



THE INTELLECTUAL CAPITAL METHOD: OVERVIEW AND INTRODUCTION

(FINAL ANALYTICAL REPORT
ON THE SELECTED METHODOLOGIES)

Result 1
of the LLP Leonardo da Vinci
LEGEND project

centire



FH | JOANNEUM
University of Applied Sciences

WISSENSKAPITAL 

Abstract

This paper forms part of Result R1 “Final analytical report on the selected methodologies” developed by project partners with relevance to the Slovak context” which was due on 31 March 2014.

Suggested citation

Respective author(s) of the chapter (2014), in: The intellectual capital method: Overview and introduction. A result of the project: “Leverage knowledge for sustainable innovation and growth” (LEGEND), edited by Olejarova, D., European Commission – Life-long Learning Programme, Brussels: Education, Audiovisual and Culture Executive Agency.

JEL classification: J24, O32, O34

Date: 31 May 2014

LEGEND results: 1

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1. CHAPTER 1: INTELLECTUAL CAPITAL METHOD DESCRIPTION

1.1. INTRODUCTION

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The “knowledge economy” as a key word is used by all major international institutions (World Bank, OECD, European Commission). Intangible Assets or Intellectual Capital as the resources for the knowledge economy were identified simultaneously but independently by several authors in 1997 (Edvinsson and Malone, Stewart and Sveiby). Since these early efforts, the topic gained increasing attention in almost all business functions – private as well as public, for profit and not-for-profit. The Journal for Intellectual Capital (founded in 1999) is dedicated to publish research particularly to this resource and covers cases from all over the world. For a detailed report of the last 15 years research and application, please refer to John Dumay (JIC, 2014).

In this paper, we focus particularly on the story of “Wissensbilanz” as it emerged from early developments in the Austrian Universities in the mid-90s and the Austrian Research Center Seibersdorf, who published the first German Intellectual Capital Report (ICR) in 1999. After a brief historic review, we focus on the current state of the art of Intellectual Capital in Higher Educational Institutions in Austria at the end of 2013. We share three current case studies in Chapter 2.1. This working paper is part of a comprehensive EU-project “LEGEND” and is a delivery for Work Package 1.

1.2. BRIEF OVERVIEW OF IC REPORTING DEVELOPMENT

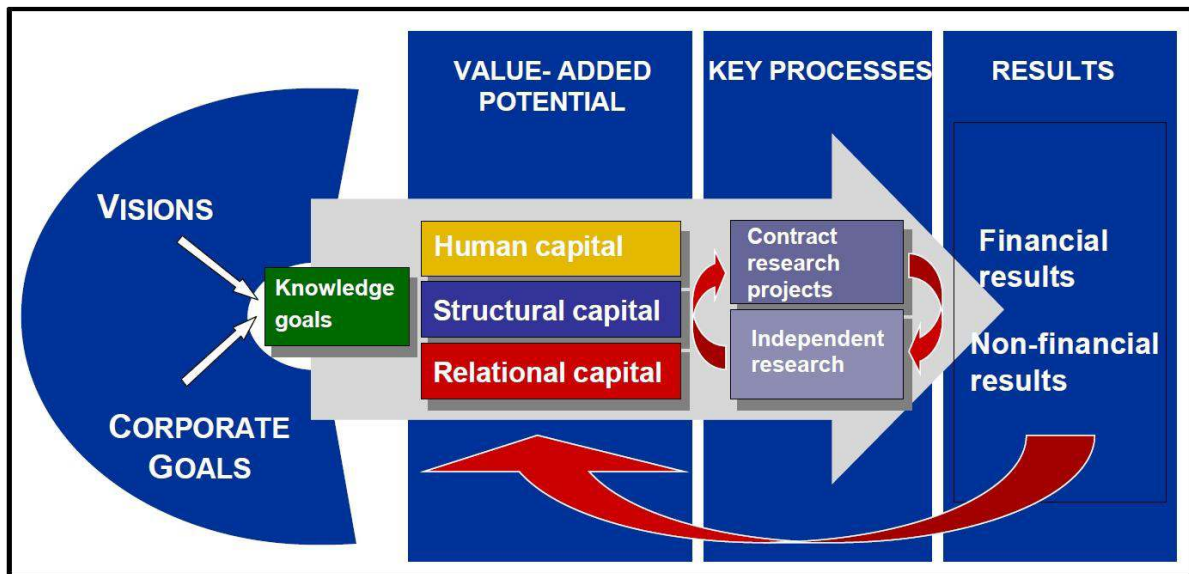
IC REPORTING IN HIGHER EDUCATION AND RESEARCH – HISTORICAL ROOTS

Research and higher educational institutions are more than most types of organizations proximately reliant on their resources of knowledge. Thus it seems self evident, that these institutions strive for an adequate management of these resources and are out for the collection of good and applicable practices for the matter of organizational improvement.

Being based on the original concept of “Intellectual Capital” (Edvinsson and Malone, 1997) one of the first examples of a model-based approach to structure, development and documentation of Intellectual Capital (IC) within an academic institution was accomplished by the ICR of the former Austrian Research Centers Seibersdorf (ARCS; today’s Austrian Institute of Technology) in 1999 being published by Koch et al. (2000).

The Intellectual Capital Report of the research center is based on an integrated process-oriented model (ARCS model; see Fig. 1). It reflects the cycle of knowledge within the institution and helps to visualize the development of intangible assets (e.g. non-financial results related to economic, research or society) while integrating tangible results as well.

Figure 1: The ARCS Intellectual Capital Report Model. Source: Koch et al. (2000).



After the definition of knowledge goals (ideally derived from the corporate strategy), the human, structural and relational capital is added and set within a framework to form the Intellectual Capital of an institution (Leitner, 2006). This intellectual capital contributes to successful implementation of research at the operating level and therefore adds value to the key processes (since ACRs' key processes contain contract and independent research). This model was implemented in DLR (Deutsches Zentrum für Luft- und Raumfahrt; Rudolph and Leitner, 2002) as a research organization as well as the Austrian National Bank with focus on financial institutions (Donnerbauer and Leitner, 2005).

The system based model was elaborated by Bornemann and Sammer (2003a) with the cybernetic dimensions of cause and effect relations (theoretical background can be found by Forrester et al., Stermann, Vester) and applied to Böhler Uddeholm (Sammer et al., 2003) and then applied in a research intensive network organizations in nanotechnology (Bornemann and Sammer, 2003b) and ecoenergy (Bornemann and Puttinger, 2004).

IC REPORTING WITHIN DIFFERENT ECONOMIC ENVIRONMENTS

By and large, the ICR Method is without major adoptions applicable to different economic systems and is not limited to research facilities and universities. Under Leadership of Leif Edvinsson, the AKWB Consortium (Arbeitskreis Wissensbilanz) was established in 2004. The project team (Alwert – Fraunhofer IPK, Bornemann – Intangible Assets Consulting, Kivikas – Wissenskapital) and further involved experts from Austria (Leitner), Germany (Heisig, North, Pawlowsky, Szogs), the Netherlands (Andriessen) and Nordic Countries (Edvinsson, Mouritsen) focused on using prior knowledge and experience on IC-Reporting in order to develop a new and more economical methodological framework for SMEs.

The German Ministry for Economic Affairs funded three phases of research. The corresponding projects were implemented at Fraunhofer Institute for Production Systems and Design Technology (IPK), Germany. The first aimed to develop and test a suitable framework as well as to publish a guideline for IC Reporting "Made in Germany". The next phase focused on

developing a software tool to support the data gathering process. The third phase focused on additional case studies (65 cases) to test both, the methodology as well as the software in specific situations such as very small start-ups, auditing requirements or network organizations. Results can be retrieved from www.akwissensbilanz.org and are documented in the new GUIDELINE 2.0 from 2008 (AKWB, 2008¹).

The methodology has been rolled out Europe-wide through the EU-funded project InCaS – Intellectual Capital Statements (ICS) for Europe (EC, 2008). The project was conducted by academic institutes (such as London School of Economics, Fraunhofer and Universitat Politècnica de Catalunya), SME associations in five countries collaborating with 25 SMEs and supported by an international expert group (Bornemann, Edvinsson, Kivikas, Leber, Leitner). The aims of the project were to systematically activate European businesses' Intellectual Capital, to establish the ICS as a management tool and to integrate national approaches on ICS in Europe. For the case study partners, Intellectual Capital Statement were drafted, implemented and evaluated in collaboration with the participating companies. As an outcome of the project, a European ICS Guideline was produced (EC, 2008)².

An overview about the actual state of the art and future developments of “Wissensbilanz – Made in Germany” can be found in Herrmann (2013). Nowadays, an increasing number of businesses, regions and other economic networks are using ICRs as an instrument of strategic planning and corporate policy development:

1. **Enterprises:** ICR were implemented in SMEs more than 1000 times (see www.BVWB.org). The methodology is increasingly part of mainstream management literature (see e.g. Bornemann and Reinhard, 2008; Bornemann, 2012) and part of management education programmes (Bachelor and Master programmes at private and applied Universities). The implementation procedures are well-developed and standardized – especially in Germany due to the work of Arbeitskreis Wissensbilanz and Fraunhofer Academy, who provide certified consulting training and auditing of IC reports (AKWB, 2012)³.
2. **Multinational companies** like Energy Baden Württemberg AG (Schmidt, 2013), Volkswagen, ZF Sachs, Kraftwerksschule E.V. (Bornemann and Otte, 2012) and others implemented ICR based on the AKWB model and use it as part of their management routines (see e.g. Alwert et al., 2009).
3. Application to **regional innovation systems and clusters:** Intellectual Capital can be considered as a major resource that is not only available within a specific company, but within larger systems such as regions and clusters. Examples for using the concept of IC in such systems include: regional innovation systems and machinery and metalware industries (Wiedenhofer, 2009, 2011 and 2012); firm-research networks (Bornemann, 2004) and clusters (e.g. automotive Baden Württemberg in Bornemann and Alwert, 2012, the EU-commission funded project “Cadic”⁴ implemented by AKWB, 2013).

¹ http://www.akwissensbilanz.org/Infoservice/Infomaterial/WB-Leitfaden_2.0.pdf

² http://www.psych.lse.ac.uk/incas/page114/files/page114_1.pdf

³ http://www.akwissensbilanz.org/Infoservice/Infomaterial/2012_Fit_fuers_Wissensbilanzaudit.pdf

⁴ http://www.cadic-guideline.org/fileadmin/user_upload/Cadic/Material/Support_Material/Case_Studies/CADIC_Case_Study_automotive_bw_v1.pdf

4. Current projects focus on the application of ICR to the **management of value chain** (e.g. in education in Bornemann and Wiedenhofer, 2013).
5. **Application to the health care sector:** Since 2013 the local government of Bavaria is testing on how to implement IC in the health care sector in order to raise process efficiency and employee motivation⁵.
6. **Status quo and future perspectives:** Consultants active in the field of implementing Intellectual Capital Reporting structures in SMEs as well as public organizations founded the association of IC consultants ("Bundesverband Wissensbilanz", www.BVWB.org) in 2012 in Germany and collaborate on further professionalization of their services. The next step will include integration of Intellectual Capital into the Integrated Reporting structures, which is an initiative supported by all major auditing companies and more than 300 large enterprises from all over the world (www.theiirc.org).

References

Alwert, K., Bornemann, M., Schmidt, U., „Wissensbilanzierung im EnBW-Konzern – Konsolidierung von Wissensbilanzen zu einem konzerübergreifenden Management-Cockpit“. In: Proceeding Professionelles Wissensmanagement Solothurn, Hinkelmann, K. & Wache, H. (ed.), GI. 145, 450-459, 2009.

Arbeitskreis Wissensbilanz (Alwert, K., Bornemann, M., Will, M.), „Wissensbilanz Made in Germany – Leitfaden 2.0 zur Erstellung einer Wissensbilanz“, Dokumentation Nr. 574, Deutsches Bundesministerium für Wirtschaft und Technologie, Oktober 2008, Berlin.

Arbeitskreis Wissensbilanz, Fraunhofer IPK, „Wissensbilanz - Made in Germany -Zusatzmodul zum Leitfaden 2.0 zur Erstellung einer Wissensbilanz - „Fit fürs Wissensbilanzaudit“, gefördert im Rahmen des Projekts „Wissensbilanz – Made in Germany: Phase IV“ vom Bundesministerium für Wirtschaft und Technologie (BMWi), 2012, Berlin.

Arbeitskreis Wissensbilanz (Alwert, K., Bornemann, M., Fridrich, A.), „CASE STUDY automotive-bw, Professional Intellectual Capital Management in the automotive industry of Baden-Württemberg“, Results from September 2010 until March 2013, CADIC Guideline, 2013, Berlin.

Bornemann, M., „Wissensbilanz als Controlling-Instrument für das Intellektuelle Kapital“ in: Klein, A.: Controlling-Instrumente für modernes Human Resource Management, Haufe, 2012.

Bornemann, M., Sammer, M., „Assessment Methodology to prioritize Knowledge Management related activities to support Organizational Excellence“. In: Organizational Excellence: Managing Information, Emerald, 2003a.

Bornemann, M., Otte, H.W., „Wissensbilanzierung bei der KRAFTWERKSSCHULE E.V. – Wie wir vorgehen, das Wissen der Kraftwerksschule systematisch zu steuern“, VGB Journal, 2012.

⁵ "ZFI und Transsektorale Versorgung von Wirbelsäulenpatienten" financed by Bayrisches Landesamt für Gesundheit und Lebensmittelsicherheit.

Bornemann, M., Puttinger, B., „NOEST (Netzwerk Ökoenergie Steiermark) Wissensbilanz 2004“, www.noest.steiermark.at, 2004, Graz.

Bornemann, M., Reinhard, R., „Handbuch Wissensbilanz, Umsetzung und Fallstudien“, Erich Schmidt Verlag, 2008, Berlin.

Bornemann, M.; Sammer, M., „Projektbericht NANONET Styria 2003 – Pilotprojekt Wissensbilanz als Steuerungsinstrument für Forschungsnetzwerke“, 2003b, Graz.

Bornemann, M., Wiedenhofer, R., „Intellectual Capital in Education - a Value Chain Perspective“, Proceedings of the IKFAD-conference, 2013, Zagreb.

Denscher, G., Hribernik, B., „Einführung einer Wissensbilanz in einem Profit-Center eines produzierenden Unternehmens“ in Pircher, R. (Ed.), Wissensmanagement, Wissenstransfer, Wissensnetzwerke, Publicis Publishing, 2010, Erlangen.

Donnerbauer, K., Leitner, K-H., „Knowledge for Stability: Die Wissensbilanz der OeNB“, personal manager, 2, 12-14, 2005.

Dumay, J., „15 years of the Journal of Intellectual Capital and counting“, Journal of Intellectual Capital, Vol. 15, Nr. 1, Emerald Publishing Group, 2014.

Edvinsson, L., Malone, M. S., „Intellectual Capital: Realizing Your Company's True Value by finding it's Hidden Roots“, Harper Collins Publishers Inc., 1997, New York.

European Commission, *Intellectual Capital Statements – made in Europe*, 2008, Berlin.

Herrmann, H-J., „10 Jahre „Wissensbilanz – Made in Germany“ – Stand und Perspektiven“, in Fischer, T., Wulf, I., „Wissensbilanzen im Mittelstand“, Verlag Schäffer-Poeschl, 2013, Stuttgart.

Leitner K. H., „Wissensbilanz als Instrument für Controlling und Reporting am Beispiel der Austrian Research Centers“, in Matzler, Kurt (Ed.), *Immaterielle Vermögenswerte: Handbuch der intangible Assets*, Erich Schmidt Verlag GmbH, 2006, pp. 261-275.

Leitner, K. H., Sammer, M., Graggober, M., Schartinger, D., Zielowski, C., „Wissensbilanzierung für Universitäten“, Bundesministerium für Bildung, Wissenschaft und Kultur, Wien, 2001. Retrieved 20 January 2013 from <http://www.weltklasse-uni.at/upload/attachments/170.pdf>

Rudolph, B., Leitner, K-H., „Research Organisations discover their intellectual capital: Experiences of the organizations DLR and ARC and the potential for comparing IC measures“, Conference „The Transparent Enterprise. The Value of Intangibles“, Autonomous University of Madrid, Ministry of Economy, November 25-26, 2002, Madrid.

Sammer, M., Bornemann, M., Denscher, G. und Horvath, W., „Wie man Intellektuelles Kapital steuert“. In: *New Management*, II/2003.

Schmidt, U., „Wissensbilanzierung und Unternehmenspublizität“, in: *Wissensbilanzen im Mittelstand*, Fischer, T., Wulf I., Schäffer-Poeschel Verlag, 2013, Stuttgart.

Stewart, T. A., „*Intellectual Capital: The New Wealth of Organizations*“, Doubleday/Currency, 1997, New York.

Sveiby, K. E., „*The New Organizational Wealth: Managing and Measuring Knowledge Based Assets*“, Berrett Koehler, (1997) San Francisco, CA. The chapter on measuring intangibles is available on-line: <http://www.sveiby.com/articles/MeasureIntangibleAssets.html>.

UASNET, „*The EDUPROF project: developing indicators of applied research*“, Final report (November 2011), Amsterdam.

Wiedenhofer, R., „*Key Drivers of Technological Innovation: Intellectual Capital View Approach*“, Intern. Journal of Transitions and Innovation Systems - Special Issue: Clusters, System of Innovation and Intangible for fostering growth: finding the keys for SMEs in transitional and developing economies, Vol. 2, Nos. 3/4, p.283-301, 2012, Inderscience Enterprises Ltd.

Wiedenhofer, R., „*Characterizing the Resource Base for Innovation within a System – a Factor Based Approach*“, Proceedings of the Conference „Management Services in the Knowledge Economy“, p. 434-443, July 2011, Famalicao, Portugal.

Wiedenhofer, R., „*Modellbezogene Analyse von Bedarf und Wirkung innovationsfördernder Maßnahmen am Beispiel des Industriesektors Maschinen und Metallwaren in der Steiermark*“, Dissertation, Technische Universität Wien, 2009.

1.3. INTELLECTUAL CAPITAL METHODOLOGIES

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BACKGROUND

The methods on how to evaluate performance have reached their limits. This becomes evident in especially Germany, where the lack of natural resources and from time to time financial capital, makes human and structural (organisational) capital extremely important to stay competitive on the global markets. However, more attention is being paid to the well being of “shareholders” rather than “stakeholders” in the present financial community and on the global financial markets. While the shareholders usually have a shorter investment horizon and focus their evaluation on the “net present value”, little attention is being paid to the development and sustainability of the “intangibles”.

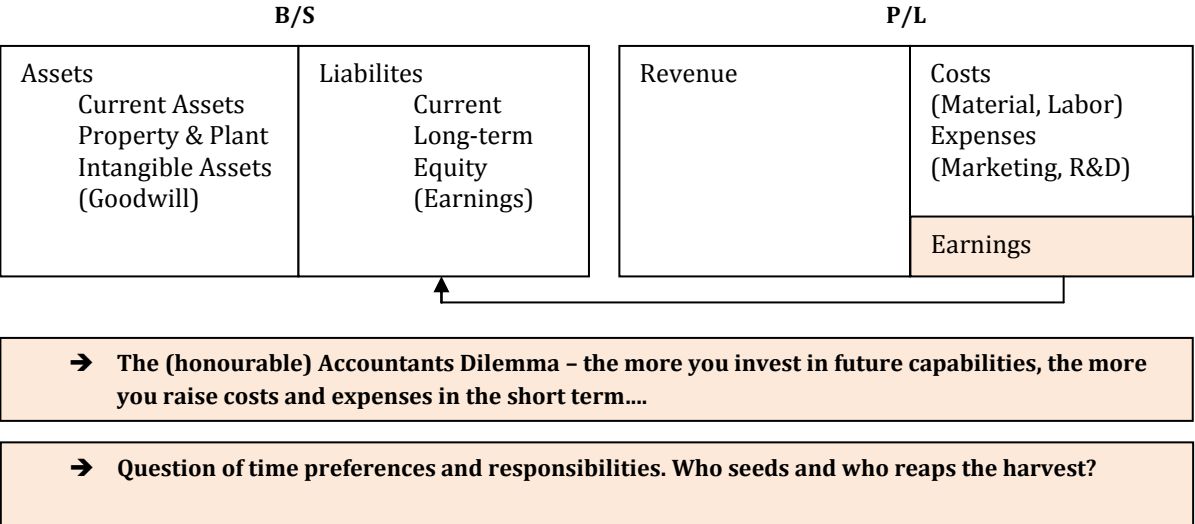
The best way to illustrate this is by depicting the accountant’s dilemma in Figure 2. Before the mantra “What gets measured gets done” (Drucker, 1954) ⁶ was introduced in the eighties, it was seen as common sense to focus primarily on “Customer Value” and to have satisfied employees. In Germany life-time employment made people feel secure in their workplace and it was assumed that this meant more time and motivation for innovation and knowledge sharing. It

⁶ Author: Drucker, P. F. (1954). *The Practice of Management*. Harper & Row – New York.

was assumed that when these two “stakeholders” were pleased, the profit would follow automatically. The revolution in information technology (IT) and the globalisation had changed this. Now it was possible to measure and calculate even the smallest expenditure in an organisation.

Moreover, business intelligence (BI) made it possible to link a specific cost to a revenue. Since the return on investments (ROI) became scarcer, greater emphasis was put on how to raise profit quicker than it had been possible before the IT revolution. Software made quantifiable information available in “real-time”; therefore, the management could speed up their decision process significantly. The profits (and the Stock Exchanges) went up extremely in the 80-ties and partly in the 90s, but came to an abrupt end with the bursting of the Internet bubble in March 2000. Ever since experts have been struggling to get an understanding of how sustainable financial value is being created and how to measure it outcome.

Figure 2: The Accountants Dilemma



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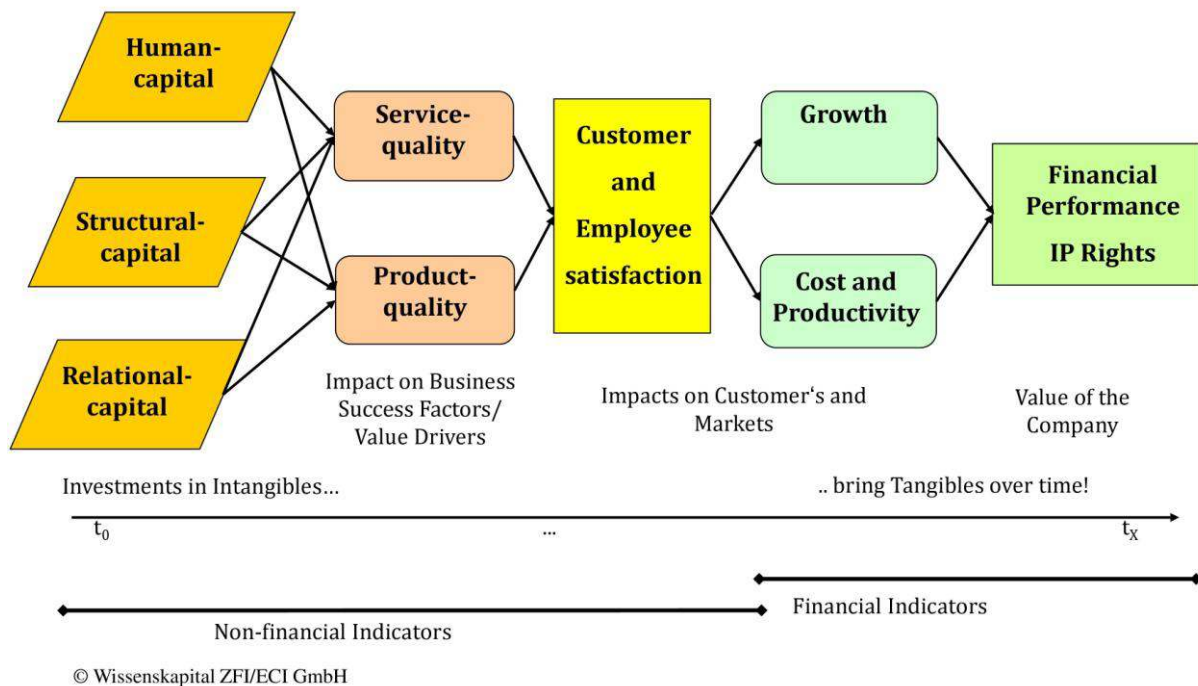
The accountant’s dilemma becomes clear when realising that with an increasing pressure orientation of managers (and politicians) becomes more and more short-term and “intangibles” suffer less attention. This is partly due to the technological development but also because the “shareholder value” has outscored the “stakeholder value” as the leading investment orientation. The nature of “intangibles” is a true reason of this. The “tangibles” have a direct and controllable impact on the profit. The “intangibles” do not have such an influence.

As Figure3 shows, the “intangibles” that need to build sustainable earnings over time are depicted on the left. They include **people and their skills** working within an organisation or a region. In addition, they comprise **structures or processes** within an organisation to put this know-how into an effective use for existing or potential customers. Moreover, the third dimension of Relational Capital is includes all **connections outside a firm** (customers, suppliers, universities etc.) that should be evaluated.

However, the investment in “intangibles” has an ROI usually longer than one year. In today’s extreme competitive environment, managers are not only being given less time to reach their profit goals but, in addition, they have to raise these goals every year. When taking into

consideration the indirect connection that the “intangibles” have to the profit, it is very difficult to quantify their ROI and almost impossible when the time horizons become shorter and shorter.

Figure 3: The Process of Sustainable Value Creation



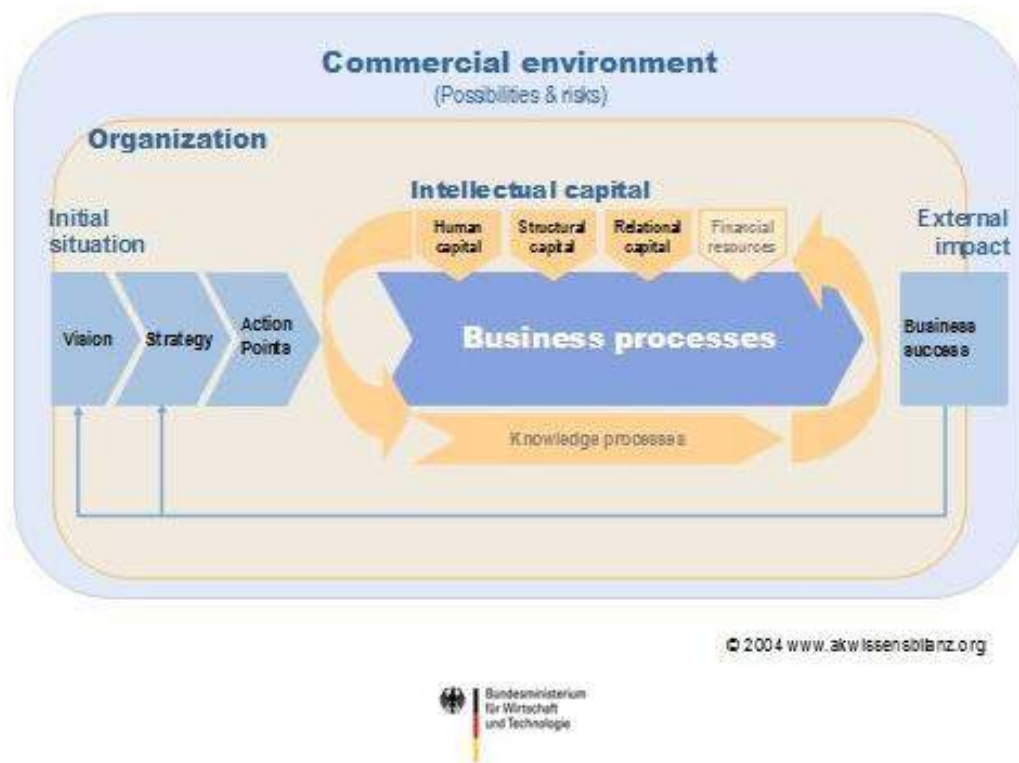
It is important to understand the time horizon in Figure 3. In order to build good customer relations and develop a well-functioning organisation with motivated people, it is the time that is needed most. To cut costs or to use a stick instead of a carrot has a positive financial result immediately. However, there is a high risk that it will be on the expense of future investments needed to secure long-term survival. Considering the competitive environment in the globalized corporations today, shareholders usually want to see the results within a maximum of two to three years. In order to put emphasis on this problem and to raise attention to innovating German small- and mid-sized enterprises (SME), the German Ministry of Economics initiated the project “Wissensbilanz – Made in Germany” and the LEGEND project will leverage these findings.

THE WISSENSBILANZ OR INTELLECTUAL CAPITAL – MADE IN EUROPE

In the German language, the word balance (Bilanz ziehen) does not necessarily mean a balance sheet as in the Anglo-Saxon language. It means that change in itself can actually be balanced as well. This is an important linguistic difference between German and English and therefore can show the cultural difference in the understanding of how an organisation creates value. In Germany there is still a moral compassion within many SME owners and leaders of companies of having a social and local responsibility as well, the stakeholder value. The so-called “Rheinkapitalismus” is not new, and was one of the major success factors for the German “Wirtschaftswunder” after World War II.

This initiative in 2004 was the first of its kind to find a real echo from the target group, small- and mid-sized enterprises in Germany and was followed up by the European Commission in the project “Intellectual Capital Statement – Made in Europe in 2006. The Wissensbilanz model is depicted in Figure 4. With its roots in Scandinavia and Austria, the Wissensbilanz added Business Success as a target for any organisation. It identified the key success factors within the intellectual capital of German SMEs that they needed for their sustainable competitiveness. At the end of 2006 already 50 SMEs had taken an active part in it when it was introduced on a European level. Today more than 1.000 SMEs Europe-wide have been using this tool focusing on intellectual capital for their internal management. In addition, the group of users comprises a number of regions and universities as well.

Figure 4: The Wissensbilanz/Intellectual Capital Statement Model developed by the Intellectual Capital Statement Project Group (AK-WB)⁷



The actual creation of an Intellectual Capital Statement is made in eight steps.

Step 1: To Describe the Business Model

In order to set the framework for all subsequent steps, the following questions should be answered concerning the initial situation of the company:

- What entity are we evaluating? Is it a whole organisation or only a specific part of it?

⁷ <http://www.incas-europe.eu/> based on -> RICARDIS (2006), “Reporting Intellectual Capital to Augment Research, Development and Innovation in SMEs”, European Commission, [online http://ec.europa.eu/invest-in-research/policy/capital_report_en.htm], Report to the Commission of the High Level Expert Group in RICARDIS: European Commission, June 2006: EUR 22095 EN.

- What does the business environment look like? What kind of opportunities and risks do we see? What is the competition doing?
- What is our vision? How do we want to position ourselves in the long term?
- Which strategy will take us there? Which is our key specific knowledge that our competitors cannot copy?
- How do we define our Business Success? What operational measurement do we need to meet also our mid- to long-term goals?
- What are our Business Processes? How are they adapted to our employee skills and customer needs?

Step 2: Defining Intellectual Capital

In the second step, the company-specific intangible resources are defined as precisely as possible - as the so-called influence factors – and are distinguished from one another. During a workshop (or in semi-structured interviews), each team member provides suggestions on index cards which are then grouped into clusters so that a maximum of 5-6 per influencing factors of capital arise. The three types of capital include the following standard factors:

- **Human Capital:** working skills, social skills, employee motivation and leadership ability.
- **Structural Capital:** corporate culture, internal communication, management information system, information technology, knowledge transfer, product and process innovation.
- **Relational Capital:** customer relations, supplier relations, public relations, relationship to investors and owners, relations with partners.

Step 3: Evaluation of Intellectual Capital

In the so called QQS evaluation, the Intellectual Capital team assesses the current status of all the IC factors in three categories: quantity, quality and systematic. It seeks to reach a consensus on the status quo, which is documented by justification from an (external) moderator and indicators. It is important that each influencing factor relates to the strategic framework that was set in step 1.

The self-assessment workshop (or interviews) begins by the following questions asked with regard to each factor:

- **Quantity/Amount:** How much do we have of it to reach our goals?
- **Quality:** Is the quality good enough to reach our goals?
- **Systematic:** How do we approach this from a management point of view to secure and develop this factor?

To measure a percentage, a scale from 0 to 120 percent is used, which is divided into four categories:

0-29 %: The quantity/quality/systematic is not sufficient.

30-59 %: The quantity/quality/systematic is partially sufficient.

60-100 %: The quantity/quality/systematic is mainly/mostly sufficient – with 90% as completely sufficient.

> 100 %: The quantity/quality/systematic is more than required.

The 120 percent rating level makes it possible to identify factors with a potential for savings.

Step 4: Measurement of Intellectual Capital

The indicators should be defined for the most important influencing factors in order to set the self-assessment from step 3 on a sounder basis. Thus, the evaluation of the IC becomes underpinned with financial and quantifiable data. This increases the validity of the ICS especially for external communication and for preparation of the “Earnings Capability Index ECI” presented below as next and final step on reporting both intangibles and tangibles in one report. An indicator must be clearly defined on a basis of a checklist of the pre-defined indicators for each IC factor and confirmed by auditors today in Germany.

The following questions help to find relevant indicators:

- Which indicators are suitable to describe the individual factors and evaluation criteria?
- Who and how do we confirm a correct analysis of the indicators?
- Which indicators are we already using and can be used in this new context?

Step 5: Interdependency Analysis

Subsequently, an impact analysis is made with the view to capture the interactions between the IC factors and business success. In a matrix (Vester 1999⁸), all IC factors are analysed how strongly they influence (or may not influence) each other. The strength is assessed from no impact (0) to a very strong impact (3). The analysis could be made as a management workshop or with interviews on site. With this matrix, energy within an organisation is assessed and put in context as to how it brings sustainable value to customers. In addition, an evaluation is carried out of how the outcome is fed back into the system. This holistic approach tries to define the balance (or miss-balance) between the three categories of IC so that an organisation can work in the most efficient way. Figure 5 visualises the outcome including the time lag when quantifiable outcome could be expected.

Step 6: Evaluation and interpretation of results

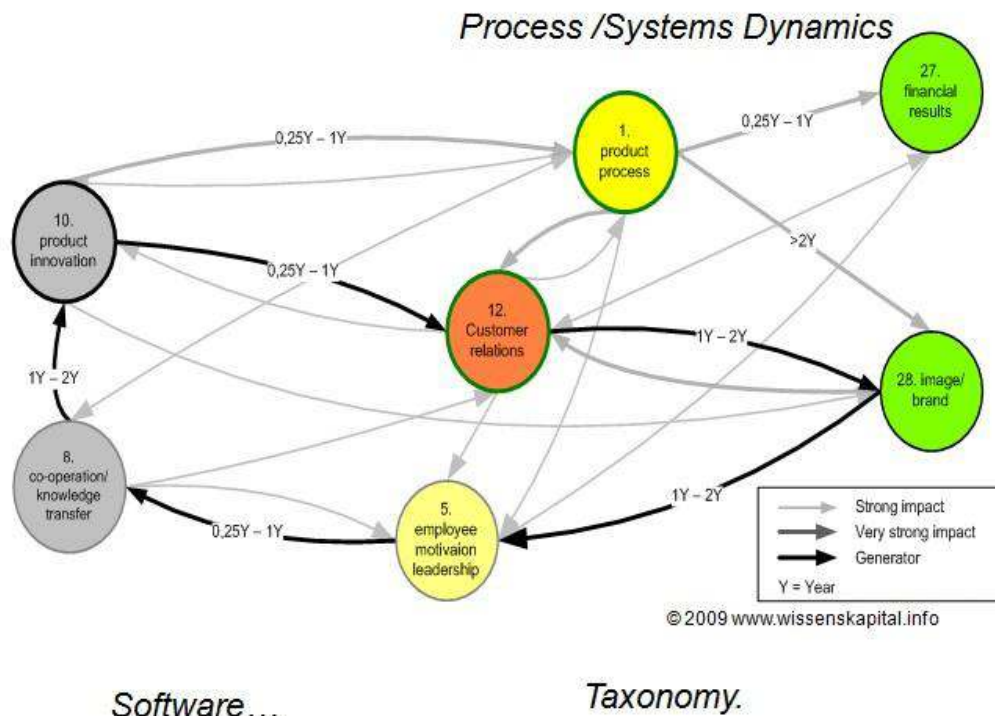
The analysis of intellectual capital from steps 3 to 5 can now be made. The aim is to find those IC factors which have the greatest potential for improvement and which are most simple to influence (with many 2 and 3 in the impact matrix under step 5). Figure 5 shows how such an analysis may look like. The aim is to find a few factors easy to manage which have a great overall influence on the system. Some loops may affect one another reciprocally, leading to higher efficiency with only small investments and management time.

Step 7: Management Action Points

The IC factors with the highest potential should now be recognized and the expected outcome should be confirmed and controlled by quantifiable data. Realistic time frames and goals should be assessed between managers and employees. A follow up process should take into account relevant analysis, such as the one presented in Figure 5.

⁸ Vester, F. (1999). Die Kunst vernetzt zu denken – Ideen und Werkzeuge für einen Umgang mit Komplexität, München: dtv.

Figure 5: Interdependency analysis (Source: Alwert 2006)⁹



Step 8: The Intellectual Capital Statement

The last step is to produce the ICS document. Initially, the ICS should work as an internal management report with detailed planning and follow-up. For instance, a follow up meeting in a workshop format leads to involvement of all personnel in the value-creation process which contributes to its sustainability. The same process can be used in other organisations and regions as well; only the goals and definitions have to be adapted to specific branches or environments. A regular reporting of actions and results improves an external view of stakeholders participating in regional or municipal development - such as customers, suppliers, financial institutes or even citizens.

THE EARNINGS CAPABILITY INDEX – ECI

The future earnings capability of a firm can only be assessed under the assumption that the material, financial and intangible resources are secured. The financial data or hard facts from an organisation show its current financial status. They also constitute a base for any future economic activities. Nevertheless, they can only show the short-term scope of the **earnings capability**. The ability to make money mid- or long-term can only be secured by investing in intellectual capital (or intangibles - see above). Such type of investment is usually difficult to find in an accounting system since it is usually recorded as a cost in the income statement. However, such investment could be the one that will give an organisation its **competitive advantage** in the future. For instance, an investment in a new product generation does not give an immediate competitive advantage but could secure new customized products or services for the future. This will thus guarantee survival of the company in a five- to ten-year horizon. Therefore, classical

⁹ <http://schaeffer-poeschel.e-bookshelf.de/wissensbilanzen-im-mittelstand-731376.html>

financial indicators cannot be considered an adequate measure for managing this type of resources.

When making strategic decisions, it may be more important for managers to understand the context than to get the results of an interdependency analysis. Similarly, in such a situation information on how qualitative factors influence quantitative factors, such as profit, is of highest relevance and significance. Therefore, it is extremely important to understand those rather abstract connections and their strategic consequences for an organisation. The clearer this picture is, the higher the likelihood that managers have the right information for their decision-making and thus have a better control over the outcome. In addition, it is of equal importance for management to be able to find out as quickly as possible whether they have made a wrong decision or not and to respond to it in an appropriate and timely manner (early warning). With the mid- and long-term earnings' forecasts, relevant risks and opportunities can be covered in order to secure the future competitive position of a firm.

With this background, the future earnings forecast shows:

- The earnings capability as a basis for future business success and profitability (cash flow);
- How and where to find and secure intangibles (and IC) potentials as a base for future earnings and profitability (cash flow);
- How tangibles and intangibles act together and what impact management decisions will have on the organisation when these are affected or changed, also over time.

How the Earnings Capability Index (ECI)[™] connects Strategic with Operational Management¹⁰

Strategic management deals with planning, implementing and controlling of corporate strategies. It can be divided into definition of goals, business environment analysis, company analysis, strategy selection and implementation of the strategy. The most important goal of an organisational strategy is to secure its long-term survival. Definition of the strategic goals is followed by an analysis of the business environment. The so-called SWOT method (strength, weaknesses, opportunities and threats) is successfully proven in doing such an analysis. It follows a specific pattern with a series of questions focused on finding out where the company stands compared to its competitors. Moreover, the method allows modelling of various scenarios, including economical, technological and political changes. Relevant parameters of how to raise performance are adapted to the existing resources within the company. When using this method, comparative advantages as well as disadvantages can be found, especially in the area of strategic intangible resources.

Changes in the market environment, as we have seen in the current financial and economical turmoil, are not currently part of the ECI methodology. However, the overall score can in specific cases be adjusted to those circumstances and the interval in the tool can be changed or widened, which is the justified "override". The reason why this override is used in the tool can relate, for instance, to special limitations of sustainability issues.

¹⁰ IP of Prof. Wulf, Mr. Pfeifer and Mr. Kivikas. Protected in Germany under Zukunftsfähigkeit ZFI (Pfeifer/Kivikas/Wulf)[™]

The ECI™ integrates strategic management with the operational level. The index comprises the factors under competitiveness and ability to change. The factors show the strengths and weaknesses in the strategic process of the firm, primarily based on the indicators. The already existing financial indicators are usually used to evaluate the current earnings status of the firm. When combined with additional data, they can provide a holistic view on the organisation. The ECI is based on the existing information and then aggregated with financial and non-financial indicators in order to get the overall picture of where the organisation stands in order to meet its future financial (and strategic) goals.

The Structures of Earnings Capability Index (ECI)™

The ECI™, as an aggregated management tool, is an important method to assess the future earnings possibility of a firm. This “fit for the future” test includes seven steps as shown in the following table (Figure 6):

Figure 6: The seven steps of “fit for the future” (extract)

Steps	Criteria	Sources
1. Current financial situation	Profitability/Cash	Annual Report, Bankratings, BSC
2. Competitiveness	Customer segments, branch, competitors, structural- and relational capital	Business environment analysis, Intellectual Capital Statement, BSC
3. Ability to change	Innovation capability, fixed vs. Variable costs, human capital	Intellectual Capital Statement, BSC
4. (Future) Earnings Capability (steps 1 to 3)	Earnings Capability Index™	Analyse of steps 1 to 3.
5. Management action points	Activity plan	ECI report, BSC
6. Implementation (in business operations)	i.e. CRM or HR development	i.e. job and process descriptions, customer survey
7. Follow-up, controlling	Verification of index	Actuals vs. Plan, KPI (adjusted)

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The starting point in the “fit for the future” test is to analyse the classical financial data in order to assess the current earnings situation (step 1). These data will be completed with facts and data on competitiveness (step 2) and ability to change (step 3), where the ICS is an integrated part of the ECI. The result of the three steps ends with a preliminary ECI™, a forecast on the company’s future earnings capability (see Figure 7 below). The outcome of step 1 to 4 will be summarized in an activity plan (step 5) with management action points to improve the overall ECI score and therefore the overall value of the firm. This activity plan is the base for the

implementation (step 6) on the operational level as well as the follow up (step 7). After implementation and within the time of impact that had been agreed in the activity plan (usually between 6 and 24 months), the results of the action points are analysed. If the results do not reach expectations, the activity plan (step 5) must be revised and adjusted. The objectives in the activity plan should be realistic and agreed upon with the managers and employees responsible to make them operational.

With the ECI™ tool, quantitative (hard) and qualitative (soft) success factors are made compatible to the firms strategic goals and prepared for implementation. To verify those factors, classical financial data, indicators from the competitive and ability to change analysis as well as the IC Statement is used. Regarding the qualitative methods or report, it is important to include the time horizon in order to avoid unrealistic expectations. The logic of how the total score is reached is depicted in Figure 7. The shift from focusing primarily on financial and quantitative indicators to clearer concentration on the qualitative factors can be considered the major difference to the existing management tools.

Figure 7: The logic behind the Earnings Capability Index (ECI)™

Current Earnings			Competitiveness			Ability to Change		
Cost / Income Ratio			Custome Value			Innovation and Growth Capability		
Value	0,0 %		Value	0,0 %		Value	0,0 %	
Score	0	0	Score	0	0	Score	0	0
Weight	1		Weight	1		Weight	2	
Cash			Market Position			Payroll Flexibility		
Value	0,0 %		Value	0,0 %		Value	0,0 %	
Score	0	0	Score	0	0	Score	0	0
Weight	2		Weight	2		Weight	1	
Profitability			Quality and Systematic Relational Capital			Quality and Systematic Human Capital		
Value	0,0 %		Value	0,0 %		Value	0,0 %	
Score	0	0	Score	0	0	Score	0	0
Weight	1		Weight	2		Weight	2	
Earnings sustainability			Quality and Systematic Structural Capital			Interdependency Analysis HC, SC and RC		
Value	0,0 %		Value	0,0 %		Value	0,0 %	
Score	0	0	Score	0	0	Score	0	0
Weight	1		Weight	1		Weight	2	
Weighted Sum			Weighted Sum			Weighted Sum		
Weight short term		80 %	Weight short term		40 %	Weight short term		5 %
Weight mid term		15 %	Weight mid term		40 %	Weight mid term		50 %
Weight long term		5 %	Weight long term		20 %	Weight long term		45 %
Short term EC forecast		0	Mid term EC forecast		0	Long term EC forecast		0

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The predefined financial and non-financial indicators or data used in the ECI™ will be evaluated on a scale where the highest score is 100. Through an industry specific weighting, the data is transformed into an index score in order to aggregate to the next level. Each index score will then be weighted regarding its relevance to the three time dimensions - short-, mid- and long-term. With this, the company can get an overview of its different abilities to earnings today and also in the future. To get the overall scoring, the results of the three time dimensions are added

into one value - the ECI™ score. In order to get the total score, the interdependency matrix is taken into account.

The systematic from the ECI™ can be used in almost any company and business sector. However, an adjustment of the weights must be made regarding the type of industry, market maturity and socio-economic conditions. To handle this, a basic questionnaire has been developed with different indicators to be used. The score to be used for comparison and the specific weighting for specific branches is still under development in some industry sectors.

2. CHAPTER 2: IMPLEMENTATION OF IC REPORTING IN PRACTICE

2.1. EXAMPLE 1: IC REPORTING AT AUSTRIAN UNIVERSITIES

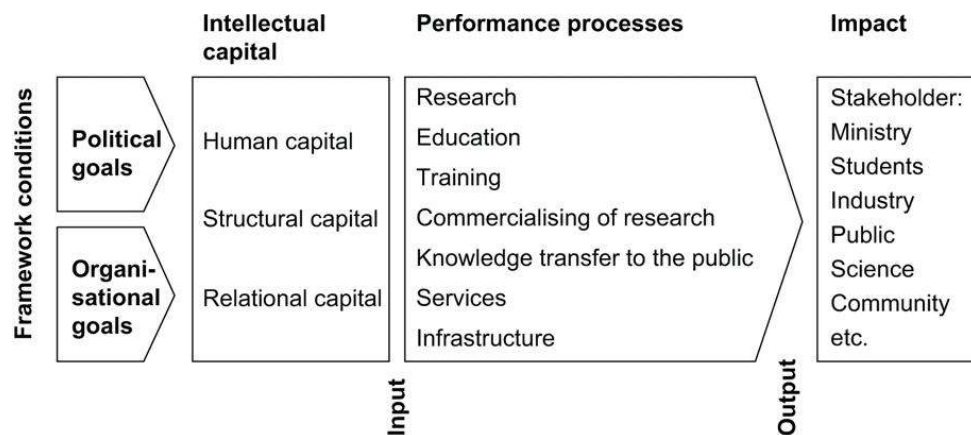
Authors: Roswitha Wiedenhofer & Christian Friedl, FH JOANNEUM, University of Applied Sciences, Graz

There are 22 public universities, 21 universities of applied sciences, 12 private universities and 9 pedagogical higher education institutions in Austria. Reforms within the University sector bringing along a higher degree of autonomy and capacity to act for Austrian public universities in 2002/03 called for a sound base for a proper assessment of the performance of these institutions in a regular, structured and transparent manner (Österreichische Rektorenkonferenz, 2003).

Amongst other reporting requirements, all public universities in Austria have been legally obliged since 2006 ("Wissensbilanzverordnung – Intellectual capital act"; Federal Ministry of Education, Science and Culture, 2006) to submit an annual Intellectual Capital Report (ICR). This was the world-wide first obligation by law to universities to annually submit an ICR (Schaffhauser-Linzatti, 2004). 20% of the government funding given to universities is contingent upon successful development of their intellectual capital. This demand gave reason for the implementation of annual, highly standardized ICR within Austrian (research) universities. Originally, more than 100 indicators had been discussed of which 56 remained for the first implementation. In 2010, the Austrian Intellectual capital act was revised (Austrian Federal Ministry of Science and Research, 2010) and the number of key figures were further reduced to 42.

To develop a single standardized system for all Austrian public universities, a process-orientated model similar to the Austrian Research Centers Seibersdorf's model (ARCS; today's Austrian Institute of Technology) has been developed (Leitner, 2003). It covers framework conditions, the intellectual capital (human, structural and relationship capital), performance processes (the university's activities, social activities, and self-imposed objectives and strategies) as well as the processes, outputs and impact to stakeholders (Schaffhauser-Linzatti, 2004).

Figure 8: Model of IC Reporting in the universities (Source: Leitner, 2004).



The report itself consists of two parts – a narrative and a quantitative part containing key figures. Since 2010, the narrative part is divided into the following 14 sectors (Austrian Federal Ministry of Science and Research, 2010):

- a) Scope of activities, strategic goals, profiling
- b) Organization
- c) Quality assurance and quality management
- d) Staff development and promotion of young researchers
- e) Research and development/development and improvement of arts
- f) Studies and continuing education
- g) Societal objectives
- h) Internationality and mobility
- i) Cooperation
- j) Libraries and specific departments
- k) Buildings/infrastructure
- l) Clinical areas/tasks in public health area (for Medical universities)
- m) Awards
- n) Summary and prospect

The development of the key figures in the second part of the ICR was the result of a long negotiation process between the Federal Ministry and the Austrian Conference of Universities (UNIKO). The result was a long list of merely classical key figures, each of them partitioned by several indicators – and has been reduced with the revision of 2010. The key figures are related to the processes of the IC reporting model. For matters of comparison, the intention of the Federal Ministry is to cover all universities with one model using the same indicators. The classification of the branches of science and research are according to the Austrian systematization of branches of science and research 2000 of “Statistic Austria” (Austrian Federal Ministry of Science and Research, 2010), which does not necessarily fit to the faculties allocation/scientific structure of the universities. Therefore, a supporting publication, how to gather and measure special key figures, is provided to the universities.

Figure 9: Examples of indicators of the Austrian Universities Intellectual Capital Report.

Key figure	Indicator
performance processes teaching	number of students/field of study
performance processes research	number of research projects
output teaching	number of alumni/field of study
output research	granted licenses/field of research
output others	activities of the library
outcome teaching	starting salary of alumni

For the data collection by the universities, there are two types of key figures distinguished, depending on their source. Original key figures are compiled and calculated by the universities themselves, whereas non-original key figures are calculated by the Federal Ministry based on data submitted by the universities. Those key figures are available through the data warehouse “uni:data” (<http://www.bmwf.gv.at/unidata>). They have to be benchmarked on a three year time series.

Certain key figures reported in the second part of the ICR can be integrated into the narrative part. In addition, the universities have recently been allowed to implement additional key figures that would support them in using the ICR as a monitoring and steering tool. If universities want to integrate those additional parameters in their ICR, the additional key figures have to be submitted to and approved by the Austrian Federal Ministry of Science.

Figure 10: Covers of ICR University of Graz¹¹, Graz University of Technology¹² and FH JOANNEUM¹³



¹¹ http://static.uni-graz.at/fileadmin/Akgl/4_F%C3%BCr_MitarbeiterInnen/WiBi_2012.pdf

¹² http://mibla.tugraz.at/12_13/Stk_16/Wissensbilanz_2012_TU_Graz.zip

¹³ https://www.fh-joanneum.at/global/show_document.asp?id=aaaaaaaaahzbcf&download=1

First prototypic examples of such ICR were implemented e.g. as a partial model at a department of the Mining University of Leoben (Biedermann and Graggober, 2005) and the Donau University Krems (Koch and Pirker, 2005). Other universities soon implemented their ICR system according to the legal requirements. The Austrian public universities organize meetings for university staff in charge of implementing the ICR on a regular basis. Further on an e-mail distribution and exchange list is established.

In the following section, three Austrian university cases are briefly described based on two expert interviews with representatives of the University of Graz and Graz University of Technology between December 2013 and January 2014.

CASE STUDY 1.1: IC REPORTING AT UNIVERSITY OF GRAZ

Founded in 1595 and hosting more than 30,000 students and 3,900 staff within 6 faculties and 123 institutes/centres, the University of Graz is the second largest Austrian higher education institution (University of Graz, Wissensbilanz, 2012). The first ICR was published for the year 2005, followed by a new publication each year. The quality management department at the University of Graz coordinates the IC reporting and is approved by the Rector's office and the University Council. The data collection is conducted in collaboration with 19 other university departments (e.g. PR department, HR department, Research Management, International relations office, UNI-IT...). The internal gathering of data starts in January and the final submission to the Federal Ministry has to be completed in April.

Since 2012, the detailed illustration of key figures and the report, how the objectives of the performance agreement are implemented, are annexed to the ICR – instead of having two documents like in previous years (University of Graz, 2013). Some indicators have been integrated in the narrative part corresponding to the 2010 revision of the legal requirements.

Figure 11: Example of one indicator, "Number of students that are actively taking exams for the study year 2011/12". Source: Adaptation of Wissensbilanz Universität Graz, 2012, p. 43.

Country	Female	Male	Total
Austria	10.212	5.443	15.655
EU	751	373	1.124
Third countries	554	241	795
Total	11.517	6.057	17.574

The University of Graz implemented additional key figures as some of the research activities are not covered by the overall university ICR model. For instance, the University of Graz conducts a study cooperation program in collaboration with the Technical University of Graz. As universities obtained the possibility to propose additional key figures, the University of Graz submitted three additional key figures for this specific cooperation program to the Austrian Federal Ministry of Science in October 2013. After some minor adaptations, hopefully followed

by the approval, the new indicators are integrated as “official” ICR indicators in the next report and also in the Data Warehouse of the Federal Ministry, where the indicators of all universities are submitted and stored. (University of Graz, Interview with Raggautz, A. & Bernhard, M., November 29, 2013)

CASE STUDY 1.2: IC REPORTING AT GRAZ UNIVERSITY OF TECHNOLOGY

Graz University of Technology (TU Graz) was founded in 1811 and is home to 12,300 students and almost 2,300 staff within seven faculties (Graz University of Technology, Facts & Figures, 2012). TU Graz published its first ICR for the year 2005. For 2012, the ICR report consists of 297 pages including an additional performance agreement part. It is a published report released through the TU Graz bulletin.

Since 2010, the ICR is combined with the progress report on goals und initiatives of the performance agreement with the Federal Ministry of Science and Research. The performance agreement is concluded for a period of 3 years, the reporting on progress has to be delivered on an annual basis. Interestingly, the Ministry has now implemented key figures for the measurement of the performance agreement as well. Hitherto key figures have only been established for the Austrian Universities’ ICR reporting but not for the performance agreement. Unfortunately, the key figures are not related.

The key figures for the ICR with additional interpretation notes have to be approved by the Rector’s Office and submitted to the Federal Ministry by March 15 each year for data clearing. This process has to be concluded by April 28 and might result in additional data collection and interpretation requirements. Interpretation notes are provided for instance for the mode of calculation, definition of certain values, statements concerning the achievement of performance goals or critic (as the definition of certain key figures is not exactly specified by the Federal Ministry). After finalization, the University Council approves and officially submits the ICR to the Federal Ministry.

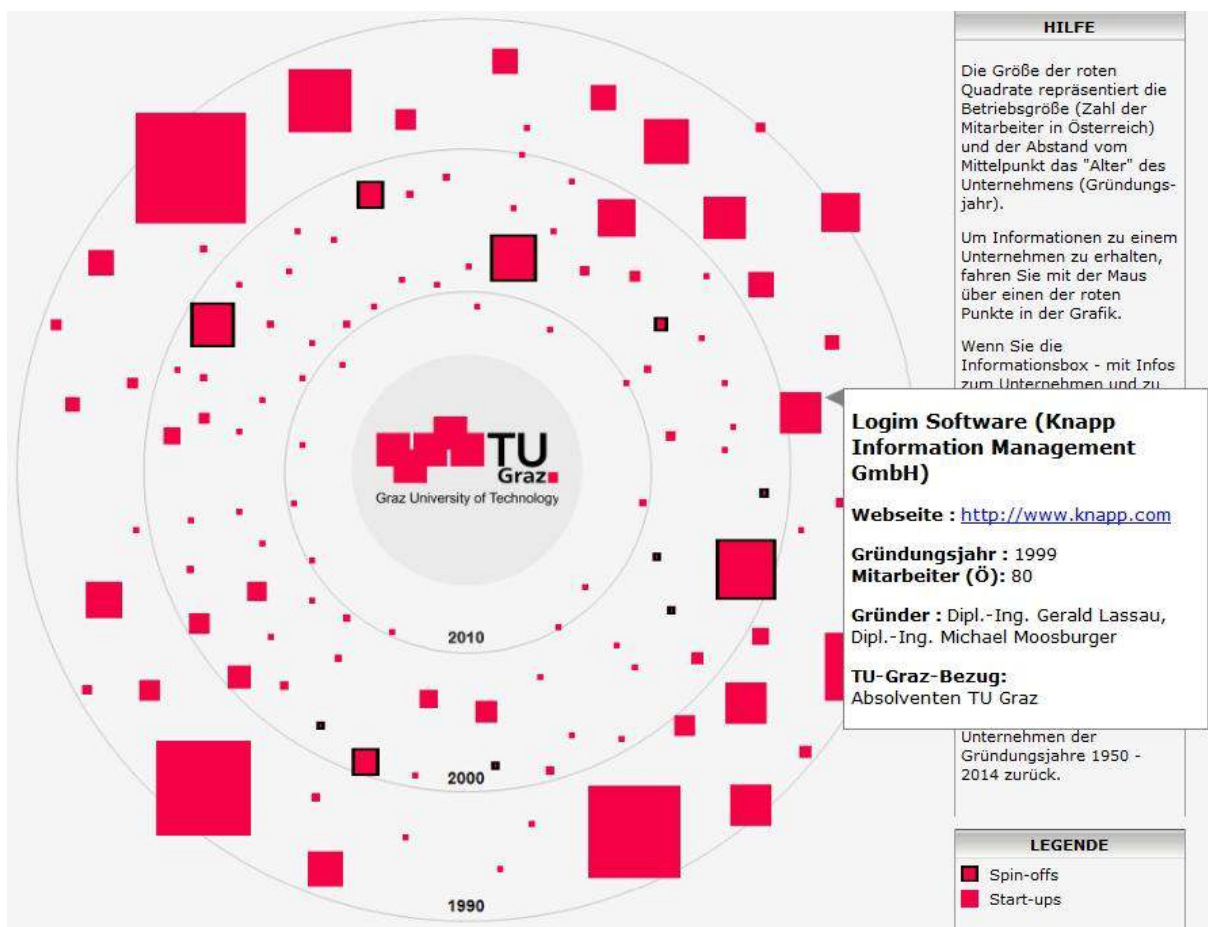
The data collection is conducted by the Rector’s Office and the Statistics & Evaluation Office. The narrative part is developed by two employees in cooperation with the heads of departments. For compiling the key figures and indicators, there are different established resource-planning systems utilized to gather the data, like SAP or the information management system. Both of them are already established instruments of TU Graz university management.

Only a few indicators have to be compiled additionally. Almost every data set collected through the existing systems needs to be manually processed, adapted and interpreted to fit the requirements of the Austrian Universities ICR system. In some cases, where the collection of required data is inconsistent or required to be scrutinized, TU Graz delivers explanations why a certain parameter is not provided.

To recap, the ICR reporting at the TU Graz is linked to existing university management tools for data collection, but requires a decent additional effort to adapt the data to ICR requirements. The TU Graz also made some efforts to link the ICR to other management instruments, such as jointly publishing the ICR with the performance progress report. As reported by the University of Graz, some key figures required by the Federal Ministry cannot be applied in the TU Graz for

its own university management and some key figures are failing to depict the real situation. Therefore, the TU Graz submitted additional optional key figures - also for their cooperation programs with the University of Graz and the University of Music and Performing Arts Graz. There are several interesting optional key figures provided in the ICR that are not mandated by the Federal Ministry and do not require the Ministry approval either. For instance, the narrative part of the report contains a map representing the entrepreneurial activities by the TU Graz alumni and staff (Figure 12).

Figure 12: Start-up and Spin-off map of the TU Graz. The size of the squares indicates the company size in terms of staff in Austria. The distance to the center is the age of the company. Source: Wissensbilanz TU Graz 2012, p. 96.



In addition, the TU Graz started and coordinates an Austrian-wide inter-university project with the aim to analyse the comparability of the ICR key figures and parameters and check their potential usability for international university rankings, such as "U-Multirank¹⁴". First comprehensive results are expected to be delivered at the end of 2014. The project implementation has already indicated that some indicators will need further improvement and their scope will have to be developed more in line with international standards (e.g. bibliometric indicators) (Graz University of Technology, Interview with Berner, M. & Euler, R., January 8, 2014).

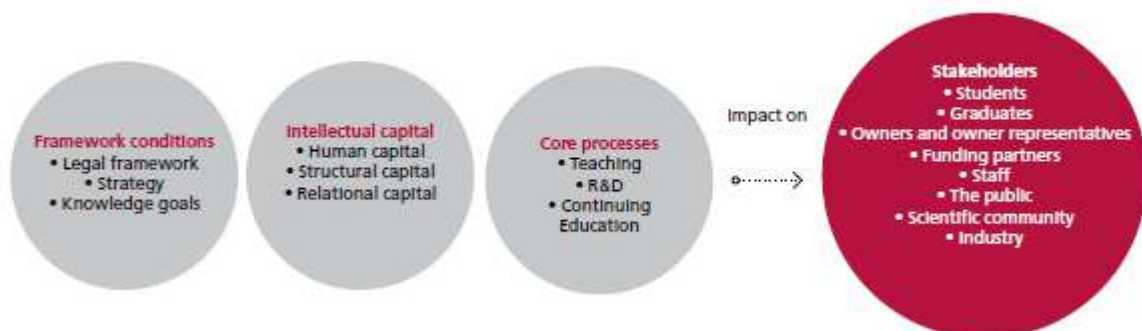
¹⁴See eg. <http://www.u-portal.org/u-multirank/>

CASE STUDY 1.3: IC REPORTING AT UNIVERSITY OF APPLIED SCIENCES “FH JOANNEUM”

In contrast to Austria’s research and public universities, the universities of applied sciences (UAS) are not obliged by law and thus are able to compile their IC reports without restrictions or standardized specifications. This has the advantage to enable the UAS to emphasize its individual profile and the disadvantage on the other hand that due to different methods of collection and documentation of different indicators comparisons of UAS to each other are more difficult.

It was as early as 2004 when the UAS FH JOANNEUM published its first annual ICR. The introduced model (Figure 13), which is still in use, is based on the model of Leitner et al. (2001), with adaptations due to the specific framework conditions and “business results” of such a public institution. In the absence of other indicators, FH JOANNEUM chose to follow the general thrust of the specifications in the ICR ordinance for universities, while simultaneously taking into account specific institutional strengths, e.g. the character of a practical oriented, applied education and R&D orientation. Since then, ICRs have been published at FH JOANNEUM regularly for each academic year.

Figure 13: The IC model of FH JOANNEUM. Source: FH JOANNEUM Intellectual Capital Report (2010/2011).



The Intellectual capital reporting model of FH JOANNEUM consists of four areas: **Framework conditions**, **Intellectual capital**, **Core processes** and output and impact on the relevant **Stakeholder groups**. The legal environment, strategies and knowledge goals of FH JOANNEUM are the framework conditions essential in creating and developing intellectual capital.

The intellectual capital is divided into three areas:

- **Human Capital** describes the skills and competencies of FH JOANNEUM staff, as well as their motivation and learning ability.
- **Structural Capital** assesses the environment that employees need to work productively. It includes structures, processes and procedures documented at FH JOANNEUM.
- **Relational Capital** shows the extent, to which FH JOANNEUM is interlinked with external partners and perceived by interested parties. It refers to networks and cooperation with research institutions and universities or commercial enterprises.

The core processes are divided into the areas of teaching, research & development and continuing education:

- **Teaching** refers to postsecondary education and focuses on the degree programmes provided.
- The area of **research & development** includes the implementation of research projects and innovative services.
- The core process **continuing education** deals with symposia, seminars, lectures, continuing education events and the postgraduate courses.

For each of the core processes, certain knowledge goals have been formulated. For example, the knowledge goals for Research & Development are:

Human Capital

FH JOANNEUM staff is active in a wide range of multifaceted projects of application-oriented research, continuously generating knowledge for the university, industry and society. The expertise gained from research & development (R&D) provides the basis for research-based teaching.

Structural Capital

The flexible structures of FH JOANNEUM form an effective basis for implementing sophisticated research tasks. State of the art laboratory and IT infrastructure and libraries support the centres of research and development and the research units in their projects.

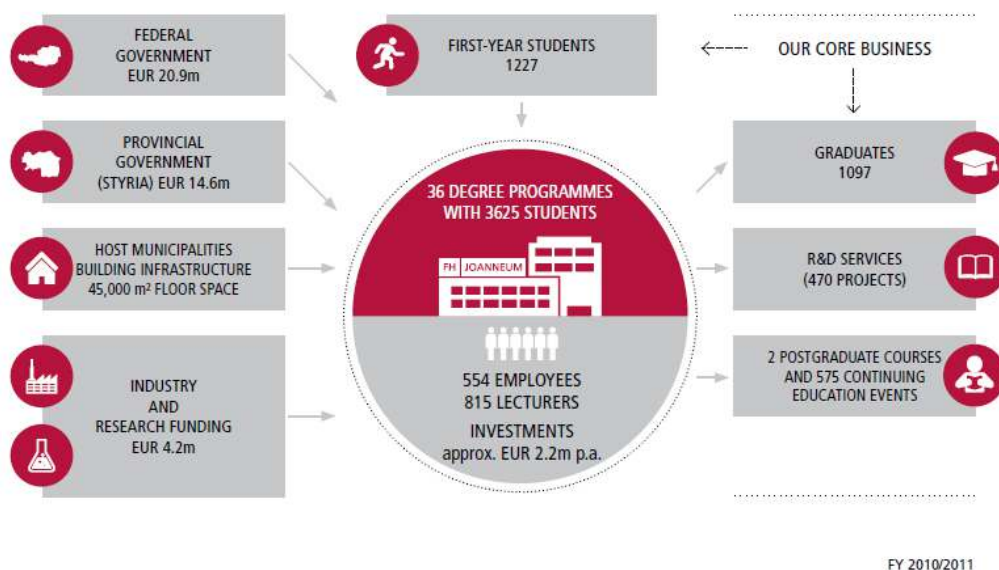
Relational Capital

Partnerships with business enterprises and high quality standards are key success factors in solving challenging and innovative tasks in a joint effort. In this way, FH JOANNEUM actively contributes to strengthening the competitive capacity of Styria as a business location and centre of research. Partnerships with universities and universities of applied sciences both in the region and at the national and international level ensure exchange and advancement of research results.

The benefit of all these core processes is finally reflected in their output and impact. The success of the processes is measured by their impact on the relevant stakeholders, such as graduates or funding partners (Figure 14).

The Intellectual Capital Reporting at FH JOANNEUM is an annual implementation process. The roughly 145 indicators were determined on the three different levels. Most of the figures are routinely gathered by central departments and were thus drawn from existing statistical data sources. A smaller proportion of the data was collected by the degree programs, institutes and departments, while in a few cases the data had to be gathered by every single employee.

Figure 14: FH JOANNEUM Business Model and Overview of Stakeholders. Source: FH JOANNEUM Intellectual Capital Report (2010/2011).



To give some examples for measuring Human Capital, some indicators describe the number of employees of FH JOANNEUM. Those indicators, for example, continue to show a growth trend compared to previous years' figures which is indicated in a column and compared to the objectives in another column.

Figure 15: Human Capital Indicators. Source: FH JOANNEUM Intellectual Capital Report (2010/2011).

Human capital describes the number of employees and lecturers of FH JOANNEUM. This indicator continues to show a growth trend compared to previous years' figures.

↑ objective: increase value ↓ objective: decrease value ↔ objective: maintain value

Indicator "Human Capital"	2008/09	2009/10	2010/11	Period under review	Trend	Objective
Number of FH JOANNEUM employees (full-time equivalent)	389.74	411.06	425.4	as at 30/06/11	↑	↔
Number of FH JOANNEUM employees (head count)	486	530	554	as at 30/06/11	↑	↔
Gender breakdown of staff						
• male	254	280	289	as at 30/06/11	↑	↔
• female	232	250	265		↑	↔
Number of faculty members ¹ (head count)	179	183	181	as at 30/06/11	↓	↔
Number of affiliated lecturers ² (head count)	815	863	805	15/11/10–15/11/11	↓	↔
Gender breakdown of affiliated lecturers						
• male	552	605	543	15/11/10–15/11/11	↓	↔
• female	263	258	262		↑	↔
Number of administrative staff – central services (head count)	124	130	130	as at 30/06/11	↔	↔
Number of employees holding a FH professorship	-	36	36	FY 2010/11	↔	↑

The core process “Research and Development” includes research project and innovative services. The indicators include, for example, “Revenue from R&D projects” or “Number of publications”, as can be seen in Figure 16.

Figure 16: Core Process Indicators. Source: FH JOANNEUM Intellectual Capital Report (2010/2011).

The core process “Research and Development” includes research projects and innovative services.

Indicator “Research & Development” ¹⁰	2008/09	2009/10	2010/11	Period under review	Trend	Objective
Number of scientists financed through third-party funded R&D projects (full-time equivalent)	45.54	45.21	72.5	as at 30/06/11	↑	↑
Number of R&D projects ¹¹	442	421	470	FY 2010/11	↑	↑
Revenue from R&D projects ¹²	€ 3,562,021	€ 3,472,550	€ 4,191,917	FY 2010/11	↑	↑
Revenue from R&D projects (%) • national • international	91% 9%	90% 10%	83% 17%	FY 2010/11	↓ ↑	↑ ↑
Number of publications ¹³	325	322	340	FY 2010/11	↑	↑
Number of employees enrolled in doctoral programmes at other universities	44	56	57	as at 30/06/11	↑	↑

An ICR team assesses and interprets the results of the annual data collection concerning the single core processes and indicators. In addition, new annual knowledge objectives are set by the management team. The ICR is approved by the CEO and published within one document with the annual report of FH JOANNEUM. This “integrated report” gives room for an integrated, holistic reporting and assessment approach of FH JOANNEUMS’ business results and resources.

SUMMARY TO THE CASES

After nearly 10 years of experience with IC Reporting in HEIs in Austria, it can be stated that this intangible asset management approach is well imbedded – since having been made compulsory – in traditional research universities and also quite widespread among applied universities on a voluntary basis in Austria.

Although there are default indicators, a stately governed process and binding procedures concerning the implementation of ICR in research universities, there are also ongoing endeavours and even organized projects within single universities to further develop and improve the applicability of ICR, the definition and selection of indicators and its usage for corporate strategic planning and controlling purposes. There is a common sense that these processes are very complex and laborious. Despite many years of experience and the existence of information and resource planning tools, single data collection procedures must still be accomplished manually. Beyond this, several topics with room for improvement within the ICR implementation process could be identified, which altogether lead to the suggestion that the significance of ICRs of research universities can still be improved.

Developments within the past years show that there seems to be a convergence of overall steering instruments for university governance from the Austrian Federal Ministry of Science, since the strategically important performance agreements are tighter coupled to ICR. Thus it can be concluded that ICR at HEI is a very vital topic with interesting dynamics also from an overall governance perspective. Further investigations of and recommendations for future developments of ICR at an organizational and policy levels as well will be addressed in Part 2 of the IC report developed within the frameworks of the LEGEND project.

References

Austrian Federal Ministry of Education, Science, and Culture, „*Verordnung der Bundesministerin für Wissenschaft und Forschung über die Wissensbilanz*“, Wissensbilanz-Verordnung 2006 - WBV 2006, BGBl. II Nr. 63/2006. Retrieved 17 December 2013 from https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2006_II_63/BGBLA_2006_II_63.pdf

Austrian Federal Ministry of Science and Research, „*Verordnung der Bundesministerin für Wissenschaft und Forschung über die Wissensbilanz*“, Wissensbilanz-Verordnung 2010 - WBV 2010, BGBl. II Nr. 216/2010. Retrieved 17 December 2013 from http://www.bmwf.gv.at/fileadmin/user_upload/wissenschaft/recht/wbv_2010.pdf.

Biedermann, H., Graggober, M., „Die Wissensbilanz als Strategie- und Steuerungsinstrument im Forschungsmanagement“ in *Mertins et al. (Hrsg.) Wissensbilanzen, Intellektuelles Kapital erfolgreich nutzen und entwickeln*, Springer Verlag, 2005, Berlin-Heidelberg.

FH JOANNEUM, Geschäftsbericht und Wissensbilanz 2011/2012, Pfeiffer, P., Riegler, G., 2012, Graz. Retrieved 8 January 2014 from https://www.fh-joanneum.at/global/show_document.asp?id=aaaaaaaaahzbcf&download=1.

Graz University of Technology (2012). Facts & Figures 2012 – Science. Passion, Technology. Retrieved January 8, 2014 from http://portal.tugraz.at/portal/page/portal/Files/BDR/SB/Facts_2012_web.pdf.

Graz University of Technology (2012). Wissensbilanz 2012. Retrieved January 8, 2014 from http://mibla.tugraz.at/12_13/Stk_16/Wissensbilanz_2012_TU_Graz.zip Koch, G., Leitner, K. H., Bornemann, M., *Measuring and Reporting Intangible Assets and Results in a European Contract Research Organization*, Joint German-OECD Conference, Benchmarking Industry-Science Relationships, October 16-17, 2000, Berlin.

Koch, G., Pircher, R., “Die erste gesamtuniversitäre Wissensbilanz: Donau-Universität Krems” in *Mertins et al. (Hrsg.), Wissensbilanzen, Intellektuelles Kapital erfolgreich nutzen und entwickeln*, Springer Verlag, 2005, Berlin-Heidelberg.

Leitner, K. H., „Wissensbilanzierung: Ein neues Berichtswesen für Forschungsorganisationen und Hochschulen“, in *Magazin Wissensmanagement* 2/2003.

Leitner, K. H., *Intellectual Capital reporting for universities: conceptual background and application for Austrian Universities*. Research Evaluation, 13(2), 2004, pp. 129-140. <http://dx.doi.org/10.3152/147154404781776464>

Leitner, K. H., Sammer, M., Graggober, M., Schartinger, D., Zielowski, C., „*Wissensbilanzierung für Universitäten*“, Bundesministerium für Bildung, Wissenschaft und Kultur, Wien, 2001. Retrieved 20 January 2013 from <http://www.weltklasse-uni.at/upload/attachments/170.pdf>

Österreichische Rektorenkonferenz, „*Wissensbilanz: Bilanz des Wissens? Die Wissensbilanz für Universitäten im UG 2002*“, 2003, ÖRK Wien.

Schaffhauser-Linzatti, M., „*Intellectual Capital Reporting for Austrian Universities – a Thrilling Work in Progress*“, 2004, Wien.

University of Graz, *Wissensbilanz 2012*, Mai 2013, Retrieved 18 December 2013 from http://static.uni-graz.at/fileadmin/Akgl/4_F%C3%BCr_MitarbeiterInnen/WiBi_2012.pdf.

2.2. EXAMPLE 2: SMALL AND MEDIUM ENTERPRISES IN GERMANY

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CASE STUDY 2.1: SOER RUSCHE GMBH

Since the German Federal Government decided to make an IC Statement for German SMEs in 2004, more than 1 000 SME have used the method and more than 100.000 flyers, toolboxes or guidelines, have been distributed¹⁵. The value of using the method varies from having a good management tool to manage intangibles (most of the respondents) to a better strategic communication towards stakeholders such as banks or customers.

In the case of the high-end clothing company of Soer Rusche GmbH (Oelde, Westphalia), it managed to survive a crisis in 2001-2002 to become one of the most famous German brands in its business segment. In addition to succeeding to profile itself as a high-end consumer brand specialist in clothing, it managed to expand from its 17 branches in 2004 to more than 50 in 2013 and to convince its creditors of being segmented in the consumer rather than textile industry. The company needed credit with a reasonable interest rate to buy new collections. The IC Statement was used to convince a bank that the company is not positioned in the textiles industry, which at that time banks did not consider to be a creditworthy branch off industry.

The response from the bank was that they needed to understand how the company was about to gain market share and become more profitable. Therefore, a continuous reporting on how they managed the intangibles was provided in a coherent form from an outside point of view. This offered a common language and more transparency on the company management actions that were to improve operations at Soer Rusche GmbH.

¹⁵ Fischer, T. M., Wulf, I. (Eds.) (2013): Wissensbilanzen im Mittelstand: Kapitalmarktkommunikation, Immaterielle Werte, Lageberichterstattung, Integrated Reporting, XBRL. eBook (PDF)

Internally, Soer Rusche was using the IC Statement in primarily four areas:

1. **To improve leadership competencies** – Due to the necessary expansion between 2005 and 2012, the management was focused too much on selling and turnover. Much less time was spent on “classic” leadership. Therefore the focus was put on improving a common culture; on developing new approaches to treating employees; and on organizing meetings on a regular basis at the headquarters in Oelde. New collections and branches were to be discussed jointly and a practice of learning from another and sharing of knowledge was nurtured. This new leadership culture has eventually meant that about 20 % of the middle management left the company because of not having adapted to these new demands on leadership proposed by the owner and CEO Dr. Thomas Rusche.
2. **To cover the German market with their own branches** – This venture has almost been completed but there are still blank spots. This effort is perceived as necessary to cover overheads and a larger collection in the mid-term period.
3. In order to retain and keep high-end customers, **a more customized information system (CRM) is being implemented**. Despite of the time and money that this costs, it must be carried out and the process is already in progress.
4. The company has decided to **expand into the markets of leisure and women’s clothing**. This has been the most difficult decision to implement so far since the sectors are not satisfactory profitable – especially the women’s clothing niche. However, it has been decided to keep all segments in order to attract the key customer target group.

The company made its third IC Statement in 2011 (since 2005) and continuous to use the method for its internal management and as a support for its external communication towards lenders and key suppliers. This case shows how introducing of an innovation in the company allowed it to stay in the market and enabled them to convince their lenders of their strategy in a comprehensive and transparent way. The IC method also gives a way to communicate and support an organizations specific knowledge on how to create customer value, which is different considering local habits and culture as well as maturity in a business or market development.

CASE STUDY 2.2: SUPPORT FACTORS – INNOVATION AND FUNDING INSTRUMENTS IN GERMANY

Germany has a long tradition of innovation. Today this is manifested by being the world leader of industrial exports. The three main areas that should be taken into consideration when analysing this success include:

1. Innovation spirit and culture
2. System of education
3. Funding and market entry

Innovation Spirit and Culture

Germany was the last among the major European countries to enter the industrial revolution. The Napoleon Wars devastated vastly the country but it was also the ignition for the Germans to unify. With beginning of 1834, the free trade zone within the German speaking countries began

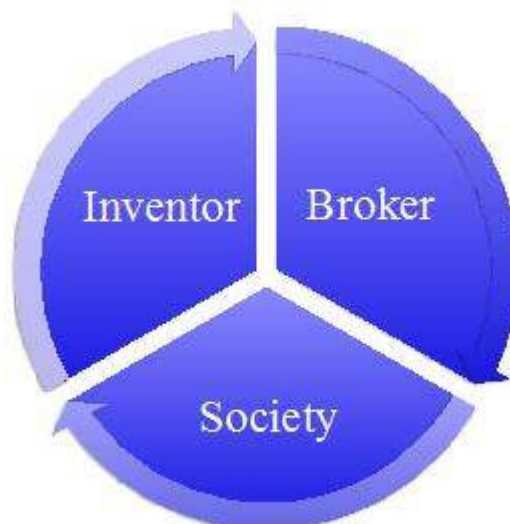
to expand, lead under Bismarck to become the largest zone in Europe at that time. This not only had the advantage of a large market potential for new products but it was also accompanied with the same language and legislation.

This series of events led to an economic boom at the end of the 20th century while attracting capital and knowledge from all over the world. Most of the German multinationals were founded at that time. It is important to note that in contrast to the United Kingdom and the U.S. where intellectual property rights were not being seen as relevant for the state to protect, the protection of patents and other intellectual property rights (IP) was in Germany very strong. At this point in time, the market conditions were clearly regulated by a strong German state. Therefore, large homogenous market, strong protection of IP and social and labour reforms lead to only small loss of production due to the workers' striking.

Especially the protection of IP gave entrepreneurs (and artists) an incentive to innovate (see Figure 17). Funding became easier due to the regional diversities (and anomalies) between different parts of Germany, which is also today an advantage (the differences between Bavaria and Berlin, for instance). Each region wants its own university and a local state bank. It is important to understand, that each of the German 16 states have their own Ministry of Education and Culture. Most of the innovation programs are today being coordinated under the Ministry of Education as well; therefore, these programs differ significantly among the individual German states.

After World War II, the allies took over all IP rights in Germany (and Japan), therefore this issue has lost its importance in the German industry, especially in the "Mittelstand". Thanks to the Lisbon agenda, this topic, however, has regained more and more importance on the German national agenda.

Figure 17: The Intellectual Property Actors¹⁶



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¹⁶ Source: Wissenskapital ZFI/ECI GmbH and prof. Kunzmann, presented at the Hans Seidel Stiftung Seminar "Geistiges Eigentum in 21. Jahrhundert" in Kloster Banz on 13-14 April 2013

System of Education

The universities are handled on a state (Länder) level. However, research institutions like Helmholtz with more than 36.000 employees, Max-Planck Institute and Fraunhofer with more researchers than M.I.T in the US (11.000) apply and test these findings in reality. These institutions are financed mainly from the state, or on 50/50 basis with the industry like the Fraunhofer institute. All those research institutes operate all over Germany and some have even branches outside Germany. Researches and academics still have a rather high status in the German society, although this has been suffering since the media has found some of the academic work (of mostly top politicians) to be rather dubious.

Although a lot of focus is made on basic and applied research, the Anglo-American venture capital business is still in its cradle. The German educational culture is more focused on testing and experimenting and not to extrapolate the existing assets and sell them on the global market. For an international and sustainable venture, both sides are needed. If engineering is seen as a competitive advantage for German companies, the understanding of risk-taking (entrepreneurship) is still being looked at as too risky and even irresponsible from most inhabitants. A safe place at Siemens is more appreciated than starting you own venture. However, since it has become a global phenomenon, this feeling of security has been changing rapidly.

On a higher educational level there are still no courses on leadership or on the specific issue on managing intangibles. Some institutions have courses in entrepreneurship, but this is still at its beginning and more an EU than a federal initiative.

Funding and Market Entry

German small and mid-size companies have access to one of the most homogenous and big market internationally. After the U.S, China and Japan, the German speaking market is fourth largest in the world. This has two consequences, first of all, there is room for niches and specialisation; moreover, whenever this barrier is overcome, the likelihood to survive internationally is much higher.

The European Recovery Program (or the Marshall plan) since 1948 and the creation of Kreditbank für Wiederaufbau subsequently have, since then, been supplying the necessary seed funding to the German industry. Today, in addition to only giving seed capital, they are also involved in state financing of, for instance, renewable energy, start-up funds and loan guarantees to SME. Until recently also the "Hausbanken" played a major role by giving liquidity to renowned local companies when needing, counting on a stable future economic development which had been the case until the collapse of the Bretton-Woods system in 1971. Also the new rules and regulations, known as Basle I-III, make it more difficult for local banks to grant loans to local SME.

A handshake of trust is no more valid when the banking authorities test the internal risk management of a bank. The alternative called private equity or venture capital is still dominated of the Anglo-Americans (90 %) and there is a cultural difference on how these funds want to run a company compared to the German understanding of sustainability (see Figure 3 above).

Where the German SMEs traditionally focus more on the left side of the Value Creation, the Anglo-American companies more focus on the right hand side, leading to disputes on what good corporate governance is and how sustainable financial value is being created. Because most of the innovation and funding programs within the EU and the Federal Government use the taxonomy from the Anglo-American investors, this usually ends in misunderstandings of strategic goals and how to get there. The North and Central European business culture is more focused on Stakeholder Value and not the existing Shareholder Value.

SUMMARY AND CONSEQUENCES FOR THE LEGEND PROJECT

Creating growth based on innovation in a region or country is a complex matter. Three things have been chosen here to explain how this could be made and Germany has been taken as an example of implementation. Evidently, the role of the state is crucial. The state is the only institution, which can legislate on access to education and the quality of it and how financial profit should be distributed within a region or state. The German experience also shows the importance of funding and the protection of IP rights in the eyes of the individual (not the trader as today), the future innovator and entrepreneur.

For Slovakia as a country in central Europe, a closer understanding of the German “Wirtschaftswunder” should be used as good practice. The Slovak economy today is very much dependent on foreign investors and corporations. This, therefore, increases the risk that the outcome of the work of the citizens (800 € average income) and the investments in education will not raise but rather deteriorate. On the basis of the case studies, it is possible to recommend the three main areas of focus of the LEGEND project: **to find and enhance innovation within SMEs; to make the intangibles visible in order to allocate investments (funding); and to protect the final outcome (intellectual property rights).**

3. GLOSSARY OF KEY IC TERMS

Term	Definition	Source
BALANCED SCORECARD (BSC)	A measurement system that balances financial value and non-financial value. A balanced scorecard is typically divided into a number, usually between three and six, of focus areas that have been identified as critical for the company. The focus areas are populated with indicators that are measured. It is suitable for communication around and visualization of value creation. The term was coined by Robert S. Kaplan and David P. Norton.	Edvinsson, L., Richtner, A. (1999) “Words of value- giving words to IC”, Skandia.
BENCHMARKING	A continuous process of measuring and comparing products, services and processes with those that are “best-in-class”; leads to “best practice”.	Edvinsson, L., Richtner, A. (1999) “Words of value- giving words to IC”, Skandia.
BEST PRACTICE	What has generated best outcome in the past.	Edvinsson, L., Richtner,

		A. (1999) "Words of value- giving words to IC", Skandia.
COMPLEMENTARY ASSETS	Anything that is valuable in getting an enterprise products, processes and services to the marketplace, both what exists at the present and what is planned for the future, e.g. fruits of innovation including scientific and technological research. There are three types of complementary assets: Generic Assets: General-purpose assets that need not be tailored to the innovation in question; Specialised assets: Assets with unilateral dependence; Co-specialised assets: Assets with bilateral dependence.	Teece, D. (2000), <i>Managing Intellectual Capital</i> , Oxford University Press. Oxford.
COOPERATION WITH ECONOMIC PARTNERS	This factor stands for cooperation between economic partners, which typically exists along the value chain (suppliers, customers).	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.
COOPERATION WITH FUNDING INSTITUTIONS FROM THE PRIVATE AS WELL AS PUBLIC SECTOR	This factor describes the financial support from different institutions, such as European Investment Bank and European Investment Fund or private venture capitalists.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.
COOPERATION WITH UNIVERSITY PARTNERS (E.G. BIGGER PROJECTS, PLATFORMS, STRATEGIC ALLIANCES, COMPETENCE CENTRES.....)	This factor describes different forms of cooperation with universities and other R&D institutions. It includes different forms of contracts, common projects and institutionalised forms of cooperation.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.
CUSTOMER CAPITAL	The value of customer base, customer relationships and customer potential. Component of structural capital.	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia.
EXPLICIT KNOWLEDGE	Explicit knowledge is formal and systematic and can be easily communicated and shared, in product specifications, scientific formulas or computer programs (Nonaka). Explicit knowledge is an articulated knowledge – the words we speak, the books we read, the reports we write, the data we compile (Hubert Saint-Onge).	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia

GEOGRAPHIC PROXIMITY OF ORGANISATIONS	The geographic proximity of organisations and local to regional factors are of high importance in many industrial site models and are partly seen as key factors for the success of companies within these regions. (Clusters and centres of excellence are potential examples which could be mentioned within this context).	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283–301.
HIDDEN VALUE	Value that is not shown in the balance sheet but still contributes to the organization's value creation, for example knowledge. Equivalent to IC. Value not included in market capitalization but inherent in the company's intellectual assets; Intellectual (capital) potential (Leif Edvinsson)	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283–301.
HUMAN CAPITAL	The accumulated value of investments in employee training, competence, and future. The term focuses on the value of what the individual can produce; human capital thus encompasses individual value in an economic sense (Gary S. Becker). Can be described as the employees' competence, relationship ability and values. Work on human capital often focuses on transforming individual into collective competence and more enduring organizational capital.	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
INDICATOR	A measurement that visualizes a certain aspect of the organization that has been identified having an impact as a key success factor. Indicators are not to be mixed up with objectives, since indicators have the purpose of indicating a certain development and not to describe a target value.	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
INFOMEDIARIES	Middlemen between investors and investees who broker information on investment opportunities.	n/a
INNOVATION	An innovation is the implementation of a new (for the enterprise, the industry or the world) solution aiming at enhancing its competitive position, its performance, or its know-how. An innovation may be technological or organizational. A technological product (good or service) or process innovation comprises implemented technologically new products and processes and significant technological improvements in any of them. An organizational innovation includes the introduction of significantly changed organizational structures, the implementation of advanced management techniques and the implementation of new or substantially changed corporate strategic orientations.	Based on: OECD / European Commission - Eurostat (1997, 2nd edition) "Proposed guidelines for collecting and interpreting technological innovation data – Oslo Manual, The Measurement of Scientific and Technical Activities." OECD Publications, Paris, France.
INNOVATION AND R&D BUDGET	For implementation of innovation and R&D-projects, a corresponding budget must be	Wiedenhofer, R. (2012) 'Key drivers of

WITHIN THE COMPANY	provided. The necessary amount should correspond to the corporate strategic positioning (e.g., technology leader) and can be part of an innovation strategy.	technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.
INTANGIBLE ASSETS	An identifiable non-monetary asset without physical substance held for use in the production or supply of goods or services, for rental to others, or for administrative purposes.	Based on: International Accounting Standards Committee, 1998, IAS 38 intangible assets. p. 984
INTELLECTUAL CAPITAL	<p>Intellectual capital is the combination of the human, organizational and relational resources and activities of an organization. It includes the knowledge, skills, experiences and abilities of the employees; the R&D activities, the organizational routines, procedures, systems, databases and intellectual property rights of the company; and all resources linked to the external relationships of the firm, with customers, suppliers, R&D partners, etc.</p> <p>This combination of intangible resources and activities allows an organization to transform a bundle of material, financial and human resources in a system capable of creating stakeholder value.</p> <p>Intangibles to become part of the intellectual capital of an organisation have to be durably and effectively internalised and/or appropriated by this organization.</p>	Elaboration from MERITUM (2002), Guidelines for managing and reporting on intangibles (IC Report), Airtel-Vodafone Foundation, Madrid, and Zambon (2000), The strategic connotations of knowledge and intellectual capital: the new drivers of the internal and external company value, presentation delivered at the Business International Conference on "The value of intangible assets", Milan, March
IC REPORTING	IC Reporting is the process of creating a story that shows how an enterprise creates value for its customers by using its Intellectual Capital. This involves identifying, measuring, and reporting Intellectual Capital, and constructing a coherent presentation of how an enterprise uses its knowledge resources.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.
IC STATEMENT	<p>An IC Statement is a report on the Intellectual Capital of the enterprise that combines numbers with narratives and visualizations, that can have two functions:</p> <ul style="list-style-type: none"> • complement financial management information (internal management function); • complement the financial statement (external reporting function). 	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.
INSTITUTIONS FOR KNOWLEDGE TRANSFER AND SUPPORT	Knowledge transfer institutions offer and coordinate supporting measures, consult and organise dissemination, networking and matchmaking, etc. In addition, regional or national state organisations also support export.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.

INTELLECTUAL PROPERTY	Intellectual assets that qualify for legal or commercial protection, i.e. patents, trademarks, copyrights, and trade secrets.	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
INTELLECTUAL PROPERTY RIGHTS	Protection of intellectual assets such as patents and trademarks.	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
INTERNATIONALISATION	Internationalisation leads to global competition, enhanced competitive pressure and at the same time to a decrease of the development time of new technologies through increased interdisciplinary cooperation	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.
INVESTORS	Public or private organizations and private individuals who invest in new or existing ventures in order to achieve a positive financial outcome.	n/a
KNOWLEDGE	Information that has value in the interaction with human capital. The ability people have to use information to solve complex problems and adapt to change. The individual ability to master the unknown. The ability to act (Karl-Erik Sveiby). Knowledge can be classified as explicit or tacit (Nonaka).	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
KNOWLEDGE ECONOMY	An economy in which knowledge is the most important input factor. The new economic theory for the knowledge economy is – in contrast to the conventional economic theory – developed in and for the knowledge era. It is especially characterized by the law of increasing returns (W. Brian Arthur and Paul Romer).	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
KNOWLEDGE INNOVATION SM	Creation, evolution, exchange and application of new ideas into marketable goods and services, leading to success of an enterprise, the vitality of a nation's economy and the advancement of society (service mark owned by Debra M. Amidon, Entovation International).	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
KNOWLEDGE MANAGEMENT (KM)	Knowledge management includes managing information (explicit/recorded knowledge); managing processes (embedded knowledge); managing people (tacit knowledge); managing innovation (knowledge conversion); and managing assets (IC) (David Skyrme, Nick Willard).	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
LEADING FIGURES AND STAKEHOLDERS	This factor describes the role of leading figures (entrepreneurs, politicians, scientists) with regard to their influence on the shape of a RIS(Regional innovation system).	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.

NEW TECHNOLOGIES	This factor stands for the implementation of new Technologies and technology transfer in companies. The acquisition of technologies can be done by own developments, purchasing technologies or patents, mergers and acquisitions or in course of cooperation.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283–301.
ORGANIZATIONAL CAPITAL	Systematized and packaged knowledge, plus systems for leveraging the company's innovative strength and value-creating organizational capability.	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
QUALIFIED STAFF ON THE REGIONAL LABOUR MARKET	This factor describes the available number and the relevant qualification of specialised staff available on the regional labour market. To achieve this, a sufficient number of educational institutions in the region are necessary, which offer a corresponding study programme.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283–301.
ORGANISATIONAL STRUCTURES FOR R&D AND INNOVATION	For generation of ideas and innovative products permanent organisational structures for innovation projects are of importance. These structures can be formed by temporary innovation management groups, teams for the creation and assessment of ideas to the point of permanent R&D departments.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283–301.
POLICY MAKERS	Civil servants on the European, country, regional or local levels involved in the stimulation of the European knowledge economy.	n/a
PROFESSIONAL EXPERTISE (OF POTENTIAL EMPLOYEES) / EDUCATIONAL STANDARDS	For the planning and implementation of innovation and R&D-projects, a sufficient number of specialized employees are necessary in the companies. Career opportunities and incentive systems should be implemented in order to create long-term commitment of the employees and the development of a pool of skilled resources.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283–301.
RELATIONS TO NATIONAL GOVERNMENTAL INSTITUTIONS AND POLICY MAKERS	This factor describes the relation to several national policy makers and institutions, which govern the development of the regional entities.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283–301.
RESEARCH & DEVELOPMENT	Research and development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new products or services.	OECD (2002, 6th edition) "Frascati Manual 2002; Proposed Standard Practice for Surveys on Research and Experimental Development." OECD Publications, Paris,

		France.
RESEARCH/ INNOVATIVE INTENSIVE SME	High tech SMEs including start-ups – for them R&D is a core activity. Medium and Low tech SMEs – SMEs perform R&D or outsource R&D but it is not a core activity. Innovative SMEs - they do not perform R&D but are innovative.	TERSTI (2003), Third European Report on Science & Technology Indicators 2003, DG Research, European Commission.
R&D FUNDING (PROGRAMMES) – WHICH ARE REGIONALLY AVAILABLE (COULD ALSO BE NATIONAL ONES, FROM WHICH THE REGION TAKES BENEFITS) AND FISCAL R&D INCENTIVES	This factor encompasses all kinds of direct R&D funding, such as diverse structural and thematic programmes on a regional, national and international (EU) levels.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283–301.
SMES	Small and medium-sized enterprises are enterprises that have between 10 and 249 occupied persons, a turnover of maximum 50 million EURO and a balance-sheet total of maximum 43 million. SMEs can be divided into: Medium-sized enterprises – They have between 50 and 249 occupied persons. The turnover threshold is 50 million and the threshold for the balance-sheet total is 43 million. Small enterprises - They have between 10 and 49 occupied persons. The turnover threshold and the balance-sheet total equal 10 million.	Commission Recommendation - 2003/361/EC
STRUCTURAL CAPITAL	Customer capital and organizational capital. What is left in the company, when the human capital – the employees – have gone home. The result/value of past IC transformation efficiency/performance. The potential for future Intellectual Capital and financial value creation. The tool(s)/vehicles for human capital relationship value creation: Consists of value-creating and non value creating (value-consuming) components. The sum of intangible assets and intangible liabilities (Leif Edvinsson).	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
TACIT KNOWLEDGE	Tacit knowledge is highly personal and hard to formalize and communicate. Tacit knowledge consists of know-how and mental models, beliefs and perspectives (Ikujiro Nonaka).	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
TANGIBLE ASSET	A physical or monetary asset. Often associated with the financial focus area.	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
TRAFFIC FACILITIES AND LOCAL PUBLIC INFRASTRUCTURE	This factor characterises the traffic and public infrastructure, especially public transport networks and super-regional transport connections.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual

		capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.
TRUST, CONVENTIONS AND CULTURAL ASPECTS	This factor stands for non-formalised norms, rules, conventions, habits, traditions as well as trust, which arise from social Interactions in the long run. These values are bilaterally accepted and reproduced by all actors.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.
VALUE	A measure of people's appreciation of some phenomenon. The value of goods and services can either be measured by the amount of money or other goods or services for which they can be exchanged. Value is what someone wants and is willing to pay to get it.	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
VALUE CREATION	Refinement and transformation of human capital, customer capital and organizational capital through mutual collaboration, into financial as well as non-financial value. A direct result of how people generate and apply knowledge.	Edvinsson, L., Richtner, A. (1999) "Words of value- giving words to IC", Skandia
WEAK TIES" - (SUGGESTED FOCUS ON THE COOPERATION OF THE REGION WITH OTHERS)	This factor describes so called 'weak tie'-relationships with others and also stands for an openness of the system to external actors.	Wiedenhofer, R. (2012) 'Key drivers of technological innovation: intellectual capital view approach', <i>Int. J. Transitions and Innovation Systems</i> , Vol. 2, Nos. 3/4, pp.283-301.

This project has been funded with support from the European Commission. This report reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.