Analysing and Enhancing IC in Business Networks: Results from a Recent Study

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Abstract: Since the acknowledgement of intellectual capital (IC) as the major driver of a company's competitive and innovative performance numerous scientific models and practical approaches were developed to capture and display the IC elements of businesses in order to make them visible and accessible for management. But since the economy has gone global and businesses are acting within a global business landscape the view on IC needs to be expanded to these new structures. Especially for small and medium sized enterprises (SME) commitment in networks and clusters is crucial for sustainable competitiveness on international markets. Alike single companies, also business networks highly depend on IC in order to perform successfully and effectively. The way businesses cooperate, exchange and acquire knowledge, find suitable partners, solve problems, develop and profit from the network has an impact on the company itself as well as on the network. Aiming at an IC-based assessment and support of SME networks, the methodology presented in this paper follows a bottom-up approach starting with the assessment of IC in the single company. Within the research projects "InCaS: Intellectual Capital Statements – Made in Europe" and "Wissensbilanz – Made in Germany" a methodology has been developed which has proved to be capable of collecting comparable qualitative IC data. Based on these results, a consolidated approach has been designed recently, collecting IC data from more than 600 companies in Germany. The results are comparable and individual at the same time, allowing to display IC settings of single companies as well as to aggregate IC information within an IC portfolio for a whole group of companies. The paper will present the methodology as well as some first results from the study taking a look at the German IC landscape based on more than 600 individual IC assessments. The paper will also discuss the possibilities of using the results for IC enhancement in networks and clusters from the view of the single company.

Keywords: intellectual capital assessment, clusters, networks, SME, IC benchmarking

1. Introduction

In recent years, the importance of clusters and networks for successful and innovative company performance has been widely acknowledged. Several projects were initiated by the European Commission addressing the question "How can clusters and networks really offer a favourable framework for enhancing the productivity, the innovation and the competitiveness of SMEs across the European Union, as one way to achieve the Lisbon Summit's Goal?"[1] Today, successful cooperation between SMEs mainly takes place on a horizontal supply chain basis, i.e. companies delivering parts to the next step of a linear value chain. Apart from that, the synergy potential of SME cooperation in Europe, e.g. vertical clusters or other forms of collaboration, is not utilized effectively yet. Moreover, promising networks and clusters are seldom transparent at all (even to their members) and suitable partners and contact persons mostly unknown. Entering or starting high performing clusters therefore often is a huge and resource consuming challenge and to some extend a matter of luck.

An additional problem arises from the fact that a key element to successful cooperation lies within the intangible resource base of companies. This so called Intellectual Capital (IC) which is understood as the stocks and flows of knowledge inside and outside the company that are critical to its business success, is the key capital of the knowledge economy. To enhance the value-adding flow of Intellectual Capital between SME's provides a huge chance of synergies for them to face the challenges of the global knowledge economy. But this presupposes that suitable partners by means of complementary IC-configurations find each other and start IC transfer on a barrier free basis.

In order to make value-added use of network relationships between enterprises, IC flows and IC flow-management within and between the member network member companies have to be build up and supported efficiently. To enrich the opportunities and the quality of business cooperation in networks

[1] EU MAP project on Enterprise Clusters and networks:
http://europa.eu.int/comm/enetrprise/entrepreneurship/support_measures/cluster/index.htm

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is a major challenge and ways to stimulate the "relational capital" in networks and clusters through collaboration and bonding among local firms and agencies across all sectors need to be identified (Migliarese 2008). The approach presented in this paper aims to outline the single steps which are necessary to support IC flows and collaboration in networks. Based on individual assessment of IC, strengths and weaknesses of a company's Intellectual Capital need to be displayed in a standardised manner in order to compare results between companies.

After giving a short overview on the theoretical background of the methodology, the paper presents the approach and some first results, showing how IC comparisons between different groups are possible: starting from the analysis and descriptive comparison between groups like business sector as a first step, it is possible to compare IC assessments of a single company with a peer group (e.g. same size, branch/ sector, region, strategy etc.) in a second step. In a third step, these comparisons can be used to match potential partners for collaborative knowledge- and best-practice-transfers or other forms of collaboration.

2. Background

The new paradigm on innovation supports the idea that the enhanced competitiveness and superior performance of a SME depends greatly on its ability and capacity to enter into *collaborative* and *dynamic* networks in *open business environments*. This has led to a myriad of new concepts (e.g. open innovation, virtual clusters, "Internet Work Enterprises", business ecology) as well as a significant body of recent research aimed at conceptualising and understanding the impact of such strategies on the firm's overall performance. This research has mainly focused on reasons, enablers and barriers for networking at organisational and business environment levels; the effectiveness of networks (Mazzanti, Mancinelli 2007) and the needs and practices of SMEs with respect to networking (Chen et al. 2005). In particular, the EFFORT project (www.effortproject.eu), albeit addressed to SMEs, mainly concerned policy on SME networks and clusters. Most of this research analyses the opinion of network participants, some employ complex networking analysis techniques and models. So far, none of it has focused on IC-flows that, if properly understood and managed, could convert such networks into truly value-adding ones.

In order to actively manage IC and enhance networking between cluster members, the value-driving elements of IC need to be understood and identified. The generation of data and information on intangible/ knowledge resources has been one of the major research issues during the last decades addressing the question of how to find a suitable way to describe the highly individual information on a companies' Intellectual Capital. Different national approaches on IC measurement and reporting have been developed and tested in the recent years leading to the fact, that there is no European wide standard regarding the measurement and disclosure of IC.

A decisive step towards the harmonisation of international approaches in the field of IC measurement and reporting has been taken by the European Research Project "InCaS: Intellectual Capital Statement – Made in Europe" (2006 – 2008) (European Commission 2008). It aimed at bridging the gap between individuality and comparability of IC-related information. The InCaS project has developed a common methodology for the measurement of intangibles and set up a common structure for the display the intangible resources of a company within an Intellectual Capital Statement (ICS). Moreover, the project also laid down a concept on how to harmonise the huge variety of intangible elements which are the basis for superior business performance (Mertins et al. 2009).

Following the most frequently used structure to describe intangible assets (Alwert et al. 2008), the InCaS approach divides Intellectual Capital into three dimensions: Human, Structural and Relational capital. Human Capital (HC) includes the staff's competencies, skills, attitudes and the employee's motivation. Human Capital is owned by the employee and can be taken home or onto the next employer. Structural Capital (SC) comprises all structures and processes needed by the employee in order to be productive and innovative. According to a sloppy but useful definition, it "consists of those intangible structures which remain with the organisation when the employee leaves" (Edvinsson, Malone 1997). Relational Capital (RC) sums up the organisation's relations to customers, suppliers, partners and the public. The EU project has started with the harmonisation of ICS content based on the empirical results collected in 50 pilot implementations: The results from practice proved, that approx. 80-90% of individual IC elements could be harmonised on an aggregated level, while remaining 10-20% are completely individual (Mertins, Will 2008). The table below shows those factors

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of Intellectual Capital, which could be harmonised across all participating companies and have been empirically identified as a standard set of so called “IC factors” relevant for all enterprises.

Table 1: Harmonised IC factors (European Commission 2008)

Type of IC	IC Factor	Definition
Human Capital	Professional Competence	The expertise gained within the organisation or in the employee’s career: professional training, higher education, training courses and seminars, as well as practical work experiences gained on-the-job.
	Social Competence	The ability to get on well with people, communicate and discuss in a constructive manner, nurturing trust-enhancing behaviour in order to enable a comfortable co-operation. Furthermore the learning ability, the self-conscious handling of critique and risks as well as the creativity and flexibility of individual employees.
	Employee Motivation	The motivation to play a part within the organisation, to take on responsibility, committed to the fulfilment of tasks and the willingness for an open knowledge exchange. Typical sub areas are for example satisfaction with the labour situation, identification with the organisation, sense and participation of achievement.
	Leadership Ability	The ability to administrate and motivate people and to develop and communicate strategies and visions and their empathic implementation. Negotiation skills, assertiveness, consequence and credibility as well as the ability to create a scope of self dependant development belong to this IC factor.
Structural Capital	Internal Co-operation and Knowledge Transfer	The manner how employees, organisational units and different hierarchy levels exchange information and co-operate together (e.g. conjoint projects). The focused knowledge transfer among employees and between generations.
	Management Instruments	Tools and instruments supporting the efforts of leadership and therefore have an impact on the way how decisions are made and what information paths are incorporated in the decision-making process.
	IT and Explicit Knowledge	The computer assisted working environment including all elements of explicit knowledge. Among these are for example specific technical operating principles, networks, fileserver, intra- and extranet, databases, internet and software applications including the content.
	Product Innovation	Innovations of great importance for the future of the organisation. Characterised by the fact, that they will bring new products into being or fundamentally change existing products and eventually result in a patent application
	Process Optimisation and Innovation	Optimisation and improvement of internal procedures and processes, e.g. continuous improvement of all business processes as well as idea management in order to gather suggestions of improvement
	Corporate Culture	The corporate culture comprises all values and norms, influencing joint interaction, knowledge transfer and the working manner. Compliance to rules, good manners, "Do's and Don'ts" and the handling of failures are important aspects of this factor.
Relational Capital	Customer Relationships	Relationships to former, current and potential customers. The management of these relations comprises activities like sales and marketing, CRM and face-to-face customer cultivation by employees.
	Supplier Relationships	Relationships to former, current and potential suppliers. The management of these relations comprises activities concerning purchases and the cultivation of suppliers.
	Public Relationships	Relationships to the public. Including the relationships to former and potential employees and the public in general, all activities of public relationship management as well as corporate citizenship, e.g. supporting regional activities.
	Investor Relationships	All relations to investors - external and internal investors - i.e. banks, owners, stockholders. The management of these relations comprises all activities providing specific information to the faction, e.g. accountability.
	Relationships to Co-operation Partners	All relations to professional associations, bodies, and societies. The management of these relationships comprises activities like joint acquisition of customers, suppliers, investors as well as an active knowledge transfer on R&D partnerships, best-practice transfer and networking activities.

Within the European Guideline for Intellectual Capital Statements (European Commission 2008), these harmonised IC factors was agreed upon as a basic standard set of factors which are relevant to the major part of companies when assessing and analysing IC. As already stated above, a certain percentage of factors will remain individual.

Standardised elements to display intangible elements can serve as a basis for the comparison of IC factors and configurations between companies. Several approaches to compare companies on the basis of common indicators have been developed in the recent years. These approaches can be located in the field of benchmarking or rating methodologies. While most benchmarking or rating approaches are quite common and focus on a comparison of business process indicators to display the company performance in relation to others, IC-based approaches are at the very beginning and aim to compare special IC configurations in order to identify knowledge strategies. On the basis of a firms' assessment of a set of standardised IC factors, strengths and weaknesses of IC can be compared between different companies e.g. the respective industrial sector, different branches, sizes, regions etc and reveal the very specific IC strategy of a sector, branch, region or any other group of companies.

3. The study approach

While the European research project aimed at the assessment, analysis and comparison of IC in individual companies on a micro level, the German research project "Wissensbilanz – Made in Germany" took the results from the European harmonisation efforts to design an approach which is able to analyse IC on a macro level. The German approach aims at displaying the German business landscape based on its Intellectual Capital. Here, the aim is not to make the IC assessments of individual companies comparable, but to show the IC configuration of a whole group of companies (e.g. sectors, regions or strategy).

In order to generate valid empirical data for such large-scale comparisons, a large number of IC data sets had to be collected. Therefore, an online questionnaire was designed, based on the European standard set of IC factors shown in the table above. The questionnaire captures each IC factor with two questions:

- How important is the IC factor for your business success (importance)?
- How good is that IC factor today (quality)?

Apart from the three IC categories human, structural and relational capital, a fourth category on traditional tangible resources (like financial resources, machinery and equipment and raw material) was added and could as well be rated by the participating companies according to its importance and quality. Participants could answer on a scale from zero to ten points. Zero meaning "no importance" or "very bad", and ten meaning "highly important" or "excellent". Additionally, general data on size, sector, age, market strategies etc. was asked.[2]

Meanwhile, 615 companies from Germany, Switzerland and Austria created 615 valid data sets. For analysis, only data sets of companies located in Germany were taken into account (N=532). The individual company assessments of the single IC factors were aggregated in order to generate a summarised picture of the importance and quality of IC in the German business landscape. Mean values were calculated from the company assessments of IC factors in order to show the relative differences between different IC factors.

4. First results

In order to describe the study sample, the basic general data about company size, sector age etc. was analysed first. 452 companies indicated their sectoral focus: about 29% of the participating companies are working in industry and 71% are service companies[3]. Of 502 companies which indicated the number of their employees, 74,7 per cent are small and medium sized companies. Thereof, nearly 30% are micro enterprises (up to 10 employees) and more than 25% are small enterprises (between 11 and 50 employees). Medium-sized companies employing 51 to 250 persons make up 19,7% of this group.[4] The remaining 25,2 per cent are big enterprises which employ more

[2] The questionnaire is available at www.wissensbilanz-schnelltest.de in German
[3] This indicates a slight overrepresentation of industry in this study. Official statistics operate with a ratio of 20/80 between industry and services sector in Germany.
[4] Categorisation based on EU SME definition: Article 2 of the Annex of Recommendation 2003/361/EC

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than 251 persons.[5] The next paragraph shows the results for importance and quality of IC factors for all enterprises (N=532). In the subsequent paragraph displays the results for two subgroups and distinguishes between IC in industry and services sector.

4.1 Ranking of intellectual capital factors

Having a look at an overview ranking of the most important IC factors in the German business landscape clearly reveals, that the most decisive intangible factors are 'human capital factors'. Only one factor from the category 'structural capital' ranks among the top 5 IC factors: professional competence heading the ranking, followed by customer relationships and another three factors from the category human capital, employee motivation, social competence and leadership ability. Least important are tangible factors like raw material or machinery and equipment, which confirms the developments and changes, businesses have undergone in the past years on their way to the knowledge economy.

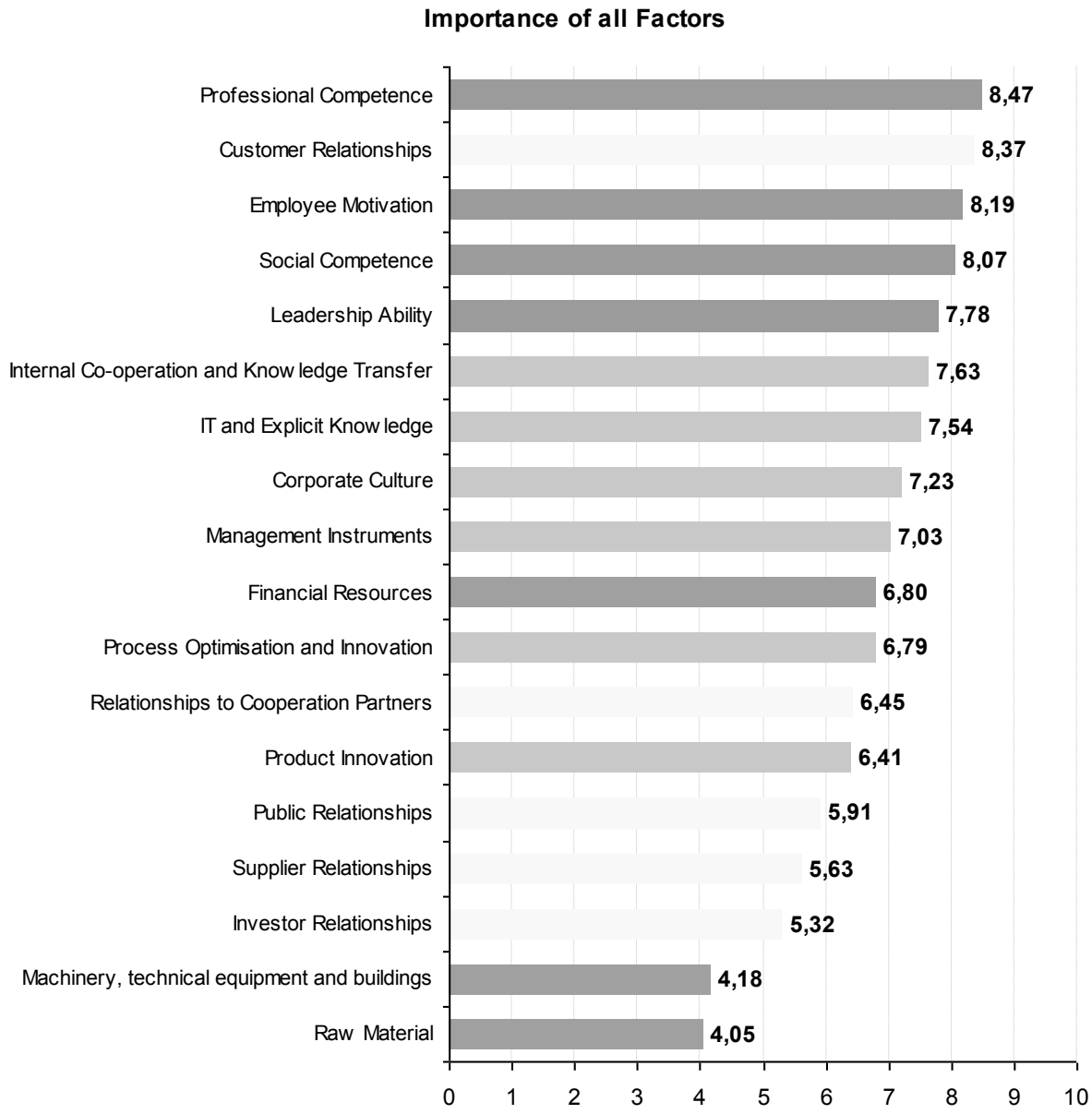

Figure 1: Ranking of the most important IC factors

[5] The ratio of SMEs in the study sample does not reflect the real SME ratio of the German economy. The German *Institut für Mittelstandsforschung* calculates an SME proportion of 99,7% of all German enterprises which are registered for VAT. See http://www.ifm-bonn.org/index.php?id=9

It is rather interesting that in term of structural capital, only customer relations are of great importance to companies. Relations to investors, suppliers and cooperation partners seem to be a less decisive element of business success.

The same analysis has been done for the second question of the online questionnaire similarly ("How good is that IC factor today?"): comparing the graph below with the results for the question about the importance of the single IC factors (see graph above) shows first, that generally the assessments for quality are lower than for assessments of importance. Moreover, the graph below comprises the same set of IC factors than the ranking of importance but displays a slightly different order of IC factors. While the first two factors (professional competence and customer relationships are still heading the ranking, employee motivation drops from the third to fifth position in the ranking concerning the factors quality. A similar change can be noted for the factor "IT and explicit knowledge" but the other way around: here the importance was ranked lower than its quality, moving the factor from rank 7 to rank 4 in the ranking of IC quality.

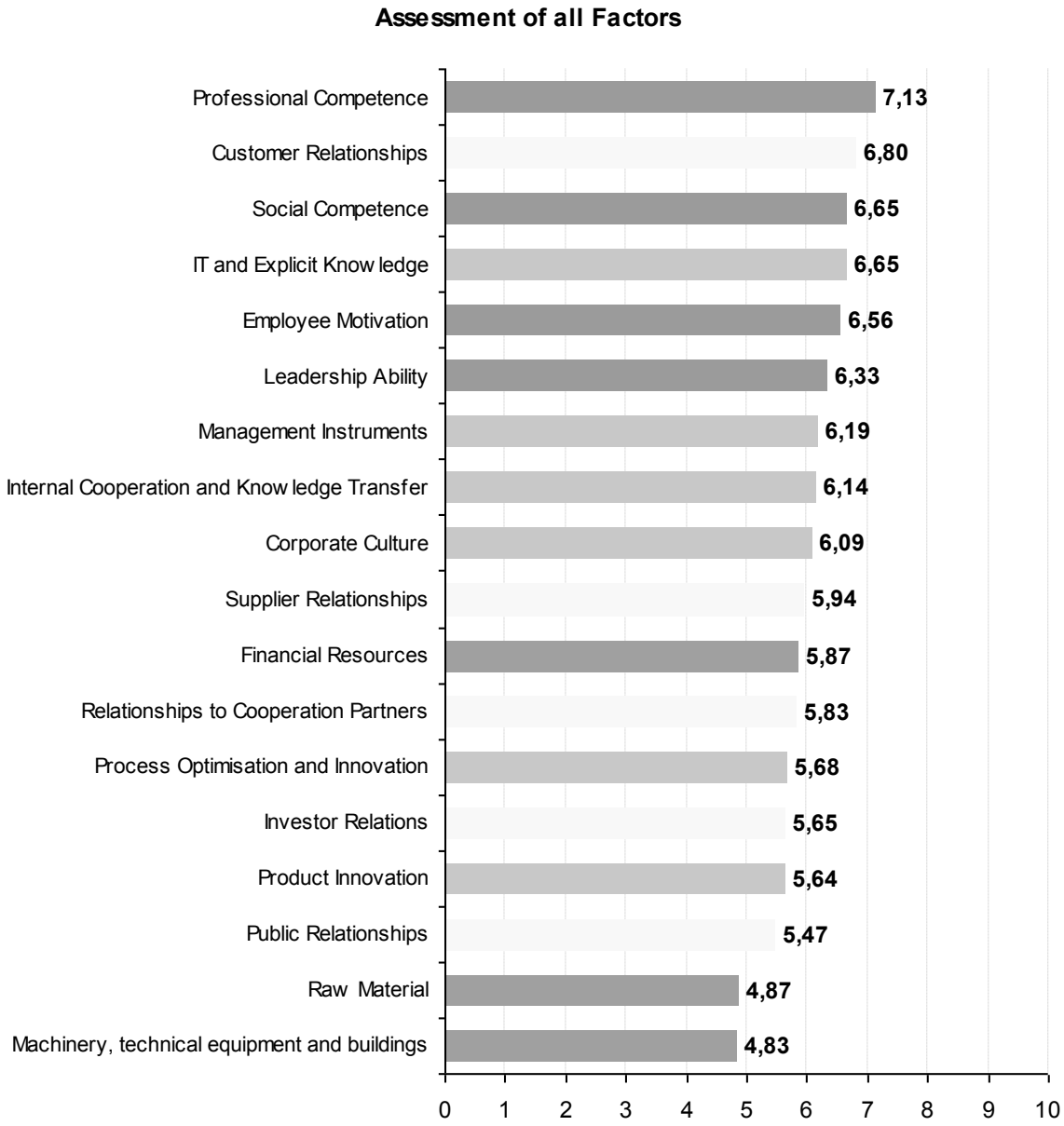

Figure 2: Ranking of the best IC factors

This very brief example already reveals differences between importance and status/quality of single IC factors. They give a first impression of strengths and weaknesses of how companies assess and deal with their Intellectual Capital. Apparently, importance and quality differ between IC factors,

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meaning that some factors are important, but not developed accordingly (e.g. employee motivation). Others are less important but have been attaining more attention or have been invested in more than necessary (e.g. IT and explicit knowledge). Taking into account, that these results are aggregated for a all German companies which took part in the study, a closer look at different types of companies allows us to analyse strengths and weaknesses in more detail.

4.2 IC comparisons between different groups

Due to the additional information which was asked about size, sector, region or market strategies, it is possible to zoom in the picture of the business IC landscape and have a detailed look at different groups of companies. As the most important differences in terms of IC were expected between sectors, i.e. service sector and industry, the paper presents a comparison between those two groups. 130 enterprises could be categorised as service companies, 322 as industry companies. The picture below shows the answers to the question “how important is the factor?” displayed in mean values.

Generally, the valuation of importance differs heavily between the sectors when it comes to the traditional, tangible factors like material and machinery. As expected, tangible factors are still much more important to industry, while being rated rather low by the services sector. Nevertheless, the results also show, that in terms of intangibles, both sectors do have more IC issues in common than expected: IC factors like human capital, relational capital and structural capital factors are most important for both sectors and are rated very high in average.

Taking a closer look at the valuations of IC factors reveals important differences which indicate different IC settings and IC strategies in sectors: As already shown in the figure above, the human capital factors are ranked the highest compared to almost all other IC factors. More interesting is that the difference between companies working in the services or the industrial sector are only marginal: although generally evaluated lower by industrial companies, it can be stated that human capital factors are almost equally important to the different sectors, although industry is sometimes said to be less dependent on highly qualified personnel. Only the factor “social competence” is rated significantly higher by companies working in the services sector.

Some interesting differences also appear related to the importance of some structural capital factors: although the importance of most factors has been rated higher by service companies, the factors “product innovation” and “process optimisation” are more important to industrial enterprises. Also, the factors “supplier relationships” and “investor relations” in the category relational capital have been rated more important by industry.

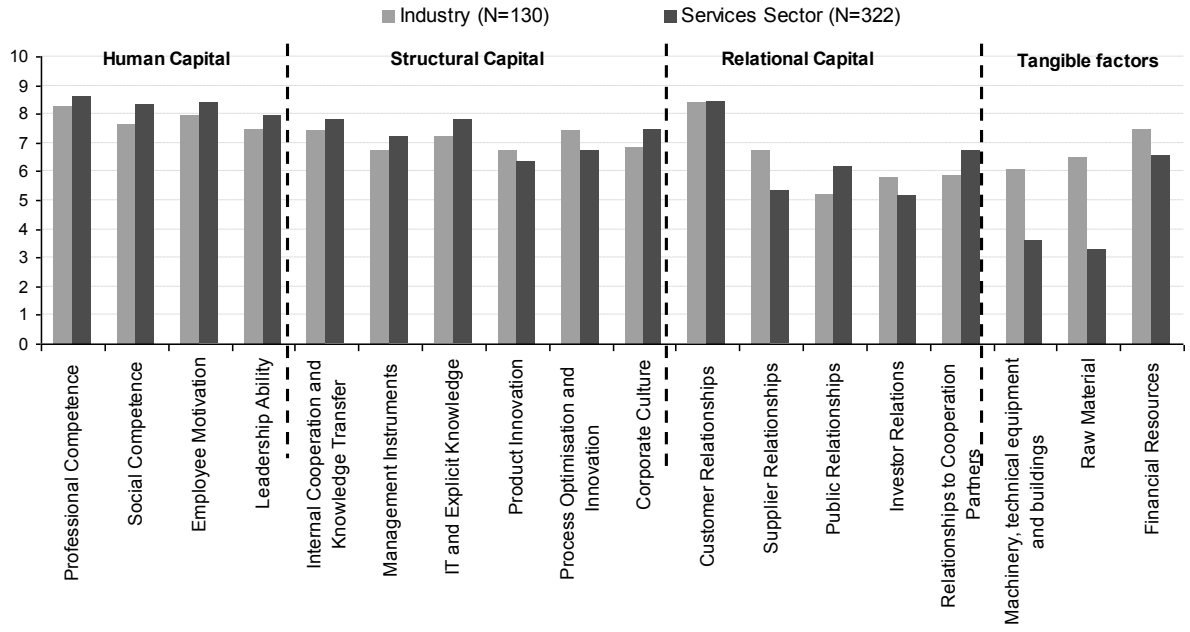

Figure 3: Importance of IC factors shown for industry and services sector

5. Summary and outlook

The paper has shown up the possibility of IC comparisons between company groups based on a standard set of harmonised IC factors. As an example, the differences of IC configurations between the services sector and industry have been displayed and analysed. Apart from some general results, the detailed look at the differences between sectors concerning IC factors' importance and valuation indicates the different IC strategies within the two groups.

Due to the data available, many other groups are comparable, e.g. region, size, market strategy etc. Thus, special IC settings or IC strategies can be analysed and identified in other groups as well. Starting from this first step, future research will now focus on a second step: an IC-based comparison of a single company with a peer group (e.g. same size, branch/ sector, region, strategy etc.). Based on the individual IC data, IC settings of single companies can be compared and the strengths and weaknesses of one company can be displayed in relation to the peer group.

This so called "IC Benchmarking" can provide a new method to compare individual IC configurations across SMEs with the aim to strengthen their competitive capabilities based on a structured and focused knowledge transfer.

Therefore, the third step will need to focus on how to bring single SMEs together on an IC basis to find suitable cooperation partners, initiate best-practice transfers in order to exchange relevant knowledge, find partners with similar IC problems, find partners with similar IC solutions, etc.

Finally, the IC benchmarking shall support enterprises to actively act in and profit from different types of networks and clusters.

Moreover, IC Benchmarking may take place on different levels adding value for different scopes and purposes: individual IC data of different companies in an existing cluster can be aggregated on the cluster level to find out about potential gaps concerning the intellectual resource base of the cluster (this may also be supported by a new IC assessment on the emergent cluster level). Based on that, well-aimed activities to grow and strengthen the cluster by actively inviting new partners to close those specific IC-gaps may be initiated from inside the cluster. Also, cluster-to-cluster comparisons become possible for evaluating the whole network and to assess the cluster performance compared to the performance of other clusters.

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