the employee at the heart of corporate strategy and suggest that employees constitute the only ‘raw materials’ from which the firm can grow and prosper. This is in line with the idea of the ‘knowledge-creating company’ (Nonaka, 1999, Sveiby, 1997).

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**Sharper Focus on People**

We regard knowledge management as the latest challenge to management. It is a concept that brings important changes to the traditional industrial and system-oriented management philosophy—changes that put a much sharper focus on people and their living and working conditions, their well-being and job satisfaction and their potential for development. It is a concept that applies to client, employee or any other interested party.

This shift in focus is, quite simply, essential if the dialogue with our clients is to function at its best and if we are to continue to give the best possible consultancy service. For us as consultants, knowledge lies at the very heart of the services we...
provide and is therefore our most important raw material. Ensuring our knowledge resources are developed optimally, therefore, is of particular importance.

Dynamic interplay with the world
Knowledge is best developed by being applied and shared in a dynamic interplay with the world about us. So human relations and dialogue must be strengthened, first and foremost to create the greatest possible value for our clients.

But knowledge can only be disseminated through the staff. It is the individual employee who possesses that knowledge and experience which, taken together, represents our very reason for being. The introduction of knowledge management is an important step in our efforts to create the best possible framework for staff development and working life, at the same time as securing the platform for the Group’s continued growth.

We monitor our performance
To make sure we are achieving the goals we set ourselves, we monitor our performance and development continuously in selected areas. To this end, every year we publish what is in effect a set of knowledge accounts as part of the Annual Report. The knowledge account - known as the Intellectual Capital Report - should be regarded as just one component of knowledge management, an important focal point.

Together with COWI’s fundamental corporate management principles, it will ensure our continued growth through the best possible consultancy to the client.

Management principles in COWI
1. The manager must communicate the values, norms and attitudes of the company in word and in action.

2. The manager must ensure that relevant knowledge is communicated and must ensure that knowledge is developed and shared at the individual as well as the organisational level.

3. The manager must communicate relevant information downwards and upwards in the organisation.

4. The manager must ensure that the necessary resources are available so that the employees can achieve the company’s goals and at the same time develop personally and professionally.

5. Through long-term development of the employees and the organisation, the manager must ensure that the organisation achieves results in the long run as well.

6. The manager must ensure that we do the right things, and that we do them right in relation to the needs of external and internal clients.

7. Both in action and in his part of the organisation the manager must ensure that there is consistency between words and action.
8. Management requires presence. The manager must establish dialogue with his employees and transparency with regard to his actions.

9. The manager must be active in his efforts to facilitate and support cross-organisational co-operation, which is beneficial to the company’s overall goals and interests.

**Figure 1: Principles of Knowledge Management according to COWI**

As a **second principle**, managers have to include employees outside the organisation not only to make them part of the organisation but also to relate them to the clients. Employees must experience clients’ needs and must be encouraged and supported in inter-unit co-operation. Therefore the notion of hierarchy is weak, and the manager has to be able to act on corporate rather than sectional goals and ambitions. The knowledge-based firm is in this exposition also an entity where different kinds of alignments have to be performed simultaneously for corporate and individual development to be integrated. This integration stems from the two main integrative mechanisms; the focus on client’s needs and the capitalisation of insight from the whole space of the firm and beyond.

However, these two principles of knowledge management are opposing. The first principle directs attention inwards in the organisation, as knowledge is located in the employee. It is the supposition that knowledge is in the ‘heads of people’ and therefore, the crucial management problem is to motivate people to use it properly. The implication is that the central knowledge management task becomes education; and that people are to be managed, because they must be aligned with corporate development. Incentives to create knowledge sharing are therefore important concerns of managers.

The other principle implies that knowledge is oriented outside the person and to some degree also outside the organisation. First of all, not all knowledge attracts the same kind of attention when an external element is added in the form of a client. The introduction of a client differentiates between relevant and non-relevant knowledge. While knowledge according to the first principle is in the person and has to pass a logic or objective criterion like ‘truth’, the second criterion suggests that it also has to ‘perform’ what is to make sense in the eyes of others. This kind of knowledge is not only personal, but also related to others’ ambitions about what knowledge can or should be able to accomplish. Secondly, the firm can possess relevant knowledge even if it is not related to individual persons. Knowledge can be found e.g. in organisational units and since clients would probably often want the firm to mobilise knowledge from different departments, suddenly the organisational mechanisms of integration of knowledge become knowledge producers themselves. This principle indicates that integration mechanisms also perform knowledge, and in particular they create new knowledge by combining and recycling existing knowledge. Managers’ concerns are here to relate items of knowledge to each other (see also Teece et al, 1997).

The complexities involved by the second principle should not be underestimated because other containers of knowledge than people are identified. Relationships
between employees and clients produce insights, relationships between employees across the firm create new knowledge and indeed, relationships between various kinds of internal employees and clients give rise to yet new knowledge.

A new layer or dimension of creativity in a professional service firm is introduced here. Individual knowledge should not develop in any direction of professional knowledge. The individual also has to know about clients and organisational arrangements that allow knowledge development and sharing to go on. This includes not least insight into corporate ambitions about her or his affairs and therefore also about the relationships between individual and corporate development (see also Sveiby, 1997).

The lingering question is then how all this is integrated? COWI’s guiding principles of knowledge management are clear about this: through dialogue. The organisational culture brings coherence and direction to the dialogue. The organisation becomes a place where people can experience each other, interact and, importantly, act in situations of co-presence. Collective learning becomes an effect of learning opportunities pursued by individuals – employees and clients – engaged in learning opportunities made possible by the common understanding of the ‘rules of the game’ being established by a community of people. So is the ambition implied at least by the management principles. However, the whole construct is founded on a fragile form of knowledge management, because learning will exist only when a breach of community ambitions has been made – that is when people experience a mismatch between what they do and what they are compelled to do by the situation they are in. Learning is developed locally and compared with cultural ideas of ambition and direction. This notion of knowledge management is what COWI somehow reacts against through its intellectual capital ambition.

**Intellectual capital and inscription of competencies**

While knowledge management practice is concerned with a mechanics that holds a community of inquirers together, intellectual capital adds a new dimension by creating a managerial agenda on the basis of the knowledge resources. Thus, intellectual capital implies new types of questions that are not primarily related to the sharing of knowledge among people. Rather, it asks questions about economising (i.e. how much to invest in knowledge development and sharing), organising (i.e. questions about where knowledge is to be located), and modularisation (what knowledge to be re-used). When these questions are raised within the framework of an intellectual capital statement they become managerially oriented questions.

Whereas knowledge management asks about the relevance from the perspective of a culture – the certainty of persuasions and prejudices of a community – the intellectual capital statement asks about relevance from the perspective of ‘reflexivity’ – the uncertainty about the adequacy of performance. Reflexivity is a different mode of inquiry than what follows from the mere sensing of a ‘disorder’ in the community. Reflexivity characterises and asks questions about status quo, often with a view to its (possible) transformation. It is characteristic that ‘the reflexivity of modern social life [is] that social practices are constantly examined and reformed in the light of incoming information about those very practices, thus constitutively altering their character’
(Giddens, 1990). Consequently, in modern life information about it is used to alter it. It transforms practices.

The intellectual capital statement is a management technology aimed at allowing such a reflexivity to occur. It does so by constructing a non-community – a non-conventional – image of the firm. One that alienates the firm and presents it in a form that is outside the conventions of corporate culture. Therefore it illuminates concerns about knowledge not in terms of their fit with an organisational culture or community, but with managerial questions based on insights that are partially decontextualised or at least taken away from the cloud of groupthink that community is likely to produce (Mouritsen & Flagstad, 2004).
<table>
<thead>
<tr>
<th>Resource</th>
<th>Budget</th>
<th>Accounts</th>
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<tbody>
<tr>
<td>1 Public clients</td>
<td>45%</td>
<td>46%</td>
</tr>
<tr>
<td>2 Semi-public clients</td>
<td>14%</td>
<td>15%</td>
</tr>
<tr>
<td>3 Private clients</td>
<td>↑ 31%</td>
<td>27%</td>
</tr>
<tr>
<td>4 Other clients</td>
<td>10%</td>
<td>11%</td>
</tr>
<tr>
<td>5 Number of clients</td>
<td>1,622</td>
<td>1,438</td>
</tr>
<tr>
<td>6 Projects abroad</td>
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<td>23%</td>
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<tr>
<td>7 Clients abroad</td>
<td>15%</td>
<td>16%</td>
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<tbody>
<tr>
<td>10 Lectures/100 employees, number(*)</td>
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<td>16%</td>
</tr>
<tr>
<td>11 Professional publications/100 employees, number(*)</td>
<td>55%</td>
<td>51%</td>
</tr>
<tr>
<td>12 Client inflow</td>
<td>32%</td>
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<tr>
<td>13 Client outflow</td>
<td>↓ 19%</td>
<td>19%</td>
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<tr>
<th>Resource</th>
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<tbody>
<tr>
<td>14 Number of employees</td>
<td>1,972</td>
<td>1,643</td>
</tr>
<tr>
<td>15 Average age</td>
<td>43.6</td>
<td>42.5</td>
</tr>
<tr>
<td>16 Length of education, year</td>
<td>6.4</td>
<td>6.6</td>
</tr>
<tr>
<td>17 Length of education, written down, year</td>
<td>4.3</td>
<td>4.5</td>
</tr>
<tr>
<td>18 Employees with highest education (PhD, etc.)</td>
<td>4.1%</td>
<td>4.7%</td>
</tr>
<tr>
<td>19 Higher education; technical</td>
<td>52%</td>
<td>53%</td>
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<tr>
<td>20 Higher education; natural sciences</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>21 Higher education; social sciences</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>22 Work experience, year</td>
<td>15.4</td>
<td>16.1</td>
</tr>
<tr>
<td>23 Seniority in COWI, year</td>
<td>9.7</td>
<td>9.7</td>
</tr>
<tr>
<td>24 Project management capacity, all projects</td>
<td>98%</td>
<td>81%</td>
</tr>
<tr>
<td>25 Project management capacity, major projects</td>
<td>35%</td>
<td>37%</td>
</tr>
<tr>
<td>26 Project management capacity, international projects</td>
<td>24%</td>
<td>28%</td>
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<tr>
<th>Resource</th>
<th>Budget</th>
<th>Accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 QA audits completed/100 employees, No(*)</td>
<td>↑ 2.3</td>
<td>5.7</td>
</tr>
<tr>
<td>28 Costs attributable to external faults(*)</td>
<td>0.4%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

**Figure 2:** COWI’s intellectual capital statement – a managerial technology for managing knowledge resources
Following this trail, it is noticed that COWI also, as explained in Figure 1, undertakes to monitor its performance as part of its knowledge management activities because this creates reflexivity. The monitoring system regarding intellectual capital is part of the organisational routines used for internal management purposes but parts of it is as shown in Figure 2 also communicated externally as part of the annual report.

The intellectual capital statement makes a completely new expression out of knowledge management. *Firstly*, it defines a framework of interest, which is larger than the one stipulated in the policies of knowledge management shown in Figure 1. A series of new objects have been added and in addition to the person – employees – two other types of resources or knowledge containers have been added, namely customer relations and organisational processes. Figure 1 actually does mention them, but their role in the overall knowledge management framework is much more substantial in Figure 2.

What happens here is that knowledge is translated into knowledge resources, which are objects, or in our terminology containers of knowledge. These containers not only enable the circulation of knowledge but they are also objects that can be acted upon managerially. Suddenly, we see that knowledge is transformed from something in the heads of people to various types of bodies or containers. The framework introduced with the intellectual capital statement also identifies three managerial problematisations. It distinguishes between resources, processes and results. In general management language, it is concerned with the constitution of the portfolio of knowledge resources (just like the financial balance sheet is interested in the constellation of assets and liabilities), the investments in process-improvement (just like the financial statement talks about investments) and in the outcomes (just like the financial statement pinpoints financial effects). The intellectual capital statement thus superimposes a set of general management questions.

*Secondly*, the intellectual capital statement spans a grid that allows numbers to be inserted. For each knowledge resource, numbers are added about the three managerial concerns, and suddenly what we get is a series of numbers that can be read over time and thus as an indication of the direction and magnitude of development. It can allow a general reading of what is going on, and we can add a decontextual, i.e. from outside the community or the culture, understanding of the state of affairs.

Looking at the indicators the firm appears stable. The structure of client relationships is stable, the structure of the employee resources is stable, but in the organisation we see that the intranet encompasses more and more best practices. The portfolio shows a concern to stabilise knowledge as best practices. Looking at the investments in processes, we see some more uncertainty in the client portfolio, as there seems to be an in- and outflow of clients. Further, the low level of intrafirm processes is somewhat surprising when considering the ambition of the firm stated in Figure 1.

*Thirdly*, even though the numbers indicate a stable firm, management has also installed a problematisation of the stability using arrows to indicate where changes are sought; more international clients and more clients in the private sector, more engagement in networks outside the firm, more attention to the intranet and more media attention. Obviously these are not conventional knowledge management, but via the intellectual capital statement a new possibility of knowledge management emerges. The statement
problematises the otherwise narrow focus of knowledge management and offers an alternative, namely that the client and the network are not outside knowledge management but indeed its central parts.

The three observations discussed above enables a characterisation of how intellectual capital might work. By inscribing knowledge resources and making them amenable to analysis through numbering knowledge is taken out of the context. Thus, knowledge is in the statement presented in a way which allows another interpretation of what happens in terms of knowledge, and also what should happen in this area. Therefore the intellectual capital statement also implies a normative proposition; it is a pondering on how the firm develops the containers in which insight, information and knowledge are found, shared, changed criticised and integrated.

The numbers only allow a decontextualised and very general interpretation of the firm – just like the annual financial statement is a one-sided and preliminary presentation of the firm’s economic value. This is why the intellectual capital statement is also interpreted and managed in the firm to undertake exactly that, and let us see what they do:

1. They are connecting the language of knowledge with the language of growth and profitability. For example, problematising the project management capacity it is suggested that ‘we will concentrate project management on relatively fewer key employees and thus optimise the use of project management experience’. The use of the capability ‘project management expertise’ is to be optimised.

2. They are presenting the composition of capabilities and knowledge resources as conducive to the changes in the market place: ‘our strategy is focused on international activities … [executed by] project management capacity on international assignments’

3. New portfolio of potential employees is reflected as ‘the survey of engineering students’ preferred places of work ranks COWI in second place’, and suddenly the individual employee is transformable from a concrete individual to an element in the labour market. The person becomes a type and the individual competency development can also be transformed into a portfolio decision.

These suggestions are of course subject to interpretation. Taking just some of the numbers and making an issue out of them we see how knowledge can be debated and thus managed without the individual person being brought into the arena. In a sense a displacement has taken place, where individuals’ characteristics have been transformed into appendices to a broader concern for the corporate agenda.

The more knowledge is made manageable, the less significant becomes the person and the aspiration to allow him or her to develop alongside corporate strategy. The person suits into the framework, it increasingly appears if he or she can understand the client and align his or her aspirations with those of the client. And the person is well-functioning if he or she can operate the best practices and become part of the
organisational capital, just like it is a particular category of people that will be equipped with the status to become project managers. Project managers – not individuals – constitute the particular kind of capability that is able to form a network around the client, the organisation and its employees. Thus, knowledge management is taken out of the context of the individual. In the end, the individual is only important for those aspects that make sense for the networks between people and, indeed, IT system and collaborative arrangements in and outside the firm (Mouritsen & Larsen, 2005).

We see here a new form of reflexivity in relation to knowledge. The firm has to be not only capable but capable to do something (cf. Mouritsen et al. 2001). This something must be strategic because it concerns what the firm is able to achieve with the competencies that it puts in place. This strategy is e.g. a narrative about how knowledge functions in the firm, what its objectives and objects are, and what kinds of efforts, i.e. concrete knowledge management mechanisms, have to be put in place. This is the way the intellectual capital statement can help to survey not only what knowledge is, but also how it develops. Concerns can be raised as to the most interesting constellation of knowledge resources and their connections. This is at least what the intellectual capital statement ‘promises’.

Looking at COWI’s intellectual capital statement and presenting the narrative according to the principles introduced in the Danish guideline for intellectual capital statements (Mouritsen et al. 2003), the relationships shown in Figure 3 can be suggested.
<table>
<thead>
<tr>
<th>Knowledge narrative elements</th>
<th>Management challenges</th>
<th>Actions</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| **Use value**               | Supply complete solutions in close cooperation with the customer | • Develop international og private markets | • Customer profile  
• Proportion of international customers  
• Proportion of international projects |
| **Product or service**      | Enhance our image with customers | • Well-organised project processes | • Number of speeches, articles and publications  
• Customer satisfaction |
| **Knowledge resources**     | Improve project processes | • Increase cooperation among group companies | • Interdisciplinary cooperation  
• Cross-organisational cooperation  
• Intra-group trading (expatriation, trade) |
|                            | Improve development processes | • Control quality at all organisational levels | • Internal and external quality audits: number and reprimands  
• Number of errors and expenses |
|                            | Optmise management systems | • Right mix of competencies and skills | • Number of internal and external professional networks  
• Number of best practice cases  
• Number with educational profile and length of education  
• Number with length of ancientitet service |
|                            | Visualise internal and external knowledge | • Visualise internal and external knowledge | • Number of errors and expenses |

**Figure 3. The constellation of intellectual capital in COWI**

The presentation in Figure 3 links the arguments presented above. It is proposed that knowledge management activities concern the list of actions, the mechanics of knowledge sharing etc. As a technology of managing, however, the presentation in Figure 3 explains the logic of knowledge and creates both a strategy for what knowledge is to accomplish, and how the knowledge narrative as well as a set of durable management challenges unfolds. Together these elements outline COWI's
business model of knowledge, a set of knowledge management efforts, and a set of associated indicators that distances focus from the affairs of knowledge sharing (as a community) so that reflexivity can be promoted. This is obviously a radical form of management or interpretation of management’s role. It is concerned more with the logic of the ‘production function’ of knowledge, i.e. the production of value from knowledge, than with the community of knowledge, which is prevalent in knowledge management. Figure 3 illustrates a translation of the intellectual capital statement. It creates a representation, which interacts with the reader’s logic: Is this really a well-functioning firm, a successful firm, or is it a sustainable firm?

The next question is how the analysis of the indicators presented in Figure 3 may help to assess this question? Here COWI presents the purpose of intellectual capital as the development of an appreciation of the user’s value of the service through a particular offering that requires certain knowledge resources. The presentation in Figure 3 explains how the translation between this ambition and certain activities take place. The ambition to create ‘interdisciplinary solutions’ translates into ‘cooperation with customer’, ‘project management’ and ‘knowledge sharing’. These again translate into various actions e.g. ranging from ‘develop markets’, ‘increase cooperation between groups’ and ‘control quality’. This is then visualized by a series of indicators to support this including ‘customer profile’, ‘level of interdisciplinary cooperation’ and ‘quality audits’. The translations show how this idea of ‘interdisciplinary solutions’ get actualized, and the various elements help to refine and redefine each other. Now we know how ‘interdisciplinary solutions’ relate to ‘quality audits’ and in turn to quality management more generally, at least as proposed by COWI.

If this analysis comes just somewhat close to an understanding of knowledge management in COWI, then its surprising that it is absolutely possible to talk about knowledge management without using the word ‘employee’ or ‘person’. The person simply does not have the same privileged place in intellectual capital as in knowledge management.

4.3. Making Competencies and Resources Visible and Manageable

The case of COWI tells us that firms struggle to put their competencies in place. Firms do not just have competencies. They have to be made visible and manageable, they have to be enacted, they are in process by being moved and attached to new ends all the time. Competence may be an effect of history but is not a resource that has durability beyond its mobilisation in practical situations. Therefore, when a competency-based theory suggests that firms thrive on stability of their competencies as unique and hard to copy by others, a caveat is necessary, namely that firms do not readily know what their competencies are, how they are productive and whether they are durable. It is part of the challenge to find this out by continuous attention to the frailty of competencies not only whether they are in place in the firm but more importantly whether they could contribute more than they do. While a resource-based theory suggests competencies to
be a stable position form which to generate rents, the perspective of intellectual capital suggests that resources continually constitute a problem since performance could have been better.

The case of COWI illustrates that firms struggle with knowledge management activities which are never competencies themselves but containers of elements that can be termed knowledge. These containers – such as the person – are a resource exactly because access to knowledge in the specific is largely impossible. This is generalisable. Firms do not know exactly what various containers of knowledge actually do or, even more difficultly, what they can do. This is the problem with competencies as generally defined in the literature – it may sum up certain traits that have been made visible throughout history and given a storyline but it rarely is able to explain and predict the range of activities that it summarises. The notion of competency summarises but it does not delegate.

Competencies is therefore an output; effects of something else. In the case of COWI this is the effect of the constellation of knowledge resources which make the firm to more than a sum of people. When the firm’s organisational knowledge is more than the sum of its people a new complexity is added namely the question what it is that is intertwined with people and how this intertwinement happens? This is where intellectual capital has a role to play. Intellectual capital is not a set of knowledge resources. Intellectual capital is separated from knowledge but inscribes knowledge resources. It makes knowledge resources visible. Just like the financial accounting statement is not the same as the economy of the firm but acts as an input to discussing what the economy can or will be, the intellectual capital statement is not the same as the firm’s organisational knowledge. But it makes this knowledge visible in a particular way and allows it to be contemplated in the firm with a view to transformation and development. The knowledge produced by intellectual capital statements is knowledge about knowledge. This knowledge is part of the development of the constellation of knowledge resources that makes up the firm’s competencies.

From the case of COWI it appears that much of what conventionally may be thought to be competences concerns the ability of the firm to do something such as produce a certain range of consulting services. In other words, COWI is capable of delivering consulting services. However, until the analysis of intellectual capital is performed it is not possible to say distinctly what this competency is comprised of. It may be a surprise that the project management system is so important. It may be a surprise that the management of employees is not so critical. It may also be a surprise that competencies are not described in large bullet points but in a narrative of achievement so that it is always connected to some beneficiary. The point is that to understand competencies they have to be described in action. They are never interesting only as an accomplishment. They are in process of being bent towards something new and therefore, even if they may be stable as a summary of sorts, they are in process when they are important. And when they are in process they are not grand competencies but mundane questions about the size, investments in and effects of knowledge resources.

Resources and competencies, of which Barney (1991, 1995) talks, are thus not stabilised routines that have their own momentum. The case of COWI suggests that momentum is an ex post rationalisation of history but no investigation of that present which form and
exploit not only knowledge resources themselves but also their interrelationships. This is important because firms’ resources and competencies are thus not factors in the design of the futures of firms. They are summaries of a past performance neatly packaged in pure language but completely lacking attention to the actual future which is in construction in the present, namely the future that requires tedious and laborious work to re-install relations between new knowledge resources. Such work, formed under the auspices of intellectual capital, is always both destructive and constructive because relations between knowledge resources are challenged with the question;”Can the results not be better?”

Bibliography


5 THE VERY HUMAN DYNAMICS OF KNOWLEDGE AND VALUE CONVERSION

VERNA ALLEE

5.1. Introduction

It has been twenty years since Karl-Erik Sveiby first proposed that the invisible assets on the balance sheet need to be managed just as carefully as financial or tangible assets. Three basic categories of invisible assets: employee competence, internal structure and external structure first suggested by Sveiby have endured as a standard way of organizing intangible assets (Sveiby 1988). Although many similar classification schemes have been suggested in the last two decades, the basic premise has held up through research and practice: organizational interventions must be understood in terms of both tangible and intangible impact (Sveiby, 1997; Edvinsson & Malone, 1997; Roos, Roos, Dragonetti, and Edvinsson, 1997 Wallman & Blair, 2000; Lev, 2001; Eccles et al., 2001, Andriessen 2004).

An even more important contribution in Sveiby’s work, however is his understanding of the dynamics of value creation. In the opening chapter of the often cited book, The New Organizational Wealth, Sveiby states clearly that “people are the only true agents in business. All assets and structures – whether tangible or intangible – are the result of human actions” (Sveiby 1997). This is an important premise that is not well addressed in most discussions of intangibles. At first glance it appears to be a blinding flash of the obvious, but it calls into question not only traditional assumptions about value creation but even some of the assumptions that are pervasive in the field of intangibles.

This paper explores the implications of Sveiby’s thinking for understanding knowledge conversion, value conversion and value networks. Sveiby’s insights about people and their interactions provide a foundation for a dynamic understanding of value conversion that puts people at the very heart of value creation. This is a considerable leap forward from traditional business “value management” with its familiar mantra of “people, processes, technology.” In a more human, knowledge-centered theory of value processes are not so much sequences of events but rather sequences of interactions. Technologies do not create value but are simply enablers for people to convert knowledge and other assets.

5.2. The Valuation Problem

Much of the work done around intangible assets has been focused on trying to put a valuation on intangibles, sparked largely by Sveiby’s observation that there can be a huge gap between book value and market value. This has historically has been referred
to as “goodwill” but with potentially millions of dollars in value at stake a knowledge-based enterprise needs to develop more deliberate ways of managing this intangible value. However, focusing only on financial valuation of static assets, tangible or intangible, ignores the simple principle that value is an emergent property of social systems.

Sveiby acknowledges that the value of intangibles only emerges in an indirect way on the stock market or when a company changes hands. He often cautions about trying to take the valuation question too far. The slippery slope of valuation became only too apparent in 2001 during the financial scandal of Enron and its accounting firm Arthur Andersen. These companies disappeared virtually overnight due to loss of an intangible asset – reputation. As the scandal was revealed Enron shares dropped from over US $90 to less than $.50. The Enron and Arthur Andersen collapse also contributed to the creation of the US Sarbanes-Oxley Act, which was signed into law on July 30, 2002.

What we often forget during incidents such as this one, the 2008 collapse of the housing market in the US, or currency fluctuations such as the decline of the US dollar is that even financial value is an emergent property of social systems. The trend in recent years to devise ever more elaborate intangible to financial “accounting” methods is an attempt to rationalize intangibles in the same way that we have insisted that financial capital and physical assets have “real” value. Intangible asset management systems do provide a very real service in helping managers and leaders focus on the social aspects of business, but they can also serve as a distraction when carried too far into valuation efforts. Further, the more elaborate the valuation method, the more removed the concept of intangibles becomes from everyday work and from the people who do that work.

5.3. The Human Dimension of Value

In order to better address how value emerges from social interactions we must first get real people back into the value model. Sveiby reminds us that organizations are not real entities – they are constructed in a constant process by people (Sveiby 1994, Sveiby 2001). “If one looks for an organization one will not find it. What one will find are events linked together. These sequences, their pathways and their timing are the forms we tend to make into business objects or processes when we talk about organizations.” Sveiby observes that these event sequences begin with Weick’s response patterns or double interacts: “patterns in which an action by actor A evokes a specific response in actor B (interact), which is then responded to by actor A,” (Weick 1979). This complete sequence is a double interact. We could more commonly use the term exchange as one way of describing this double interaction. An A to B action with no response is simply an event or more specifically a transaction.

Exchanges carried out in sequence describe pathways not just of events and interactions but of actual value flows. If we begin with the assumption that value is an emergent property of social systems then we must look to this fundamental “cellular” level of value creation and organization – the way people interact to organize exchanges and value flows.
We see the first evidence of value emergence in the exchange. When one person provides something to another that action can be perceived as having a positive or negative value in the eyes of the recipient. When perceived value is positive people feel they have gained or benefitted from the action. If perceived value is high they would be likely to respond in a way that would encourage that action to repeat. One response is to pay the other money to continue the action, a tangible transaction. Other responses may be intangible reciprocity such as expressions of appreciation or responding in kind. For example if one person shares a key business contact with another and he or she returns the favor there is a positive reinforcing loop where both parties gain value. If perceived value is low then a repeat of the action is not encouraged or may even be actively discouraged. Thus in order for value to emerge the action or offering must be perceived as desirable on the part of the recipient.

5.4. Knowledge and Value Conversion

Over the course of interactions and exchanges value often changes form. Value conversion occurs when one form of value is converted to another. The exact nature of these conversions cannot be absolutely predicted because they operate according to probability, not predictability. Value conversion is not a mechanistic process – it is a human process. Sveiby anchors value conversion capacity solidly in the human:

“People can use their competence to create value in two directions: by transferring and converting knowledge externally or internally to the organisation they belong to. When the managers of a manufacturer direct the efforts of their employees internally, they create tangible goods and intangible structures such as better processes and new designs for products. When they direct their attention outwards, they will in addition to delivery of goods and money also create intangible structures, such as customer relationships, brand awareness, reputation and new experiences for the customers. (Sveiby 2001)

Sveiby explains how knowledge transfers are the foundation of value conversion. Through collaboration and knowledge sharing, supported by various technologies and mechanisms, knowledge is transferred or converted into different forms of intangible assets. He suggests nine dimensions of knowledge transfer or conversion of one type of knowledge asset to another.

1. Knowledge transfers/conversions between individuals
2. Knowledge transfers/conversions from individuals to external structure
3. Knowledge transfers/conversions from external structure to individuals
4. Knowledge transfers/conversions from individual competence into internal structure
5. Knowledge transfers/conversions from internal structure to individual competence
6. Knowledge transfers/conversions within the external structure
7. Knowledge transfers/conversions from external to internal structure
8. Knowledge transfers/conversions from internal to external structure
9. Knowledge transfers/conversions within internal structure
He also suggests a 10th action to “maximize value creation – see the whole.” This is not actually a transfer or conversion, but rather a sense making and oversight action. So knowledge transfer and conversion, according to this understanding is the foundation for creating intangible assets. How those intangible assets, in turn, get converted into more negotiable forms of value is the question that is specifically addressed in value network analysis.

5.5. Converting Assets into Negotiable Value

People convert their competence and other assets under their control into other, more negotiable forms of value that can be deployed or delivered to others. They make these value offerings into the internal or external facing value networks they are part of by playing contributing roles. People usually have many assets to choose from. As individuals we have both financial and intangible assets. We might have some money or capital (financial assets); we have tools and ways of working (internal structure); we have expertise and know-how (human competence) and we have our reputation and personal network (external structure). This also holds true for organizations.

We put these assets into motion by converting them into value offerings for others. While each role initiates or offers a potential deliverable for trade, it becomes a completed value transaction only upon acceptance by another role in the network. When someone is willing to provide a value in return then together they execute an actual value exchange. So, although value can be offered at the role level, it is only when that value is accepted or validated by another role in the network that the value conversion is complete.

In turn, when people receive value inputs they convert them into some kind of gain, asset or capability for themselves. They will use knowledge inputs for example to improve competence; payment for services improves financial assets and so forth. If we can more deliberately work with these value conversion dynamics we can not only better utilize and leverage the assets we have but can also explicitly link value flows to the accumulation or growth of those assets (See Figure 1).
This principle of value conversion applies at every level of value creation from shop floor to nation states and global action networks. A simple example of value conversion would be an intangible asset such as product marketing competency being converted into a more negotiable form of value such as marketing services or reports. People also accumulate assets or realize value from various inputs. An example is when a tangible value input, such as purchased market intelligence reports, is converted into a non-financial asset of increased levels of marketing competency.

5.6. Networks and Value Conversion

If human exchanges and interactions are at the heart of both value conversion then the typical ways organizations and business models are represented are inadequate and even misleading. The most used organizational model is the organization chart, which effectively captures reporting relationships but has little to do with the actual way the work gets done or how value is created.

Work simply refuses to stay neatly in the boxes on the organization chart. It has long been acknowledged that the real work gets done through informal networks. Social network analysis (SNA) has well demonstrated this in the last few years (Cross and Parker 2003, Anklam 2007). This methodology, which has been used in many different sciences since the 1930s, has helped people to visualize and understand how work conversations and knowledge exchanges (as intangible exchanges) spill over across organizational boundaries.

Social or organizational network analysis is being used more commonly now to identify and support knowledge sharing and expert networks in the organization. But SNA typically maps only one type of link and one kind of role across a network. Therefore, it tends to produce static “snapshots” of relationships rather than illuminating flows and exchanges, which is essential for understanding value conversion.

The natural pattern of any living system or social system is the network (Allee 2002). Organizations also are networks consisting of people playing specific roles and engaging in value interactions oriented toward the achievement of a particular task or outcome. (Even the hierarchical organization chart when flattened out forms a classic “hub and spoke network” pattern.) The “true agents” in business – people - participate in the network by playing these roles and converting the tangible and intangible assets under their control into negotiable offerings that serve the network.

Any organization or activity-focused group of people, therefore, can be understood as a value conversion network, or more simply as value network. A value network is defined as any set of roles and interactions in which people engage in both tangible and intangible exchanges to achieve economic or social good. Value network analysis (VNA) introduces several elements into network analysis that bring us much closer to mapping value as an emergent property of human interactions. In value network analysis:
• Nodes represent roles that can be played by one or many participants;

• Links denote delivery of a discrete, specific and negotiable form of value (a deliverable);

• Each link can have multiple characteristics. For example a link can be characterized by its specific deliverable (such as a report), its nature as tangible or intangible, its perceived value and other key characteristics;

• Links can be sequenced to define key value creating flow paths or movement over time;

• Every deliverable or transaction can be directly linked to financial and non financial scorecards.

This last element, perhaps more than any other sets value network analysis apart from classic network analysis, which is more focused on structure. Value network interactions can be linked with transactional data (financial) non-financial data (intangible assets) and performance indicators at the level of transaction, role and network.

Value network analysis goes beyond evaluating the one simple network of like links that is usually addressed in SNA. VNA is actually a comparative analysis of three networks that address the same roles and activity: the network of only tangible transactions, the network of intangible transactions and the network of all transactions. Traditional SNA analytics can be applied to all three of these networks and comparative analysis of the structure of these three network patterns often brings illuminating insights. An overall value network can look very cohesive for example, but the intangible network might be very fragmented, which would show that relationships and communication patterns may actually be quite weak. Some of the most useful structural indicators are centrality, structural dependency, density and stability of weak ties. However, what may denote a strength in a social network structure could actually indicate something quite different in terms of value creation. Network indicators can be used to assess resilience, stability, reciprocity, and risk in terms of value creation capacity.

What is most interesting in regard to Sveiby’s work, however are those VNA indicators that are different from the classic SNA indicators. In particular there are a number of indicators emerging in value network analysis that can augment understanding of intangible asset management and value conversion.

5.7. **Intangible Asset Management**

Sveiby suggests three key measurement dimensions to consider in managing intangible assets at the organizational level: indicators of growth and renewal; indicators of efficiency and indicators of stability. Value network analysis provides a way to focus specifically on a number of different indicators for intangible asset management, including some that he suggests.
Growth

Growth of assets is actually managed at the level of the role in a value network, since assets are controlled and utilized by particular roles. Every value input has an impact on financial and non-financial assets. Managing value means understanding how every input it is improving the financial picture, the competence of people, the efficiencies of internal structures and processes or the quality of our business relationships, brand and other external structure.

Sveiby also reminds us also that “in contrast to the Value Chain the intangible value in a Value Network grows each time a transfer takes place because knowledge does not physically leave the creator as a consequence of a transfer” (Sveiby 2001). He also reminds us that value is contextual and a knowledge transfer can also be viewed as a loss. So calculating the value of the knowledge transfer more accurately requires being able to understand the value impact of each unique transfer. Any cost/benefit analysis of an exchange must include intangible asset impact, not just financial. Knowledge and other transfers must be evaluated in terms of potential cost or risk and for financial and non-financial gain. In value network analysis knowledge transfers are spelled out very specifically as actual value deliverables (usually intangible) that pass from one role to another. The cost usually does not involve diminishing of the intangible asset but is more in terms of the capacity that is required and labor expended to create the deliverable.

Efficiency or asset utilization

Efficiency in asset utilization can be effectively managed in a value network by assessing value outputs in terms of how well financial and non-financial assets are being utilized to create value. Value outputs and contributions can also be assessed for their potential value impacts (gain or loss) for industry, society or the environment, thus expanding the intangibles assessment to include sustainability indicators. Again this assessment is most easily conducted at the role level, although results can be aggregated to assess overall efficiency of the network.

Efficiency of value conversion might also be a consideration. If key roles are receiving adequate inputs yet are not producing value outputs with a high perceived value then their value conversion efficiency is low. This type of indicator is perhaps more subjective than some people would be comfortable with, as typically the data for this type of indicator is gathered by surveying network participants but it is still useful to ask the question.

There is also of course one of the classic efficiency indicators – time. The time it takes for completion of critical flow paths is very straight forward to calculate both subjectively as high, medium or low and also objectively as actual time calculations to complete a transaction or flow path sequence.

Role contribution to intangible asset generation

It is also possible to assess the direct contribution of each role to building intangible assets as strategic capability, both for the role itself and for the network overall. Just as
role can have its own individual intangible asset profile, a profile of assets for the overall network, or key roles within it can also be determined.

5.8. Value Network Indicators

Acceptance of any value offering is contextual and dependent upon the functioning of the whole network or system of value. In other words, a deliverable is considered value in one context but not in another. *Value is therefore an emergent property of the network, so understanding the functioning of the network as a whole is essential to understanding exactly how and why value is created.* Although it is useful at the role level to understand one’s role in the network and manage one’s value inputs and outputs, the dynamics of value in a network are dependent upon network effects, and one cannot determine value by simply adding up all the roles and their outputs (Allee 2008).

The classic unit of analysis in business is the organization and the industry. Networks themselves are usually evaluated as economic entities in terms of their overall output. Efforts to understand economic outcomes from networks have been gaining ground in the last few years using social network analysis. Several analysts and researchers are using SNA, both metaphorically and analytically, to try to understand networks as economic entities with at least a limited focus on intangible outcomes and exchanges (Granovetter and Swedberg 2001, Cross and Parker 2003; Dawson 2003; Iansiti & Levien 2004).

The expanded elements in VNA provide new insights and offer a number of new potential indicators at the level of the network. Several of the following sample indicators have been developed with colleague Oliver Schwabe and Sveiby has also provided helpful feedback and suggestions in the course of this work.

*Stability of the value network*

Stability in value network analysis is not about stability of any single asset but focuses on the stability of the network and its capacity to generate value. Classic structural network indicators such as weak tie stability and density are also useful as stability indicators for value networks. However there are two unique value network indicators that are even more helpful. One indicator is the ratio of tangible to intangible value exchanges. Relationships that are built on only tangible value exchanges are at risk when competitors offer a lower price or something goes wrong with the contract. However, if there is a healthy ratio of tangible to intangible (at least 1:1) then two roles are more likely to work through a problem and keep the relationship.

A second dimension of stability is perceived value. Perceived value is also critical for Brand management. Perceived value can be determined at the level of the transaction or the role. It also can be aggregated at the network level. If there is an overall sense of high perceived value then the network would be more stable than one where people perceive low value. Since value is an emergent property of the value network attaching a financial value to each transaction or role is not a fruitful exercise. An approximation of the financial value of the network could be determined by looking at total revenues or
valuation of participating organizations, but this would probably not explain how that valuation is achieved. Perceived value on the other hand is quite deliberately subjective and as such could well be a leading indicator for financial value (although this has not been researched to date). Value holds multiple dimensions for people and financial value is not always the real motivator for participating in a value network. Asking people their perceived value of a transaction or role or even the network itself provides a way to assess the stability of role relationships and the network as a whole.

Resilience and reciprocity

The ratio of tangible to intangible transactions also is an indicator of network resilience. This ratio shows the balance between tangible and intangible exchanges. Intangible exchanges tend to follow human relationships and many also require a degree of trust. An appropriate ratio of tangibles to intangibles indicates that strong relationships exist with the potential for sense making and negotiation. This capacity allows those playing different roles to adapt, adjust and negotiate change without fragmenting the network.

A high percentage of tangible exchanges might show a high level of transparency through formal structures, but it also might indicate that there is a lack of trust and low flexibility. A high percentage of intangible transactions might show high flexibility and strong personal relationships. On the other hand it also might indicate inefficiencies and “work-arounds” where a formal process is broken or where more structure is needed. The “right” ratio varies with culture and industries. This ratio is also a key to determine both the role level and network level of reciprocity.

Risk

Risk is an interesting assessment at the level of the value network. Centrality, a classic SNA network indicator is usually used to define the most influential or “central” people in a network. From the standpoint of a value creating network if one or two roles carry exceptionally high centrality this is actually a risk factor for the network overall. The risk increases even more if the role is played by only one person or organization. If, for some reason, that person or organization fails to execute their role effectively it reverberates negatively throughout the entire network. Another classic indicator that helps to assess risk is network density, which typically shows the speed of communication.

5.9. Conclusions

Value network analysis provides a “missing link” between intangible asset management, the organization chart, process management and social network analysis. By supporting role behaviors and an intangibles mindset it moves intangibles from the specialized realms of accounting and strategy literally to the shop floor. The approach is rapidly gaining adoption in global companies such as Boeing, in global action networks addressing atrocities, slavery and other systemic social and environmental challenges, and in government agencies. It is being used by everyday project managers and “flow path leaders” to address challenges from supply and logistics to open innovation and organizational redesign. At the business web level it is being used to
understand complexities in transportation, pharmaceuticals and many other industries. It has also been used to demonstrate powerful linkages between innovation value network patterns and Intellectual Capital creation at the regional and national level for the European Commission. (Allee et al 2007).

The robustness of the value network method is in large part due to carefully building upon and expanding the theory of knowledge-based enterprise. Further, integrating living systems theory and insights from cybernetics allows a more organic understanding of how value emerges from social systems. Focusing on people as the “true agents” of value creation as proposed by Sveiby provides a new perspective of value creation. People move to center stage in the business model. Instead of being considered interchangeable cogs in the wheel of industry they become the means of production for value itself. By integrating financial and intangible asset management with a deep appreciation of these very human dynamics, value network analysis provides a way to truly model how a knowledge-based enterprise creates value.

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References


6 THE PRINCIPLES OF INTELLECTUAL CAPITAL EFFICIENCY - A BRIEF DESCRIPTION

ANTE PULIC

6.1. Introduction

It has taken quite some time to write this paper, starting in 1998 when the VAIC™ concept was presented at the 2nd IC congress in Canada, and finishing in spring 2008, during a visit to Acapulco. It features both, intensive theoretical and practical work. Theoretical thesis was tested in business practice, corrected and re-examined, while practical experience inspired new theoretical solutions. The past 10 years of research and examination have been true laboratory work and the results are described in this article.

The main finding is actually very simple and short: being efficient is no great philosophy or art, but a very practical and applicable skill. Moreover, efficiency can be executed and achieved by everyone, be it by managers in business or by individuals in private life.

But let me start at the beginning, with the key question: What is the root problem of efficiency today? The answer is that we are facing a similar situation with intellectual work as was faced by manual work before Taylor. Measurement of intellectual work still implies “rules of thumb”, which means that everybody does it “his way”. Such practice must be replaced with a system that enables precise insights into IC performance at all levels of business activity and continuous improvement of intellectual work efficiency, similar to what Taylor did with physical work.

The following research confirms our thesis.¹ More than 1600 presidents and board members of biggest companies worldwide see possibilities in improving productivity in the field of knowledge management, that is, intellectual capital management.

¹ The Economist (2006), Economist Intelligence Unit, pp. 93
6.2. Nature of Value Creation in Knowledge Economy

Today it is possible to state with certainty that the focus of working activity is out of classical production, which represents the dematerialization of economic activities. The named process of dematerialization, which has been almost fully overlooked by economic theory, has become more and more evident. We can confidently say that we have entered the epoch of intellectual value creation.

In the current economy the predominant activity is no longer production of goods but production of knowledge, which is then built into goods and services. This is the starting point of any further economic analysis. This transformation has affected at least two areas: the production of goods and the value of goods. There is a considerable difference between knowledge-based added value and physically added value.

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2 P. Drucker (1986), «The frontiers of Management – Where Tomorrow's Decisions are Being Shaped today», New York 1986. If something exists, then it is the small group gathered around the new theory of growth, with P. Romer.
During the industrial era, the dominant way of value creation was mass production of goods, in other words, physical creation of value added. In the real world that meant that financial capital had a determining role. An enormous number of workers was engaged in poorly paid jobs trying to create as many goods as possible because value creation depended upon quantity. Today, the situation is different. The created value added does not depend upon the increase of produced goods but the knowledge content incorporated into goods and services. Value is not created by the quantity of produced goods but through the quality created by knowledge workers in designing, e.g. new software programs or inventing new medicine. This leads to following conclusion: as value of the products/services was once determined by the quantity of raw materials and physical work, nowadays it is mainly determined by knowledge content incorporated into goods/services.

All of this changes the nature of value creation dramatically. It is no longer possible to think of goods as a physical manifestation of value. This means that the loss of value of goods does not happen due to their physical ware but due to out-dated knowledge built into them. Basically, the reason we buy a new product is not because the previous one fails to fulfil its function, but because the new one contains more knowledge. Therefore, it is not the physical component of the product that becomes obsolete; it's the immaterial component - the knowledge. This has become true for all industries, from software industry to tourism and other sectors.

Since we are dealing with knowledge-based economy it is a necessity to explain the distinction between knowledge and intellectual capital. As far as capital is concerned, economic thought defines quite precisely what that implies. Let's take money as an example. Is all money capital? No. Money stuffed in a sock or put away in its more modern version, a home safe, is not capital. Capital is only the money or property - buildings, machinery, raw materials - that is used to create new value. The same analogy applies to knowledge. There are many people that dispose of very impressive knowledge, but their knowledge will never become intellectual capital if they are not able to transform it into value creating action that will cause a reaction on the market – a demand for whatever that person has to offer. In the same way as money is not capital if it doesn't serve the purpose of creating value, knowledge that fails to fulfil the same function is not capital either. From an economic point of view it is possible to conclude that only such knowledge becomes intellectual capital that can be transformed into value identifiable on the market, or in other words, into benefits the customer pays for.

Although people talk of knowledge as the main carrier of power in this era, that power actually refers to its manifestation in business, and that is intellectual capital. In the new economy the concept of intellectual capital is used as a synonym for those employees, who have the capability of transforming and incorporating knowledge into product and services that create value.

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People are the main carriers of knowledge. In order to go one step further a new employee status needs to be found. And this requires a big breakthrough: intellectual capital needs to receive the status of key resource, which at least means becoming equal with physical and financial capital. In reality this should not be hard to achieve. If we all agree on the fact that employees are the key resource of the 21st century and that today knowledge is what once were land and money, then it is only reasonable to give this resource the status it deserves: of investment and not cost any more.

Employees, who are treated as investment, are the beginning and the end of the new, knowledge based, economy. In the same way as investments were made in plants and machinery in order to create value during industrial economy, today we invest in employees, who are the main value creators of contemporary economy. Nowadays companies combine two key resources: physical and financial and intellectual capital. Within their interaction – the different business activities – value is being created. The above mentioned shift seems inevitable in moving forward to knowledge based economy. Treating the knowledge worker as investment, not only in words but also in accounting terms, makes the popular slogan become true: “The knowledge worker is the most valuable asset of companies in the 21st century”

6.3. Business Success in the Knowledge Economy

We are faced with the following questions: How can business processes, companies and whole national economies be successfully managed with the immaterial component of business, knowledge, becoming ever more dominant? And, even more importantly: How do we know whether this is done successfully or not, that is, how productive they are? Over the past 20 years many methods and approaches, categorised by different criteria, have appeared in an attempt to answer above questions. Since a thorough overview of the methods already exists, there is no need to go deeper into this now. However, an interesting question is why they have not been applied in a wider range in business practice.

According to managers and some academics the main problems of most methods and procedures are as follows:

- In general, measurement results refer to company level only, which is not by any means sufficient for successful management of intellectual capital. Try to imagine management that e.g. is monitoring expenses on company level only.

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- Measurement of IC performance and therefore management in value creating processes is not enabled. Remember professor Juran's saying: «If you don't manage the processes, you don't manage the company at all». This implies that if it is not possible to measure IC performance in processes we can not say that we have measurement methods adequate to satisfy the needs of modern companies.

- Most methods and procedures are applied during limited time periods, e.g. monitoring intellectual capital is conducted once or twice a year. Imagine management making decisions based on business reports issued every 6 to 12 months. This cannot meet business needs.

- With non-monetary approaches the possibility of comparison with others is difficult or impossible, no matter whether on company, sector or national level. Without benchmarking possibility with other business subjects, it is impossible to determine one’s position in business environment. Like a ship without navigation instruments.

- Last but not least, after having obtained various results, many managers are still clueless of whether their company’s intellectual capital has created more or less value as compared to the previous time period. Or in different words, whether the company has created value and how much. Therefore, after all the analysis conducted, IC productivity is still unknown.⁵

Taking into consideration all that is said, there is no valid argumentation against a monetary based measuring system which is real economy. We will continue to work in a business environment of monetary transactions for many more years. Because of that there is no other way but to lay a bridge between the intellectual capital output on the one side and money which is used in all transactions on the other side.

The goal must therefore be to find a measuring model for the knowledge economy which will serve employees, management, investors, business partners, and states in the same way. This model has to be able to indicate how much value has been created and how productive it is at all levels of business activity: with business processes, segments of the company and at company level. It has to provide the possibility of comparison with others, and to cover both micro and macro level of business activities.

Under the new circumstances, value is determined by the relationship between the customer and the product/service in which the quantity of knowledge is the key. On the other hand we have the relationship between created value added and the resources engaged in value creation.

This leads us to following two relations:

(1) Customer ↔ Product/Service
(2) Value Added ↔ Resources

Because of the limited space we will deal with the second relation (2) only. Here we have a key indicator, value creation **efficiency**, that features the relationship between value added and utilized resources.

<table>
<thead>
<tr>
<th>Economy</th>
<th>Industry age</th>
<th>Knowledge age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring system</td>
<td>Quantity</td>
<td>Quality</td>
</tr>
<tr>
<td>Scope</td>
<td>Revenue</td>
<td>Value</td>
</tr>
<tr>
<td>Business success</td>
<td>Profit</td>
<td>Efficiency</td>
</tr>
</tbody>
</table>

**Figure 2. Characteristics of the Industry age and the Knowledge age**

This way a base for the creation of a new measuring framework is given in which created value added and efficiency of resources become the new measuring units for business success – that is productivity – in knowledge-based economy.

“Intellectual assets are intangible. After all, so is value. Let’s make the link between the two more “visible”. ⁶ The measuring framework, as presented before, gives a signpost how to connect knowledge and money.

The new measuring system is based on value added, which, on the one hand, visualizes companies’ business capability and, on the other hand, creates a bridge between intellectual capital as a non material resource and the monetary sphere. Value added reflects business success in an appropriate way in accordance with knowledge economy's logic, according to which knowledge is incorporated into products and services. In short, value added indicates the power of companies in wealth creation.

Neither revenue nor profit, the basic indicators of industrial economy, does not really show whether and how much value has been created and I would like to demonstrate this with following examples.

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<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Revenue</th>
<th>Value Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>KONCAR-ING.</td>
<td>234,523,170</td>
<td>31,190,413</td>
</tr>
<tr>
<td>1254</td>
<td>KONČAR-INSTITUT</td>
<td>55,325,411</td>
<td>31,601,272</td>
</tr>
<tr>
<td>184</td>
<td>KONCAR-TRANSFORMES</td>
<td>264,429,731</td>
<td>13,964,793</td>
</tr>
<tr>
<td>835</td>
<td>KONCAR-MONTING</td>
<td>58,418,084</td>
<td>13,005,953</td>
</tr>
</tbody>
</table>

**Figure 3. Revenue and Value Added for selected companies**

In Figure 3 we can see four companies, with a considerable difference in revenue (up to five times) but the same value added. In the second table the companies have similar value added but totally different profit (which is also not suitable for establishing a link to real value creation).

<table>
<thead>
<tr>
<th>Company</th>
<th>Value Added £M</th>
<th>Operating profit £M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siemens, Germany</td>
<td>24200,9</td>
<td>2423</td>
</tr>
<tr>
<td>DaimlerChrysler, Germany</td>
<td>23546,0</td>
<td>1957</td>
</tr>
<tr>
<td>Deutsche Telekom, Germany</td>
<td>23296,1</td>
<td>5281</td>
</tr>
</tbody>
</table>

**Figure 4. Value Added and Operating Profit for selected companies**

The new concept, which is introduced in this paper, has a number of advantages that, whilst not replacing existing measures, complements them in a significant way. Value added is an objective indicator of business success since output and input, the two categories it is derived from, are taken from the market. On the contrary, profit is an indicator that is based on numerous subjective transactions and calculations.

Easy calculation is possible at various levels of business activity, from process inside the company to company units at company level, regional and national level. This makes value added a universal unit that unites the entire economy. Furthermore, it can be calculated whenever it is necessary and, in accordance with classical business reports, on a weekly, monthly, quarterly and annual basis.

Value added is a measure that reflects employee's and management's contribution to value creation. The use of value added can be an important step in encouraging and involving all employees to make a participative contribution to their work situation and
increase wealth, especially if it is linked to a productivity bonus scheme, which can be geared to increase in value added. Even more, management has a precise system to receive feedback on their activities. Higher added value and higher employees’ salaries ensure higher dividends for investors – shareholders, taxes (state), and higher investments in further development. Value added, as a measure, unites all participants of economic activity with one goal: creating as much value as possible.

After having obtained the business result, value added, calculation of the efficiency of utilized resources – intellectual and physical/financial capital – is a matter of simple mathematics. The efficiency parameters are received by putting the business result into relation to each of the resources.

First, let us deal with today's key resource, intellectual capital, consisting of two basic components, human and structural capital. The human capital of a company is represented by its workforce and, in accounting terms, by the expenditures for employees. In the presented concept expenditures for employees are not part of input any more. In accordance to this, employees are not treated as cost but as investment. The logic behind this is that people invest their knowledge and capabilities whereby their engagement is evaluated through company's activities at the market and reflected in the created value added. I have published this concept in a rudimentary form in my work in 1992, and in the papers published in 1997 and 1998.

We can state the following: as the quantity of products produced in a certain time unit was a productivity indicator of manual work and manual workers, in the same way represents the quantity of value added per invested monetary unit (efficiency of intellectual capital – ICE), an indicator for the productivity of knowledge workers. Therefore it becomes a new key indicator.

In order to gain total insight into the performance of resources in value creation, financial capital is not to be excluded. Although its significance has been diminishing with the rise of knowledge economy its role in value creation can not be ignored. Intellectual capital can not create value by itself. Actually, to be more accurate, business efforts will give optimal results only if intellectual capital is combined with financial capital. This is why information on this resource's value creation efficiency is needed as well.

The sum of both indicators, intellectual and capital employed efficiency gives us an aggregated indicator that shows the overall efficiency of a company in value creation and features its intellectual ability. In simple words this aggregated indicator (VAIC) shows how much new value is created by each monetary unit invested in resources. The

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7 With regard to the limited space, it is not possible to deal with structural capital.

8 Pulic, A. (1993), Elemente der Informationsekonomie, Wien
higher this coefficient, the better is a company's intellectual capital in creating value for its stakeholders.\(^9\)

**What is the benefit of this? We are dealing with two issues that traditional economy did not have answers to.**

**First**, in real economy only the two afore mentioned indicators (value added and efficiency) show whether value is created or destroyed. One of the reasons why companies face difficulties today is that managers are not aware of the fact that they might have been destroying value for years until their final break down. This happens because traditional indicators like revenue or EBIT can create an illusion of business success by showing positive trends although value is being destroyed at the same time, which becomes visible through the new indicators. This will be elaborated in more detail in the next part.

**Second**, value added and efficiency of value creation reconnect the micro and macro levels of economy after a long time. This is due to the fact that these measures are equally relevant at all levels of business, from processes and units inside the company to company level, at the level of virtual communities, to city, regional and national economy level. Intellectual Capital Efficiency (ICE) connects the two spheres since both micro and macro level are treated in the same way and the same data base is used for calculation.

For example, at national level value creation can be monitored with sectors by determining which sectors are above and which are below national economy’s efficiency average. Reasons for the situation have to be found and actions for improvement of weak areas are to be initiated if possible. The same principle applies for the economies of regions within a national economy and companies within a sector.

Another advantage of applying the same measure to all levels of business activity is that companies can receive orientation with regard to their performance related to national or regional efficiency. All of the afore mentioned provides new insights to government administration allowing for a totally new scope of action and a far more efficient management of national and regional resources.

Finally, next to the economic implications, the shift towards value added and the efficiency of resources in value creation has an additional sociological component. For the first time in history, value added and above all, the efficiency of intellectual capital, unites all actors of business activity. Until recently, there were opposing interests of the ones who owned wealth in any form – gold, land, financial capital – and those who worked in creating that wealth – slaves, serfs, blue collar workers. Today, that gap can easily be bridged since creating more value means a benefit for all parties:


employees, managers, shareholders, government. They all unite in a common goal, creating value more and more efficiently (in particular if the rewarding system is tied to value creation and efficiency). Therefore, all parties are motivated to know whether their intellectual capital creates or destroys value.

6.4. Reasons for the Fall of Productivity

In this part of the paper I will bring up arguments in favour of a new way of monitoring business success and will explain the problem of falling productivity in knowledge economy. For this reason it is necessary to focus on the results provided by the two measuring systems: the classical one and the new one, presented in this paper. The main difference between these is that the first one encompasses and therefore controls only financial capital performance whereas the second one encompasses and therefore controls both key resources, but first of all intellectual capital.

When the data, which has been derived from annual reports is analysed according to both measuring systems some illusions can be discarded: at the same time, while promoting positive business results, meaning an increase in revenue and profit, many companies might actually face value destruction in the way that value added and efficiency of value creation are decreasing.

![Graph showing Value Added, Intellectual Capital Efficiency, and Capital Employed Efficiency over time]

**Figure 5. Characteristics of a case company**

In this example, management's achievement, a 5.3% increase in revenue and a 15.7% in profit is questionable due to the fact that all new parameters show a falling trend: a year long decrease in value (VA), a 50% decrease in intellectual capital efficiency (ICE) and...
a 38% decrease in financial capital efficiency (CEE). Throughout the world, in numerous companies many a manager lives and works guided by such illusions.

The usual first reaction of managers, who are confronted with such a situation, is disbelief. They can not believe that the results come from the same database. This is what gives proof that time has come for a change with traditional indicators of business success. Analysing a case of scientific reorientation a renowned historian referred to such transition periods as processes which include “dealing with the same bunch of facts as before just establishing new kind of relationships between them, providing this way a totally different framework”.\(^{10}\) This is what intellectual capital efficiency is about. **The same basic data – revenue, costs – is brought into a new system of relationships, more complex than before, and new results are received, more objective and more appropriate for a new business reality.**

Managers can easily get into trouble by relying on the traditional measuring system only, since they make decisions based on data that is not featuring modern business reality. This illusion is a result of the following paradoxes.

**The first paradox**, EBIT (operative profit – OP) is in no relation to the created value in the company. Being one of the basic indicators of business success, EBIT is used by many managers in operative decision making. Since EBIT is a consistent part of value added it is to be expected that they are in some kind of interdependent relationship, or, in other words, that a higher value added would result in a higher EBIT.

Empirical analysis, which was conducted at 700 of the largest European companies from 36 sectors, investigating the relationship of VA and operative profit (EBIT) showed the following:\(^{11}\)

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As can be clearly seen, there is no significant correlation between created value and EBIT. In other words, this means that profits are determined no matter of the value added created. Hence, company’s success is not evaluated on the basis of its capability to create value, but on the basis of calculations that do not have direct connections with value creation.\textsuperscript{12}

I have received almost the same result in analysing a big retail company. The analysis encompassed 300 stores, which had been operating for at least three years. The finding was that stores with hardly 500.000 VA and those with over 950.000 VA showed the same EBIT, in this case 200.000.

This empirical research gave way to my main finding: \textbf{EBIT is in no correlation to value added} and it does not indicate the capability of companies (or lower units - stores) in value creation. Relying only on that indicator, managers do not make optimal decisions.\textsuperscript{13}

The second paradox is that the EBIT margin, which should be reflecting business efficiency, is in no way related to the productivity of resources, in particular intellectual capital.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure6.png}
\caption{VA and OP for 700 companies}
\end{figure}

\textsuperscript{12} With all the analysed sectors, there have been only 5 where a close relationship between EBIT and created value added could be found. Those are: mining, chemicals, fixed line telecommunications, nonlife insurance, oil & gas producers. Having the nature of their business in mind this result makes sense since intellectual capital does not have a key meaning there.

\textsuperscript{13} According to reasearch, due to ignorance of IC efficiency criteria, the mentioned retail chain had a fall of value added amounting up to around 7 million € in 2005.
Figure 7. ICE and EBIT margin of 300 stores

The graph above (Figure 7) shows the relation between EBIT margin and ICE. Analysis of 300 stores has given following results:

- Stores that had a high EBIT margin, about 9.5%, showed an ICE index in a scale from 3.5 to 5.0. This means that the same margin was found with stores, where 3.5 monetary units were created per one invested unit, as well as those, where 5.0 value added was created per one invested monetary unit (that is over 40% more).
- The similar result was received with analysis of stores that had a low EBIT margin – with the same EBIT margin they had 30% range of IC efficiency.\(^{14}\)

With regard to the displayed results I would like to conclude the following: business decisions based on EBIT margin are not reliable since, as shown, it is in no direct relationship to company's value creation and intellectual capital efficiency.

Unfortunately, this shows that many of the good intended efforts of managers who want to create good for themselves and their companies, do not actually create wealth for the company or the nations as a whole. On the contrary, they destroy value rather than create it.

Now, based on the presented two paradoxes, an answer can be given to the issue of continuing fall of productivity in the most developed countries of the world. These economies have deeply entered knowledge based economy, where intellectual capital is a predominant resource in value creation. However, management of this resource is still

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\(^{14}\) Cicek, M. (2007), Intellectual Capital in Retail, Zagreb
based on measuring systems focussing on financial capital only. This way the chance to measure the performance of this vital resource is missed and, furthermore, to manage it in a successful way, herewith influencing efficiency of value creation

6.5. Principles of Intellectual Capital Efficiency

“A whole generation of managers refuses to accept reality and oversees a paradoxical decrease of productivity, because people, who own economic power, have lost touch with economic reality.”

If productivity has been decreasing for years it is not because it has to be, but it is rather a consequence of business decisions which are being made based on inadequate indicators which do not display the real state of everyday business. In order to change the current state of the art new principles of business efficiency have to be introduced.

6.5.1. Intellectual Capital Efficiency has no Limits

In the industrial epoch productivity was limited. It was not possible to create more than it was allowed by the limitative factors, technical and natural ones. Let us take a carwash for example. The productivity of the employees will be determined by the time which is necessary for the machine to complete the job.

In knowledge economy there are no limitations to value creation. When software, movies or similar knowledge-based products are created, the only restraint is the attitude of the customer towards the product.

Therefore it is possible to continuously increase efficiency of value creation depending on:
- clear definition of goals regarding value creation,
- knowledge and capability of management and all other employees in the realization of the goals set.

The ones who will follow the instructions below will certainly and undoubtedly be able to increase continuously their efficiency. The increase will be exactly proportional to the clarity of their vision, which means defining clear goals and the strength in pursuing them.

6.5.2. Value Creators are the Presupposition of Efficiency

Today’s companies do not need better managers. They need better value creators – individuals who do not only understand organizational processes but also the way of functioning which enables continuous increase of value added.

The existing productivity problems are caused by lack of business imagination in utilizing new possibilities and less due to the optimizing solutions in given circumstances. Therefore, a new manager type is needed **who will manage value creation, not just people.**

According to Proudfoot Consulting research: “The reasons for low productivity have been the same for years: managers do not care enough about unproductive processes. They just do not know what is going on.”\(^\text{17}\)

This is confirmed by a survey, which highlights that existing productivity problems are mainly a result of poor management and unsatisfying labor control. If bad communication is added as the third reason, then the state of productivity is not surprising. Is it necessary to mention that all those weaknesses refer to intellectual capital management, which is the dominant resource today.

### 6.5.3. Continuous Increase of Value Added

Value creation is the precondition of efficiency. In order to increase productivity of knowledge work the first step is to monitor what is going on with value added.

It is of a great importance to be aware of the fact, that without continuous increase of value added, survival of the company and workplaces is endangered.

There are various combinations that lead to an increase of value added, and all of them are based on various movements of income and costs. Increase of value added can be achieved if income grows faster than costs or if the same income is achieved with lower costs. A third possibility is that income overgrows costs. As for other combinations, they do not require great mathematical skills.

In order to ensure continuous growth of value added the following factors are of crucial importance:

- **Innovation** – enables continuity in increasing the knowledge content of products/services. As said before, in contemporary economy building knowledge into products and services (but also in all other business activities) is a vital activity, which makes innovation a basic requirement for market survival.

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\(^\text{16}\) Thakor Anjan V., (2000), Becoming a Better Value Creator: How to Improve the Company’s Bottom Line - And Your Own, John Wiley & Sons

\(^\text{17}\) Financial Times Deutschland, 5.1.2008.
Continuous innovation is nothing else but implementation of new knowledge in order to ensure continuous growth of value added.

- If that can be done then all the presumptions for market domination are given. Thorough analysis of market position (benchmarking) has to show where the company is positioned in relation to its competitors in order to ensure leadership and the necessary quantity of output.

- **Continuous investment in developing employee’s competences**, meaning their knowledge and capabilities. Employees are the carriers of knowledge, which is the crucial substance of products and services. Hence, this substance has to be continuously improved in order to provide new results.

By following the above, results in continuous growth of value added are likely to be achieved and thus a safe future of company and workplaces ensured.

### 6.5.4. Efficiency in Value Creation

Creating value added is not enough; it has to be done efficiently as well. Efficiency means creating more and more value with one invested monetary unit in utilized resources – financial and intellectual capital. In the old times productivity meant producing more and more physical units in a certain period of time, today we can see productivity as producing more value per invested monetary unit in each of the resources.

This means that for each sector average efficiency can be calculated in order to provide orientation for companies. For example, let us take that average intellectual capital efficiency in retail is 2,15. Companies below this efficiency have a very specific goal: do whatever they can to achieve sector average. Others have to focus on retaining the leading position with regard to value creation efficiency. It is a huge advantage that one strong criterion has been introduced that indicates their market position.

What is gained by this? A realistic new system is introduced that brings order into business, similar to Taylor’s system of manual work improvement. The introduction of time, as criteria for manual work operations, provided a base for productivity increase in those days. Similar to that today, the criteria of value creation per invested monetary unit – intellectual capital efficiency – is introduced providing a base for productivity increase of knowledge workers.

### 6.5.5. Increasing the Level of Intellectual Capital Efficiency

As much as it is important to monitor value creation, it is vital to take care of the efficiency of resources utilized in business. Herewith, the relationship between the created value added and intellectual capital (human and structural) is of decisive importance. In order to receive a general overview of productivity at all levels (processes, units, companies, regions, nations) following parameters are provided:
### Efficiency Description of efficiency levels

**2,50**  
(Or more) is a sign of very successful business performance. This result is mainly received by companies from hi-tech businesses and other conjunctive sectors. This is the lowest level of efficiency that can really ensure safe business and workplaces.

**2,00**  
This is a minimum for efficient business performance in most sectors (enough value is being created in order to cover for employees' salaries, amortization, bank interests, taxes, dividends to shareholders). Enough is left for intensive investment in development.

**1,75**  
Business is in relatively good shape but does not guarantee long term safety. All liabilities are liquidated, however, there is not enough for business investments and therefore future business success is uncertain.

**1,25**  
Worrying – survival of company is endangered – not enough value is created to ensure business development. Some inputs are not covered, as well as some liabilities towards stakeholders.

**1,00**  
Much worrying, on the edge of the survival – OUTPUT is insufficient for covering all inputs necessary for operational business – with this efficiency only labor expenses are covered. In case efficiency is below 1, then not enough value is created to cover obligations towards employees.

---

**6.5.6. Control of Value Added and Efficiency**

The process is a group of tasks, where it is possible to trace precisely how much value it creates. Creating new products or services includes various activities that are realized through processes. In some of them value is created and in some it is destroyed. **Therefore, it is important to have insight into the contribution of each process to value creation and efficiency, both short and long term.**

In order to find out the efficiency of intellectual capital it is necessary to identify the processes that destroy value, which are the ones that work below company’s efficiency average. Possible causes have to be found and eliminated if possible. This should become a key activity in all companies and I think that it is impossible to lead a company without such insights.

Therefore, thorough and continuous control of value creation is a must. This is not just talk, but an ongoing task, even a mission. In order to increase value creation of the company successfully it is necessary to determine how much value is created in each process and, if possible, for each workplace. It is the only way to get an idea of the company’s weak and strong parts.

Even if a company creates value successfully at company level there are units where value is destroyed. Here we refer to general jobs such as accounting or HRM. These
departments have a supporting function to the core activity, and therefore they need to be related to value creation. It is of a crucial importance to locate company parts, which are focused on core business activities but destroy value. It is here that improvements have to be done first. This way, by controlling value creation in processes, knowledge-based business is possible.

This is not only true for current business. It is of no less importance to control the effects on value creation caused by decisions on key issues. This means that each action, primarily by management, but other employees as well, has significant influence on company’s value creating or destroying ability. Analysis of management’s decision making and its impact on value creation has to become an important part of the decision-making process.

If these conditions are not met, we talk about value destruction. The following situations are signals warning of possible problems in current business:

- fall of value added in relation to the former period,
- fall of value creation efficiency,
- efficiency that is below the average of the environment, companies’ and national.
- increase of value added which is lower than inflation.

The first alarming signal is a decrease of value added in relation to the former period. If value added inside the company is monitored on a continuous basis it is less probable that top management will be taken by surprise. Even if such a situation occurs, management should do its best not to let it continue for a longer time period.

It is important to stress that not each decrease is a tragedy. For example, due to certain investments, a fall of efficiency could happen and is completely normal. Since returns on investments can be expected decrease will surely not last for long in such a case.

A fall of value creation efficiency in relation to former periods, e.g. the previous year, means value destruction as well. A certain efficiency level tells us how much of the resources – intellectual and financial capital – are needed in order to create a certain mass of value added. Basically, that level is determined by companies’, sectors’ or national economy’s average efficiency level. A fall of efficiency below that level means that more resources has to be engaged in order to create the same mass of value added.

For example, let us take a situation where average intellectual capital efficiency is 3,15 on company level. Each company consists of organizational units, subsidiaries or similar entities. Efficiency results of each one generate company’s average efficiency. This general, average efficiency, is only a result of the units below and above average company’s efficiency. All units that operate below the average efficiency actually destroy value. Reason: they use more resources to create a single unit of added value than is necessary on the company level.
One other way of destroying value is efficiency that is below average of the business environment. Let us take the former example, a company with average efficiency of 3.15. If the productivity of IC in that sector is 5.50 (like e.g. in telecommunications) then the mentioned company is destroying value as well since it is performing below sector average. The reason is the same: more resources have been utilized than average in that sector.

6.5.7. Continuous Elimination of Value Destruction

In order to keep the business productivity increasing control of intellectual capital efficiency is necessary, starting at business processes that destroy value. Experience has shown that solving problems is less a problem than detecting the areas where value is being destroyed. After such analysis some of the companies were truly surprised to find value destruction in those company units that were classified as successful before.

Creation of any product or service requires manifold activities. Some of them add to value creation some do not. It is very important to know what each activity is doing with regard to value creation, short and long term. Only because a company creates value as a whole does not mean that there are no units/parts where value is not destroyed.

Improvement of business processes where value is being destroyed leads to an increase of efficiency in critical parts of the company as well as of company's total efficiency. Value creation efficiency or inefficiency of each unit transfers to total efficiency of the company. That is valid for all levels of business (from the business processes to the national and global economy).

6.5.8. Efficiency Remuneration

Intellectual capability is based on the potential of employees. Their knowledge and capability transformed into value at the market are the fundamentals of contemporary business and will be in the future as well. It is therefore of the utmost importance to exactly define the remuneration which the employees ought to receive for their intellectual efforts.

In the past that was dependent on two factors: the time spent at work and the quantity of physical output. Today that is not valid any more since individual and group value creators (the knowledge-workers) have entered the scene. Therefore, remuneration has to be based on the capability of individuals firstly to create value, and secondly, to do it efficiently.

The principle “as much my work contributes to value creation and increases efficiency” would be a fair criteria for remuneration of employees and management.

This criterion is actually in use today in the form of employees’ participation as shareholders, especially in high-tech businesses. However, only a small number of employees is encompassed by this kind of remuneration. Therefore this practice should be expanded to all work places where it is possible.
6.6. Conclusion

The presented principles shall be used for elimination of all kinds of losses, which might occur at all levels of business activity. If non-efficiencies are spotted they can be removed with help of the principles and there is no company that could not increase its efficiency and thus contribute to more efficient national economy by applying them. How come this can be claimed with certainty? Because now, causes for inefficiencies can be precisely pinpointed by recording the way in which they diverge from one or more of the listed principles.

As Frederick W. Taylor introduced control of movement and time necessary to perform manual work at the beginning of 20th century, now, at the beginning of 21st century the approach described in this paper, introduces control of value creation and efficiency, not only within company units but also within a national economy.

Owners (e.g, state, shareholders, funds) are the ones who will face the challenge first: they now have instruments to control management. Calculation of average efficiency on national or sector level is used as a base for benchmarking of all companies. Under such conditions, the mode of ownership is not important any more. What is important? It is enough that the owner determines the level of efficiency management ought to achieve.¹⁸ This might not suit many managers but it is the only way to increase productivity.

We have to start accepting the fact that economy has faced a Copernican change, based on a totally new world view and occurring events. For a long time people believed that the sun was circling around the Earth and that was the accepted reality. No one even doubted that something could be wrong with that notion until 500 years ago when Copernicus provided a totally different explanation – the Earth is circling around the sun. This shift in world view was not caused by a change of natural flows – the movements of the planets were the same all the time – but due to a new interpretation of the existing reality. And this is what we are doing now, interpreting the existing economic reality of companies and national economies in a new way, by introducing new principles of intellectual capital productivity.

In the end I will repeat one more time: it is impossible not to increase efficiency of value creation if everything said in this paper is done. The advantages and benefits that arise from it will make everybody happy: the employees who will be able to keep their jobs with their families, the shareholders because they will achieve the goal of their investments, the state because it will have more money for social and other programs, management because it was successful in fulfilling its business and social function. In

¹⁸ In particular, this is crucial with state or para state owned companies. For the past decades, there has been a story going on, that these companies can not be efficient (profitable), since the state is a bad owner. Although there are many examples that this does not have to be true, now the alleged reasons cease to be valid. The state, as any owner, can require a certain efficiency level for all companies it owns, depending on the sector and market position.
short: continuous increase of value creation efficiency leads to individual wealth as well as wealth of nations.

All that has been said was initiated to a great extent by the work of Karl-Erik Sveiby. I am grateful for some inspiring moments with him. Nowadays, many people deal with the IC issue but only few have given such a great contribution as he has. Furthermore, I am grateful to him because his work has helped me to find a possible solution to the problem of increasing productivity of intellectual capital. Based on his division of intellectual capital, finally the possibility opened up to connect classic economic theory and the knowledge economy. With the concept shown below it is possible to make a connection between the production function and TFP.

\[ \hat{Q}_t = s^K_t \hat{K}_t + s^L_t \hat{L}_t + \hat{A}_t \]

**Figure 8. IC and the production function**

*Karl Erik, for your birthday, I wish you to be our inspirator for a long time.*
APPENDIX 1. The Efficiency by the Application of Principles of IC Efficiency

Shipyard ULJANIK

From: 2000 – 2005:
- the time needed to build a ship has been reduced by 54% (green columns)
- reduction of effective working hours by 65% (red line)

«The case study of our company indicates that by applying the principles of intellectual capital efficiency, combined with the application of the VAIC™ methodology – which helps to visualise the intellectual ability of the whole system and the processes - as well as by using the knowledge, the talent and the creativity of our employees, it has been possible to achieve continuous improvement of business results.» Dr. Klaudio Tominovic, Director of Intellectual capital

IGM Buildings

“The principles have opened new perspectives and helped us to increase value added of our business processes. This concept has enabled us to control value creation and efficiency in all of our 23 profit centers. This way, we have been able to increase business efficiency year by year. The principles have proved to be of great benefit to CEO and management. Of course, just for those who are capable of coping with reality, no matter how positive or negative it is.” Predrag Mikulec, CEO
APPENDIX 2. The Loss by Ignoring Principles of IC Efficiency

Example 1: ERICSSON NT – Croatia

Although revenue keeps increasing continuously, value added oscillates. In 2004 at each € invested in employees more than 2.5 € value added was created. In 2007 only slightly above 1.5 €, one € less than four years ago.

Or, even more specifically:


Loss due to fall of IC productivity was: 45,771,372 €.

Example 2: InBev Croatia - world's leading brewer
APPENDIX 3. The Calculation of Value Added and Intellectual Capital Efficiency

1. The business result is value added, which is calculated as the difference between output and input. The basic definition is as follows:

\[ VA = OUT - IN \]

Where:
- \( VA \) = value added for company
- \( OUT \) = total Sales
- \( IN \) = cost of bought – in materials, components and services

Value added can be calculated from company’s accounts as follows:

\[ VA = P + C + D + A \]

Where:
- \( P \) = operating profit
- \( C \) = employee costs
- \( D \) = depreciation
- \( A \) = amortisation

2. Human capital efficiency is received as a result:

\[ HCE = VA / HC \]

Where:
- \( HCE \) = human capital efficiency coefficient for company
- \( VA \) = value added
- \( HC \) = total salaries and wages for company

3. Structural capital, as the second component of IC is calculated as following:

\[ SC = VA - HC \]

Where:
- \( SC \) = structural capital for company
- \( VA \) = value added
- \( HC \) = total salary and wage duty’s for company

4. Structural capital efficiency (SCE) is calculated in the following manner:

\[ SCE = SC / VA \]

Where:
- \( SCE \) = structural capital efficiency for company
- \( SC \) = structural capital
- \( VA \) = value added

In this case the trends of revenue and value added diverge.

In 2005 at each € invested in employees more than 5 € value added was created. In 2007 value creation was 3,5 € per 1 € invested in employees.

Or, even more specifically:

in 2004 investments in employees 12.381.861 €. Value added was: 53.556.077 €
in 2007 14.363.346 € 50.689.171 €
Loss due to fall of IC productivity was: 8.932.008 €
5. By adding up the partial efficiencies of human and structural capital the Intellectual Capital Efficiency (ICE) is obtained.

\[
\text{ICE} = \text{HCE} + \text{SCE}
\]

Where:
- \( \text{ICE} \) = intellectual capital efficiency coefficient
- \( \text{HCE} \) = human capital efficiency coefficient
- \( \text{SCE} \) = structural capital efficiency coefficient

6. Capital Employed Efficiency is calculated in the following manner:

\[
\text{CEE} = \frac{\text{VA}}{\text{CE}}
\]

Where:
- \( \text{CEE} \) = capital employed efficiency coefficient
- \( \text{VA} \) = value added
- \( \text{CE} \) = book value of the net asset for a company

7. Until now the formulas for the value creation indicators have been presented, but in order to enable comparison of overall value creation efficiency all indicators need to be added.

\[
\text{VAIC} = \text{ICE} + \text{CEE}
\]

Where:
- \( \text{VAIC} \) = value added intellectual coefficient
- \( \text{ICE} \) = intellectual capital efficiency coefficient \((\text{HCE} + \text{SCE})\)
- \( \text{CEE} \) = capital employed efficiency coefficient

This aggregated indicator indicates the overall efficiency of a company and indicates its intellectual ability of value creation. In simple words VAIC indicates how much new value has been created per invested monetary unit in each resource. The higher this coefficient the better the company’s intellectual capital, which creates value more and more efficiently.
LITERATURE


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7 NATIONAL INTELLECTUAL CAPITAL AS AN ECONOMIC DRIVER - PERSPECTIVES ON IDENTIFICATION AND MEASUREMENT

PIRJO STÅHLE

Abstract

Intellectual Capital (IC) is a rather recent line of research that has attracted interest along with the development of the global knowledge economy. Currently there is a relatively common understanding about the importance of knowledge as a source of economic competitiveness, and several IC models have been presented to operationalize its essence, function and benefits. The early phase of the research concentrated on conceptualizations of IC, mainly in the context of business companies. Recently, however, the community, regional and national perspectives as well as the identification, measurement and scaling of IC metrics have increasingly been in focus.

In the global economy IC research has the potential to make an important contribution to understanding the new nature of competitiveness. The development of methodologies for identifying, assessing and measuring national IC may help in terms of coping in the knowledge economy. The main challenges are on the one hand to find reliable methodologies through which to identify IC and its economic impact, and on the other hand to establish how national intellectual capital can be optimized and steered to enforce economic growth. This paper describes the tools and responses to these challenges the IC community has produced so far, and discusses what still needs to be done. The analyses produced via the chosen measurement models provide the antecedents for use in future research efforts.

Key words: measurement of Intellectual Capital, Intellectual Capital models, economic influence of Intellectual Capital, national Intellectual Capital.

7.1. Introduction

There is rather unified understanding about the importance of knowledge as a source of economic competitiveness, since an increasing proportion of GDP currently resides in
economic commodities that have little or no physical manifestations. However, the methods and models used for measuring intellectual capital (IC) and its effects have not yet established indisputable standards or metrics that could be widely beneficial to the knowledge society (e.g. Malhotra, 2003; UNPAN, 2003).

The early phase of IC research in the 80s and 90s concentrated mainly on the micro-economic context, but recently regional and national perspectives have also attracted interest within the IC community (Amidon, 2001; Bounfour, 2003; Bounfour and Edvinsson, 2005). Alongside the challenge of applying IC on the national scale is the increasingly serious problem concerning measurement and related IC metrics.

National IC (NIC) refers to the concept “that applies the principles of intellectual capital measurement and management on a macro-economic level, in such a way that it helps to give direction to future economic development” (Andriessen and Stam, 2004, p. 11). According to this definition, IC research could at best both make a significant contribution to the strategic steering of knowledge economies and act as a support for national foresight. However, this stage has not yet been reached. Currently there is not enough knowledge about the economic effects of intellectual capital. On the one hand, some measurements show that IC acts as an economic driver (e.g. Choo and Bontis, 2002; Lerro et al., 2005; Alexander, 2006; Cabrita and Vaz, 2006), but on the other its influence on economic growth has not been proved (e.g. Firer, 2003). These contradictory results do not necessarily imply a disconnection between IC and economic growth, but might also be attributable to flaws in the models and related methodologies for measuring and scaling IC metrics.

The main objective of this chapter is to analyze the preconditions for measuring national IC as an economic driver. The aim is to find a model or models that could reliably identify and measure its effect on economic growth, especially in the macro context.

### 7.2. Identifying and measuring Intellectual Capital

#### 7.2.1. The IC taxonomy of three

Intellectual capital is an abstract and complex concept that is difficult to identify and operationalize – be it on the organizational or national level. Over the last decade various models and classifications have been presented with many measurement and reporting applications. Currently there is rather unified understanding about its structure and dimensions, and several measurement exercises involving comparative indicators have been conducted. The taxonomy of three – human, organizational and relational capital – is the most established view of IC, and has been applied in most of the measurements. This model is sufficiently established that it “has proven to be a sound basis for measuring and comparing IC on both firm and national level” (Andriessen and
Stam, 2004, p. 10). The taxonomy was originally presented by Karl-Erik Sveiby, whose work from the mid-1980s has been identified as the root of the whole IC movement (Sulliuan, 1998; Edvinsson, 2005; Andriessen and Stam, 2004). It has been further developed by many academics, most notably by Edvinsson and Malone (1997).

Macro-level research on IC started to emerge at the beginning of the 2000s. National measurements have been mainly based on the model introduced by Edvinsson and Malone (the E&M model), and no specific macro models have been developed. The common view among academics is that there is no need for a specific NIC model since the IC concept is relatively transferable from the micro to the macro level (Edvinsson, 2002; Andriessen and Stam, 2004). No serious questioning of this notion has arisen.

In addition to the academic studies, comparative analyses and rankings of nations based on the basic IC taxonomy have also been conducted by international institutions such as the UN19, the World Bank20, the EU21 the OECD22 and several private institutions including the WEF23 and the IMD (2005 and 2007). All of these have used the E&M model or parts of it as the basic framework.

7.2.2. Towards the identification of IC as an economic driver

The IC taxonomy of three is evidently becoming a standard on both the micro and macro levels of measurement. The interesting questions are, however, whether this emerging practice is able to show the connection of IC with economic growth – and what other kinds of approach are possible.

Since thorough reviews of IC measurement methods have been presented elsewhere (Sveiby, 2000 and 2007; Andriessen, 2004; Malhotra, 2003), it is unnecessary to give one here. Instead, I have chosen three of the models for closer analysis based on their unparalleled contribution specifically in the present context.

In the context of this study, three approaches are chosen for closer analysis:

1. The model developed by Edvinsson and Malone (1997) since it established the taxonomy of three and introduced the core concepts and categories that have provided the basis for national IC metrics in many cases. The model itself was originally used for reporting a company’s IC (Skandia Navigator, 1994), and its later applications have produced specific metrics and indexes aimed at IC measurement.

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19 Human Development Index, UNPAN 2003
20 Knowledge Assessment Methodology (KAM) and Knowledge Economy Index, KAM 2007
21 Innovation Scoreboard, EIS 2006; EIS 2007; see also EU 2004, 2005, 2006a, 2006b
22 Measurement recommendations following the MERITUM project and EU recommendations, OECD 2006
23 The Lisbon review 2006, WEF 2006
2. The model developed by Ante Pulic (2000 and 2003), since he was the first to transform the established core concepts of the E&M model into pure economic figures. He operates solely in the realm of money, and is genuinely interested in the economic value and efficiency of IC.

3. The model developed by Baruch Lev (2005; Gu and Lev, 2002), since he analyzed the effect of intangibles on economic performance and introduced the concept of intangible driven earnings. Lev’s perspective has no roots in the IC tradition or in the E&M model. He is exclusively interested in the effects of intangibles, not in their components – and he is also the only one to incorporate time as an essential measurement variable. He measures the effect of intangibles over the course of time by analyzing the relation of intangible driven earnings to future success. Thus he has developed a potential instrument for economic steering and foresight.

The two latter models were chosen for closer analysis because they aim at measuring IC by identifying its effects on economic performance, and they both take a unique and promising approach. Both are clearly economic, and the focus on efficiency guarantees their usefulness.

The contributions of all three approaches are important in terms of seeking to identify the influence of IC on economic growth. They are analyzed in the next sections in accordance with their contribution to measuring the effect of national IC. Each one is then examined in the light of three essential questions:

1. How reliably is the model able to identify national Intellectual Capital?
2. How valid and reliable is the method for measuring national Intellectual Capital?
3. Is the method capable of showing the influence of IC on economic growth?

Finally, conclusions are drawn on the special features and problems of macro-level IC measurement that need to be acknowledged as the next generation of measurement evolves.

7.3. Measurement applications in the Edvinsson & Malone (E&M) model

7.3.1. The problems of the model

The model developed by Edvinsson and Malone (1997) presents a clear conceptual and structural base for IC. It divides it into two main categories, Human Capital and Structural Capital: the latter is further divided into Market capital (or Customer
Capital) and *Organizational Capital*, which again is divided into *Process Capital* and *Renewal Capital* (or Innovation Capital). The multi-level hierarchy of the model is the most detailed, and it is also the one most frequently used in both conceptual and measurement applications, as explained earlier. The original IC perspectives contained in the taxonomy of three are further refined: *Relational Capital* is called *Market Capital* or *Customer Capital*, and is positioned as a subcomponent of *Structural Capital*; thus the elements are the same but their hierarchical order is different. The measurement problems that both models cause are similar however, and their applications are, in principle, close to each other.

Even though the E&M model offers a clear and structured understanding of the elements of IC, it has some serious problems from the measurement perspective. First, conceptual problems arise in choosing the indicators for the sub-categories (e.g. Lönnqvist and Mettänen, 2002), and secondly, measurement problems arise when attempts are made to form composite indexes for IC.

---

Figure 1: The IC model developed by Edvinsson and Malone (1997)

There is, for example, clear confusion concerning the definitions of *Structural, Organizational* and *Process Capital*. Marr and Starovic (2005) consider *Organizational* and *Structural Capital* equivalents, whereas generally the latter is defined solely through the related concept of infrastructure (e.g. Sullivan, 1998, p. 178; Bontis, 2002, p. 632). Malhotra (2000) defines *Organizational Capital* in terms of *organizational structures, patents and trademarks*, for example, which clearly mix *Renewal and
Market Capital metrics with those of Organizational Capital. For the same reason of conceptual vagueness, ICT usage, for instance, is sometimes considered part of Structural Capital (Andriessen and Stam, 2004) or Organizational Capital (Malhotra, 2000) and sometimes part of Process Capital (Bontis, 2004). Since current IC studies use the underlying metrics differently – even if the core concepts misleadingly remain the same – the measurement results cannot be generalized and must always be interpreted case by case (Marr and Starovic, 2005).

The other problem concerns measurement and metrics, i.e. the question of how to form the indexes and ensure their validity. Even if the model itself is well structured and consistent, it does not offer any guidelines for making valuations between the subcomponents of IC. For example, before we can create the index for the total IC level of a country we need to know how Human Capital and Structural Capital or Renewal Capital and Process Capital relate to each other. The model does not give clear underlying metrics or straightforward guidelines for conducting reliable and unambiguous analyses.

7.3.2. Andriessen and Stam’s Application

The Intellectual Capital of the European Union by Andriessen and Stam (2004) effectively illustrates both the conceptual strengths of the E&M model and the weaknesses concerning the scaling of the indexes.

Andriessen & Stam further develop the taxonomy of three by introducing new perspectives combined with the effect of IC. They cross-categorize the chosen statistical indicators and three new categories - Assets, Investments and Effects. With this categorization they also attempt to tackle the problem of time, since assets could be regarded as a demonstration of the present, the effects of the past, and the investments of the future.

<table>
<thead>
<tr>
<th></th>
<th>Human Capital</th>
<th>Structural Capital</th>
<th>Relational Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: The Intellectual Capital Monitor developed by Andriessen and Stam (2004, p. 11)
The introduction of the three separate categories of assets, investments and effects is constructive, but problems emerge depending on the indicators used to measure effects. The table below (Table 2) raises the following question: Whereas the indicators clearly (aim at) measuring IC they de facto do not reveal whether they are the results of high GNP driven by other than IC drivers of the economy, which means that they do not conclusively measure IC effects.

<table>
<thead>
<tr>
<th>Human capital</th>
<th>Structural capital</th>
<th>Relational capital</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- GDP per hour worked (as % of US) (7)</td>
<td>- Percentage of businesses using the Internet for purchasing and selling (1)</td>
<td>- Broadth of international scientific collaboration (2)</td>
</tr>
<tr>
<td></td>
<td>- Value added of high tech industry, relative to GDP (2)</td>
<td>- Percentage of patients with foreign co-inventors (2)</td>
</tr>
<tr>
<td></td>
<td>- Birth rate of enterprises (3)</td>
<td>- Export of royalty and license fees (2)</td>
</tr>
<tr>
<td></td>
<td>- Birth rate of enterprises (5)</td>
<td>- Export of services (2)</td>
</tr>
<tr>
<td></td>
<td>- The share of persons with an equalised disposable income below the risk-of-poverty threshold (3)</td>
<td>- High tech export (2)</td>
</tr>
<tr>
<td></td>
<td>- Life expectancy at birth (9)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Indicators for the Effects of IC (Andriessen and Stam, 2004, p. 14)

To solve the problem of the scaling of the indexes Andriessen & Stam normalize all measurements by subtracting the minimal value and dividing it by the total length of the scale, i.e. maximum value minus minimum value. The result is a number between zero and one for each indicator: zero denotes the threshold of uselessness and one the maximum value achieved. This requirement means in practice that a maximum value – which acts as a yardstick – needs to be defined separately for every indicator. The authors define rules for combining various value streams, arguing that when it comes to combining value, the additive rule \((1 + 1 = 2)\) is an exception. The so-called G-rule (=goal-oriented) is much more common and heavily recommended, according to which in order to achieve a certain goal a trade-off between different values is needed, i.e. the weighting of measures above a threshold value. When the different indicators are combined into one, Andriessen & Stam use “the correct combinatory rule” that follows from the value hierarchy. The exact implementation of the G-rule and the trade-off values nevertheless remain undefined. In practice, they combine the different indicators into a composite index based on speculative weightings instead of the established relations between the subcomponents (see Andriessen and Stam, 2004, p. 30).

7.3.3. **Applications put forward by Nick Bontis**

In “Benchmarking the Arab states” Bontis (2001 and 2004) rather successfully uses the concepts, metrics and indicators incorporated into the E&M model. However, the core problems of index formulation remain. For example, he uses seven indicators for the
National Human Capital Index of the countries, and weights each of them speculatively between 10% and 30% (Table 3, the last line). Also another problem is evident in the calculation of national IC, which is formed as a direct average of Market, Human, Process and Renewal Capital. These solutions are understandable, since some choices must be made in order to obtain any comparable results. However, the choices as such lack a reliable scientific basis, even if they are in the right ballpark, as in this case.

Table 3: An example of the weighting of metrics (Bontis 2004, p. 26)

<table>
<thead>
<tr>
<th>Metric</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
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Weighing | 30% | 10% | 12% | 10% | 13% | 10% |

H1 HC02 literacy rate
H2 HC03 number of tertiary school per capita relative to highest value
H3 HC51 number of primary teachers with required qualifications
H4 HC16 number of tertiary students per capita relative to highest value
H5 HC111 percentage of primary teachers with required qualifications
H6 HC25 percentage of male grade I net intake
H7 HC25 percentage of female grade I net intake

Even if Bontis is partly trapped by the impreciseness of the E&M model, he also develops it further – and lays the ground for devising solutions to some of the problems embedded in it. He does a remarkable job in analyzing inter-relational dependencies (correlations) between the IC components and the financial figures. The results of his study show that the inter-relational dependencies of different IC components range from negative to positive, significant and non significant. Furthermore, different IC components may relate to the level of GNP (here interpreted as financial capital) either directly or via other IC components (Figure 4, Bontis 2004, p. 31).

The results are important as they clearly indicate that the weighting of components may be based on the analysis of inter-relational dependencies rather than speculative choices.
In a more recent study based on Bontis’ approach the inter-relations have been studied in more detail (Bontis and Wu, 2005, see also Bontis, 2002). The results show that the internal dynamics of IC are nested and complex: whereas Human Capital in this study seems to enforce economic performance only moderately (Figure 5, upper section), it relates strongly to economic performance via Process Capital, as does Innovation (Renewal) Capital (Figure 5, lower section). Thus, many of the IC components rely on each other and must be calculated through the inter-relational effects. This case study indicates, for example, that Innovation Capital must be factored into a comprehensive IC index by taking into account the level of Process Capital, i.e. the high level of Innovation Capital has an effect only when Process Capital is also on a high level.

Bontis’ study is an important contribution to IC research, on both the micro and macro levels of analysis. The core finding also supported by other research results (e.g. Cabrita and Vaz, 2006) is, that IC components, as well as their inter-related connections and dependencies, affect economic performance, but non-directly, in an interconnected and dynamic manner.
Figure 3: The empirical results concerning the direct and indirect impact of elements of intellectual capital on performance (Wang and Chang 2005, pp. 230-232)
7.3.4. Open questions

Researchers using the E&M model for indicator-based analysis need to solve the following problems:

1. How should Structural and Organizational Capital be defined? Are they only composite blocks constituted of their subcomponents, or do they have their own content? For instance, does Structural Capital have unique metrics or indicators that as such do not refer to Market Capital and Organizational Capital?

2. How should one choose the relevant indexes? Is there a problem when moving from the micro to the macro level?

- The national perspective on IC and its measurement opens up a set of specific problems. These are linked partly to the established IC taxonomy and partly to the fact that the national perspective differs from the corporate perspective, not only in scale but also intrinsically. When micro-level models are applied directly to the national level, the hypothesis in the IC community is that they function in a similar way. However, we might not find the same kind of indicators on company- and national-level balance sheets – and even if they are to be found, their functions may be different. For example, how should we understand the significance of brand value as part of Market Capital on a national scale, or R&D investments as part of Renewal Capital given that R&D is effective only when it results in sufficient project-specific funding? Furthermore, the inter-relational dependencies between indicators and IC components may or may not be the same on a national scale.

3. How should we calculate the composite IC index from lower-level components? For example, is Structural Capital to be understood as a sum, as a weighted sum, or as a product of Market Capital and Organizational Capital?

- These questions have been solved either through the straightforward use of the 1:1 summation (Marr, 2005; Marr and Starovic, 2005) or through simple benchmarking (Bontis, 2001). In the latter case the highest value or score of a specific metric is set to 100 (or 1), and the same metric for comparatives is expressed as percentages (or ratios) of the highest. This is an adequate and acceptable solution when dealing with only a few metrics, but when the number grows (as is always the case when using the E&M model with around 20 metrics per block) the comparison becomes diffuse, even impossible. This is why the problem is often solved by using general summations, i.e. the higher-level index is produced as an average or weighted average of its underlying metrics (e.g. Bontis, 2001). However, this results in an illusion of clarity at the cost of reliability and adequacy, since the procedure lacks theoretical justification.

4. How should upper-level indexes be compared? For example, Educational levels and Years of practical experience are both part of Human Capital, but how should
these (together with other Human Capital metrics) be factored in and thereby produce the final national Human Capital index?

- This is a question of determining the proper weighting of indexes when producing higher-level indexes, and of identifying the most significant indicators for each IC metric. Bergheim (2005), for example, argues that Human Capital can be measured exactly through only one indicator, years of education, as all other indicators are linked to and reflected in it. If this is true, adding further indicators only mixes up and distorts the results if not weighted with full accuracy.

5. How should metrics, indexes and cross-nation comparisons be scaled? What are the principles for making IC comparatives across cases?

This problem arises when the focus shifts from mere levels of IC (e.g., levels of education) to its effect on national wealth creation. When the focus is on the latter it is a question of both finding a methodology that will identify its effect as an economic driver together with other drivers of the economy (e.g., natural and financial resources) and identifying the developmental and socio-economic dependencies affecting the economy. For example, when the openness of trade has been proven to be a single effective (IC) driver (Miller and Mukti, 2000; Söderbom and Teal, 2003; Neuhaus, 2005), how are we to weight this in cases like China or Russia?

7.4. Ante Pulic’s Value Added Intellectual Coefficient

A totally different approach towards defining and measuring the effect of IC on economic performance is proposed by Ante Pulic (2000, 2003 and 2005). He was the first to focus explicitly on the connection between IC and economic performance and to operate solely with financial indicators. Unlike the other researchers in the field of economic IC (e.g. Hwang et al., 2003) Pulic uses established IC concepts. His model ties Human and Structural Capital to economic figures and produces an unambiguous Value added intellectual coefficient (VAIC) index as the output. The model has been applied in various companies as well as for regional and national purposes. It has also been referred to by other researchers, but has not yet been analyzed or further developed.

Pulic’s VAIC model measures the extent to which the economy produces added value based on intellectual efficiency or by exploiting intellectual resources. VAIC calculations (Figure 6) are based on:

a. Human Capital (HC), which is interpreted as Employee Expenses
b. *Structural Capital* (SC), which is interpreted as the difference between *Produced Added Value* (VA) and *Human Capital* (HC).

Efficiency figures are calculated as ratios of:

- *Capital Employed Efficiency* (CEE)
- *Human Capital Efficiency* (HCE)
- *Structural Capital Efficiency* (SCE).

Theoretically, VAIC is a relational index in which produced *Added Value* is compared to *Capital Employed* and *Human Capital*. When *Added Value* is zero (or negative) VAIC may take negative values. The calculated VAIC index normally ranges between 1 and 3, and in practice it is created by the sum of the ratios of value-added to capital employed and *Human Capital* as employee expenses.

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**Figure 4: The construction of the Value Added Intellectual Coefficient VAIC**
7.4.1. Conceptual problems

In terms of calculating Intellectual Capital Efficiency (ICE) VAIC follows the applications – and problems – of the E&M model, as ICE is the net sum of Human and Structural Capital Efficiency. However, compared to the E&M applications VAIC takes a clear operational approach, and to some extent gives clear metrics for all its concepts on the corporate, regional and national levels of the economy (e.g. Sitar and Vasi’c, 2004).

Results based on Pulic’s model have been contradictory concerning the influence of IC on economic growth. Some cases have revealed a clear relation between VAIC and economic performance (Pulic, 2000, 2003 and 2005), but in others there has been no evidence of such a relation (Kujansivu, 2006; Kujansivu and Lönnqvist, 2007; Firer, 2003). This exposes two basic problems inherent in the model.

First, Pulic implants the IC concepts into economic analysis rather loosely, e.g., uses Personnel Expenses as a substitute for the concept of Human Capital. The problem becomes evident in the cross-national comparisons according to which, for example, among the highest levels of IC efficiency in Europe are, surprisingly, Greece and Italy (Pulic, 2003, p. 6). This result is possible since Human Capital is calculated solely in terms of personnel expenses, and wages and salaries vary from country to country and are strongly dependent on socio-economic factors. It is evident that results calculated in this way mainly refer to other components than IC.

Secondly, the same problem occurs when Value Added minus Personnel Expenses (VA – HC) is used as a substitute for Structural Capital. When Human Capital in some logical (although limited) way can be linked to Personnel Expenses, the linking of Structural Capital to the difference between Value Added and Personnel Expenses is difficult to justify on any basis.

7.4.2. Calculation problems

An interesting application is the use of VAIC in order to establish a connection between companies’ market value and their IC. In this VAIC is used to explain the difference between the market and the book value. Here Pulic uses the straightforward hypothesis that companies’ market value is in direct proportion to Capital Employed and VAIC (Pulic, 2000, p. 3; see also Williams, 2000). He succeeds in showing that a company’s VAIC and its market value have a tight correlation (Figure 7), and even if “the VAIC method is primarily focused on the measurement of value creation efficiency of resources it also provides a possibility to calculate the approximate market value of companies which are not noted at the stock exchange” (Pulic 2000, 3, p. 39).

24 For comparison: Italy’s IC is one of the weakest in the EU countries according to Andriessen & Stam, 2004.
Figure 5: The relation between market value and VAIC (Pulic, 2000, p. 40)

Pulic claims that companies’ market value can be calculated de facto from their Capital Employed (CE) and VAIC. However, according to the VAIC calculation the results expose the general value trends of company stocks, which always tend to rise according to:

- capital employed (CE)
- high value-added performance (when value added per human capital (VA/HC) and value added per capital employed (VA/CE) are high)
- low cost structures (when the difference between added value produced and human capital per value added (SC/VA) is high).

Because VAIC is based on these figures, it is clear that both developments go together. For this reason it does not really give any new knowledge about the development, but takes instead some chosen economic figures and uses them as a separate index, very much as only a index for economical efficiency per se (see also Kujansivu and Lönnqvist, 2007).
In spite of the above shortcomings, Pulic makes a brave start both in opening up a new perspective on IC and in understanding its function. He transfers the core IC concepts to the economics context and gives them purely economic interpretations. Thus he makes IC computable by presenting rather straightforward formulae for calculating the value-added intellectual coefficient, or the VAIC index. The core contribution lies in the fact that various IC components, such as Human and Structural Capital, are certainly reflected in the company and national balance sheets. However, the challenge ahead is to disclose this reflection in more explicit and reliable detail.

7.5. Baruch Lev’s intangible driven earnings

The third model, developed by Baruch Lev (2001; Gu and Lev, 2002), offers a completely different method compared to the two presented above. His approach focuses explicitly on the economic effects of intangibles, and the roots of his thinking are in no way in the IC taxonomy of three. His genuine interest is purely economic, but unlike Pulic he exposes the effect of intangibles without using any explicit indicators or definitions.

Referring to the economic effects of intangibles, Lev simply divides the source of (all) economic performance into three categories, physical, financial and intangible. He transforms intangible driven earnings into financial figures by reducing the effects of physical and financial driven earnings on total earnings. Accordingly, the effects of intangibles cannot be measured directly, but they can be measured as a residual from the effects of physical and financial driven earnings. As a result, the intangible driven earnings identified this way are ratios or percentages of overall earnings.

Lev’s approach focuses on measuring the real effects of active intangibles, not on measuring or even defining the intangibles themselves. This is, in fact, both the strength and the weakness of the model. In some sense it is undisputable that the sources of economic performance are physical (e.g. plants, properties and equipment), financial (e.g. cash, stocks or financial instruments) or intangible (e.g. brands, processes and human resources). The weakness in Lev’s model is, however, that it lacks the detailed indicators of the intangibles. Thus the very concept of intangibles remains unexplained and hidden. This rather complicates matters, since calculated in this way we do not in fact know what has been measured. Lev (2002) defines intangibles as “a source of future benefits that doesn't have a physical embodiment” but in practice it is difficult to know what kind of elements they cover. In any case, Lev’s concept of intangibles is more extensive that the established IC taxonomy of three, including necessarily also such elements as strategic position and market demand, which are not included in physical or financial driven earnings.

This may be the reason why Baruch Lev – despite the revolutionary results attained – is not more established in the field. On the other hand, his method has been criticized for being too complicated and difficult to apply (Steenkamp, 2003). The main difficulty is in explicitly determining how return on physical and financial assets is to be calculated. Even if the approach is theoretically sound, defining financial and physical assets
explicitly in figures may cause problems in practice. However, Lev has extensively elaborated the problem (Gu and Lev, 2002).

Figure 6: Intangible driven earnings based on Baruch Lev

Many researchers have applied Lev’s model to national stock markets (e.g. Colwell et al., 2001 and 2007). In all cases, the results have proved that companies in the same industry with the greatest share of intangible driven earnings also manage better in the long term, i.e. from five to twelve years (Gu and Lev, 2002). This result is noteworthy for two reasons. First, Lev was the first to show reliably the influence of intangibles on future earnings, and secondly, the same dependency between intangible driven earnings and economic performance has been verified also by other researchers.

Lev’s context of measurement is micro economic, but the model has successfully been applied to stock markets on a national scale. The method may have an important contribution to make in attempts to grasp the effect of IC on the national level. However, further development is needed. Lev’s approach could be refined, for example,
by conducting a comparative analysis of companies with high and low percentages of *Intangible Driven Earnings*. The similarities and dissimilarities may open up the elements of IC and give a more detailed picture of intangible drivers.

7.6. Towards the identification and measurement of national IC

The three IC approaches described above have both strengths and weaknesses from the measurement perspective. How reliably are the models able to identify national Intellectual Capital? How valid and reliable are they in terms of measuring it? Are they capable of showing the influence of IC on economic growth?

In terms of identification, the taxonomy of three – initiated by Sveiby and further developed by Edvinsson and Malone – has had a major influence. In concept and structure it makes it easy to communicate about IC, even if as such IC is a highly complex and abstract phenomenon. This is its most valuable contribution. For measurement purposes on the other hand, the E&M model is too general, even if it has served as a good basis for the first-generation measurement methodologies. It gives some general guidelines for choosing the indicators for different IC categories, but no principles for calculating the weightings or the indexes. Finally, it does not focus at all on the influence of IC on economic growth.

Pulic’s model takes an important step forwards in linking IC concepts to financial figures, but at this stage it confuses the basic concepts: their meanings change and become diffuse as the relations to financial figures are based on semantic intuition more than analyzed facts. The challenge ahead it to clarify how different IC components are reflected in the financial figures on the balance sheet of a company or a nation.

Neither the E&M model nor VAIC is able to establish the connection between IC and GNP growth through cause and effect. Cause and effect (of IC) necessarily involves either 1) the concepts of time or 2) the concept of inter-related dependency. Measuring IC levels and comparing them to GNP does not de facto reveal whether high GNP is the precondition for high IC or vice versa. It may well be that high IC is the antecedent of high GNP, for example the result of investments made possible through high GNP driven and sustained by non-IC factors (rich countries can afford higher education). Likewise, a high VAIC does not really reveal whether the added value is caused by market factors, i.e. by the difference between supply and demand. Neither model differentiates the cause and the effect.

Baruch Lev, on the other hand, is excellent in terms of demonstrating the effect, but he totally loses the essence of IC. This makes it difficult to identify what is behind the effect, i.e. what is really meant by intangibles. Evidently the residual from financial and
physical capital also includes factors other than those included in the established view on IC, such as in the strategic or market-based perspectives.

The three IC approaches discussed in this chapter (Figure 9) focus on three facets of the same phenomenon, IC and its dynamics. The model developed by Edvinsson & Malone gives the conceptual tools and building blocks for understanding IC; Ante Pulic’s model links IC in a structured manner to economics, and suggests the close connection between IC and economic performance; and the model put forward by Baruch Lev links economic performance to the real effects of intangibles. Thus the three models complement each other, and all make a clear contribution to IC research in general, and to IC measurement on the national level. However, there are still several open questions concerning national-level IC measurement, that have not been dealt with properly in any measurement approaches. These are introduced in the next section.

Figure 7: The contribution of the presented models to IC identification and measurement

7.7. National IC – measurement black spots

7.7.1. How could the effects on the economy caused by IC and other drivers be delineated?

The most frequently used way of showing the effect of IC on the national economy is to calculate correlations between IC indicators and GNP. However, this may be misguided because the method does not recognize that 1) there are also other drivers that influence
economies, such as natural resources, whose share in the national economy must be
excluded before the IC-based effects are calculated, and 2) the level of GNP as such
says nothing about its annual growth rate or growth trend.

Many national IC measurements have dealt with this problem. For example, in their IC
evaluation of EU countries Andriessen & Stam found no statistical correlation between
GDP and IC assets, but there were significant correlations between the effects of *Human*
and *Relational Capital* and GDP per capita. “This indicates that the effects we are
measuring are not only the result of intellectual capital, but also the effect of financial
wealth. This may explain why Germany and Luxembourg score high on effects but
much lower on assets.” (Andriessen and Stam, 2004, p. 23). Bontis also takes up this
issue. In measuring the IC of the Arab countries he points out that the effect of natural
resources – such as oil – also needs to be accounted for. He clusters Arab states into the
rich and the poor, and analyzes IC behavior in each group separately (Bontis, 2004, p.
32). In another study (Firer, 2003) the effect of natural resources in South Africa is
assumed to explain why this country with high GNP and high productivity still has a
low VAIC index.

National wealth is influenced by various economic non-IC drivers, which need to be
acknowledged in order to expose the true relation between national IC and national
economic growth. Focusing on GNP is misguided, especially when it comes to nations
relying heavily on natural resources such as oil and energy, as these non-IC-based
drivers alone produce high GNP levels. Likewise, having a high GNP, like most
developed countries, does not necessarily ensure that growth is IC-driven: it could also
be vice versa in that IC is produced as the outcome of wealth. The research task would
then be to adjust GNP by reducing the effect of non-IC drivers in the economy. This
should be evident, even based on the E&M model, as it clearly contains *Financial*
*Capital* as a (mainly neglected) non-IC driver affecting national wealth, e.g., GNP and
GNP growth. Furthermore, in order to distinguish between causes and effects, it is more
informative to following developments over time than to measure the levels at a certain
point. Thus the focus of the analyses must be transferred from GNP levels to GNP
growth trends (see Ståhle and Ståhle, 2007; Ståhle and Bounfour, 2008). Most of the IC
measurements have focused on its level, although it is evident that this cannot be
regarded as an equivalent measure of its general effect.

7.7.2. **IC as an economic driver is dependent on the developmental stage of a
country**

National economic drivers (IC level being one of them) are heavily dependent on the
GNP level of the nation, and thus they are contextual in nature. The economic basis of a
nation determines which set of IC drivers is most effective in boosting the economy
(WEF, 2007). The preliminary results of Ståhle and Ståhle (2007) and Ståhle and
Bounfour (2008) show that IC drivers of the economy (calculated in terms of IC-related indicators) have different effects on and relations with GNP growth:

a. **Sustaining effect**: the present level of the indicator correlates with the present level of GNP annual growth.

b. **Boosting effect**: the present level of the indicator correlates with the GNP annual growth trend.

c. **Linear growth potential**: the growth trend of the indicator correlates with the present level of GNP annual growth.

d. **Exponential growth potential**: the growth trend of the indicator correlates with the GNP annual growth trend.

Furthermore, the study found that the effect of a driver varies according to the developmental stage of the nation, and tends to saturate, i.e. to lose its power to enforce economic growth. Not surprisingly, all of the saturated IC drivers were found in economies with both a high level of GNP/capita and low or medium GNP growth rates. The saturation process could clearly be identified by analyzing the effects of the IC drivers separately according to the developmental stage of the economy. Saturation occurs mainly in two ways:

a. Drivers may turn into necessary *pillars* of developed economies, e.g. education in general. As this takes place over time the most saturated drivers are to be found in developed economies, e.g. the loss of mass-production efficiency as a competitive advantage or the transfer of literacy as an IC driver into media literacy in developed countries.

b. IC drivers are bound to *time and context*, e.g. technical knowledge and technology usage have a limited lifetime. Technological drivers cannot be merely transferred and repeated indefinitely in the expectation that they will endlessly enforce national wealth creation as such, or even work as they used to. As a challenge for developed economies this calls for continuous renewal and knowledge enhancement.

These and similar findings (e.g. Ortiz, 2006) highlight the necessity to acknowledge both intrinsic variations in IC drivers and their contextual dependency, i.e. that the effects of different IC drivers are specific and are dependent on the developmental stage of the nation (e.g. Weziak, 2007; Manuelli and Seshadri, 2006).

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25 For the correlation analysis GNP was not corrected by taking into consideration nation-specific physical or financial drivers, i.e. natural resources. The countries were divided into three groups based on their economic levels, which to some extent corrected the errors, as those in the same groups had relatively similar economic structures. In order to verify and produce more reliable results the analysis will be conducted using corrected GNP values.
7.7.3. **The next-generation measurement of national IC**

The models and approaches used until now for measuring national-level IC and its economic effects form a good basis for further development. The results gained this far goes back to the groundbreaking conceptual work and the development of various methodologies by the IC community, starting from the initial work of Karl-Erik Sveiby and continuing to the present. In striving to gain ever more reliable knowledge on the effects of IC, however, we need the established measurement practices of the next generation.

In this sense there are at least six challenges to be met:

1. The inaccuracies in the definitions of the IC categories must be clarified. The current confusion reflects the choice and use of indicators, and results in various different applications in the analysis. This makes general cross-case comparison impossible.

2. The fit between the IC concepts and the corresponding a) statistic indicators and b) financial figures must be confirmed.

3. The problem of constructing composite indexes based on lower-level indexes must be solved in a scientifically reliable manner based on the interdependences of the subcomponents and their connection with economic growth.

4. The influence of non-IC drivers on GNP must be acknowledged in order to facilitate reliable analysis of the economic effects of IC.

5. Hypotheses concerning the similarity of micro- and macro-level indicators and their economic effects need to be proved correct or incorrect. The differences and similarities must be explicated from the measurement perspective.

6. The state of the economy must be taken into account in analyses of the effects of IC on GNP, since the IC drivers tend to saturate, and the dynamics of the effects are different at different economic levels.

The strategically sound steering and development of national IC will be possible after these problems, or some of them, are solved. Accurate and precise identification of the effect of specific IC components and their inter-relational dependencies will give decision makers a powerful tool for steering knowledge intensive economies.
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ON THE RELATIONSHIP BETWEEN INNOVATION, INTELLECTUAL CAPITAL AND ORGANIZATIONAL UNLEARNING

RONGBIN W.B.LEE

Abstract

Intellectual capital has long been recognized as a source of innovation. The term innovation capital is used by some researchers to highlight this connection. However, there are different types of innovation varying from product, process, and market innovation to organizational innovation. It has been pointed out that different types of innovation make demands on various components of intellectual capital. In addition, the higher forms of innovation, such as organizational innovation demand more flexibility from its human capital requiring it to unlearn as well as to learn. Whereas organizational learning builds up the corporate memory and structural capital, organizational unlearning contributes to reflective learning and double loop learning and enhances the organization’s ability to innovate. The emergence of the science of knowledge ergonomics and knowledge neuronomics are opening up new research paradigms in knowledge management and intellectual capital management.

8.1. Introduction

Karl-Erik Sveiby says his working life has been a journey of unlearning. "My first job was as an auditor, unlearning what I had learnt about accounting in the university. It took two years 1972-1974 and I also learned that I was not fit to be an auditor. It took me six years as a manager in Unilever to unlearn the accountant experience."……During that period he was co-founder and editor of Sweden's first management magazine, Ledarskap, and Sweden's first newsletter covering the consulting industries, Konsultvärlden, in which he supported Swedish managers unlearning what the American management gurus tried to teach…..He continues his lifetime passion for "unlearning." (http://www.kwork.org/Stars/sveiby.html)

Among the many ground-breaking ideas which Prof. Karl-Erik Sveiby has introduced into the field of knowledge management, the intellectual asset as a new source of strategic advantage has laid down the rich soil for the growth of the intellectual capital movement up to the present (Sullivan 2000). The work of Sveiby (1997) in Sweden, published originally in Swedish, addresses the human capital dimension of intellectual capital and has inspired a lot of thinkers and practitioners worldwide.

The acquisition of knowledge assets and their effective management have now been widely recognized by policy makers and researchers to be the key source of innovation and drivers for competitive advantage for firms, organizations, cities and regions, and
have attracted great attention from governments worldwide. At the organizational level, the factors affecting the process of innovation and value creation are interconnected. In the knowledge economy, successful firms and organizations no longer just compete on products and services per se, but also compete on the underlying capabilities that make the products and service sustainable, i.e., the innovation capability that is based on intangible assets and on intellectual capital. The reporting of intellectual capital and the management of intellectual capital serve as an effective and practical change agents in implementing system innovation. The above are often invisible in financial statements, but represent all the important assets such as human capital and structural capital embracing technologies, skills, organizational capacity, management philosophy and customer networks.

Many different researchers have come up with different concepts of innovation in the business value chain. How are these concepts related to various components of intellectual capital? How is this capital built up in an organization? These are some of the issues addressed in the following sections.

8.2. Institutionalization of Innovation

According to the Merriam-Webster dictionary, innovation is “the introduction of something new, and can appear as a new idea, method or device”. The Department of Trade and Industry, UK refers to innovation as “the successful exploitation of new ideas”. This implies that it is not just the invention of a new idea but also that the idea can be brought to market. As distinguished from invention, innovation is the transformation of those ideas into value creating outcomes.

As distinguished from invention, innovation is non-random, i.e., innovation can be systematic. The transformation of new ideas into a value creating process can be institutionalized, and is thus closely related to the intellectual capital of an organization. In other words, innovation can be brought about in an organization systematically and can be embedded and ingrained in the business process, management philosophy and culture of organization, as an asset that an organization can cultivate and manage. TRIZ, the acronym for “Theory of Inventive Problem Solving (Genrich 1984)” is a successful example of systematic innovation that builds organizational know-how and assets in innovating technological product and process. The conceptual approach of TRIZ comprises the way from a concrete problem over an abstract problem to an abstract solution and from there to a concrete solution (Moehrle 2005). This is a good embodiment of the knowledge conversion process as described in the SECI model of Nonaka (1995), in which knowledge is socialized, internalized, combined and externalized to come up with the visualized products.

The OECD OSLO Manual 1992 and 1997 versions used the technological product and process definition of innovation. Over time, it has recognized the need to include manufacturing and service innovation activities in addition to technological development. In its 2005 version, the OSLO Manual also included organizational
innovation and marketing innovation. Four types of innovation are identified as: product, process, marketing, and organization innovation. As mentioned, innovation at the organizational level is non-random and can be embedded in the intellectual capital of the business process. Whereas TRIZ is structural capital for innovating product and process, different types of innovation will require emphasis to be placed on different components of intellectual capital (Fan and Lee 2007).

8.3. Innovation and intellectual capital

Bontis and Choo (2002) dissected Intellectual capital into three sub-domains, namely human capital, structural capital and relational capital. Human capital refers to the knowledge, skills, experience and capability that an individual’s own and contribute to the organization. The structural capital encompasses the capability of the organization including process, infrastructure, systems and intellectual properties. The relational capital deals with the relationships with external entities such as customers, suppliers, partners and alliances. All these intangibles contribute to the systematic innovation capability of an organization.

![Figure 1 – 3-Dimensional model relating various intellectual capital components and innovations](image)
At the macro-level, innovation capital can be expressed as a function of the sub-domains of intellectual capital. Figure 1 shows a three dimensional model relating human capital (HC), structural capital (SC), and relational capital (RC) to the different types of innovation, namely: product, process, market and business innovation. It will be most favourable if a company has resources in all three dimensions, as the vertex of the cube. However, it is also possible that a combination of various degrees of resources in the three dimensions are needed for different results. It is further suggested that different type of innovation require different degrees of resources and not necessarily maximum amounts in all three dimensions.

For instance, product and process innovation will require a high level of structural capital (SC) along with a good measure of human capital (HC). Relational capital (RC) can be relatively smaller but also needs knowledge of customer requirements and some market intelligence. For market and business innovation, a high RC is a key success factor where HC and SC are relatively less important. Their relative positions in the quadrant are shown in Figure 1. The successful market innovation of the Octopus of the Mass Transit Railway of Hong Kong and the supply chain innovation of Li & Fung Ltd. for examples rely more on their relational capital (i.e., their customers, alliances and suppliers) than on their structural capital (Fan and Lee 2007).

8.4. Organizational Learning and Intellectual capital

Adapting the business value chain of Kaplan (1996), Marti (2001) developed a framework for an Innovation Capability Benchmarking System (ICBS), in which a differentiation is made between two types of core capabilities, namely between design and development on the one hand, and manufacturing, marketing and service, on the other. The first type of capability is referred as the innovation intellectual capital whereas the latter is referred as the operation intellectual capital. Such differentiation follows closely the technological product and process definition of innovation of the 1992 OSLO Manual published by OECD. However, as shown in Figure 1, product and process innovation rely more on structural capital such as exemplified by TRIZ. Other forms of innovation would demand a different type of innovation capital.

Among the various attributes of intellectual capital, the quality of its human capital, that is exemplified by its learning capacity and capacity for change, is the most relevant in assessing the market and business innovation potential of an organization. The importance of organizational learning in the building up of intellectual capital and even financial performance has received much attention from researchers (McGraw et al 2002). The ability of an organization to sense changes from its environment, to adapt to changes and to learn, have become one of the key management issues in fostering systematic innovation.

At the basic level, the main purpose of organizational learning is to detect and correct errors and misfits within the existing governing principles, values and policy of an
organization (Aygris and Schon 1978). There are two types of organizational learning which are not often differentiated in the literature on intellectual capital, namely, exploitative learning and reflective learning (Figure 2). In exploitative learning, the knowledge needed to complete a task is generally well catered for by the organization's routines that are codified. Examples of such learning include inspection of products to check their compliance with quality standards, the follow-up action from the annual appraisal of staff performance, the selection of suppliers and contractors, etc. Learning of this type at the organizational level can be called *exploitative organizational learning* (EOL). EOL makes use of available collective knowledge for continuous improvement. The aim of this kind of learning is to restore the existing status-quo of the operating conditions within the existing parameters and policy of the organization. The exploitation of the first kind of organizational knowledge in order to achieve organizational goals forms the main content of what constitutes knowledge management and intellectual capital management.

There is a second type of organizational learning which can be called *exploratory or reflective organizational learning* (ROL). ROL shifts from the mastery of discrete and external pieces of knowledge by its members or groups (such as procedures for the implementation of TQM etc.), to the collective exploration of new values, methods, and governing principles to guide institutional actions. In addition, this higher form of organizational learning is said to be reflective, as learning is inward-focused, i.e., towards learning about the organization itself (its attitudes, beliefs and values, etc.), learning itself (i.e., learning how to learn), and rethinking and relearning things they believe they already know. This type of learning is more related to organizational unlearning as changes in beliefs and routines in organizations are involved (Akgun et al. 2007), and it is important to the development of the ability of an organization to innovate.
Figure 2  Exploitative and reflective organizational learning

The exploitative type of organizational learning is indispensable to the building up of the structural capital of organizations (i.e. in continuous improvement). However, it is not so effective compared with the reflective type of learning that leads to innovation (to doing different things). Reflective learning is closely related to unlearning. There is growing evidence that the capability for both individuals and organization to acquire new knowledge depends not only on how quickly they can adapt to the external changes, but also depends on how ready they are, and on whether they have the capacity and space for the new knowledge, that is, their inherent level of unlearning potential. The meaning of unlearning is discussed below.

8.5. What is Unlearning?

Unlearning means different things to different people, and different words used in different disciplines may in essence refer to some kind of unlearning process. Examples are: intentional forgetting, unfreezing, unframing, sense-unmaking, emptying, and even brain-washing. On one hand, it is important to realize the context under which unlearning is developed. On the other, it is also worthwhile to appreciate the common
points of the various underlying concepts. Only in an established and specific disciplinary matrix where common values and assumptions are well developed, do people tend to have agreed words and shared meanings. The meaning of unlearning will be discussed from the perspectives of socio-biology and social change.

According to Freeman (1999), unlearning is the dissolving of existing meaning structures, together with the meltdown of cognitive and emotional structures that are counter to socialization, and are a prelude to new learning. This is brought about by the release of neuro-hormones in the brain which modify our behavior. Examples are found in many mammals such as in tigers and sheep. When a mother delivers her litter, oxytocin (also found in humans) is released to enhance the bonding between the mother and her offspring, which would otherwise be difficult. The adoption of a new behavior is assisted by brain chemistry. Neuroscience thus becomes indispensable in explaining much of the behavior exhibited in unlearning.

Schein and Warren (1965), considered two of the founders of organizational psychology, developed a model that explains how attitudes change according to Lewin's basic change model of unfreezing, changing, and refreezing (Lewin, 1951). Human change, whether at the individual or group level, is a profound, psychological dynamic process that involves painful unlearning without loss of ego identity, and difficult relearning as one attempts to restructure one's thoughts, perceptions, feelings, and attitudes.

Unlearning implies the re-examining of the governing principles, values and norms in the design of action. Figure 3 shows the framework for single loop and double loop learning (Agyris and Schon 1978). When the desired consequence or results are not obtained, people will adjust or change their action strategies according to the goal they set, but will leave the governing principles or values unchanged. This is single loop learning. If a disconfirmation of ones’ assumptions and belief occurs and the "quasi-stationary equilibrium" is de-stabilized, this would trigger unfreezing and double loop learning. This involves a change in the values and governing principles, and a reframing of actions is made. If a learner practices new action strategies from the existing governing principles, values or assumptions, there would be no unlearning and no new learning. One thing worthy of note is that as we grow older, the nature of our learning process become more isolated (less interaction with the world compared with our childhood), our meaning structures becomes more complex and more rigid. The more we learn the more specialized we become and the more difficult it is for us to understand one another and unlearn. This partly explains the high degree of learning disabilities that develops among professionals and mature organizations.
Unlearning in an organizational setting means organizational forgetting in order to implement change; which implies discarding existing knowledge in order to improve performance. Deeply entrenched knowledge is a barrier to new learning. When the change involves creating knowledge that is outside the boundary of the organization's practice, resistance is high. People do not typically question the assumptions behind established routines and practices. Even in incremental change, over-reliance on existing rules and procedures or "encased learning" may lead to small improvement only. This is especially true for professionals as well as for organizations that are well established. This accounts for the fact that young people and newly-formed companies have the highest learning abilities when properly motivated. The demography of the human capital of a company bears a relationship to the propensity of the company for innovation and change.

8.6. Innovation Capital and Organizational Unlearning

While single loop learning results in the accumulation of lessons learnt and “good practices”, it helps relatively little to increase an organization’s potential for innovation. The redesigning of governing principles and values through the process of organizational unlearning and double loop learning that leads to cultural change is indispensable for harnessing the innovation capital and capability for the higher forms of innovation such as those needed for marketing and business. Relatively little research has been conducted in relating organizational unlearning to innovation capital.
The various drivers underpinning innovation capital and hence innovation capability are shown in Figure 4.

**Figure 4. Drivers underpinning innovation capital and innovation and the various sub-components of intellectual capital**

Innovation capital is more invisible than traditional structural capital and is best defined in terms of the quality of that part of human capital that is related to human reflective learning skills and to the ability to unlearn. In Figure 4, the contribution of structural capital to innovation capability is different from the contribution of innovation capital. This difference is shown by the different widths of the arrows. The connection of traditional structural capital in terms of existing know-how, process and artefacts to innovation is weak, or sometimes these may even be barriers to new knowledge. The major contribution comes from the innovation capital at the organizational level (in doing different things) which implies a cultural change accompanied by the re-designing of the values and beliefs that are stored in the corporate memory of an organization and accumulated through the exploitative type of organizational learning (see right hand path of Figure 4). Such a redesigning in the pursuit of organizational knowledge involves unlearning, which is basically a right brain activity (concerned with values, beliefs, emotions, etc) as compared with left brain activities (concerned with procedures, logics, rationality and objectivity etc).

However, it must be emphasized these two activities of organizational learning and unlearning are not mutually exclusive as they support each other just like the way the
two halves of the brain work together. Traditional research in understanding intellectual capital and innovation management focuses more on the development of human resources and organizational knowledge which are shown on the right hand side of Figure 4. The new science which merges cognitive psychology, economics, brain studies, and ergonomics gives us a deeper understanding of the development of the human capital needed for innovation. Whereas knowledge ergonomics (Edvinsson 2002) addresses how the human-environment system should be designed to enhance knowledge sharing and building, such as the provision of “Ba” (Nonaka 1998) in knowledge conversion, knowledge neuronomics address how the brain chooses to abandon or acquire certain knowledge. Knowledge ergonomics and knowledge neuronomics have opened up a new research paradigm in intellectual capital management.

8.7. Conclusions

Innovation and its management is a key issue for not only technology organizations but also for service organizations as the boundary between these two is slowly dissolving. These issues are extensively researched from the perspectives of technology management, organizational development, strategic management and recently intellectual capital management. Whereas product and process innovation stipulate the exploitation of structural capital of a company, its know-how and skills etc, the higher forms of non-technological innovation (such as market or business model innovation) demand that part of the human capital that is concerned with learning and unlearning capability. The unleashing of such potential requires an unconventional form of knowledge management, a multi-disciplinary approach that merges industrial and organizational psychology, social biology, ergonomics and neuroscience.

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9 HUMAN RESOURCE REPORTING AND MANAGEMENT IN THE FINNISH STATE SECTOR 26

VELI-MATTI LEHTONEN & GUY AHONEN

9.1. Introduction

The interest in human resource reporting (HRR) has varied tremendously over time (Gröjer and Johanson 1996). After Flamholtz’ seminal works in the 1960s the attitude has changed from enthusiasm in the 1980s to total disinterest in the beginning of the 1990s. The attitude has also varied among nations. The interest in HRR has generally been greatest in the Nordic Countries and smaller elsewhere. In Sweden HRR almost became mandatory by law at the end of 1980s and in Finland it became a very widespread habit in mid-1990s.

To some extent the Nordic interest in HRR can be explained by the political context (Ahonen and Gröjer 2005). The Nordic welfare model has been conducive to general transparency and worker participation. The great Finnish interest can be associated with the great economic slump that the nation experienced at the beginning of the 1990s and a rising belief in knowledge as a general vehicle of economic progress that grew at that time.

The State sector and its organizations have in Finland gone through an immense transformation and development process, starting from the years of the economic recession in the beginning of the 1990’s. Due to organizational changes and the re-establishment of job descriptions, the number of State personnel working in the field of budget assessment has decreased from its peak of 215 000 in 1988 to 122 000 in 2007.

The State administration is strongly dependent on its intangible assets. There is a great dependence of internal structures (Sveiby 1997) as public sector activities are by their nature very regulated by procedural and principal norms. To accomplish their tasks state sector organisations also are very dependent on their relations to related organisations, typically to other ministries or the Government, therefore being dependent on their relational or external capital (Edvinsson and Malone 1997, Sveiby 1997). But most importantly, results in the state sector are reached mainly through personnel inputs. The current aim of the Finnish State sector is to have all of its responsibilities carried out as efficiently, economically, and effectively as possible (Ministry of Finance 2008). Therefore, structural and functional reforms are expected of organizations. The general

26 The essay is based on Veli-Matti Lehtonen’s doctoral dissertation thesis “Henkilöstöjohtamisen tehostaminen valtionhallinnossa henkilöstötöntilinpäätösinformaation avulla” at Hanken, Helsinki 2007, for which Guy Ahonen was the main supervisor.
aging of personnel has resulted in increased recruitments as well as adapting the structure and skills of the remaining staff to meet increased productivity requirements.

To cope with the challenges brought by the changes in the work environment, a new type of management has been required, as well as new management tools and new knowledge related to the personnel. A human resource administration system has been created for the state sector in order to ensure this. The state sector has been using this system since 1995. The information in the system forms a standardized set of definitions, concepts, and classifications, which enables both joint use and comparative use of the information, as well as analyses. Now that the state sector has used the human resource administration system for over a decade, more than 90% of its organizations maintain a Human Resource Report (HRR) in some form or other.

The aim of this essay is:

To present how human resource reporting is integrated to the management of state sector organisations in Finland and to examine the feasibility of collecting HR data within the State sector HRR framework.

9.2. The theoretical framework

The theoretical base for understanding the recent development of the Finnish state sector development are as follows 1) personnel reporting theories, 2) the rise in popularity of New Public Management leadership models, 3) the history of personnel reporting in public administration and the private sector, and 4) personnel process-based strategic management in the Finnish state administration. This accounts further for why conducting HRR in the state administration has increased greatly and what type of effect this has had on the improvement of working communities, management and efficiency.

Human Resource Accounting (HRA) commenced in the United States only nearly 50 years ago. Flamholz has created the actual theoretical base for HRA (Flamholz 1999). HRA identifies and measures human resources and conveys it to relevant stakeholders. Among the groups that require information are the management and executives of an organization, the employees, and the owners in their different capacities. HRA contains the information related to the costs to a company and other organizations of the recruitment, selection, hiring, orientation, training and the state of the personnel from several points of view. Ultimately it is a matter of the economic value the personnel holds for an organization.

Flamholz (1999) mainly used a cost-based approach to consider human resources in theoretical models and he used examples of companies where HRA had been implemented. Costs in HRA turn into crucial components and investments, which then have an effect on the value of human resources.
Falmholz used the elements of the administrative processes of human resources as a starting point for human resource management. In addition to describing the contents of these processes, Falmholz describes the costs of each process and the effects of different procedures on the value of personnel. According to Falmholz, human resource management is a system where personnel inputs are turned into personnel profits (Falmholz 1999, 12-19). The inputs consist of people, in other words individuals, personnel groups, and the entire organization. The transformation process consists of individual personnel management procedures. These are acquisition, development, allocation, preservation, utilization, evaluation, and rewarding. The main objective of HRA is to offer information that is required in the aforementioned management processes.

The purpose of financial reports and financial statements (the income statement and balance sheet) is to give owners and investors information of the wealth and profitability of an organization. The practice in which investments into human resources are included into expenses instead of assets, however, distorts the income statement and the balance sheet.

Falmholz suggests four ways in which the annual human report of an organization can be presented 1) a “letter” from the top management, 2) a statement of intangibles, 3) formally unrevised additional financial statements, and 4) including personnel investments into the regular financial statement (Falmholz 1999).

9.3. New Public Management in Finland

The public sectors of western countries have gone through an immense process of transformation and development in the past quarter of a century (Almqvist 2004). The external characteristics of this have been the decrease of bureaucracy, dismantling of multilayered organizational structures, lowering of the hierarchical structures of organizations and management, and the decrease in the number of personnel. The aspiration has been to establish commercial enterprises and incorporations out of public utilities that provide services for the citizens, the public administration, and the economic sector. Efficiency, effectiveness, and economy became the principal values in the transformation of the public sector. Models for the transformation were sought from the business sector. Public organizations were to be made smaller, their hierarchies lower, and their functions more innovative, and supportive of profitability. Personnel management was in need of a change, through which the traditional characteristics and virtues of the public service structure, such as stability and uniformity, were to give way partially to flexibility, freedom of activity, and result-centeredness (Lähdesmäki 2003, 15).

These doctrines described as New Public Management became especially popular within the state administration of Finland in the late 1980’s. This was manifested as a wide-range establishment of commercial enterprises and incorporations of public
utilities, as well as the implementation of the model of result-oriented management, and in connection to this, result-based budgeting. One feature of this improvement program has been the closing down of central government agencies and the merging and shutting down of other central government organizations. At the same time some of the responsibilities of these organizations have been transferred to the ministries, to newly founded or already existing organizations as well as to regional and local state administrations.

The strategic and political responsibility of directing state administration lies with the Parliament, Council of state and different Ministries. The Ministries make result agreements with their subordinate agencies and departments, setting out the responsibilities these are to conduct in practice. Furthermore, duties set forth in a result agreement may be delegated on to municipalities. The state’s system of accounting was renewed in 1997. Result-oriented management has thereafter been constantly developed by perfecting accountability and the related accounting procedures.

The Ministry of Finance is currently in charge of a program entitled “The action program for the productivity of public administration and service production.” Each branch of administration and their subordinate agencies and departments are responsible for implementing the program (Ministry of Finance 2003). Attention is focused on organizational management; operation processes; the utilization of technologies for handling data and information; and first and foremost, on the skills, work ability, and motivational factors of personnel. As a consequence of the productivity measures the number of state personnel will decrease by an estimated 12% by the year 2015.

Since the 1990’s Office for the Government as Employer has worked in collaboration with the head labour market organization for government agency employers and employees and been in charge of conducting vast developmental measures. These measures have concerned the system for negotiations and contracts, remuneration, management, the development of the working community, and work ability. The creation and development of systems for data and information that support the activities of the employer and negotiations, and human resource management has also taken place in the same context. The true catalyst for this development work was the report of the personnel committee’ report completed in 1990 (Komiteamnietö 1990) and the following principal decisions of the Council of state (VNp 7.3.1991; VNp 30.8.2001; VNp 23.03.2006).

9.4. Human Resource Accounting and Reporting from the 1990’s onwards

The HRA applications in the Finnish state sector from the 1990’s rely more or less on the theories and practices presented by Flamholz. The base for these applications and calculations was the theory of human resources value, in other words, the idea that the actions of personnel create added financial value for an organization. Information of labour costs and the utilization of working hours are often used as a basis to form indicators and HRA.
Several scholars have had an influence on the formation of the human resource reporting system of the Finnish state sector. Gröjer and Johansson published in 1996 an influential book on Human Resource Costing and Accounting (Gröjer & Johansson 1996a). Sveiby’s writings on the creation of the wealth in knowledge-intensive organizations and their role of competence in achieving results (Sveiby 1997) has been highly acknowledged. Ahonen (Ahonen 1992 and 1998) developed applications of HRR’s and took them into practice especially in the business sector. Lehtonen was responsible for the development, implementation, and utilization of the human resource administration system and related HRR for the state sector (Ministry for Finance 1994, 1996, 2000, and 2001).

According to Gröjer and Johansson, the purpose of human resource calculations is to advance improved decision-making (Gröjer & Johansson 1996, 24). Ahonen maintained that HRR is a crucial document needed for the external communication about the personnel capital of an organization (Ahonen 1998, 33, 49). In the state sector, the human resource administration system and the HRR conducted from it is meant primarily to be a development and decision-making tool for the strategic management of an organization (Ministry of Finance 2001).

The information of calculus systems related to personnel management consists of key figures related to personnel costs and investments as well as presenting personnel in the income statement and balance sheet of the organization. Ahonen suggested that the key HRR key figures should be divided into three categories (Ahonen 1998, 143): labour force, including working years as full year equivalents, working hours performed out of entire working hours, overtime performed and permanent employment relationships; individual personnel characteristics, including average salary, years of training, skill-index, education and development costs, sick-leave percentage, and the work ability index; work community indicators, including data on the organisational climate, work-related stress, and customer satisfaction. Key figures are needed from at least two years to indicate the direction of development, although more years can be used for comparison as well. The human resource administration system used by the state sector uses to a large extent the same components as Ahonen’s model. The human resource management system contains information needed for strategic management, including current personnel inputs; the need for personnel; the motivation, competence, and working ability of the personnel; personnel investments, incentive remuneration; results; and the capital worth of human resources (Ministry of Finance 2001a, 33). The recommendation within the state sector is that personnel information and key figures should be presented in a five years series.

In the year 2001, 16 % of companies and 56 % of municipalities provided HRR’s (The Centre for Occupational Safety 2006, 45). In the municipal sector, HRR’s are currently compiled by over 70 % of all municipalities. More than 90 % of state sector’s organizations conducted HRRs in 2006 (Lehtonen 2006).
9.5. Personnel process-based strategic management

Results are usually achieved in state organizations through personnel inputs, and most of the work is usually knowledge-based. HR management and professionals have a central role in carrying out strategies. The HR architecture must thus be fitted into the strategy of the organization. Management is expecting answers to the question “Which practices and politics lead to good functional and economical results?”

The forming of personnel value in the state sector is a result of the added value that the personnel produces for an organization: in other words, how productively and economically commodities and services are produced with human resources and how effectively set goals are achieved. This can be affected through personnel processes and the first-rate management of them. Personnel processes are the acquisition, placement, competence management, well-being management, performance management, rewarding, and productivity management of personnel. The theoretical foundation for the structure of personnel processes is based on an application of the input-output model of human resource management presented by Flamholz (1999, 12-19).

The state sector has had use of the human resource administration system and related HRR since the year 1995. The data-frame for the system was created in 1994 in an internal working group of the Ministry of Finance (Ministry of Finance 1994). As a result of this project a manual was published in December 1996, for state organizations titled: “The human resource administration system, HRR” (Ministry of Finance 1996). The manual depicted the broadly modelled information content of the human resource administration system. It also depicted the concepts, definitions, and classifications of this information, described the contents of the HRR-report, and described the utilization of the information as an aid for management. It was recommended in the manual that state organizations put the system into use. A group appointed to follow-up and further develop the HRR renewed the HRR-manual in 2001 (Ministry of Finance 2001).

When analyzing personnel data and establishing target levels, the management of an organization needs comparative data from similar organizations, other organization groups, and the entire state sector. For this reason the group appointed to follow-up and further develop the HRR chose approximately 100 key figures based on the information content of the HRR. These key figures were then monitored from the year 1997 onwards through a HRR-key figure questionnaire addressed to state organizations (Ministry of Finance 1997-2005).

The foundation for the human resource administration system and the HRR-information contained in it has been built on personnel management process-thinking, addressed further on in the study along with the theoretical and practical frame of reference. This is why HRR’s are a central information base when implementing process-based personnel strategy and through this achieving results in an organization.
9.6. Empirical analysis

9.6.1. Approach and data

To analyse the feasibility of the information gathered in Human Resource Reports in the state sector, the data was tested against the HR administration model developed for the state sector. The model is called the “personnel strategy based on personnel processes”. Indicators from the HRR were related to each of the processes in the model.

The aim of the study is to test empirically the personnel processes-based model depicted in Figure 1 in order to discover whether statistically significant dependencies can be identified between personnel processes and to discover whether there is a sufficient number of these statistically significant dependencies (Figure 1).

![Diagram of personnel management processes](image)

*Figure 1  The personnel management processes on the basis of the value and productivity of human resources*
In addition to the key figure questionnaire, the research material consists of the annual data of the change in work productivity measured according to productivity statistics in 23 organizations during either all or some of the researched years. This data was gathered by Statistics Finland.

The work satisfaction of personnel and related issues are analyzed more specifically in the years 2004-2005 on the bases of data from the VMBaro personnel questionnaire created for the state sector by the Ministry of Finance.

To discover the current utilization level of the HRR, a questionnaire ("The Questionnaire on the Utilization and Effectiveness of The Human Resource Report") was aimed at liaison people for HRRs in organizations in September-October 2006.

The research material in the case-description of Tekes (the Finnish Funding Agency for Technology and Innovation) is their HRR-information, key figure data from their budget proposal and score card, as well as other background material (for example, of their management system).

The starting point in the search for answers to the research problem is the analysis of management processes depicted in Figure 1. The effectiveness of HRR in implementing personnel strategic goals, which are in direct support of the functioning and productivity of an organization, is examined through research sub-questions related to different processes. An answer to the main research problem is sought through these sub-questions.

Regression analysis is used as the research method. It provides an accurate tool for the analysis of different dependencies and regulations affecting the implementation of components of personnel strategy. These dependencies and regulations are depicted through HRR-indicators. The analysis indicates what type of instrumental effect different HRR-indicators have in the implementation of productivity promoting personnel strategies and the improvement of management. The research results may provide possible solutions which can promote strategic management of human resources.

After several trial models, an assessment was made of the most descriptive models for each sub-question related to the main research problem of the study. The criteria for choosing the models were as follows: the theoretical bases presented in the study, the statistical significance of the variables contained in each model measured by t-tests, and also the total percentage of each model.
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<td>2. Personnel balance sheet</td>
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1. Acronyms of personnel processes: AC= acquisition, AL= allocation, CO= competence, PR=productivity, WE= well being, PE=performance, RE=reward, ST=structure and MO=motivation

**Figure 2** The main groups and subgroups of the data-frame for the Human Resource Report
9.6.2. Personnel recruitment

The analysis of the personnel recruitment process aimed at answering the following question:

Does the Sate sector’s HRR-information promote effective recruitment of personnel and what issues should in the future be taken into account when making the recruitment of personnel more effective in state administration?

To answer the above question, the regression model 1 was assessed in order to study factors connected to incoming turnover, which is an operative indicator of personnel recruitment (see model 1 in Figure 3). The results of model 1 as well as models 2-19 are depicted in Figures 3-5. Each assessed model shows the dependent variable, the constant term of the model, the independent variables and their regression coefficients along with their signs and statistical significances, the total percentage of the regression model (%), as well as the number of observations in the model and possible limitations of the material.

Of the independent variables of model 1, the following were in a direct connection to incoming turnover: the annual change of labour costs in fixed prices, the percentage of fixed-term employment, and the percentage of female personnel. The larger the size of an organization is the larger the incoming turnover. When exit turnover increases, incoming turnover naturally increases as well because new personnel must be recruited to replace those who have left. The higher the level of the education index within an organization and the more working experience in other organizations, the higher the incoming turnover. An effect related to the years being studied was found for incoming turnover because the incoming turnover decreases in years 2000 to 2005.

Model 1 shows that the level of education in an organization grows through new recruitment of personnel, which supports introducing the state sector’s strategic policies in practice.

The model shows that recruitment of personnel significantly increases the labour costs of an organization because of the costs of personnel replacement. To explain in more detail the positive connection between the incoming turnover of personnel and the increase of labour costs, model 2 was assessed (see Figure 3). It studied what factors explain the flux in the annual change of labour costs in fixed prices between different organizations. Labour costs increase when the share of personnel that has worked in the organization for less than a year grows. An increase in the share of fixed-term personnel also increases labour costs. The growth of fixed-priced training costs calculated per man-year has the same effect.

Model 3 has been utilized to analyze factors that explain the level of education from the point of view of personnel recruitment. The more specialists an organization has, the higher the level of education (see Figure 3). Organizations that have a high level of education also have a relatively large share of fixed-term employees in their personnel,
a high average-age of personnel, and an exit turnover which exceeds the median in state organizations.

The results show that personnel recruitment strategies should take into account problems arising from fixed-term employment and also the importance of keeping personnel in an organization, especially when it comes to higher education levels.

The results indicate that the HRR-system of state administration produces data which enforces effective recruitment of personnel. Furthermore, the research results show the importance of the additional costs caused by recruitment and reorganisation of personnel, the question of fixed-term personnel and the increasing level of an organization’s competence capital.
### Dependent variable

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<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
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<td>The annual changes of labour costs in fixed prices, %</td>
<td>Index of the level of education</td>
<td>Internal mobility of personnel, %</td>
<td>Total job satisfaction</td>
<td>Index of the level of competence</td>
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### Independent variables

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<th>Fixed-term personnel total, %</th>
<th>Female, %</th>
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<th>Exit turnover, %</th>
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- o = p<0.1; * = p<0.05 (almost significant); ** = p<0.01 (significant); *** = p<0.001 (very highly significant)

- 1 state personnel excluding university education
- 2 state personnel excluding university education and other educational and training services

Figure 3 The regression coefficients, statistical significance, total percentage of the regression models and number of observations of the regression models which are assessed in research (models 1-7)
9.6.3. Allocation of personnel

The analysis of the allocation process of personnel explored the question:

Does the state sector’s HRR-information promote effective allocation of personnel and what aspects should in the future be taken into account when increasing the effectiveness of personnel allocation in state administration?

How is the allocation of assignments materialized in government? Are the goals of personnel allocation met with regard to job satisfaction, continual development, and productivity? These questions were examined through regression model 4, where the dependent operational indicator of allocation is the internal mobility of personnel (see Figure 3).

When job satisfaction of personnel increases, internal mobility lessens. Job satisfaction is measured with an index valued between 1 and 5. The results reflect the fact that a person’s satisfaction with higher current work (for example, with the contents of work, the remuneration, the management and support of development in the unit) encourages him/her to remain in the current position. On the other hand, when job satisfaction decreases, changing the work unit is one of the attempts made to improve the factors behind job satisfaction. The more outside job experience the personnel of an organization have, the less the need there is for transferring jobs within the organization. The explanation to this is that in the beginning of a career the motivation in a new job is highest during the first years. At this time people are not ready to transfer to new work even within the same organization.

To conduct a deeper analysis of the research question concerning job satisfaction, model 5 was assessed (see Figure 3).

As internal mobility grew job satisfaction lessened. Great internal mobility reflects the discontent of personnel, as was shown reversely by model 4. The more an organization invests in personnel training the more satisfaction is found among the personnel in turn. The index of level of competence is compiled from both the internal and external working experience of personnel. As this index grew, job satisfaction improved als. This result proves the commonly known fact that people feel motivated and are not burdened by stress in their work if they have applicable and extensive competence. As the average-age of an organizations personnel increases job satisfaction lessens.

Based on the results of models 4 and 5, internal mobility would seem to be a consequence of the need to improve the motivation and competence of experienced and well educated personnel who has worked in the organization for a longer time.

The results indicate that the HRR-system in state administration produces data which advances the effective allocation of personnel. Furthermore, the research results indicate that it is possible to improve especially the motivation and competence of the discontented members of personnel through properly realized individual-based allocation.
9.6.4. Competence management

The process of competence management consists of discovering, generating, increasing, evaluating, and sharing knowledge, as well as leveraging knowledge (Jashapara 2004). Competence is a critical production input for knowledge intensive organizations that are typical within the state sector. Competence is currently and especially in the future considered the basis for the success of organizations.

In order to analyse the competence process of the state sector HR policy the following question was examined:

Does the state sector’s HRR-information promote effective competence management of personnel and what aspects should in the future be taken into account when increasing the effectiveness of competence management in state administration?

Factors connected to the level of competence were studied in model 6 (see Figure 3).

Since most of core competence at the organizational level is established through working experience, the average age of personnel is one of the most essential factors affecting the level of competence. It is also surprising that sick leave and the index of the level of competence have a very strong negative correlation. This reveals the fact shown in many studies and indicated in model 5 that the more competent a person is and the more interesting job assignments he/she has, the easier it is to cope and even enjoy work. This decreases work related stress and improves job satisfaction. These factors in turn have a decreasing effect on sick leaves (compare, for example, Karasek, Theorell 1990). This result is also supported by the positive correlation between job satisfaction and competence levels which means that job satisfaction is a fundamental part of competence.

Model 7 was used to study which factors are connected to competence management, i.e. the existence of a competence management procedure and the extent of conducted personnel training (see Figure 3).

As job satisfaction improves and the amount of sick-leaves lessens, the index depicting competent management rises. This result further strengthens the notion that developmental input into competence has a direct correlation to the improvement of job satisfaction and the decrease of sick leaves. Surprisingly, however, the more people with a higher level university education an organization has, the lower the index of competence management becomes. Could the reason perhaps be that in an organization with a large amount of highly educated people, competence surveys, for instance, have a lesser significance for identifying developmental needs for competence, and that the development of competence is mostly achieved by performing challenging work?
The results indicate that the HRR-system in state administration produces data which advances effective competence management of personnel. Furthermore, the research results indicate that competence management and related developmental inputs improve the motivation of personnel and decrease the amount of sick-leaves. However, among higher levels of education competence management is not considered important.

9.6.5. Well being management

Managing the well-being of personnel is a broad concept. It includes taking care of the job satisfaction of the personnel and its motivation as well as factors related to the maintenance and improvement of physical and emotional working ability. Indicators of well-being are: the job satisfaction barometer, the amount and frequency of sick-leaves, exit turnover, retirement due to disability, and different indicators of work ability. Each of these factors were analysed separately.

Regarding the processes affecting well-being, the aim is to study the question:

Does the state sector’s HRR-information promote effective management of the well being of the personnel and what aspects should in the future be taken into account when attempting to increase effectiveness of the management of well being of personnel in state administration?

Job satisfaction and motivation

Of the different personnel strategic indicators, job satisfaction is the most often used measure for depicting the working atmosphere, recognizing areas in need of improvement, and verifying the effectiveness of completed developmental measures. The Ministry of Finance has provided state agencies with a free of cost tool for measuring job satisfaction. The Ministry of Finance has provided state organizations from the year 2004 onwards with a further developed VMBaro-personnel questionnaire system.

What factors affect job satisfaction? This question has been researched through model 8 based on the key figure data of the HRR (see Figure 4).

When training investments increase, job satisfaction improves. Although the training of personnel is only one part of the improvement of competence, it reflects a more widespread positive attitude towards the development of competence. Thus the development of competence is one of the most essential means of improving job satisfaction. This is why an organization must invest in both the training of personnel and developing job skills. The strong positive correlation between job satisfaction and the development of personnel has been established in many studies (see, for instance, Crossan, Hulland 2002, 720-721). Job satisfaction has improved in the years 2000-2005. This is most probably a reflection of the positive results from the widespread
developmental steps undertaken by the State sector and its organizations related to the state of work environment and its management. Having a status of permanent employment also improved the job satisfaction of personnel although the correlation between these two did not approach statistical significance. Job satisfaction is lower with predominantly male personnel and with higher average age of personnel. This result emphasizes the fact that attention must be paid to the management of people of different ages and genders, so that the personnel remains functional throughout their working careers including the later years.

Model 9 examines job satisfaction. The research material was the information from the VMBaro questionnaire from the years 2004 and 2005, and it was assessed using a stepwise regression model (see Figure 4).

The desire to change workplaces explained the largest percentage (16%) of the variance in job satisfaction. As the intention of changing workplaces becomes stronger, job satisfaction lessens. A great threat is, therefore, that when a person’s job satisfaction worsens, he/she seeks employment elsewhere. This will be a notable factor in the near future as competition for capable workforce increases in the reducing job market. Thus, job satisfaction as a strategic and predictive indicator of human resources becomes all the more significant. Management is more satisfied than supervisors and experts. Other personnel who operates mostly in support services experience the least job satisfaction. When personnel grows older, job satisfaction worsens. Also when productivity increases job satisfaction improves.

The results indicate that the HRR-system in State administration produces data which advances the effective management of the job satisfaction of personnel. More specifically, the research results indicate that job satisfaction may be improved by investing in the development of competence. HRR-indicators also show that the willingness to change workplaces is highly positively correlated to job satisfaction. The results also bring forward the importance of applying different managerial approaches to personnel of different ages in the management of job satisfaction.
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<th>Model 10</th>
<th>Model 11</th>
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<td>Total job satisfaction</td>
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<td>Leaving turnover, %</td>
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<tr>
<td>Year</td>
<td>0.033***</td>
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<td>-0.413*</td>
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<tr>
<td>Index of the level of education</td>
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<td>Training expenses, euro per man-year (fixed price)</td>
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<tr>
<td>Average age, year</td>
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<tr>
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<tr>
<td>Male, %</td>
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<tr>
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<td></td>
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<td>-0.032*</td>
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<td></td>
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<tr>
<td>Primary fixed-term personnel, %</td>
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<td></td>
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<td>0.660***</td>
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<td>24.1</td>
<td>20.6</td>
<td>52.8</td>
<td>29.1</td>
<td>12.2</td>
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<td>4149 2</td>
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</table>

o = p<0.1;  * = p<0.05 (almost significant);  ** = p<0.01 (significant);  *** = p<0.001 (very highly significant)

1 State personnel excluding university education and other educational and training services
2 VMBaro data

**Figure 4** The regression coefficients, statistical significance, total percentage of the regression models and number of perceptions of the regression models, which are assessed in research (models 8-13)
Exit turnover

The exit turnover of personnel (changing work places to other organizations) is one of the central factors reflecting the well-being of the personnel of an organization.

The goal of the HRR-procedure is to identify the developmental and background factors related to exit turnover in order for management to be able to intervene with them. Exit turnover can be kept in check, again, through managerial procedures and programs that increase job satisfaction and working ability.

As depicted in model 10, when the share of fixed-term personnel and the share of payment for over-time per wage increase, exit turnover increases.

Working overtime depicts job satisfaction from the viewpoint of coping at work. As the amount of overtime increases, exit turnover grows indicating problems with coping with the amount of work. Model 10 also shows that the trend for exit turnover has been decreasing in the years 2000-2005. With, for instance, the help of the HRR-procedure, it has been possible to manage human resources in a way that has kept the exit turnover under control and even lessened it.

Does job satisfaction have an effect on exit turnover? This question was studied through model 11 (see Figure 4). As job satisfaction improves, exit turnover lessens. This result supports the results presented in the previous chapter according to which job satisfaction decreases as the willingness to change jobs increases. The model reveals the fact that by developing the working environment in a way that increases job satisfaction, the management of an organization can also control harmful exit turnover. As the productivity of work increased, exit turnover decreased. Thus exit turnover is a factor that must be taken into account when improving productivity.

The results indicate that the HRR-system in State administration produces data which advances the effective control of exit turnover. More particularly, the research results indicate that background factors for exit turnover are often the fixed-term status of employment and coping problems reflected by over-time pay. The research results bring good job satisfaction forward as a central factor in reducing exit turnover.

Sick-leave

Sick-leave is one of the most controversial personnel indicators, especially when discussing the strategic significance of sick-leave to human resource management.

Assessed on the basis of the key figure material, model 12 depicts the dependent variable and operative indicator of sick leave as the percentage of sick leave to regular working hours (see Figure 4).

As payment for over-time grew, the proportion of sick-leave to regular working hours for personnel increased. This is a consequence of the previously-mentioned coping problems, which appear as job related stress. The increase in the level of education has a
lessening effect on sick-leave. The reason for this phenomenon is probably that assignments which require higher education are more challenging and interesting when it comes to developing competence and the contents of work. Because of this, people might come to work even when sick. The level of education itself is an index of the dedication to work. The more females an organization has, the higher the amount of sick-leave. This is partially explained by the fact that average age of women in public administration is 2 years higher than that of men. Sick-leave for men is often longer than for women. The explanation for this phenomenon is that the sicknesses men and women suffer from are different in nature and severity, and the probability of absence (care-taking of one’s own health) for the women may be higher than for men.

In this study, the role of gender (the proportion of females) in increasing the amount of sick leave is smaller than in many other studies (see, e.g., Steel, Rentsch 1995). As the job satisfaction of the personnel of an organization grows, the amount of sick-leave decreases. Model 12 shows how, for example, overtime and job satisfaction reflect the effects of stress.

To conduct a deeper analysis of the phenomenon of sick leave, models 13 and 14 were assessed. These models examine the length of sick leave (working days/case) and the health percent (see Figure 4 and Figure 5).

Model 13 indicates that the older the personnel of an organization are, the longer the sick leave is in duration. Contrary to the results of model 12, the average age of personnel is a significant explanatory factor for the variance of individual sick leaves. Sick leave among personnel with higher education is clearly shorter in duration then among those with lower education. Also, when the share of women in an organization grows, the length of sick-leave shortens. This result proves the fact that women take shorter sick-leaves than men. This is probably due to the different reasons for sicknesses for women and men and to the severity of illnesses, as has been previously shown.

In model 14 the dependent variable is the health percent of an organization, i.e., the proportion of personnel not taking any sick-leave in the year (see Figure 5).

A larger share of men than women did not take any sick-leave at all during the year. This further supports the conclusions presented above. Also fixed-term employees were healthy throughout the year more often than permanent staff. A partial explanation to this could be the desire of a fixed-term employee to give the employer a positive image as a good and motivated employee.
<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Model 14</th>
<th>Model 15</th>
<th>Model 16</th>
<th>Model 17</th>
<th>Model 18</th>
<th>Model 19</th>
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<tr>
<td>Health percent</td>
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<td>-135.189</td>
<td>4.061</td>
<td>-159.990</td>
<td>63.731</td>
<td>-64.891</td>
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<td>Job satisfaction</td>
<td></td>
<td></td>
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<tr>
<td>with management</td>
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<td></td>
</tr>
<tr>
<td>Total job satisfaction</td>
<td></td>
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<tr>
<td>Labour productivity</td>
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<td>Labour productivity</td>
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<tr>
<td>Job satisfaction</td>
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<tr>
<td>with management</td>
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</tr>
</tbody>
</table>

Independent variables

| Constant            | 2720.514 | -135.189 | 4.061    | -159.990 | 63.731   | -64.891  |
| Fixed-term personnel total, % | 0.337*** |          |          |          |          |          |
| Female, %           | -0.284***|          |          |          |          |          |
| Exit turnover, %    | -1.369** | 0.069*   | -6.311*  |          | 0.034°   |          |
| Year                | 1.445*** | -0.017   | 2.958**  |          |          |          |
| Average-age, year   |          |          |          |          |          |          |
| Payment of overtime per wage, % | -0.061* | -39.913**|          |          |          |          |
| Index of performance management | 0.007** |          |          |          |          |          |
| Personnel training hours of regular working hours, % | 0.127* | 0.221*** |          |          |          |          |
| Personnel with post-graduate education, % | 0.011* |          |          |          |          |          |
| Rise in salary based on performance (number of people), % | 0.005** |          |          |          |          |          |
| Rise in salary based on job demand (number of people), % |          |          |          |          |          |          |
| Number of people (%) who have had result-based remuneration, % |          |          |          |          |          |          |
| The utilization of PBS-data in management | 19.664***|          |          |          |          |          |
| The calls of occupational health care / man-year |          |          |          |          |          | -0.142 |
| Goals for PBS-indicators |          |          |          |          |          | 0.137***|
| Total percentage of the regression model, % | 14.6 | 43.8 | 17.0 | 27.5 | 48.7 | 46.5 |
| Number of observations (n) | 336 ² | 42 ¹ | 72 ² | 57 | 19 | 109 |

o = p<0.1;  * = p<0.05 (almost significant); ** = p<0.01 (significant); *** =p<0.001 (very highly significant)

1 State personnel excluding university education
2 State personnel excluding university education and other educational and training services

Figure 5  The regression coefficients, statistical significance, total percentage of the regression models and number of perceptions of the regression models which are assessed in research (models 14-19)
A significant research result is that as the average-age of personnel increases, the health percent also increases. This shows that younger employees are absent more often than older employees. Elderly employees are healthier on an individual level than younger employees and give a larger work input when measured by workingdays. This proves the observation that many managers and human resource experts have made. The amount of personnel healthy throughout the year has decreased somewhat in the years 2000-2005; this indicates that the amount of sick leave among government personnel is slightly on the rise.

Management and other experts in charge of human resources should deepen their analysis of sick-leave so that measures of improvement may be allocated correctly. Research results show that measures taken to improve occupational health and working ability should be directed to all personnel groups and especially towards younger employees.

The results indicate that the HRR-system in State administration produces data which advances the effective control of sick leave. More specifically, the results point at the importance of taking into account how stressful or burdensome the work is. Sick leave concerns all personnel and all age groups and, therefore, measures of improvement must be directed at the entire personnel.

Generally, the results about the well-being at work indicate that the HRR-system in State administration produces data which advances effective management. More specifically, the research results indicate that in managing well being, special notice should be paid to the job satisfaction, exit turnover, and sick leave of personnel.

9.6.6. Performance management

In order to analyse the performance management process, the following question was pursued:

Does the State sector’s HRR-information promote effective performance management and what aspects should in the future be taken into account when trying to increase the effectiveness of performance management in State administration?

Performance management, together with an encouraging remuneration system, is an essential input factor when an organization aims to achieve productive, effective, and economic operations. The central directors (drivers) of performance for management procedures are motivational factors. The aim is to affect these factors through management procedures.

Whether performance management can improve the job satisfaction of personnel is studied using model 15 (see Figure 5).

The higher the index of performance management, the more satisfied the personnel is with management. Improving measures related to performance management in an
organization is the most central way of affecting satisfaction with management. Inputs in training – which also demonstrate a more extensive effort in development – also have an improving effect on satisfaction with management. This is natural, because developing personnel is a central part of performance management. The larger the number of individuals in an organization with a post-graduate education (a licentiate or doctorate), the more satisfied the personnel is with management.

With support from Office for the Government as Employer, vast programs and procedures concerning the development of management have been conducted or are currently being carried out in State organizations. They have had a positive effect on satisfaction with management, as model 15 indicates. Thus, job satisfaction in management has improved in the years 2000-2005.

The results indicate that the HRR-system in public administration produces data which advances effective performance management of personnel. More particularly, the results indicate that performance management is one method for improving the job satisfaction of personnel, where a stimulating factor is also input in personnel training.

**9.6.7. The reward system**

Although the procedure of HRR cannot directly affect remuneration, HRR-indicators can demonstrate the importance of salary as a factor that improves the motivation and productivity of personnel.

In order to analyse the reward system the following question was examined:

Does the State sector’s HRR-information promote effective rewarding of personnel and what aspects should in the future be taken into account when increasing the effectiveness of remuneration of personnel in State administration?

To clarify the matter model 16 – in which the dependent variable was job satisfaction was assessed (see Figure 5).

Of all the independent variables, only the variable indicating the personal portion of salary (“rise in salary based on performance”) produced a statistically significant $t$-test value. The larger the number of people in an organization who has gotten rises to the personal portion of salary, the more satisfied the personnel.

As pay for overtime increases, job satisfaction decreases (with a statistically nearly significant $t$-test value). Thus payment for overtime cannot be considered an encouraging salary factor but quite the opposite.

According to model 16 rises in salary based on the demand of the job or result-based remuneration decreased job satisfaction. Since measured by the $t$-test these dependencies were not statistically even almost significant, reliable conclusion cannot be drawn. It is probable, however, that portions of salary related to the demand of the
job or result based remuneration have a positive, yet lesser effect on job satisfaction than the personal portion of salary.

The results indicate that the HRR-system in State administration produces data which advances effective rewarding of the personnel. More specifically, the research indicates that the motivation and thus results can be improved in particular by encouraging remuneration tied to performance and competence.

**Productivity management**

The productivity management process of the research examines the following question:

*Does the State sector's HRR-information promote effective productivity management and what aspects should in the future be taken into account when trying to increase the effectiveness of productivity management of personnel in State administration?*

To solve this sub-question of the research problem models 17, 18, and 19 were assessed (see Figure 5).

The change in the work productivity of personnel is the greater the more the management of an organization utilizes HRR-information (model 17). This result shows that fundamental factors of productivity, such as competence and the basic elements of well being at work, can be affected by conducting concrete management and development procedures. These procedures are directed by the HRR-procedure and the HHR-indicators it contains. The fact that productivity increases with age is probably an indicator of how the accumulation of competence through experience and learning at work affect productivity.

How do factors related to the coping of personnel affect the change in work productivity? Model 18 brings clarity to this question (see Figure 5).

Although the model is based on a small amount of observation material, it indicates pay for over-time having a decreasing effect on the productivity of work. This demonstrates that the longer people work beyond regular working hours, the less productive they become, and the worse the results they achieve. Exit turnover is one of the consequences of coping problems, and this causes an additional cost to an organization through the loss of core competence. Therefore, it is natural that the development of productivity decreases as exit turnover increases. The amount of sickness, depicted by visits to occupational healthcare, has also had an adverse effect on the productivity of work.

Model 19 was used to study how setting goals for the personnel key figures and development inputs affects one of the base elements of productivity, namely how personnel experiences job satisfaction with management (see Figure 5).

The larger the share of working hours spent in training and the more precise the goals set for key figures of the HRR, the more satisfied the personnel of an organization was
with management. This demonstrates the importance of developing competence and directing with personnel key figures when it comes to productivity work.

The results indicate that the HRR-system in State administration produces data which advances effective productivity management of personnel. More specifically, the results imply that setting goals for the indicators can improve work productivity. The research results also demonstrate the significance of experience-based professionalism as an increaser of productivity and, on the other hand, the adverse effect of exit turnover and working overtime.

9.7. Discussion

The goal of this study was to examine whether the HRR-information produced in Finnish State administration promote the effective implementation of personnel strategy based on personnel processes.

The analyses seem to demonstrate that the HRR- procedure together with its strategic key-figure indicators is a functional and effective instrument for implementation of personnel strategies and improvement of managerial practices in organizations and the government conglomerate.

The strategic goal of an organization and the entire State administration is that operations are productive, effective, and economic. The results of this study indicate that when used in a goal-oriented fashion HRR-indicators as management instruments fulfil this aim of productivity. In addition to this general conclusion some specific observations were made.

Job satisfaction and indicators related to it rose to be the most important indicators for strategy-based personnel management. Other work well-being indicators, such as sick leave and exit turnover, also seemed important. Also indicators related to personnel allocation, competence management, and productivity management proved to be highly relevant.

Personnel in support services is the most unsatisfied personnel group according to work satisfaction evaluations. For this reason organizations should pay special attention to the development of the content of work and the competence of personnel in support services.

The results show that job satisfaction among all personnel groups can be improved by investing in the competence inputs of the personnel and striving for a constant increase in the level of competence.

The research reveals that measures of the amount of overtime constitute a central indicator for the coping of personnel with the demands of the work. In order for an organization to endure the problems caused by the magnitude of the work load, the organization must have a functional personnel planning procedure.
References


VNp 23.03.2006. Valtionneuvoston periaatelpäätös valtion henkilöstön aseman järjestämisestä organisaation muutostilanteissa.


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Professor in economics, University of Zagreb, Croatia. He completed his doctorate at the Zagreb Faculty of Economics in 1978 with the dissertation /The Role and Place of Market in Socialism. He has been working in scientific research for more than two decades having published five books and over 50 scientific articles. In 1988 he was guest professor at Institute for International Management in UNI Graz, Austria where he started his IC related research and co founded the Austrian IC Center. He has been focusing on intellectual capital performance since 1995 and is considered to be one of the IC pioneers worldwide. His major contribution to the development of measurement tools suitable for knowledge economy is the Value Creation Efficiency Analysis (powered by VAICTM software). He was one of the first in the world to start measuring value creation efficiency of IC at city, regional and national level next to corporate and sector level. He is author of the third national IC report in the world “IC- Efficiency of Croatian Economy – at National, Regional and Company Level”. He was the first mentor to a PhD student in the IC field in Austria, Croatia, Slovenia and Serbia. His VAICTM methodology is being used for scientific work by students worldwide. His professional appointments include Professorship in Economics at University of Zagreb, co founder of IC Center Croatia, President of Croatian IC Association.

Pirjo Ståhle

Professor at the Finland Futures Research Centre, Turku School of Economics. She has been involved in business renewal and innovation projects for more than 20 years and written numerous books and publications on organizational renewal. She has also served on many national and international expert panels in the areas of innovation, education and foresight. She was the country's first-ever Chief Knowledge Officer (Sonera 1998-2001) and her book on knowledge management (together with M. Grönroos) was the first Finnish book on this subject. In 2006, she was invited to become a founder member of the New Club of Paris, an international forum dedicated to knowledge society issues. Professor Ståhle has published several books and more than 100 articles in popular and scientific publications and given numerous lectures and presentations on themes related to organizational renewal, innovative management, and knowledge-intensive economy.
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Esheng Wang
Rob Weells


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