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**INTELLECTUAL CAPITAL MANAGEMENT IN INTERNATIONAL AND
RUSSIAN SOFTWARE COMPANIES**

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ABSTRACT

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The importance of the company's intellectual capital (IC) increased during the last decades due to knowledge-based economy development. Despite the clear understanding of the IC importance, researchers agree on the fact that many difficulties in management of intangibles still exist from the both theoretical and practical points of view.

The goal of the study is to conduct a comparison of IC management approaches used in international and Russian software companies. To carry out a proper comparison and identify similarities and differences, software firms are explored from the point of view of IC, and then be compared in the context of international and Russian sectors.

At the end of the study, current IC management findings in international and Russian software companies are presented, and comparison of IC management is done. It was investigated from the comparison that international and Russian software companies have similarities and few principal differences in several IC management areas. The comparison of IC management approaches between international and Russian software companies provide helpful information to both, researchers and practitioners.

АННОТАЦИЯ

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Важность интеллектуального капитала (ИК) возрастает в течение последних десятилетий благодаря развитию экономики, ориентированной на знания. Несмотря на ясное понимание важности ИК, исследователи сходятся во мнении, что много сложностей в управлении ИК до сих пор существует с теоретической и практической точки зрения.

Цель данного исследования – проведение сравнения подходов по управлению ИК, используемых в международных и российских софтверных компаниях. Для выполнения надлежащего сравнения и обнаружения сходств и различий, софтверные компании изучены с точки зрения ИК и затем сравнены в контексте международного и российского секторов.

В конце исследования представлены данные о состоянии управления ИК в международных и российских софтверных компаниях, а также выполнено сравнение управления ИК. Из сравнения было обнаружено, что международные и российские софтверные компании имеют сходства и несколько принципиальных различий в области управления ИК. Сравнение подходов к управлению ИК в международных и

российских софтверных компаниях предоставляет полезную информацию, как для исследователей, так и для практиков.

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Explanation of Abbreviations and Symbols

IC	Intellectual Capital
ICM	Intellectual Capital Management

1. INTRODUCTION

This study compares and analyzes intellectual capital management (ICM) approaches in international and Russian software companies. International software sector has a long history and well developed (Datamonitor 2010a), while Russian software sector started its history less than 20 years ago, but in 2010 it was already considered as one of the fastest-growing software sectors in Eastern and Western Europe (Datamonitor 2010a). The main subjects considered in this study are practical methods of ICM in international and Russian software companies, and comparison of these approaches between mentioned organizations.

1.1. *Background of the research and theoretical gap*

By intellectual capital (IC) we understand all non-physical and non-monetary capitals which make this company more valuable on the market (Stewart 1997; Mayo 2000). IC consists of human, structural and relational capitals (Stewart 1997). Human capital lives in human heads; it includes employees' skills, abilities, knowledge, etc (Stewart 1997; Bontis 1998; Sullivan 1998). Structural capital includes everything "what is left after the people have gone home" (Mayo 2000, 523), i.e. systems, patents, culture, publications. Relational capital is the value of relationships company's stakeholders, i.e. customer loyalty, market share, goodwill (Stewart 1997; Mayo 2000). ICM refers to a number of management instruments, which allow companies to analyze and protect its IC, and identify possible sources of profits there.

Importance of the company's IC increased during the last decades due to knowledge-based economy development (Sullivan Jr. and Sullivan Sr. 2000). The difference between summarized value of the company's physical assets and its market prize can be in many times. Despite the clear understanding of the IC importance, researchers agree on the fact that many diffi-

culties in management of intangibles still exist from the both theoretical and practical points of view (Sullivan Jr. and Sullivan Sr. 2000).

Software company is a complex concept which describes all companies working in the following areas: “design, development and customization of software products; provision of contract programming services; provision of applications software; provision of system solutions; conversion of systems solutions; conversion and maintenance of systems; and training” (McAdam and Fulton 2002, 337). Software companies own significant amount of IC, perform a high level of product innovations, and usually lack physical assets (Seleim, Ashour, and Bontis 2004).

Despite the fact that software industry in Russia exists for a relatively short period of time, Russian technicians are highly-demanded on the local and international labor markets due to fundamental knowledge in mathematics and engineering (Bardhan and Kroll 2006). During the Soviet Union existence the Russian government did not pay enough attention to the software market development. According to Bardhan and Kroll (2006), in 1990s, after the Soviet Union collapse, many technicians and scientists with the fundamental academic knowledge in the area of mathematics and engineering left academic schools and laboratories and came to small Russian entrepreneurial companies or to branch offices of well-known international software corporations (IBM, Microsoft, Intel, etc). Nowadays technical education and work skills are well represented among Russian software specialists (Bardhan and Kroll 2006; Hawk and McHenry 2005). Beginners are free to get a fundamental technical education through good network of Russian universities and scientific laboratories. According to Bardhan and Kroll (2006, 84), in 2002 about 49.5% of employees working in Russian software firms have “Master of Technology” degree; “Bachelor of Technology” degree – 11.1%; PhD degree – 8.5% (Figure 1).

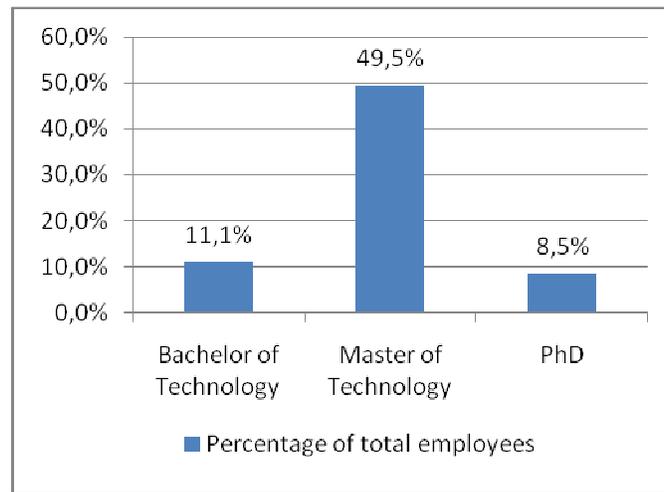


Figure 1 Education level of employees in Russian software companies in 2002 (Bardhan and Kroll 2006)

(Datamonitor 2010b; Datamonitor 2010c) Russian software market strongly grew for many years due to constantly increasing demand from a wide-range of customers: individual clients, local and multinational companies of different sizes, government organizations, etc. For example, during the period of 2005-2009 a compound annual growth rate (CAGR) of Russian software market was close to 20.9% (total revenue in 2008 about EUR 2.1 billion). Starting from 2009, the global economic crisis significantly influenced the market – its value decreased by 18.1% till EUR 1.79 billion comparing to the same figures in 2008. At the same time, the latest forecast for the software market in Russia predicts the growth by 73.2% during the next 5 years – from 2009 to 2014 (Figure 2); for example, in 2010 Russian software market already grew by 14.7% (EUR 2,058.3 million). (Datamonitor 2010c, 24) Generally speaking, in 2010 IT market in Russia was considered as “the fastest-growing one in the Central and Eastern Europe region”. Compared with other countries, in 2010 Russia has only 3.3% of the software market share in Europe (Datamonitor 2010c). Despite this fact, Bardhan and Kroll

(2006) considered Russia as one of potential global leaders in providing IT services and software, as well as India and China.

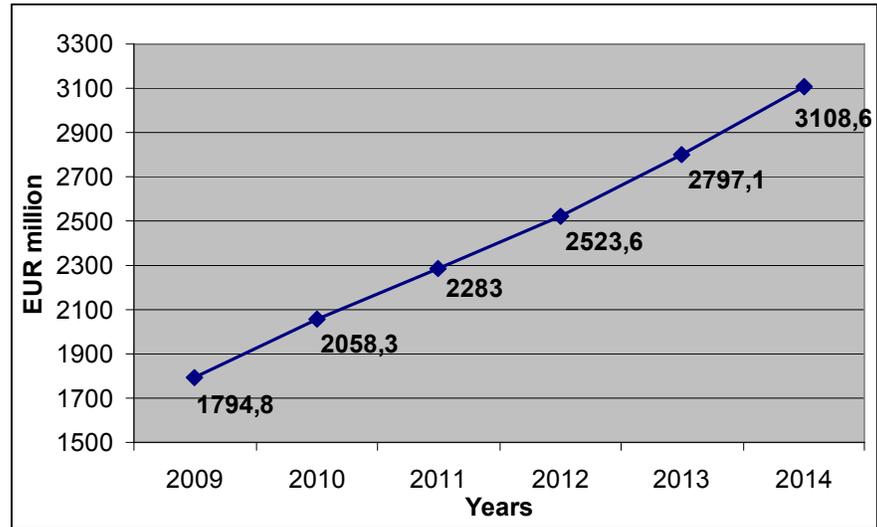


Figure 2 Russian software market value forecast for 2009-2014 (Datamonitor 2010b)

In 2009 European software market was estimated about \$75.2 billion (Datamonitor 2010a) (Figure 3). The global economic crisis influenced significantly this market, so a decline was registered in this sector from 2008 to 2010 (Datamonitor 2010a).

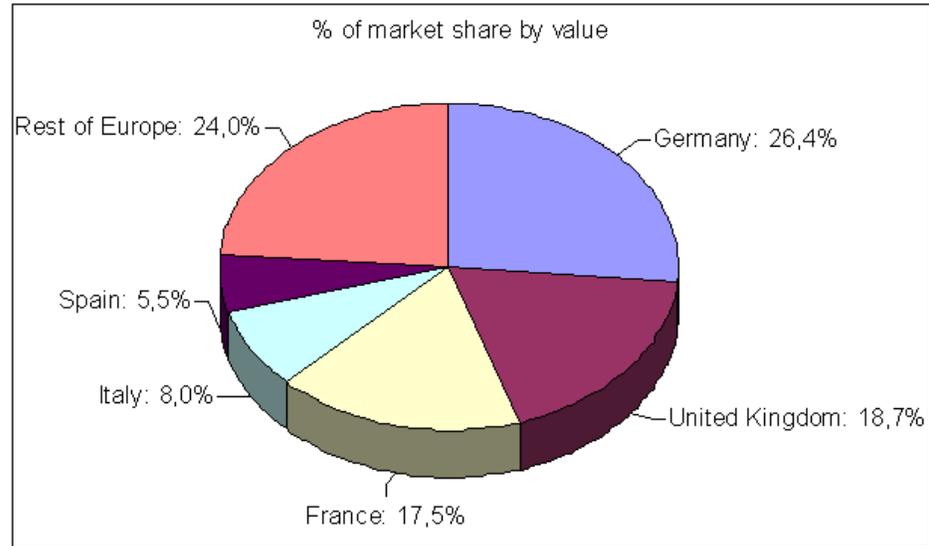


Figure 3 European software market share by value in 2009 (Datamonitor 2010a)

European software market is labor intensive where skilled technicians are in constant demand (Datamonitor 2010a). Despite the simplicity of the market entry, big international companies (Microsoft, IBM, SAP, etc) have very strong position in the described industry. These companies spend big money on R&D and can relatively easy get access to the existing technologies and intellectual capital through acquisition of their smaller competitors (Datamonitor 2010a). Big software companies in Europe occupied their own niches (Datamonitor 2010a). For example, Google, one of the major European market players, generates revenue from web advertisement; Microsoft offers a big variety of software products to individual clients and organizations; SAP offers ERP systems; Oracle – databases.

To consider European software sector more precisely, let's consider Finland as one of European countries. Finland is characterized as very technological country with the strong scientific foundation. According to Datamonitor (2010d), Finland took the third place from the point of view of innovations among all countries in 2009. Information technologies are highly integrated

into all sectors of Finnish people life. According to Ali-Yrkkö and Martikainen (2008), in 2008 Finnish IT sector included about 8,000 companies and 46,000 IT professionals. 33,000 of these people referred to the Finnish software sector. The majority of software companies in Finland (about 70%) are small (employing less than 5 people); they work mainly in areas of desktop and Internet-based software design and development due to low entry barriers. On the other hand, large Finnish companies have software development departments for maintaining their core business, like Nokia, one of the world lead producers of mobile device, developing software for each type of its mobile phone.

Summarizing, international software sector has longer history than Russian one; it is labor intensive; and big international software companies hold their strong positions there.

Many studies about IC were carried out in the context of software sector; in most cases – on examples of the global leading software countries like India, Egypt, Taiwan, etc (Kapur and Ramamurti 2001; Seleim, Ashour, and Bontis 2004; Wang and Chang 2005). The topic of IC measuring in international and Russian software firms has been touched in several research papers as well (Tovstiga and Tulugurova 2007). In these works IC was considered either by several basic factors as only one part of more general study on another topic; or the study was carried out in terms of all innovative companies, not only software ones. Despite the fact of a big number of researches in the area of IC, there is still not enough empirical support especially in the context of software companies located in Russia; no comparison between international and Russian software firms from the point of view of ICM was made.

Summarizing, the areas of research concentration are presented on the Figure 4 and marked by stars. The theoretical framework of this study is presented on the Figure 5.

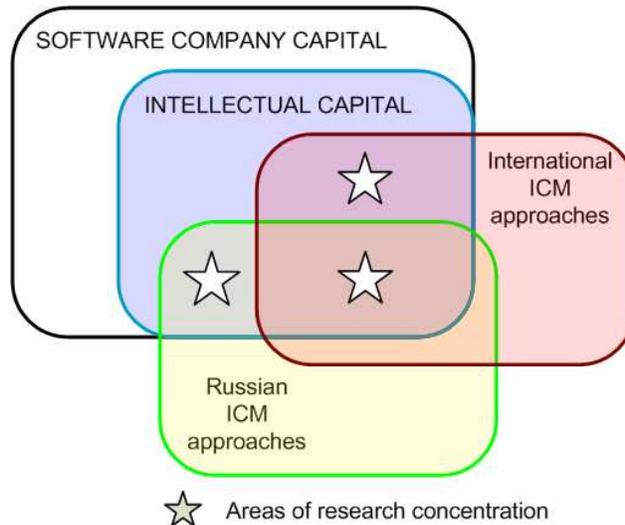


Figure 4 Areas of research concentration (marked by stars)

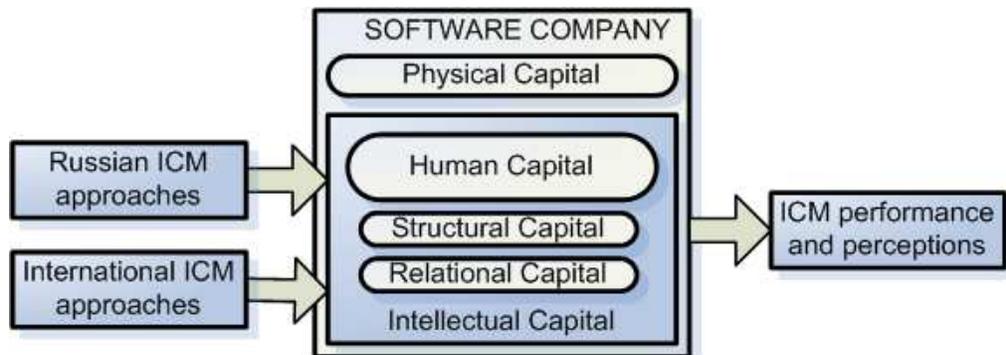


Figure 5 Theoretical framework of the study

1.2. Research objectives and scope

The main goal of the study is to conduct a comparison of ICM approaches used in international and Russian software companies. To carry out the proper comparison and to identify similarities and differences, software firms have to be explored well from the point of view of IC, and then be compared in the context of international and Russian sectors.

The following research questions are considered within the specified scope.

Table 1 Research questions of the study

<p>Research question 1: What are the features of ICM in a software company?</p>
<p>Research question 2: What similarities and differences in ICM approaches between international and Russian software companies exist?</p>
<p>Research sub-question 2.1: If any differences in ICM approaches exist, what are the main reasons of such situation?</p>
<p>Research question 3: Which aspects of ICM have the highest priority in international and Russian software firms?</p>

To understand the real differences in ICM methods between international and Russian software companies, firstly the IC taxonomy of a software company has to be described. Then possible ICM methods in the context of software area should be mentioned.

The theoretical goal of this study is to partly cover the existing gap in understanding the current situation in Russian way of managing IC in software companies. In addition, the current situation in management of IC in international software organizations will be explored. At the same time, ICM differences and similarities between these two groups will be studied through comparison. The managerial goal of the current study is to provide ICM practitioners the up-to-date information about the existing situation in the described area, so make them able to take the most profit making decision.

1.3. Methodology and research method

This study is a cross-country research where data is gathered through interviews with the top representatives of international and Russian software companies. An interview protocol is designed on the basis of previous ICM researches (Krotova 2009), designed IC taxonomy for software companies and the matrix of IC transformation (Pike, Fernstrom, and Roos 2005). The structure of the interview protocol is shown on the Figure 6.

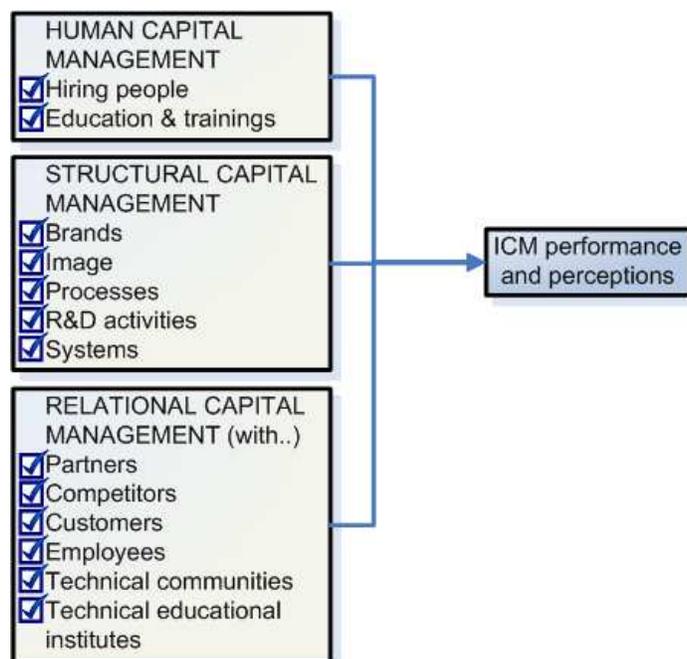


Figure 6 Research interview protocol structure

So this research uses qualitative approach. The interviews were organized through private networks of the researcher and academic advisors. Then thematic analysis was applied to the collected data, and main findings were presented.

1.4. Structure of the research

The current research is organized according to the following schema (Figure 7).

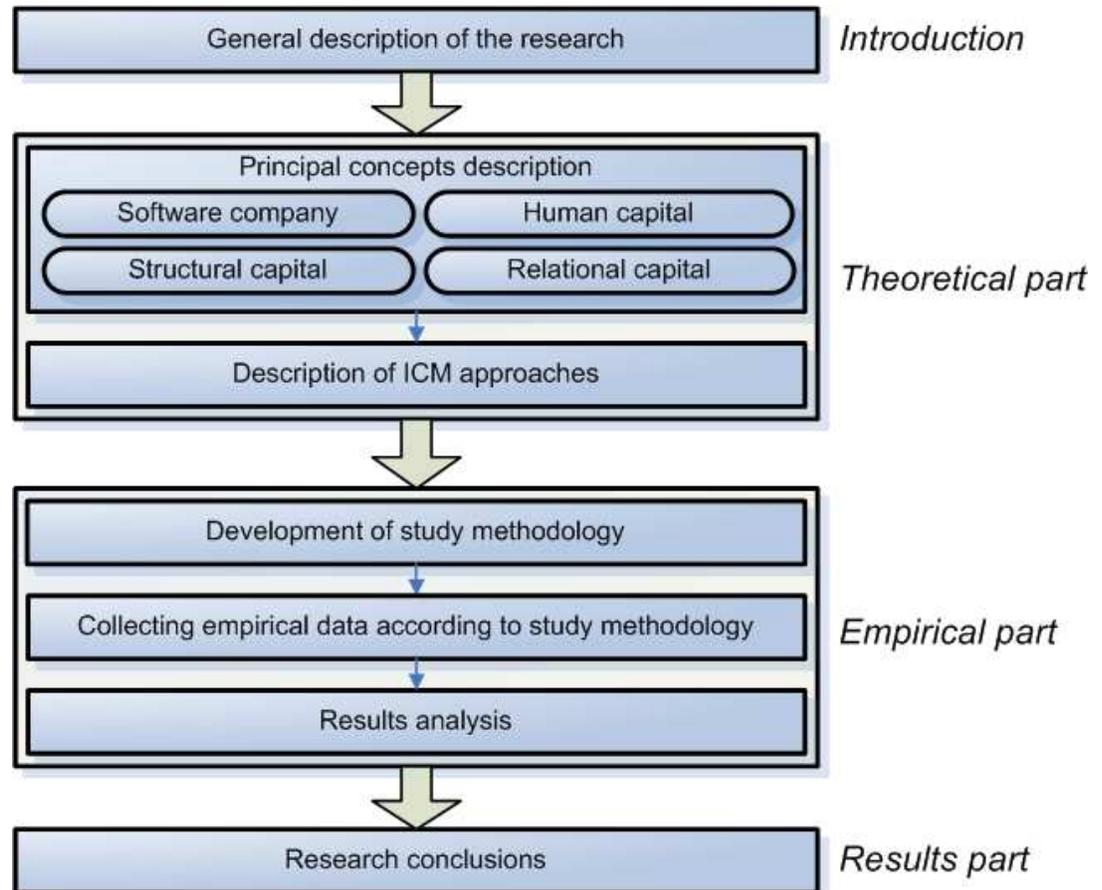


Figure 7 Organization of the research

The current work is conditionally divided into four parts: introduction, theoretical and empirical parts, and results.

Introduction mainly formulates the general description of the study consisting of the background of the study, the theoretical gap, research objectives, scope, and limitations which are covered by the Chapter I.

The main goal of the theoretical part is to introduce the principal definitions which are used further in the study; review literature about the research problem and identify prevailing literature trends. The secondary data for theoretical part is selected from numerous academic resources, mainly full text databases such as EBSCO, eLibrary, Elsevier, and Emerald Management Xtra. Chapter II introduces IC terms; Chapter III describes software company related concepts.

The empirical part describes the study methodology and data collection: research method, the process of the empirical data collecting, participants' criteria and information, data analysis and measures are explained in the Chapter IV. All collected data is well documented and systematized, so further analysis is easily carried out. Research findings, results and their analysis are considered in the Chapter V. Theoretical and empirical parts are principal sections of the study.

Chapter VI describes conclusions, theoretical and managerial contributions, limitations, and suggestions for the future study.

1.5. *Limitations of the research*

The current study has several limitations.

First of all, Russian territory covers a big area and populated in the unbalanced way. The majority of software companies are located in big cities with population exceeding one million people (Moscow, St Petersburg, Novosibirsk, Yekaterinburg, etc). So the scope of the current study is limited by software companies likely located in big Russian cities.

Secondly, some information related to the company's IC can be held back because of its confidential nature. Thus the bigger number of interviews was organized to collect relevant and reliable data.

1.6. Summary on Chapter I

The Chapter I describes the main focus of the current study.

First of all, the background of the research and the theoretical gap are described. Software company, IC and its principal elements (human, structural, relational capitals), ICM concepts are introduced. The general overview of the Russian and international software sectors are made. The history of Russian software market growth is provided as well as the midterm forecast for its further development. The reasons of the high IC concentration inside of the software firms are provided. An overview of the existing studies in the area of IC presence inside of software companies is made. Finally, theoretical framework and areas of research concentration are provided.

Then the research objectives and scope are described. Four central research questions of the study are formulated. Theoretical and managerial goals of the study are explained.

Methodology and research method are introduced. Then the organization of the research is presented; each of its four main phases (introduction, theoretical part, empirical part, and the results) is introduced. The aim of each chapter in this work is described. Finally, the possible limitations of the research are explained.

2. INTELLECTUAL CAPITAL

The following sections provide several principal definitions which will be used further in the current paper. There are also an historical overview of intellectual capital definitions and well-known intellectual capital classification and measurement frameworks.

2.1. *Intellectual capital general definitional issues*

Intellectual capital is a relatively new concept. The majority of researchers still even did not agree on the more or less common IC definition. Generally speaking, each company owns not only tangible assets (equipment, cash, etc.), but also some intangible assets, which make this company more valuable on the market. According to Mayo (2000, 522), Sveiby (1998), company's market value can be represented with the following formula:

$$\text{Market value} = \text{Tangible assets} + \text{Intangible assets}$$

Mayo (2000, 522) noted that "in most organizations today, the intangible assets are greater than the tangible, and they will be increasing at a faster rate". Stewart (1997) mentioned the fact of growing difference between company's market price and the financial estimation of its equity. Teece, et al. (2000, 6) wrote that such "additional value" is important in both relatively new (Internet, microelectronics, etc.) and more traditional industries (steel, oil, etc).

There are several opinions about the person who first time introduced IC concept.

Firstly, Stewart (2002) wrote that the first mention of IC term was made by Kronfeld and Rock (1958, 90). Kronfeld and Rock (1958, 88-89) tried to estimate the market value of several technical companies like "Hewlett-Packard", "Electronic Association", and "High Voltage Engineering". They

called (1958, 90) the difference in higher company's net value and price/earnings ratios comparing to other bigger companies as "intellectual premium" and showed a connection between strong position of each of these small companies on the market and attitude of their management to R&D programs. Finally, Kronfeld and Rock concluded (1958, 90) that "the IC of such companies is perhaps their single most important element", helped these companies to make good progress. Later the term of "intellectual premium" was used by some IC researchers, for example by Sveiby (1998). He considered (1998, 346-348) the case of one of the most profitable European software companies "WM-data", compared company's equity and its market value and found that the company's equity composed only 1/6 from the share price; the rest of the share's price was the "intellectual premium" value. The author concluded (Sveiby, 1998, 348) that this case is not unique and intellectual "premiums are common features on all markets". Similar results got Edvinsson and Malone (1997) when considered "Netscape", "Microsoft" and "IBM" companies and mentioned that there is "a gap between the values of enterprises state in corporate balance sheets and investors assessments of those values". Intellectual premium is higher in high-tech companies and makes them more valuable comparing to any other since high-tech companies are "pioneers" (Edvinsson and Malone 1997; Sveiby 1998).

Secondly, many scientists consider John Kenneth Galbraith as a person who for the first time clearly specified the term of "intellectual capital" (Bontis 1998; Feiwal 1975; Hudson 1993). Galbraith (1969), an eminent economist and scientist, noted that "intellectual capital can be seen as a process of value creation in addition to an asset, an action more than just knowledge or pure intellect".

Thirdly, there is an opinion (Sullivan 2000) that the term “invisible assets” was at the first time introduced by Japanese management scientist Hiroyuki Itami when he published the work “Mobilizing Invisible Assets” in Japanese (1980). This work for the long time escaped notices due to language of publication until 1987 when it was republished in English (Itami and Roehl 1987); then this work became more known by European scientists. Itami and Roehl (1987, 1) wrote that “the intangible assets, such as particular technology, accumulated consumer information, brand name, reputation, and corporate culture, are invaluable to the firm’s competitive power”. And then “in fact, these invisible assets are often a firm’s only real source of competitive edge that can be sustained over time” (Itami and Roehl 1987, 1).

Choong (2008) made an overview of existing IC definitions, classifications and reporting methods, the most popular ones among the majority of IC researchers. He listed (2008, 610-611) existing IC terms (“invisible assets”, “intangible assets”, “intellectual property”, “immaterial values”, “intangibles”, and “goodwill”) and explained why there are so big number of different IC definitions. Firstly, he stated (2008, 612), authors try to describe company’s intangible assets from the different application perspective (accounting, etc.). Secondly, US and Europe researchers describe the same IC concepts using different terminology, i.e. there is a cultural difference (Choong 2008, 613); for example, “intangible assets” in the US, and “immaterial values” in Germany, Sweden, and France. Bontis (2001, 57) stated that many IC researchers define the same terms in different words; they are “merely labeled differently”. Lev (2001, 5) wrote that the term “intangibles” is widely used in the accounting area; “knowledge assets” – in the economical area; “intellectual capital” – in management works; and “intellectual property” – in the legal area. Andriessen (2004, 60) mentioned that in any case the most spread term is “intellectual capital”.

Considering the most oft-quoted IC definitions, Stewart (1991) stated that if all such company's knowledge things like "patents, processes, management skills, technologies, information about customers and suppliers" will be taken together, then this knowledge will compose company's IC. He also defined IC (Stewart 1997) as "the sum of everybody knows within a company and which gives it a competitive advantage". Sullivan (2000, 5) defined IC as "knowledge which can be converted into profit". Lev (2001, 5) stated that IC is "a claim to future benefits that does not have a physical or financial (a stock or a bond) embodiment", "a patent, a brand, and a unique organizational structure (for example, an Internet-based supply chain) that generate cost savings". Roos, Pike, and Fernstrom (2006, 59) define IC as "all non-monetary and nonphysical resources that are fully or partly controlled by the organization and that contribute to the organization's value creation".

Summarizing, each company owns not only financial and physical resources, but also something else which adds the company significant value and makes company's progress on the market more successful. This additional value is called IC. Many researchers wrote about growing importance of IC for companies. Thus Teece, Pisano, and Shuen (1997, 510) noted that each company should pay much attention to its "soft assets" like company's values, culture, skills, organizational learning, etc.

2.2. *Intellectual capital elements*

Choong (2008) made a literature review of all existing IC classifications. According to the results, no agreement about IC classification exists between researches at the moment (Choong 2008, 623). Most publications describing IC categorizations have a gap in theoretical foundation. Even if the paper has such foundation, this foundation is either too abstract or too broad (Choong 2008, 616). Despite this fact, Choong (2008, 622) concludes that

“the rationalization of IC using the categorization approach better describe what IC is as compared to using definition approach.”

Stewart (1997) stated that all company's assets can be divided in two main groups – traditional capital and intellectual capital. Traditional capital usually includes all physical and monetary company's assets (equipment, financial assets, property, etc.). According to Choong (2008, 617), Sveiby was one of the first researchers who tried to systemize IC; Sveiby (1989, 92) introduced the following IC components – employee competence, internal structure, and external structure; each of them exist in any company. Many researches accepted this classification. At the same time, Kaufmann and Schneider (2004, 377) state that this classification is too abstract, and overlaps can occur (i.e. the same intellectual assets can be included either in one or another IC category). Edvinsson and Malone (1997, 11) modified Sveiby's categories into human, organizational, and customer capital (this classification was also accepted by Mayo (2000)). Stewart (1997) extended Sveivy's classification to human, structural, and customer capital (this classification was also accepted by Bontis (1998)). Later Stewart called “customer capital” as “relational” one, meaning not only relationships with the company's customers, but also with other stakeholders (this classification was also accepted by Roos, Pike, and Fernstrom (2006)) (Figure 8). Lev (2001, 18) used innovation-related intangibles, human resource intangibles, and organizational intangibles as principal intellectual asset components.

At the moment, the commonly used IC classification usually contains the following components: human, structural (or organizational) and customer (or relational) capital.

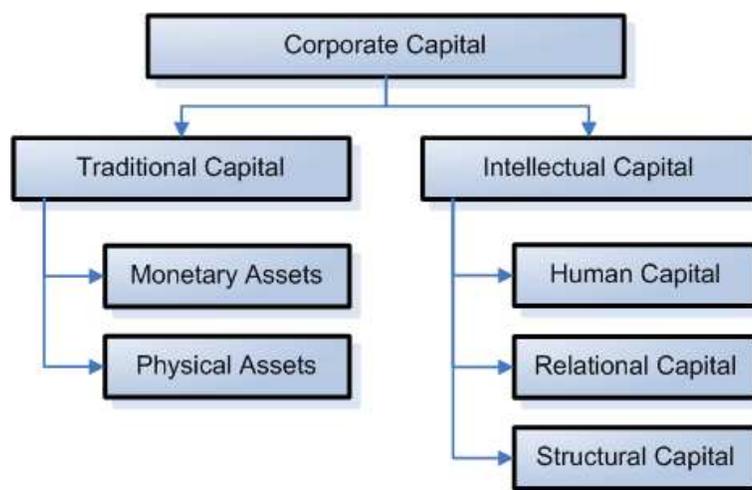


Figure 8 Breakdown of corporate capital by Roos, Pike, and Fernstrom (2006)

Stewart (1997) wrote that main elements of human capital are employees' skills, competencies, and abilities of people, i.e. human capital lives in human heads. Bontis (1998, 65) characterized human capital as assets consisting from individual tacit and explicit knowledge. Moreover, he added that human capital on the individual level consists of personal "genetic inheritance, education, experience, and attitudes about life and business". Sullivan (1998, 133) described human capital as "company's individual employees, each of whom has skills, abilities, knowledge, and know-how". According to Mayo (2000, 523), human capital includes such company factors like "individual competence and expertise, judgment, wisdom; team competence; leadership and motivation".

Stewart (1997) wrote that the relational (customer) capital is "the value of relationships with suppliers, allies, and customers". Stewart wrote also that there are two main forms of customer capital. The first one is "customer loyalty" meaning the customer expectation of goods' quality. The second form of customer capital by Stewart is "brand equity" which can be estimated from financial point of view. Mayo (2000, 523) extended the boundaries of Stewart's definition and stated that relational capital (customer capi-

tal) consists of “customer contacts, relationships, loyalty, satisfaction; market share; image, reputation, brands”.

The third component of IC breakdown, structural capital, according to Mayo (2000, 523), is “what is left after the people have gone home”. The author includes in structural capital the following factors: “systems, methodologies, patents, know-how, databases, knowledge, and culture”. Bontis (1998, 65) provide another definition of structural capital and states that “IC does not include intellectual property” like copyrights, patents, different design rights, trade and service marks, etc. Stewart (1997) wrote that this type of capital “belongs to the organization as a whole” and that it consists of “technologies, inventions, publications, and business processes”. Wang and Chang (2005) described structural capital as consisting of two components - innovation capital and process capital.

According to Mayo (2000, 523), all these IC components “are grown by people”; each of them is a result of human intellectual work. Moreover, development of each of these three IC components is vital to the company’s success on the market. Wang and Chang (2005) wrote that each organization has to constantly make the balanced improvement of all its IC components to achieve a good value creation. At the same moment, Mayo (2000, 523) concluded, that if the company pays not enough attention to even one of its IC components, it will be more difficult for this company to survive and grow, because human, relational and structural capitals are closely interrelated.

There are many other IC classifications; for example, Sveiby (1998, 348-351) described the classification called “family of three” of intangible assets (Figure 9).

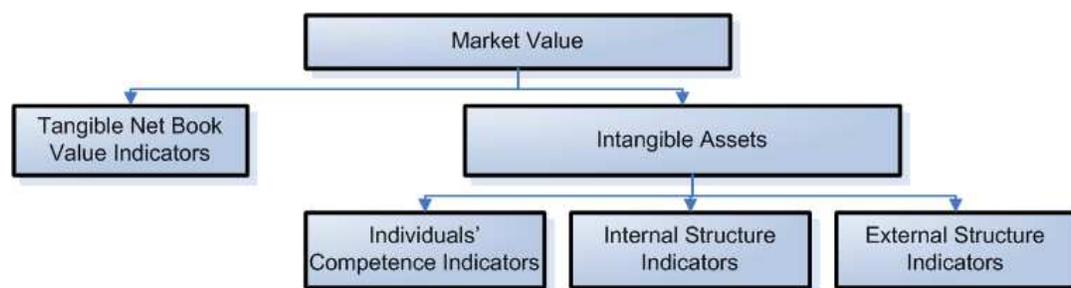


Figure 9 Market value indicators breakdown according to the “family three” concept (Sveiby 1998)

By Sveiby (1998, 349), company’s market value consists of tangible net book value and intangible assets. At the same time, company’s intangible assets have three principal components – individuals’ competence, internal structure, and external structure. Each of these tangible and intangible components has four indicators: growth, renewal, efficiency, and stability/risk.

Sveiby (1998, 344) defined individual competence as “people’s capacity to act in various situations”. Individual competence component, by Sveiby (1998, 344), includes “skill, education, experience, values and social skills”. Company should pay attention to its people and individual competence factor since everything related to the company (assets, structures, etc.) is a result of human activities. The author wrote that on practice company may pay some compensation to its employees in case of emergencies (for example, staff reduction) with the purpose of increasing people’s loyalty; such proactivity is considered as “invisible financing of employee competence” (Sveiby 1998, 344-345).

The second component of intangible assets according to Sveiby (1998, 345), the internal structure, is number of “patents, concepts, models, and computer and administrative systems”, owned by the company. All these assets are usually generated inside of the company by its employees or can

be got outside merging some another organization. The author adds that internal structure also contains “the internal networks, the culture and the spirit” (Sveiby 1998, 345).

The last component of intangible assets by Sveiby (1998, 345) is external structure which includes “relationships with customers and suppliers, trademarks and reputation, or image”. The value of intangible assets depends not only on company (like in case of internal structure); it more depends on the company’s approach in solving customers’ issues. So intangible assets are owned not only by the company; it is better to consider like intangible assets sharing.

Comparing two described above IC classifications, the following simple table can be build (Figure 10):

Human Capital	Individuals' Competence
Relational Capital	External Structure
Structural Capital	Internal Structure

Figure 10 IC classifications (Roos, Pike, and Fernstrom 2006 from the left; Sveiby 1998 from the right)

As it can be seen, there are some common ideas between these frameworks. At the same time, Choong (2008, 616) states that the proper IC definition and categorization, from accounting point of view, should help people to show IC on the company’s balance sheet; that can happen only if intangible assets will be “quantitatively identifiable”.

2.3. *Intellectual capital measurement basics*

During last decades traditional approaches of firms valuing became less and less applicable. According to Sullivan Jr. and Sullivan Sr. (2000, 328), the number of companies which principal capital is more intangible increased significantly. In 1978 an average company associated about 80% of its market value with tangibles, and about 80% - with intangibles; in 1998 the situation changes significantly: only 20% of company's corporate value was associated with tangibles, and 80% - with intangibles.

Despite the increasing importance of IC measurement task for each company in conditions of the knowledge-based economy, IC still "remains unrecognized by the traditional accounting paradigm" (Regan, et al., 2001, 34). One of the reasons of such situation, Sullivan Jr. and Sullivan Sr. (2000, 332) noted, is that no model which connects IC and the company's market capitalization exists. Another reason is that no commonly accepted approaches to IC measurement exist as well. Seleim, Ashour, and Bontis (2004, 333) supported this idea and reminded that "what is measured, is managed". Roos and Roos (1997) wrote that on practice managers do not consider ICM seriously.

For example, Seleim, Ashour, and Bontis (2004) developed a special system of valuables for measuring each of IC components, carried out a survey among Egyptian software firms and organized interviews with the companies' CEOs according to this measurement model. Then the authors applied quantitative methods to the empirical results. The approach of developing the measurement system containing a set of factors for each separate IC study is the most common method among researchers to estimate IC.

Summarizing, the most outstanding research in the area of IC measurement was carried out by Andriessen (2004) who identified 30 different methods of intangibles measurement and studied 25 of them.

2.4. Summary on Chapter II

The purpose of Chapter II is to introduce the main concepts in the IC field.

Chapter II starts from the introduction of various IC definitions. Then numerous synonyms of the intellectual capital term are listed (“intangibles”, “invisible assets”, “intangible assets”, “intellectual property”, “immaterial values”, “goodwill”). Possible reasons of a lack in the commonly accepted terminology among IC scientists are provided. Finally, three prevailing versions of IC term appearance are shortly described.

Then the commonly used IC classifications are presented. The majority of publications have either too broad or too abstract IC classifications, so there is a gap in the theoretical foundation of the existing IC classifications. Company’s assets consist of traditional and intellectual ones; usually IC can be categorized as human, organizational (structural) or customer (relational). Each type of IC component is described in details. Good IC categorization system should unambiguously classify all IC elements, so they can be easily measured and therefore managed.

Finally, IC measurement area is covered. Due to the complexity of IC measurement, company’s IC in many cases stays unrecognized and cannot be well handled. Then intellectual capital management definition is introduced.

3. MANAGEMENT PRACTICES OF INTELLECTUAL CAPITAL

According to Roos and Roos (1997), despite the growing importance of IC in conditions of knowledge-based economy, the majority of even practicing managers do not know how to properly collect, measure, and handle IC. Due to necessity of ICM be aligned with the company's strategy, Chapter III considers IC taxonomy and common ICM methods.

3.1. IC taxonomy in software companies

To be able to speak about company's IC measurement and management, multilevel IC taxonomy is introduced in the context of software companies.

According to the corporate breakdown from Roos, Pike, and Fernstrom (2006), the first level of IC taxonomy consists of traditional and intellectual resources. The second level of corporate capital can be represented by sub-groups of mentioned resources: monetary and physical assets - in case of traditional capital; and human, relational and structural capitals - in case of intellectual one. The current work is mainly focused on IC research, so there is no need to go deeper in the categorization of traditional capital and its sub-groups. Then Löthgren (1999) developed this IC taxonomy till the fourth level (Figure 11).

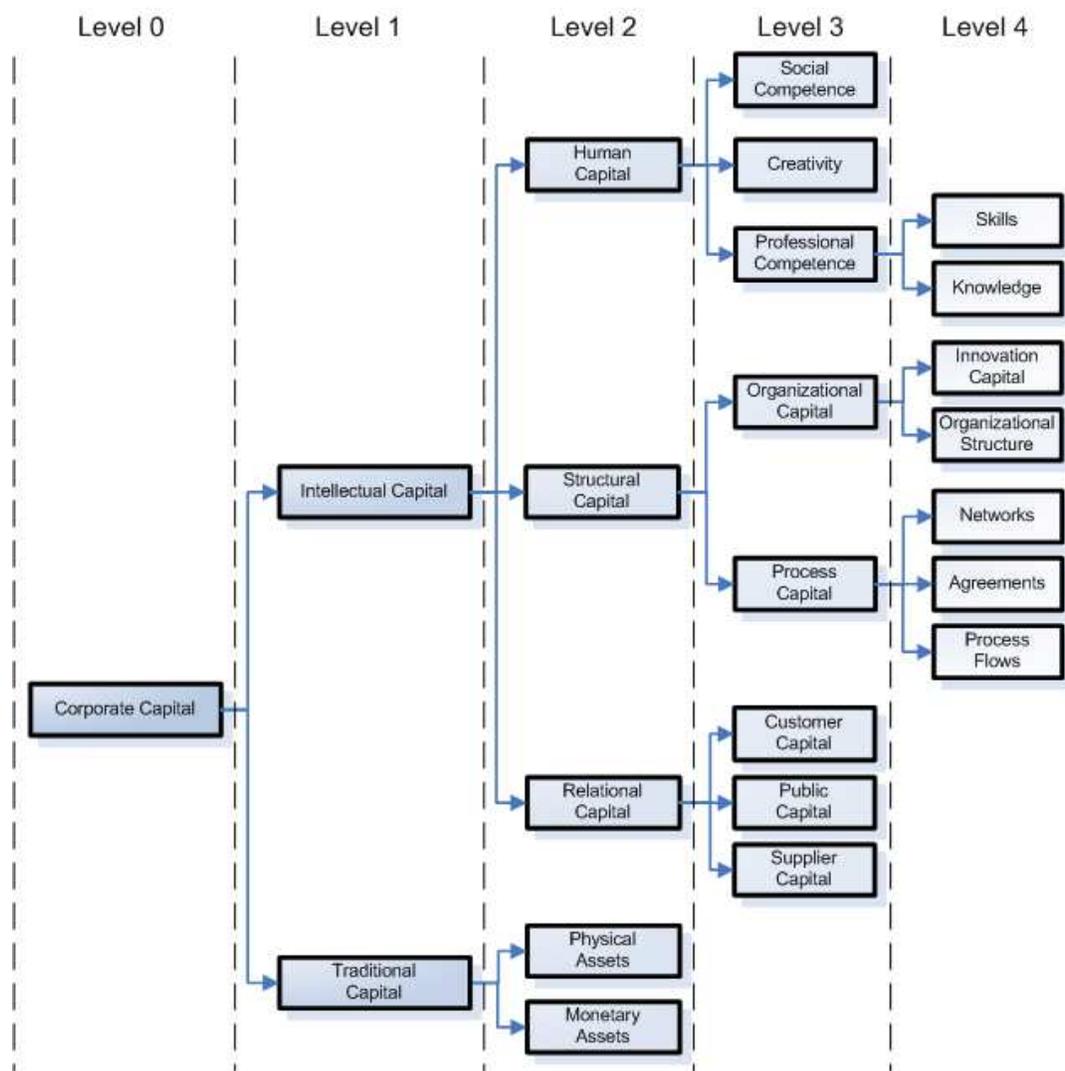


Figure 11 IC taxonomy (Löthgren 1999)

According to the introduced IC taxonomy (Löthgren 1999), human capital includes creativity, social and professional competences. Creativity is an employee's ability to find new methods instead of repeating existing ones. By social competence we understand employee's ability to communicate in a normal way with colleagues and other people related to the business. Professional competence includes everything related to the employee's education and previous experience, and consists of two sub-groups - knowledge and skills (measured as "activity performance").

Structural capital contains organizational and process capital sub-categories on the third level (Löthgren 1999). Process capital covers organizational operation in short-term period; on the other hand, organizational capital consists of innovation capital and organizational structure, where innovation capital is responsible for processes and results of company's innovation, for example, copyrights and trademarks and organizational structure includes such entities like organizational atmosphere and culture.

Löthgren (1999) stated that relational capital in the introduced taxonomy consists of company's relationships with its stakeholders. The principal sub-groups of the relational capital on the third level are customer, supplier and public capitals.

Pike, Fernstrom, and Roos (2005) also introduced taxonomy for technological company (Figure 12) which is much more detailed than taxonomy from Löthgren (1999). It contains five types of resources on the first level (human, organizational, and relational; physical and monetary); 26 types of resources on the second level and already more than 100 on the fourth level.

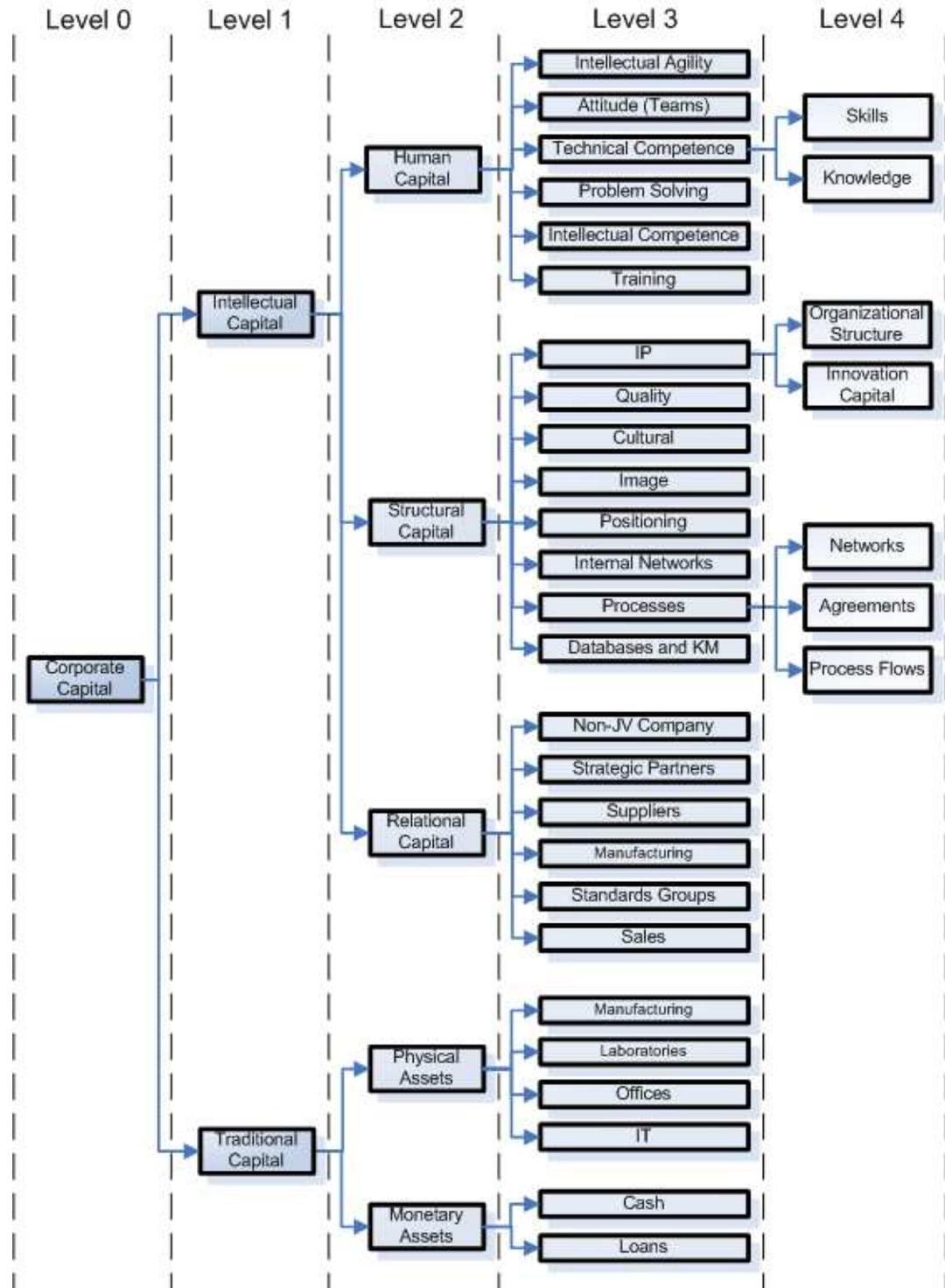


Figure 12 IC taxonomy (Pike, Fernstrom, and Roos 2005)

From the point of view of the current study, both of these taxonomies practically have their own limitations. On one hand, the taxonomy from Löthgren (1999) is quite general; it can be applied in almost any context. That is why it has to be specified for the exact research area to become more applicable in action. At the same time the taxonomy from Pike, Fernstrom, and Roos (2005) covers many different IC elements and not all of them are fully represented in the software sector. For this reason these two taxonomies were combined into one and specialized for software companies (Figure 13).

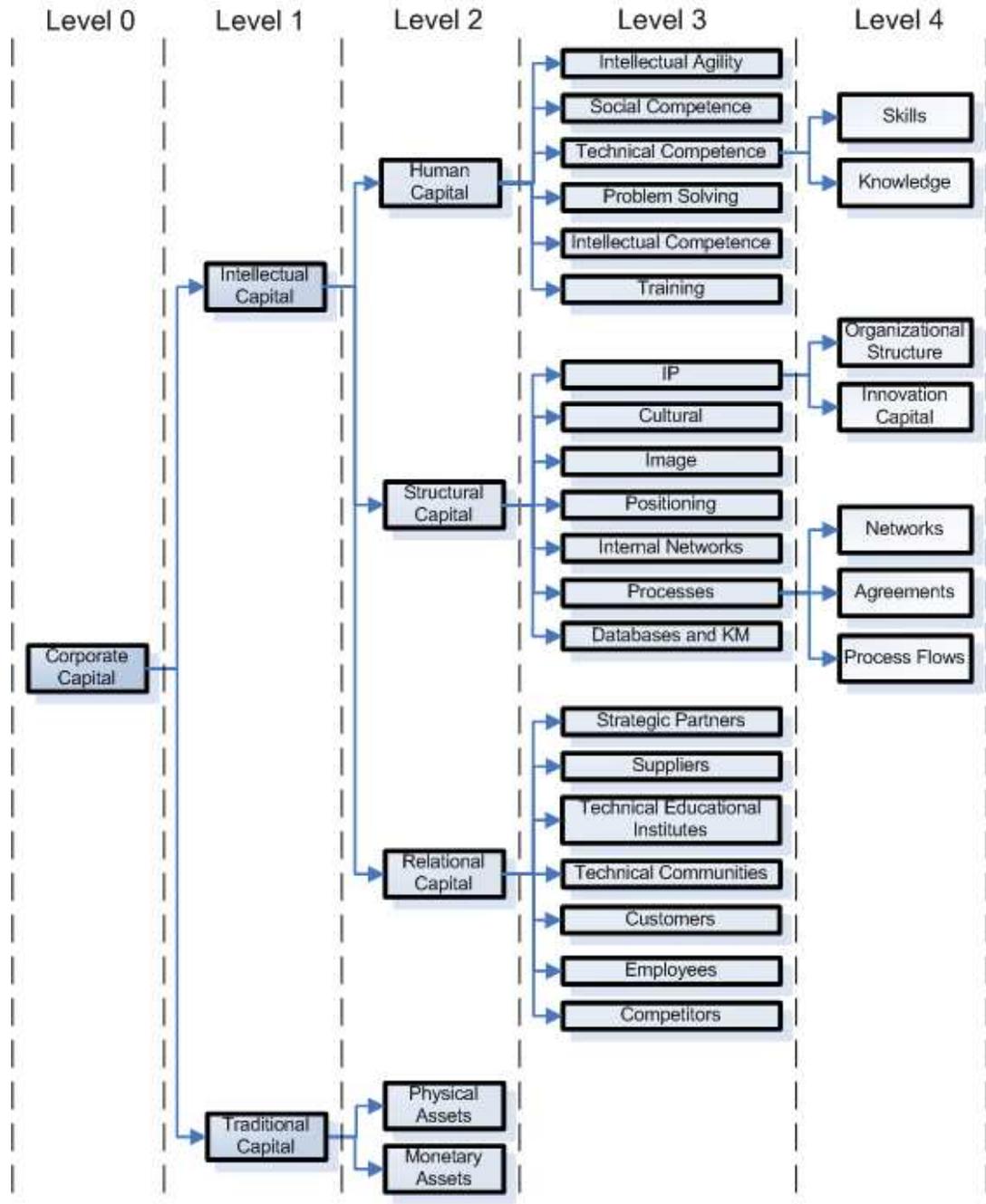


Figure 13 Combined IC taxonomy for the software sector

The combined taxonomy represents the most essential elements of IC of a software company. Some IC components which are hardly applicable to the software sector context were simplified. The first three levels of the com-

bined taxonomy are similar to taxonomies from Löthgren (1999) and Pike, Fernstrom, and Roos (2005) and consist of the same components:

- Level 0. All taxonomies have corporate capital as the top of their trees;
- Level 1. Then corporate capital consists of intellectual and traditional capitals;
- Level 2. IC consists of human, structural and relational capitals; traditional capital – physical and monetary assets;

The percentage of traditional capital comparing to IC is relatively small in software companies. That is why there is no need to consider physical and monetary assets in details. This research is mainly concentrates on the IC components.

Human capital in the combined taxonomy consists of intellectual agility, social, technical and intellectual competences, problem solving knowledge, and trainings. Intellectual agility means employee's ability to think "outside of the box", i.e. his/her creativity. Social competence is an individual's ability to apply emotional and intellectual skills to become a true member of the society. Technical competence includes technical skills and knowledge needed for successful realization of a set task. Intellectual competence covers academic mastery as well as intellectual resourcefulness. Each of these employee's characteristics is an important part of the organizational human capital, and thus should not be left behind the consideration.

Structural capital in the combined taxonomy consists of intellectual property (IP), culture, image, positioning, internal networks, organizational processes and structure, databases and other systems for knowledge management. Intellectual property usually consists of industrial property (trademarks, patents, etc.) and copyrights (on different forms of expression). Organizational

culture covers standards of behavior, values, beliefs, positive atmosphere, etc.

Relational capital in the combined taxonomy consists of relationships with customers, suppliers, employees and other public stakeholders such like strategic partners, technical educational institutes, technical communities, and competitors.

Other groups like manufacturing were excluded from the combined taxonomy due to low relevance to the research context.

Pike, Fernstrom, and Roos (2005) also described the general matrix of transformations of the first level resources (Figure 14).

	HUMAN	ORGANISATIONAL	RELATIONAL	PHYSICAL	MONETARY
HUMAN	Training and mentoring	Knowledge codification, new IP	Building & developing relationships	Developing prototypes	Sales of man-hours
ORGANISATIONAL	Developing competence through use	Data mining	Market intelligence	Equipment and process innovation	Sales of IP, processes & knowledge
RELATIONAL	Chance to build skills in relationship handling	Importing IP, processes, association with brands	Networking amongst customers	Use of other company's assets	Relationship selling, preferential deals
PHYSICAL	Facilities to train with	Possible new products & know-how	Facilities build relationships	Production from raw materials	Sales of products
MONETARY	Recruitment training, conditions	Investment in brands, image and systems	Investment in building links	Investment in assets	Interest or dividends from investments

Figure 14 Matrix of transformation of the company's first level resources (Pike, Fernstrom, and Roos 2005)

Pike, Fernstrom, and Roos (2005) stated that practitioners can modify the introduced matrix through filtering or removing of relatively unimportant transformations. According to this statement, several types of transformation are filtered from the matrix as non-relevant to the research scope. Thus, the areas of research concentration do not cover transformations of physical and monetary resources into physical and monetary ones. Transformation of organizational and relational resources into physical and monetary ones also stayed beyond the research scope.

As a result, the list of questions for interviews (interview protocol) and descriptions of human, structural, and relational capitals are developed according to the introduced IC taxonomy for software companies, previous ICM studies (Krotova 2009), and the filtered matrix of IC transformation (Pike, Fernstrom, and Roos 2005). The subject of human capital transformation into five other types of resources is addressed in the first section of the interview protocol “Questions about human capital”. The subject of organizational capital transformation into human, organizational and relational ones is addressed in the second section of the interview protocol “Questions about structural capital”. And the subject of relational capital transformation into human, organizational and relational ones is addressed in the third section of the interview protocol “Questions about relational capital”.

3.2. *Human capital management*

To survive in the fast-changing environment, software companies have to pay significant attention to managing their people. For example, such global giant like Yahoo sets human capital management as first priority task on the list of its strategic priorities (PriceWaterHouseCoopers 2006). Usually human capital management includes two main sub-groups: hiring new specialists and personnel enhancement (Krotova 2009) (Figure 15).

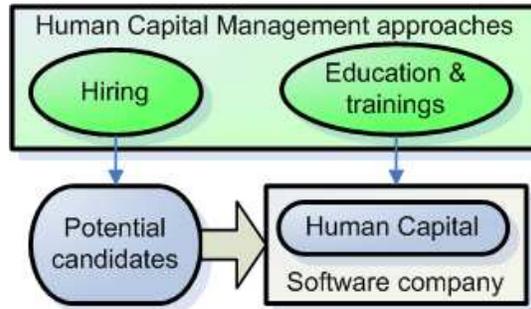


Figure 15 Main Human Capital Management approaches in software companies

The main objective of the hiring process is to employ high-potential personnel. This process in the software company usually includes several principal phases: development of key requirements to a potential candidate (traits, qualifications, and work experience), publication of the position (company's internal and external resources), schedule and carrying out of interviews with interested candidates, and finally making a written job offer to the selected candidate (Hoch, et al. 2000). Usually requirements to a candidate in software sector include specific technical knowledge and work experience, analytical skills, and, at least, one foreign language proficiency (reading, writing). The most frequently required soft skills are communication skills (verbal, written) as well as leadership, teamwork and problem-solving skills. In personal requirements to potential employee software companies usually include positive attitude and willingness to learn fast (Figure 16) (PriceWaterHouseCoopers 2006).

Requirements to a potential employee		
Principal requirements <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Specific technical knowledge <input checked="" type="checkbox"/> Specific technical work experience <input checked="" type="checkbox"/> Analytical skills <input checked="" type="checkbox"/> At least one foreign language proficiency (reading, writing) 	"Soft skill" requirements <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Leadership <input checked="" type="checkbox"/> Teamwork <input checked="" type="checkbox"/> Problem-solving <input checked="" type="checkbox"/> Communication skills (verbal, written) 	Personal requirements <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Positive attitude <input checked="" type="checkbox"/> Willingness to learn fast

Figure 16 Common requirements to a candidate in a software company

The sources of hiring new people in the technological sector are quite limited. A candidate can be recruited from a technical University (last-year student or recent graduate), partnering firm, competing company or can come from another industry (PriceWaterHouseCoopers 2006). It is a common practice when software companies set partnership with top technical Universities in order to attract high-potential students in advance; participate in Career Day events.

Becker (1994, 17) wrote about personnel enhancement that “education and training are the most important investments in human capital”. Regular trainings in combination with good compensation can improve the employees’ performance, knowledge, loyalty to the company, motivation, and as a result the company’s business performance. Usually all listed things can be hardly imitated by the company’s competitors.

The main aim of all personnel enhancement practices is timely identify, support and then grow the high-potential employees (Hoch, et al. 2000). Some commonly accepted approaches to achieving that are the following (PriceWaterHouseCoopers 2006) (Figure 17):

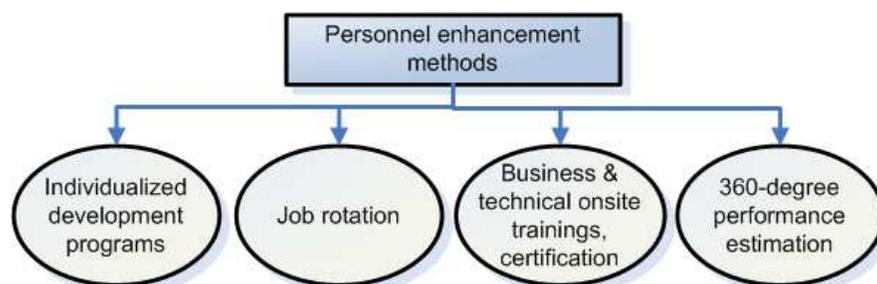


Figure 17 Common methods of personnel enhancement in software companies

First of all, in chase of the most talented people technological companies introduce individualized development programs (PriceWaterHouseCoopers 2006). Such practices became widely used in many sectors of economy due to the increasing global markets competitiveness and employees' desire of building their own career path; even small software companies follow this core principal of mentoring. Semi-annually face-to-face discussion of the employee's performance is a good method of regular tracking employee's career growth plan (Hoch, et al. 2000; PriceWaterHouseCoopers 2006). Higher potential the employee has, wider scope of action is entrusted to this person.

Secondly, job rotation method is also frequently executed in high-tech companies (PriceWaterHouseCoopers 2006). It means that an employee gets a possibility to apply his/her knowledge and skills in different areas in a predetermined way (Hoch, et al. 2000). In this case the person can find exactly whose areas of operations in which he/she is interested most of all and thus become satisfied; the company also benefits due to increasing employees' awareness of different business functions. Job rotation can be, for example, in teams, projects, departments, etc. A separate type of job rotation is international rotation which quite popular in international software companies.

Thirdly, certain software companies organize onsite trainings and certification for their personnel (PriceWaterHouseCoopers 2006). Presence of official certificates, for example, from Oracle, SAP, Cisco, Microsoft, etc. improves company's human capital and increases its market value. As a rule, such courses require significant investments, so not all but just major companies extensively put such approach into practice. On the other hand, coaching seminars and business trainings without getting branded certificate are available to every software firm. For example, sometimes software companies invite external instructors for organization of foreign language

classes or stimulate its employees to visit professional technological events (Hoch, et al. 2000).

Another widely accepted method of employee's enhancement is 360-degree performance estimation (PriceWaterHouseCoopers 2006). That means that the software firm tends to collect different opinions about its employee from people in his/her environment (manager, colleagues, partners, customers) and provide an honest review in order to highlight employee's areas which require improvements. Usage of 360-degree performance evaluation method gives the company a possibility of continuous learning and improvement.

Summarizing, organizational success depends on the company's ability to identify relationships between its human capital and its performance. The best performing companies widely use the described approaches to recruit, maintain and develop their talented employees. Thus any software company should be well grounded in basic principles of human capital management. Accurate human capital management will bring value to the company, motivate its employees and therefore increase company's strategic outcomes.

3.3. *Structural capital management*

To survive, modern technological companies shape their internal structure according to the changes in the environment. Bodrow (2006) states that 29.8% of European TOP 200 companies mentioned the organizational structural factor as the most important one for a successful ICM. At the same time it is relatively easy to measure structural capital of a software company comparing to human and relational ones. The way of maintaining documents inside of the company is intimately connected to the level of its structural capital.

Programs which are usually used in software firms are the core instruments of translation of employees' tacit knowledge into explicit one. Generally speaking, there are two categories of most widely used programs in software companies: application and programming tools (Figure 18). Intranet plays crucial role as well (PriceWaterHouseCoopers 2006).

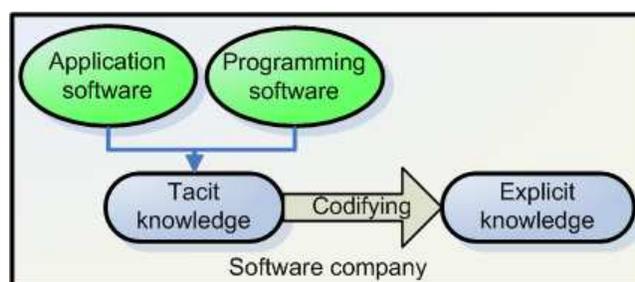


Figure 18 Transformation of tacit knowledge into explicit one by usage of application and programming tools in software companies

Application software includes such sub-categories like management information systems, databases, communications software, spreadsheets and word processing (Figure 19). A wide range of management information instruments exist; all of them provide better visibility of the company's business processes. There are different systems for customer relationship management (CRM), enterprise resource planning (ERP), project management (PM), supply chain management (SCM) and other management areas. The most commonly used database management systems in organizations are SQL Server, Microsoft Access, PostgreSQL, MySQL, Oracle, and Sybase. Communication software transfers all types of information (data, image, voice and video) and consists of e-mail tools (Microsoft Outlook, WebMail, Thunderbird, etc.), instant messaging tools (Windows Live Messenger, Skype, ICQ, etc.), and telephony tools (used in call centers). At the same time the majority of companies use spreadsheet and word processing instruments on a daily basis, for example, Microsoft Excel, Microsoft Word or Open Office. The majority of called systems are integrated into the corpo-

rate Intranet; it serves as a set of portals where company's employees can keep and share their knowledge (PriceWaterHouseCoopers 2006).

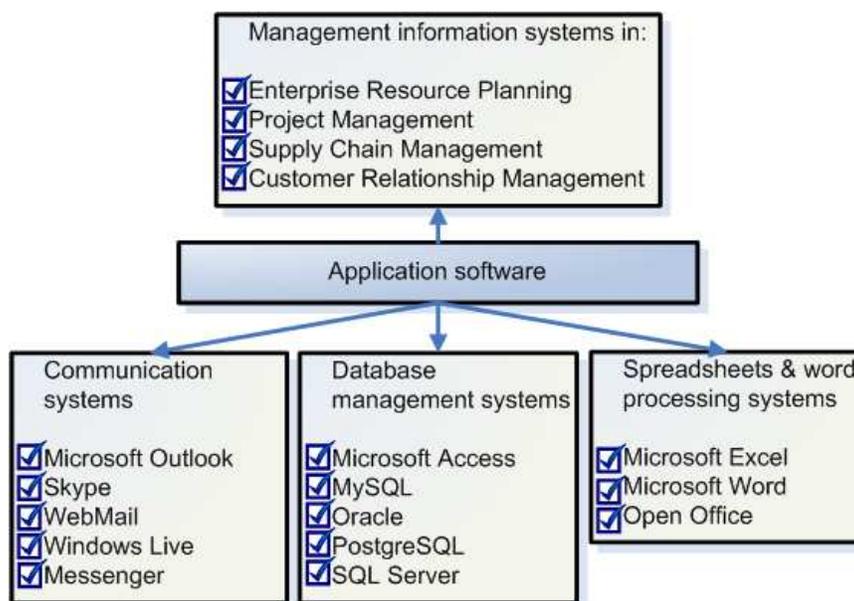


Figure 19 Application software commonly used in software companies

On the other hand, programming tools are essential ones in software firms. Some of their sub-categories are the following: integrated development environments (IDEs); tools for application building, debugging, formal verification, static analysis, memory usage, time reporting and version controlling. Actually, there is a big number of different IDE (the most well-known are Microsoft Visual Studio, WinDev, JBuilder, Eclipse, etc.); all other listed instruments are usually built into these IDEs. Some software firms intensively use different graphical tools including vector and raster editors as well as animation and 3D modelers (for example, Adobe Photoshop, CorelDraw, etc).

Nagappan, Murphy and Basili (2008) states that in the majority of cases commercial software development process is organized in teams of engineers who, according to the organizational structure, report to a manager or

a group of managers; there is a project orientation. Actually, specialists relocate from their departments to the project teams.

As a part of structural capital management, software companies can take care about their brands and image (Hoch, et al. 2000; PriceWaterHouseCoopers 2006). Software branding is positioning of a software product (with its name, logo, graphical design, etc.) where the main purpose is to create a customer's association with the software quality and style. As a result, strong brands increase firm's structural capital.

Moreover, any software company has to protect its IC through registering patents, trademarks, copyrights, and introduction licenses for end-users, etc (Hoch, et al. 2000).

3.4. Relational capital management

Relational capital management plays a crucial role for the company's success (Hoch, et al. 2000; Pike, Fernstrom, and Roos 2005). In software firms relational capital management includes such sub-categories like management of relationships with partners, customers, technical educational institutes and communities, personnel, etc (PriceWaterHouseCoopers 2006) (Figure 20).

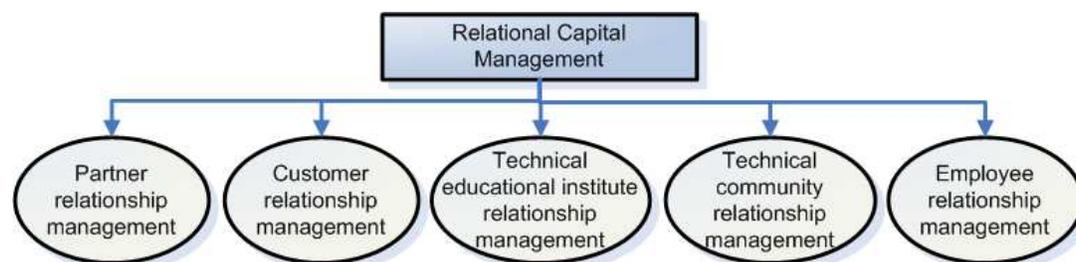


Figure 20 Common categories of relational capital management methods for software firms

First of all, to survive on the market, modern software firms have to concentrate on their core competencies, and put less important activities into hands of their partners (PriceWaterHouseCoopers 2006). Obviously, in the conditions of the global rivalry it is becoming more and more difficult for any software company to serve the full range of functions by itself. There is a rule: more complex software product is, more probable that it will be somehow outsourced. With the increasing complexity of modern software, partner networks and outsourcing become widely used in the technological sector. It also concerns areas where software act as a service, for example, in business process outsourcing or R&D services (Hoch, et al. 2000). In any case, the quality of relationships between partners is defined by their reputations and level of trust. Mutual trust development through intensive communication is a key factor in the existing unpredictable market environment. Trust management is a quite complex field where companies-partners can spend years on trust building and can loose all obtained results in a moment after one wrong decision (Hoch, et al. 2000). Thus, software companies have to be transparent for their partners, intensively communicate and try to understand each other.

Secondly, on the other hand, customer relationship management (CRM) is a hot topic in the recent researches. Payne and Frow (2005) define customer relationship management as a strategic approach of contribution to the shareholders' wealth through development of stable relationships with company's clients in related segment. It means that any company, particularly software one, has to hurl all effort into building long-term relationships with its clients. On practice CRM usually refers to two related spheres of business: attraction of new customers and improvement of relationships with existing ones (PriceWaterHouseCoopers 2006; Krotova 2009) (Figure 21). Both imply collecting, storing and processing maximally detailed information about the clients.

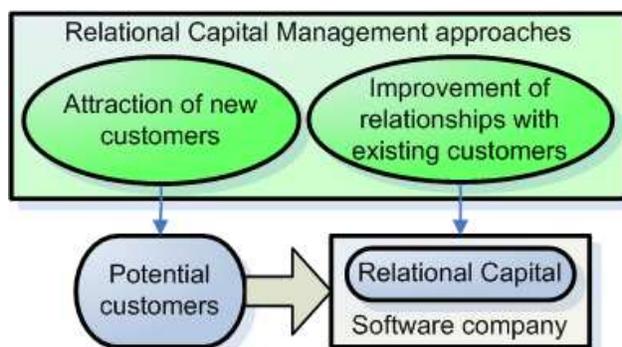


Figure 21 Common methods of relational capital management in software firms

To improve relationships with customers, the software company has to understand its clients' needs, increase their satisfaction, for example, through providing post-release services and support.

To do so, software companies use the combination of the following methods of interaction with its potential and existing customers (Payne and Frow 2005):

- Personal communication in neutral territory (for example, during the specialized outside conferences, technical and business seminars, industry exhibitions) or on the customer's site;
- Personal communication on the company's site (for example, in the company's office);
- Direct communication via telephone (or call center dispatchers);
- Interactive communication through direct advertisement (direct mails and e-mails; radio, TV and Internet commercials; etc.);

Actually, the term CRM is often refers to maintaining of the corporate data repository for keeping consolidated information about company's customers (for example, clients' behavior and demographics), and application of spe-

cial IT instruments for data analysis and taking decisions (Payne and Frow 2005).

Thirdly, from the strategic perspective, software companies should make provision for its future – build relationships with technical educational institutions (Figure 22). Widely used methods include regular company’s participation in Career Day events, offering student internships in different business departments, and organization of the multi-stage student competitions; thus the software firm can look for the talented technical students and recent graduates in advance while these people attending their Universities. The described tactics has a great positive impact on the company’s performance in a long-term period (Hoch, et al. 2000). Moreover, building and maintaining such relationships do not require significant investments from the company’s side; and continuous relationships keep software firm and educational institutions “on the same wavelength”, i.e. the company one of the first becomes familiar with the latest trends in existing scientific and technological streams.

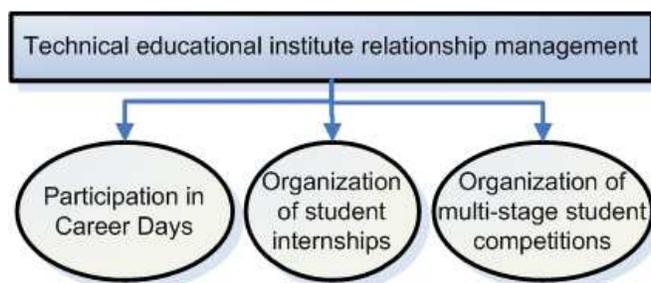


Figure 22 Common methods of relationship management – a technical educational institute and a software company

Fourthly, it is essential for technological company to develop loyalty among technical communities and increase the base of its followers. According to Gibbs, et al. (1990), software community is a group of people involved in development, distribution and end use of software products. Technical

communities can exist in many different forms and consist of technical experts, employees, customers. There is a common goal – to share information within a specified practical area and benefit from this process (Hoch, et al. 2000). (PriceWaterHouseCoopers 2006) Any software firm has to take seriously its relationships with technical communities; due to fast-changing environment in the high-tech sector, any software company should constantly organize and participate in technical conferences, exhibitions, workshops; release new products as well as new versions and upgrades of the existing ones on the regular basis; give technical communities a possibility to try new products first (pre-releases and trials) (Figure 23).

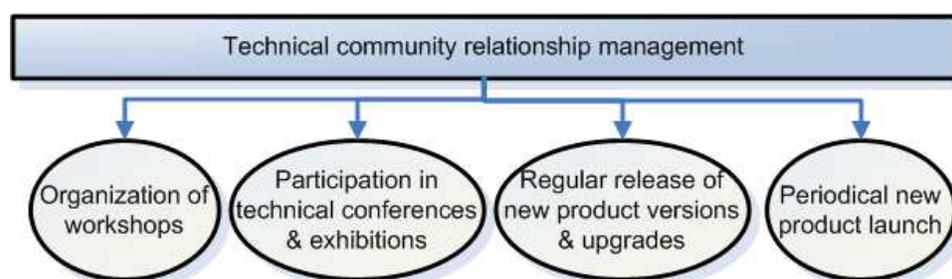


Figure 23 Common methods of technical community relationship management in software companies

Fifthly, any software firm has to constantly invest in relationships with its personnel. Employee's satisfaction will directly result in his/her performance and thus in the level of the corporate culture (Castro & Saez 2008). According to Bodrow (2006), 47.1% of European TOP 200 companies mentioned corporate culture as the most critical factor of a successful ICM. Common ways to bring positive changes in the corporate culture in software companies are the following: organization of different teambuilding events (inside and outside of the office, for example, on Friday's evenings) and corporate celebration of public holidays; payment of health and dental insurances; offering a salary competitive on the labor market, annual bonuses based on the end-year results; providing a sports club purchase discount, free meals

and so on (Figure 24). Regular surveys among software company's employees can reflect the level of office's environment well-being (PriceWaterHouseCoopers 2006).

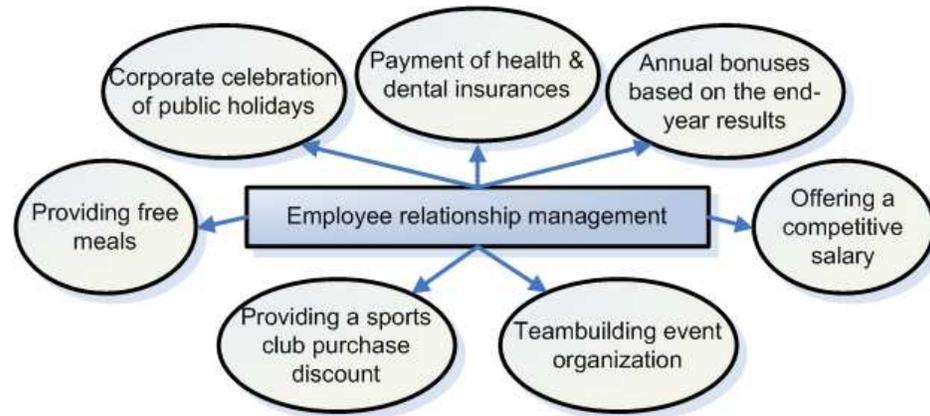


Figure 24 Common methods of employee relationship management in software companies

Finally, as a matter of courtesy, the software company usually supports its relationships with the stakeholders through compliment with the public holidays or offering discounts to loyal customers (PriceWaterHouseCoopers 2006).

Summarizing, any software company has to pay great attention to relationships with its central stakeholders - partners, customers, technical educational institutes, technical communities and employees. Trusty and long-term relations will significantly contribute to the company's relational capital and thus contribute to the business profitability.

3.5. Summary on Chapter III

Chapter III covers common methods in human, structural, and relational capitals management for software companies.

The specified IC taxonomy of a software company is provided. Then methods of human capital management are specified (hiring new employees and personnel trainings). After that common methods of structural capital management are described: application and programming tools application; Intranet usage; project team organization; software branding; IC protecting through registering patents and trademarks, introduction of licenses for end-users. Finally, methods of relational capital management in software companies are listed and explained: management of relationships with partners, customers, technical educational institutes, technical communities, and employees.

4. METHODOLOGY

The main goal of this study is to collect and explore the real life experiences of software companies' top representatives and understand wide-spread ways of ICM. This understanding provides a clear insight into ICM implementation within the chosen industry.

Empirical research is designed in accordance with analogical qualitative researches in previous studies (Krotova 2009). This study concentrates on international and Russian software companies, where data collection is organized through a series of interviews with software organizations. The list of questions for interviews is based on the introduced IC taxonomy, previous researches (Krotova 2009), and the matrix of IC transformation (Pike, Fernstrom, and Roos 2005). The following topics are considered: methodology and data collection, interview protocol structure and design, participant criteria, participant information, data analysis, and data measures.

The research questions which shape the current study are:

Research question 1: What are the features of ICM in a software company?

Research question 2: What similarities and differences in ICM approaches between international and Russian software companies exist?

Research sub-question 2.1: If any differences in ICM approaches exist, what are the main reasons of such situation?

Research question 3: Which aspects of ICM have the highest priority in international and Russian software firms?

4.1. Data collection

Generally speaking, qualitative research provides answers on the questions who, what, when, and how. The current study is mainly focused on ques-

tions what and how. The qualitative research was chosen due its maximum flexibility in the specified scope. The unit of analysis is a software company.

The target population of the current study is software companies established in Russia or abroad. Target interviewees are mid-to-high-level managers who are authorized to take ICM decisions inside of the chosen organization. It is expected that respondents own relevant and reliable information about implementation of ICM practices in their organization, because data collection is mainly focused on interviewees' experience. According to the chosen approach, data was collected through open-ended formal interviews about description of the real life ICM experiences from company's top representatives (CEO, CIO, directors, etc.) and then interpreted. All interviews were carried out either face-to-face on the interviewee's side or by the phone or/and Skype due to remote location of an interviewee.

Because the sampling frame includes different-sized software companies from various geographical locations and it is difficult to reach mid-and-high-level management in any company, for this purpose multiple contacts were organized through personal networks of the researcher and academic advisors. All depth, semi-structured oral history interviews were documented; thus records provide the basis for the further analysis.

Finally, the main researcher's role was to ask questions, then observe and record information during interviews.

4.2. Interview protocol structure and design

To have a good ICM comparison, an interview protocol is designed for carrying out interviews with companies' representatives. Questions are formed on the basis of introduced IC taxonomy for software companies, previous ICM studies (Krotova 2009), and the matrix of IC transformation (Pike, Fernstrom, and Roos 2005) (Appendix 1); thereby, questions from the initial

sources were a little modified to be able to apply resulted list of questions in software companies, or hidden because of their irrelevance to the chosen research concentration area.

The interview protocol starts from introduction letter clarifying the meaning of the ICM concept and the main research objectives. The interview protocol's body consists of 33 open-ended questions, almost equally allocated to three sections – by type of capital (Figure 25):

- Questions about human capital;
- Questions about structural capital;
- Questions about relational capital;

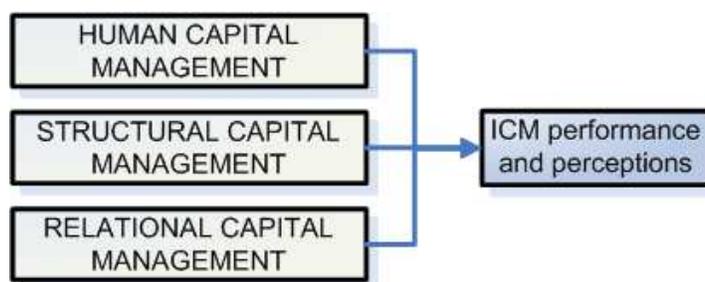


Figure 25 Structure of interview protocol

In the human capital section the following subjects are addressed: hiring processes, enhancement processes, and organizational policies towards employees (Figure 26).

In the structural capital section the following subjects are addressed: software systems, internal business processes, intellectual property protection (through patents, trademarks, and licenses), R&D activities, brands and image (Figure 26).

In the relational capital section the following subjects are addressed: organizational culture; attraction and serving of customers; competitive advantage

es; management of relationships with technical communities, technical educational institutes, partners, and personnel (Figure 26).

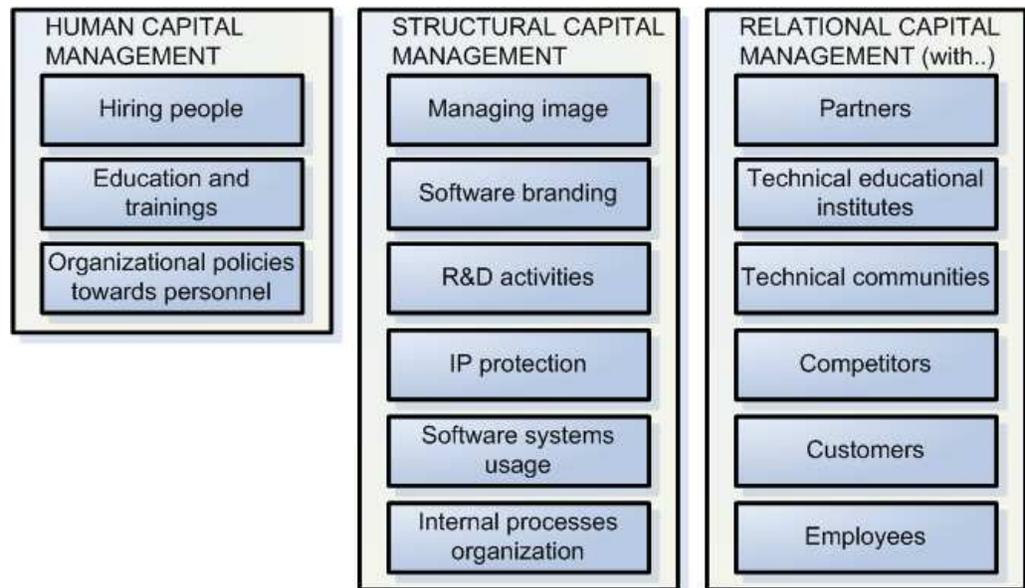


Figure 26 Key elements of the interview protocol

The interview protocol consists of open-ended questions designed on basis of previous researches. These questions were a little modified in accordance with developed IC taxonomy and the matrix of IC transformation (Pike, Fernstrom, and Roos 2005), what is described before, to be able to apply resulted interview protocol in software companies. Some questions from the initial list of questions were hidden because of irrelevance of them to the chosen area of research concentration.

4.3. Participant criteria

For this study, I carried out nine interviews with mid-to-high-level representatives of international and Russian software companies. My selection criterion was based on the previous experience of an interviewee. A participant should have a mid-to-high-level position in the company's management, and thus be able to take operational decisions concerning ICM on the corporate

level. I did not select interviewees by gender, age, race or educational background.

I relied on my understanding and intuition of defining whether potential participant meet the chosen criterion or not. Each study participant has been working in technological industry for at least several years, gathered solid experience, and inclines to open and honest discussion.

4.4. Participant information

As it was already mentioned before, interviewees were found with the help of the researcher's network and the network of academic advisors. The information about study participants is presented in Table 2. This information does not contain participants' private information (age, race, etc.), because it does not refer to the area of research concentration, and provides some level of confidentiality.

Table 2 Participant information

Interview identifier	Interviewee name	Country	Company name	Position
A	Valentin	Russia	Exigen Services Russia	Director of Academic programs
B	Andrei	Russia	Lanit-Tercom	CEO
C	Anatoly	Russia	Digital Design	Executive Director
D	Igor	Russia	Business Incubator Ingria	Executive Director
E	Alex	Russia	IT-Portfolio	CEO
F	Karina	Finland	Nokia	Senior manager

G	Dmitry	USA, Russia	Microsoft	Senior manager of Academic programs
H	Vincent	Belgium	KONE Belgium	Global network architect
I	Alex	USA	OBS Labs	CIO

4.4.1. Exigen Services Russia

Exigen Services, a global software enterprise founded in 1993, has several Russian developing centers located in St Petersburg, Kazan, etc. Exigen Services Russia, as well as the parent company, focuses on outsourced software development and re-engineering. According to the official information, Exigen Services employees about 2,000 experienced software engineers, where about 400 work in Russian offices.

4.4.2. Lanit-Tercom

Lanit-Tercom is a Russian software company which started its history in 1991 as a state unitary enterprise Tercom and in 1998 joined Lanit Holding. The main focus of Lanit-Tercom is science-intensive software projects from local and global customers. The company is established on basis of St Petersburg State University, mathematical and mechanical department. Many of 600 company's employees have academic degrees in engineering and continue to combine work and teaching in the University.

4.4.3. Digital Design

Digital Design is a Russian software company which was found in 1994. Nowadays Digital Design has two big offices in St Petersburg and Moscow, and employees more than 350 high-level technical specialists. According to the official information, in 2008 the total number of projects completed by the company exceeded 1,000; at that moment the annual revenue amounted about 16 million Euros. Digital Design provides its customers a wide range of software services such like software design, development, maintenance, migration, integration, and consultancy.

4.4.4. Business Incubator Ingria

Business Incubator Ingria (Ingria) is a part of Technopark Ingria, an organization oriented on development of technological and innovative projects from the very beginning. Ingria started its operations in December, 2008 in St Petersburg, Russia and nowadays includes 33 entrepreneurial software companies for which it provides a wide range of services starting from business basic (first business plan) till assistance in market commercialization.

4.4.5. IT-Portfolio

IT-Portfolio is a small entrepreneurial software company founded in 2009 in Russia. At the moment, IT-Portfolio employs 5 high-level software engineers and focused on development and promotion of their several software start-ups.

4.4.6. Nokia

Nokia is a Finnish international communications company which operates in the areas of mobile devices production and mobile software development. In 2010 Nokia employed more than 130,000 people all around the globe, invested about 5.9 billion Euros in R&D, and sold 453 million mobile devices. Each of these Nokia devices is equipped with operation system and mobile software developed by Nokia as well.

4.4.7. Microsoft

Microsoft is one of global leaders in software development industry. Microsoft presents in more than 80 countries and employs about 90,000 of specialists; the majority of them are technicians. Microsoft Russia, a Russian company's subsidiary, was opened in 1992; nowadays, Microsoft Russia has more than 40 offices located all around the country, and employees more than 1,000 of people. Microsoft Russia successfully operates in several engineering fields such like brand software promotion, product localization and Russian market adaptation.

4.4.8. KONE Belgium

KONE is an international company operating in the area of production of elevators, escalators, cranes, and automatic doors. KONE was founded in 1910 in Finland; nowadays, KONE employs more than 33,800 people, presents in about 50 countries, and has seven international R&D centers. KONE Belgium is the company's Belgian subsidiary which was opened in 1988 and employs more than 700 specialists. KONE Belgium has the only KONE global IT and software departments responsible for all corporate infrastructure and software. Many unique corporate programs were created in KONE Belgium.

4.4.9. OBS Labs

OBS Labs is an outsourcing software company which was initially founded in Russia in 2000. Nowadays the company employs about 30 technical professionals of the highest level and its headquarters is located in San Francisco, CA, USA. OBS Labs specializes in development of mobile and web applications, software consulting and code reviewing as well as software integration and maintenance.

4.5. *Data analysis*

After data was collected, the researcher transcribed all interviews. First of all, the researcher read all documents carefully several times, and then read slowly each protocol looking for common ideas which seem to be relevant for the research scope (Giorgi 1997). The researcher looked for words, statements and other expressions which went from the interviewees' experience. One by one, the researcher put marks in a column alongside each text highlighting possible meanings of thematic parts (Giorgi 1997). After coding the researcher combined similar statements (overlaps) and generated a list of themes related to the ICM research field. After that, according to Giorgi (1997), the researcher read all texts again looking for additional meanings. Then the list of developed themes was modified, the researcher

went through themes one more time with reformulation of generated statements for better representation. As the last step, each theme was named and described in details (Giorgi 1997).

4.6. Data measures

Before making conclusions, there is a need to prove the validity and reliability of the study. Validity in qualitative research means whether the results are accurate from the point of view of the researcher and interviewee (Huberman and Miles 2002). Reliability in qualitative research means the freedom of the collected data from random and unstable errors (Huberman and Miles 2002).

In order to collect more representative data, the researcher investigated official company's documents before the interview. During the interview the researcher prepared protocols and recorded observations; tended to understand the meaning hidden in the interviewee's answers, specify the context, and investigate cause-and-effect links. All interviews were well structured and recorded with the purpose of minimization of possible bias from interviewee's and interviewer's sides.

Minimal personal information was required from participants (company title, description of interviewee responsibilities, etc.), so the study is mainly focused on participant's experience (the confidentiality of process).

To be sure that nobody will be harmed ethically, the list of questions was sent in advance. During the interview the researcher did not put pressure on interviewees and carefully asked questions with the purpose of avoiding any type of biases and errors from respondent's or interviewer's sides.

4.7. Summary on Chapter IV

Chapter IV includes description of general methodology, data collection approach, interview protocol structure and design, participant criteria and information, data analysis method, and related data measures.

Before methodology, research questions are reminded. Then data collection process is introduced; and the interview protocol design and its key elements are explained in details. After that criteria of interviewee selection are listed and explained, and each company participating in the study is shortly described (date of foundation, number of personnel, fields of operation, etc). Finally, data representation from the point of view of validity, reliability, confidentiality, and ethics is supported.

5. RESULTS AND ANALYSIS

In this chapter all data collected from different international and Russian software companies is shown and analyzed. It covers the following topics: themes related to human capital management; themes related to structural capital management; and themes related to relational capital management.

5.1. *Themes related to human capital management*

After application of the thematic analysis to the collected data, the following findings and themes related to human capital management are identified.

HC.1 Respect and acceptance from technical colleagues play key roles in Russian software companies

All five participants from Russian software companies gave to understand between lines that respect and general acceptance among technical colleagues are essential parts of the desired goal inseparably connected to the meaning of successful career. As participant B told, "... from some moment of his career, technician understands that recognition in the social technological environment starts to play more important role than even earned money". Participant E mentioned that "...competitive salary is a good addition to interesting tasks, when your brain works".

HC.2 Career promotion plays a key role in international software companies

Three participants F, H, and I from international software companies out of four, alternatively to their Russian colleagues, expressed the opinion that people in their organizations tend get higher positions, i.e. "...grow professionally" and expand the list of their work responsibilities. Participant I supposed that this fact ties to "...more flat organizational structure of [international software] companies". Interviewee G could not answer related questions precisely due to the "...mixed [work] experience".

HC.3 Technicians in software companies take pleasure from the work process rather than from its result

Six interviewees out of nine mentioned that the work process often satisfies technicians even more than the result of this process. Participant D told that manager "...needs thorough watch or care" and that "there is a need to remind technicians that the main purpose of their work is earning money, because... from time to time they are very much taken with ideas". Participant D also noted that this feature is most pronounced in small innovative software companies. Participant I mentioned that he does "...not see something criminal in such enthusiasm, because it is enthusiasm for work". Interviewees C and F did not pay attention to this topic in their speech.

HC.4 Talent hunting is a priority external activity in software companies

Eight participants out of nine highlighted their constant demand for talented newcomers. Interviewee H told that employee gets a reward after he/she brought a talented person to the company, and this person successfully passed the probation period. Interviewees A, B, C, and G told that some employees from their organizations combine work and teaching at universities, so they have a possibility to identify and first make a job offer to the most potential final-year students. Participant I was the only interviewee who told that their team is already formed, so the company does not especially look for new experts; at the same time, participant I specified that he would rather agree to take a talented specialist if such chance will appear.

HC.5 Talent development is a priority internal activity in software companies

Seven interviewees out of ten stated that among all organizational activities talent development is one with the high priority. All participants who mentioned this fact work in companies which exist on the market for a relatively long period of time. For example, participants A, B, C, and G especially mentioned the fact of existing of special mentioning and talent development

programs in their organizations. Two other participants D and E deal with relatively young innovative projects; they recognize the importance of talent development as well, but said that they "...have more important problems..." on the seed stage of their projects.

HC.6 Russian software companies prefer to hire specialists from employees' network rather than "person from the street"

All participants agreed that the company's goodwill plays an important role on the market. Moreover, interviewees from Russian software companies stated that due to the limited number of educational institutes "...every one knows every one else". That is why specialist's reputation is an important factor in recruiting. As it was already highlighted before, in Russian software companies there is practice of stimulation of existing employees to bring new people from their network to the company; and HR experts often favor to familiar people rather than "people from the street". Interviewee E confirmed that he knew all people working in his company before the firm's foundation. Finally, interviewee B told that 90% out of 800 people working in the company came through employees' network. Interviewee B also mentioned that according to his many years' experience, "person from the street" usually works in his company not longer than 2-3 years, while people especially brought to the company – average 7 years.

HC.7 Personal knowledge of a candidate rarely influences the final decision about job offer in international software companies

International software companies have wider range of specialists companying to Russian ones, which, actually, limited by national labor market. According to the interviewees G, H, and I, at a new position opening HR specialists in international software companies rarely address to existing employees and try to use their own resources. Finally, when a short list of candidates is formed, the personal knowledge of a potential employee will not play a principal role in making final decision.

HC.8 People are considered as the most important part of software companies

All interviewees agreed that people is the most vital source of competitive advantage for their technological organizations. The position of any software company on the market is mainly determined by its engineers and technical specialists, so employees have to be considered as a fundamental source of innovations and, consequently, generating profits. Participants B, C, F, and H called personnel enhancement and mentoring one of the prioritized activities in their companies.

5.2. Themes related to structural capital management

After application of the thematic analysis to the collected data, the following findings and themes related to structural capital management are identified.

SC.1 There is no sense in patenting of intellectual software property (technology, program code, algorithms)

All interviewees agreed to the fact that it is quite difficult to protect your intellectual software property in Russia and internationally. The participant D told: "what can you patent? It is not possible to normally patent software technology. I mean that in this case you patent either your program code, or algorithms. Obviously, it has no sense to patent program code; the same program written on another programming language is already another program. The story about patenting algorithms is the same." The interviewee B confirmed that despite completion of several scientific IT projects, this big company got no patents during the last 2-3 years. In addition, participants D, E, and I mentioned that if you even decide to protect your intellectual software property, there is no sense to patent this property in only one country; you should prove your idea through at least Russian and international patents. Each of these certificates costs a lot, the process takes long period of time, and, finally, there is no guarantee that these documents will help you somehow in the future. Interviewee E concluded: "Big companies like

Google or IBM can spend huge money on patenting, but we [small entrepreneurial software company] can not”.

SC.2 Democratic and positive atmosphere in software companies increases their efficiency

All participants mentioned that their organizations try to maintain and develop open and positive atmosphere as well as respectful culture. Interviewees C told that all doors in the organization “...are almost always open, except only conference rooms”. In their organizations, according to the interviewees A, B, F, H, and I, any employee can come to the manager’s room directly and ask all necessary questions or make suggestions. In addition, participant E joked that all personnel of his company is located in one room, so “...this environment could not be more open”. Participant B stated that his organization tends to remove all unnecessary boundaries and bureaucratic acrimonies, and thus decrease the time for taking decisions and improve efficiency.

5.3. Themes related to relational capital management

After application of the thematic analysis to the collected data, the following findings and themes related to relational capital management are identified.

RC.1 Successful technicians in software companies often combine professional and academic activities

All interviewees confirmed that some of their colleagues continue to combine work and teaching at educational institutions. Companies usually look with favor to such activities, because they consider teaching as a way of specialist’s self-fulfillment on one hand, and enhancing relationships with educational institutions on another. Interviewees A, C, G, and H mentioned that their companies stimulate employees to organize seminars or elective courses for both, their colleagues and students. Interviewee B told that his company is located on the basis of the Saint Petersburg State University;

and therefore most technicians are first of all professors and students, and only then employees.

RC.2 Continuing development and maintenance of relationships with academic institutes improve business performance of the software company in the mid-term

Interviewee B told that his company is a knowledge-intensive one; it is located on the basis of the university where almost any employee is a student, PhD student, or another research associate. All other participants mentioned that their companies also often find the talented employees they require in academic institutes. Interviewees' companies actively participate in student Career Days, and organize student technical competitions and special student programs on the yearly basis. In this manner business select and attract the most talented technical students, let them know more about the company, and invite to undertake a summer internship or another trainee program. According to the interviewee A, future recruitment of such students is "just a matter of time". According to the participant D, firms are expected to help in development of hired students, who in the mid-term will become a major innovating force of this business.

RC.3 Maintaining of reputation and building of customer network are effective ways to obtain new clients in software companies

Interviewee B told that new customers often know about the company from already existing customers: "to get a positive feedback... we [the company] do the work qualitatively and on time". All participants listed different ways of finding and attracting new customers, for example, corporate agents and representatives at home country and abroad, industrial advertisement, and participation in professional events. According to the common opinion given by the majority of participants, customer networking is one of the most effective ways to obtain new clients.

RC.4 Promotion of employees' cohesion is a priority task in software companies

According to the opinion given by all interviewees, promotion of personnel cohesion is an important task for their companies. All participants confirmed that any improvement of relationships between employees is beneficial to their organizations; for example, each interviewee provided a short description of recent teambuilding event or corporate celebration of some public holidays. Interviewee B told the researcher that “the salary motivates people only by 30 percent”. Participants A, B, F, G, and I also stated that employees' motivation and consolidation grows out of alternative ways of personnel fulfillment and encouragement such like getting by a team the annual bonuses based on the result of their already completed projects.

RC.5 Keeping culturally diverse personnel motivated and going to the same purpose is one of challengeable tasks in international software companies

Interviewees F, G, H, and I told the researcher that one of important managerial tasks in international software companies is removal of possible misunderstandings based on difference in culture. To do so, according to the common opinion of listed participants, business has to make people communicate a lot and intensively share their knowledge in such organizations. The participant G mentioned the value of regular face-to-face or remote group meetings where employees of the same company can become more acquainted with each other; “of course, we spend more time and energy [comparing to non-international companies], but it is for the benefit of the company”, interviewee G concluded.

5.4. Summary on Chapter V

The current chapter reviews the themes related to human, structural, and relational capital management. Human capital management section has eight themes: two of them are associated with international software companies, two - with Russian software companies, and the rest four – with

both, international and Russian, software companies. Structural capital management section contains two themes associated with both, international and Russian, software companies. Finally, relational capital management section includes five themes associated with both, international and Russian, software companies.

6. CONCLUSIONS

The main purpose of this chapter is to summarize all study findings, describe limitations of the research as well as its conclusions. This chapter covers the following topics: summary, conclusions, theoretical contribution, managerial contribution, limitations, and suggestions for the further research.

6.1. Summary

The main goal of the current study is to conduct a comparison of ICM approaches applied in international and Russian software companies, and particularly, to specify differences and similarities in described approaches.

ICM refers to practical methods which make companies be able to handle their IC and therefore increase the profit. IC importance grows due to the knowledge-economy development. At the same time there are still many theoretical and practical difficulties in ICM. Russian software sector was chosen as “the fastest-growing one in the Central and Eastern Europe region” (Datamonitor 2010c, 24). A software company was chosen as a unit of analysis due to its knowledge-intensive nature.

To complete the study, a special interview protocol was designed on the basis of developed IC taxonomy in the context of software companies, previous ICM studies (Krotova 2009), and the matrix of intellectual capital transformation (Pike, Fernstrom, and Roos 2005). This list of questions contains three big sub-sections related to three types of intellectual capital. Qualitative data was collected through nine interviews with mid-to-high-level representatives of international and Russian software companies. Thematic analysis was applied to the collected data to identify the common patterns.

The following research questions were formulated for guiding this study:

Research question 1: What are the features of ICM in a software company?

Research question 2: What similarities and differences in ICM approaches between international and Russian software companies exist?

Research sub-question 2.1: If any differences in ICM approaches exist, what are the main reasons of such situation?

Research question 3: Which aspects of ICM have the highest priority in international and Russian software firms?

6.2. Conclusions

Main findings of the current study related to the research questions are shown below.

Research questions 1

ICM in software companies has its own particular specifics. Much attention is paid to personnel enhancement, especially technical expertise and competence; improving organizational environment and respectful culture creation; development of relationships with technical educational institutes and building customer network. At the same time, less attention is paid to development of relationships with competitors; patenting of intellectual software property; software branding due to industry specifics.

Research question 2, Research sub-question 2.1

There are quite many similarities in ICM approaches between international and Russian software companies.

First of all, open and innovative organizational culture plays very valuable role. Positive atmosphere makes people willing to create new and to share accumulated knowledge what is definitely beneficial to the technological company. Therefore, both international and Russian software companies tend to invest in development of open and respectful organizational envi-

ronment through regular teambuilding events and general personnel enhancement.

Secondly, technicians in Russian and international software companies take pleasure from the work process rather than from results of this work. It means that software engineers would prefer more difficult solution instead of a standard one just to practice their skills. That is why company's management should take into consideration all facts concerning technical specifications before making the final ICM decision in order to maximize the company's value.

Thirdly, many technicians in Russia and abroad often combine professional and academic activities. Software companies favor such situation due to win-win situation: software engineers feel themselves actualized, while the company benefits from improved relationships with universities where it can first find and recruit talented last-year students.

Fourthly, reliable reputation still remains one of the most significant competitive advantages of the technological company which can be hardly imitated by other organizations and easily lost. Both, international and Russian software companies, understanding this fact, tend to continuously develop and enhance their relationships with existing customers. Therefore, there is a possibility that sometimes customers' partners can get a positive feedback about the company and request its services in the future perspective. The customer network is one of the most effective ways to get new clients in both, international and Russian, software companies.

Fifthly, both, international and Russian, software companies pay much attention to promotion and maintenance of employees' cohesion between each other through organization and carrying out of regular teambuilding

events and corporate celebration of public holidays. Cohesive personnel works in average more effectively and, thus, makes its company more benefiting from that. So practitioners should take into consideration the importance of employees' cohesions and try to apply this principle in the real life.

Finally, there is almost no sense in patenting of intellectual software property owned by software companies due to several reasons. It is difficult and expensive to patent a new technology. Any new program has only two elements through which it can be patented – programming code and algorithms. The program can be easily re-written on another programming language; algorithms are impossible to protect. That is why even after patenting the intellectual software property, software companies get small guarantee of their IC protection. Practically speaking, software companies in Russian and abroad in rare cases prefer to spend money on registration domestic and international patents.

At the same time, ICM approaches have several principal differences between international and Russian software companies.

First of all, respect and acceptance from technical colleagues often have higher importance for a Russian software company employee comparing to an international company. Historically, Russian technicians have good engineering education; the percentage of PhD owners is quite high; therefore professional recognition is considered as the highest reward from the company's side. On the other hand, career promotion is considered as an important purpose in international software companies. Such situation can occur due to more flat organizational structure of international software companies. The hierarchy here is less, so more people have positions on the same organizational level. That is why vertical career motion is considered as one of the biggest achievements. This is one of reasons, why ICM approaches

concerning human capital management in Russian and international companies may differ.

Secondly, during a recruiting process personal knowledge of a candidate often influences the final decision about hiring in case of Russian software companies. There are several reasons of such situation: organizations have access to the limited domestic labor market; the number of domestic technical educational institutions is limited, so “every one knows every one else”. That is why an employee considers his/her reputation and network as big advantage in the work searching process. At the same time, recruiting specialists working in international software companies have access to wider international labor market, and thus can choose from more diverse range of candidates. Finally, in international software companies when a short list of potential employees is formed, the personal knowledge of a potential employee will rarely influence the final decision. This significant difference in ways of behavior is inseparably connected to differences in ICM approaches between international and Russian software companies.

Finally, international software companies sometimes face additional tasks comparing to non-international companies due to their organizational nature; for example, the task of keeping culturally diverse personnel highly motivated and wanted to go towards the same purpose. As a result, international software companies have to spend more resources on development of good relationships with its employees, i.e. smooth over possible cultural contradictions, what is usually avoided in non-international organizations.

Research question 3

In both, international and Russian, software companies ICM is considered as one of the prioritized internal and external activities to which management pays much attention. Human capital is considered as the main value

driver. Generally speaking, the company's leading position on the market is inseparably connected to its "foundation" in the form of employees' education, experience, attitude, motivation, and the loyalty towards the organization. Talent recruiting through pro-active hiring from technical universities and talent development through introduction of various mentoring programs are considered as top priority ICM activities in all considered software companies.

6.3. Theoretical contribution

One of the theoretical contributions made by the current study is that several principal concepts such like intellectual capital and intellectual capital management were explained in details with numerous references to relevant and reliable sources. The paper is written on the language understandable by ordinary business representatives.

Secondly, the importance of the current study is supported by the fact that no studies was found that analyze and compare ICM approaches in the narrowed context of Russian and international companies, specifically in software sector.

This study contributes to the theoretical base of knowledge surrounding ICM, and makes researchers able to further investigate and understand ICM in technological context. The lack of deep understanding of the ICM leaves researchers and practitioners without necessary instruments to effectively manage intangibles, and therefore can result in additional organizational difficulties in conditions of the modern competitive market.

According to the research findings, employees in software companies are considered as a fundamental source of innovations and, consequently, generating profits. Mid-to-high-level representatives consider people capital as one of the most vital sources of competitive advantage for their companies.

Much of the literature about IC and ICM confirms the importance of human capital in knowledge-intensive firms, including software ones (O'Regan, et al. 2001; Seleim, Ashour, and Bontis 2004; Wang & Chang 2005; Castro & Saez 2008). For instance, Castro & Saez (2008) concluded that the strong position of a high-tech company on the market is mainly determined by its engineers and other technical specialists. Wang & Chang (2005) proved on the example of all listed Taiwan IT companies that human capital as the main component of the IC can significantly affect other IC components.

Another finding I was surprised is that development of relationships between a software company and academic institutes is considered as the strategic investment. Management does not prevent combining of professional and academic activities by company's experts, but gives encouragement to these activities. Described findings are partly supported by Castro & Saez (2008) who wrote that the strategic alliance of a high-tech organizations with its key partners from other industry' areas heighten the company's market position due to possibility of learning something new.

Another interesting research finding states that both, international and Russian, software companies often try to develop a positive and respectful atmosphere for better business performance. It was relatively supported by Castro & Saez (2008) who wrote that the structural capital in high-tech firms is often represented in the form of specific innovative organizational culture and plays almost the same valuable role for the company as the human capital.

6.4. Managerial contribution

Intellectual capital provides strong competitive advantages to the company owning it. In conditions of knowledge-economy development, practitioners and professionals in software firms should not ignore the importance of proper ICM. Comprehensive approach to this area is an indispensable requirement from the modern software industry. Understanding the experiences of efficient mid-to-high-level management representatives, participating in taking important ICM decisions on the daily basis, is crucial to identification of potential contributions to the software company and to improvement of this business. The participants of the current study describe important practices about their software organizations. Executive managers may want to consider these insights as a reason to improve the quality of their ICM interactions what will result in tangible outcomes for their organization. So the practical importance of the current study is related to applicable methods and experiences of ICM in software firms.

While many technological companies today are created and already operate, there is a wide gap between the number of successful international and Russian software firms acting on the market compared to those which discouraged with available opportunities. This research shows practitioners the similarities and differences of ICM, and thus helps to obtain the competitive advantage with the references to various organizational natures.

6.5. Limitations

This study has three main limitations: two – in the design of data collection; and one – in the design of the research.

The first limitation related to the data collection design is that interviews with representatives of several international software companies were carried out not in the face-to-face format which is more preferable, but either by phone, or by Skype.

The second limitation of data collection design is that some confidential data about participants (age, gender, race, etc.) was not taken into consideration, so no relationships between these characteristics and the field of the research concentration were considered.

The third limitation related to the research design is a refuse to use the combined research approach consisting of qualitative and quantitative research methods. In this case the information would be more statistically representative.

All described limitations need to be reduced, so some necessary actions which can to be taken in the future research are described in the next section.

6.6. *Suggestions for the further study*

Firstly, organize a longitudinal study to collect more participant observations, combining both qualitative and quantitative research approaches for more statistically representative results.

Secondly, collect observations based on more specified selection criteria. The companies have different size in number of personnel and revenue, original country, economic status. Such approach can highlight more deep understanding of relationships between collected data and exploration of research questions.

Thirdly, narrow the research scope from all software companies to some specific area of operation, for example, to software consulting companies.

Results of a study taking into consideration these recommendations can provide researchers more deep understanding of internal and external processes related to the ICM in software companies.

BIBLIOGRAPHY

Ali-Yrkkö J., Martikainen O. 2008. *Ohjelmistoalan Nykytila Suomessa*. Economy Research Institute. Retrieved from <http://www.etla.fi>.

Andriessen, D. 2004. *Making sense of intellectual capital. Designing a method for the Valuation of Intangibles*. Amsterdam: Elsevier Butterworth Heinemann.

Bardhan A.D., Kroll C.A. 2006. Competitiveness and an Emerging Sector: The Russian Software Industry and its Global Linkages. *Industry and Innovation* 13(1): 69-95. Retrieved from EBSCO database.

Becker, G.S. 1994. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago: The University of Chicago Press.

Bodrow, W. 2006. Knowledge Management in Small and Medium-Sized Enterprises. *International federation for information processing publications (IFIP) Volume 207*: 41-53. Retrieved from ACM database.

Bontis, N. 1998. Intellectual capital: an exploratory study that develops measures and models. *Management Decision* 36 (2): 63-76. Retrieved from Emerald Management Xtra.

Bontis, N. 2001. Assessing knowledge assets: a review of the models used to measure intellectual capital. *International Journal of Management Reviews* 3 (1): 41-60. Retrieved from CiteSeer.

Castro G.M., Saez P.L. 2008 Intellectual Capital in high-tech firms. The case of Spain. *Journal of Intellectual Capital* 9(1): 25-36. Retrieved from Emerald Management Xtra.

Choong, K.K. 2008. Intellectual capital: definitions, categorization and reporting models. *Journal of Intellectual Capital* 9 (4): 609-638. Retrieved from Emerald Management Xtra.

Datamonitor. 2010a. *Industry Profile. Software in Europe*. Retrieved from MarketLine database.

Datamonitor. 2010b. *Industry Profile. Software in Russia*. Retrieved from MarketLine database.

Datamonitor. 2010c. *Country analysis report. Russia*. Retrieved from MarketLine database.

Datamonitor. 2010d. *Country analysis report. Finland*. Retrieved from MarketLine database.

Digital Design. About the company. <http://www.digdes.com/about-company>

Edvinsson L. and Malone M.S. 1997. *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*. New York: HarperCollins Publishers Inc.

Feiwel, G.R. 1975. *The Intellectual Capital of Michal Kalecki: A Study in Economic Theory and Policy*. Knoxville, TN: The University of Tennessee Press.

Galbraith, J.K. 1969. *Ambassador's Journal: A Personal Account of the Kennedy Years*. Boston, MA: Houghton Mifflin Company.

Giorgi, A. 1997. The theory, practice and evaluation of phenomenological method as a qualitative research procedure. *Journal of Phenomenological Psychology* 28 (2): 235-260.

Hawk S., McHenry W. 2005. The Maturation of the Russian Offshore Software Industry. *Information Technology for Development* 11(1): 31-57. Retrieved from EBSCO database.

Hoch D., Roeding C., Purkert G., Lindner S., Muller R. 2000. *Secrets of software success: management insights from 100 software firms around the world*. Cambridge, MA: Harvard Business School Press.

Huberman A.M., Miles M.B. 2002. *The qualitative researcher's companion*. London: Sage Publications Ltd.

Hudson, W.J. 1993. *Intellectual Capital: How to Build It, Enhance It, Use It*. New York: Wiley.

Ingria Technopark – Business Incubator. About the Business Incubator.
http://ingria-startup.ru/en/about/about_business_incubator_ingria/

Itami H., Roehl T.W. 1987. *Mobilizing invisible assets*. Cambridge, MA: Harvard University Press.

Kapur D., Ramamurti R. 2001. India's emerging competitive advantage in services. *Academy of Management Executive* 15(2): 20-33. Retrieved from IUPUI (Indiana University-Purdue University Indianapolis) database.

Kaufmann L., Schneider Y. 2004. Intangibles: a synthesis of current research. *Journal of Intellectual capital* 5 (3): 366-388. Retrieved from Emerald Management Xtra.

Kronfeld M. and Rock A. 1958. Some Considerations of the Infinite. *The Analyst's Journal* 14 (5): 87-90. Retrieved from JSTOR.

Krotova, M. 2009. Intellectual capital management as a mean to increase company's competitiveness: case of KPMG consulting company. Master's thesis, Saint Petersburg State University, Lappeenranta University of Technology.

Lanit-Tercom. About the company. <http://www.lanit-tercom.com/?q=en/about> (accessed April 4, 2011)

Lev, B. 2001. *Intangibles. Management, Measurement, and Reporting*. Washington, DC: The Brookings Institution.

Löthgren, A. 1999. Essays on the legal protection of structural capital. Thesis in Law, Gothenburg University; available from <http://gupea.ub.gu.se>.

Mayo, A. 2000. The role of employee development in the growth of intellectual capital. *Personnel Review* 29 (4): 521-533. Retrieved from Emerald Management Xtra.

McAdam R., Fulton F. 2002. The impact of the ISO 9000:2000 quality standards in small software firms. *Managing Service Quality* 12(5): 336-345. Retrieved from Emerald Management Xtra.

O'Regan P., O'Donnell D., Kennedy T., Bontis N., Cleary P. 2001. Perceptions of Intellectual Capital: Irish Evidence. *Journal of Human Resource Costing and Accounting* 6(2): 29-38. Retrieved from Emerald Management Xtra.

Payne A., Frow P. 2005. A Strategic Framework for Customer Relationship Management. *Journal of Marketing* Volume 69: 167-176. Retrieved from University of Ljubljana, Faculty of Economics library database.

PriceWaterHouseCoopers. 2006. Industry Views. Technology executive connections. Successful strategies for talent management. Volume 3. <http://www.pwc.com/gx/en/technology/pdf/talent-management.pdf> Accessed February 26, 2011.

Pike S., Fernstrom L., Roos G. 2005. Intellectual capital. Management approach in ICS Ltd. *Journal of Intellectual capital* 6(4): 489-509. Retrieved from Emerald Management Xtra.

Roos G., Pike S. and Fernstrom L. 2006. *Managing Intellectual Capital in Practice*. Amsterdam: Elsevier Butterworth Heinemann.

Roos G., Roos J. 1997. Measuring your Company's Intellectual Performance. *Long Range Planning* 30(3): 413-426. Retrieved from Elsevier.

Seleim A., Ashour A., Bontis N. 2004 Intellectual capital in Egyptian software firms. *The Learning Organization* 11(4/5): 332-346. Retrieved from Emerald Management Xtra.

Stewart, T.A. 1991. Brainpower: How Intellectual Capital Is Becoming America's Most Valuable Asset. *Fortune* (June 3): 44-50. Retrieved from eLibrary.

Stewart, T.A. 1997. *Intellectual Capital: The New Wealth of Organizations*. London: Nicholas Brealey Publishing Limited.

Stewart, T.A. 2002. *The Wealth of knowledge: Intellectual capital and twenty-first century organization*. London: Nicholas Brealey Publishing Limited.

Sullivan, P.H. 1998. Profiting from intellectual capital. *Journal of Knowledge Management* 3(2): 132-142. Retrieved from Emerald Management Xtra.

Sullivan, P.H. 2000. *Value-driven Intellectual Capital: How to Convert Intangible Corporate Assets into Market Value*". Toronto: John Willey & Sons.

Sullivan P.H. Jr., Sullivan P.H. Sr. 2000. Valuing intangible assets – An intellectual capital approach. *Journal of Intellectual capital* 4(1): 328-340. Retrieved from Emerald Management Xtra.

Sveiby, K.E. 1989. *The Invisible Balance Sheet*. Stockholm: Ledarskap.

Sveiby, K.E. 1997. *The New Organizational Wealth: Managing and Measuring Knowledge-based Assets*. San Francisco, CA: Barrett-Kohler.

Sveiby, K.E. 1998. Measuring Intangibles and Intellectual Capital. In *Knowledge management. Classic and Contemporary Works* by D. Morey, M. Maybury, and B. Thuraingham. Cambridge, MA, USA: MIT Press.

Teece D.J., Pisano G., Shuen A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal* 18 (7): 509–533. Retrieved from JSTOR.

Teece, D.J. 2000. *Managing intellectual capital: organizational, strategic, and policy dimensions*. Oxford: Oxford University Press.

Tovstiga G., Tulugurova E. 2007. Intellectual capital practices and performance in Russian enterprises. *Journal of Intellectual Capital* 8(4): 695-707. Retrieved from Emerald Management Xtra.

Wang W.Y., Chang C. 2005. Intellectual capital and performance in causal models. Evidence from the information technology industry in Taiwan. *Journal of Intellectual Capital* 6(2): 222-236. Retrieved from Emerald Management Xtra.

LIST OF APPENDIXES

APPENDIX 1 ICM interview protocol for software companies

APPENDIX 1 ICM interview protocol for software companies

Introduction of the interview protocol

Research work

«Intellectual capital management in international and Russian software companies»

The current research is carried out by Maria Levkina, 2nd-year master student of Graduate School of Management in Saint Petersburg State University (GSOM, SPbSU, Russia) and Lappeenranta University of Technology (LUT, Finland).

In modern software companies information and employees knowledge (intellectual capital) play principal role, even more significant than physical and monetary assets.

The term of intellectual capital (IC) usually includes:

- **Human capital** – the collection of knowledge, individual competence and relationships owned by the company's employees (i.e. social and business features);
- **Structural capital** – organizational structures, systems, processes; patents, copyrights, trademarks;
- **Relational capital** – all relationships of the company with its stakeholders (clients, suppliers, employees, technical communities and educational institutes);

Any software company is a bright example of an organization owning a significant amount of IC. Software companies grow and develop due to their knowledge, innovations and new technologies usage on the daily basis. Meanwhile effective ICM according to the organizational strategy positively and non-linearly influences company's profits.

According to the research carried out in 2009, specialists expect the significant growth of the software market in Russia by almost 75% in the next 5 years (2009-2014). At the same time, ICM in Russia is poorly researched from the practical point of view. So the main purpose of the current study is research and comparison of ICM methods applied on practice in international and Russian software companies as well as their theoretical foundation. Organization and carrying out of interviews with software companies is the main method of empirical data gathering for the future research analysis.

During the interview with software companies the researcher tends:

- To get the deep understanding of ICM models in the company;
- To describe the company's attitude to its IC and ICM;
- To get information about the problems related to the ICM inside and outside of the company;
- To research the process of taking decisions in the company towards its ICM;

Thank you for your participation!

Best regards,

Maria Levkina

March 2011, Russia

APPENDIX 1 ICM interview protocol for software companies***(2/4)*****Questions about human capital**

- Q1. Which types of educational activities does the company organize for its employees?
- Q2. Which goals does the company try to achieve while enhancing its employees?
- Q3. What is a level of mentoring system development inside of the company?
- Q4. Which career opportunities does the company offer to its employees?
- Q5. Which methods does the company use for employees' retention, improving their motivation and building loyalty towards the company?
- Q6. How many times per year does the company make a revision of existing salaries?
- Q7. How long does an average employee work in the company?
- Q8. What are the 3-5 prioritized requirements to a potential employee?
- Q9. What are the main company's policies towards its employees?
- Q10. What is the influence of the company's human capital on creation of its products and profit generation?

APPENDIX 1 ICM interview protocol for software companies***(3/4)*****Questions about structural capital**

- Q1. What are the 3-5 types of application & programming software used in the company on the daily basis?
- Q2. What are their main functions?
- Q3. How many resources does the company approximately spend on maintaining of the listed software systems?
- Q4. Which actions does the company take for increasing its employees' awareness about the implemented software systems?
- Q5. What are the 3-5 specific characteristics of the company's internal business processes which make the company different from its competitors and give competitive advantages?
- Q6. Which actions does the company take for protection of its intellectual capital?
- Q7. Which intellectual capital assets of the company is it most difficult to protect?
- Q8. What percentage of its expenses does the company spend on R&D activities, development and implementation of new technologies?
- Q9. Which new patents were registered by the company during the last 2-3 years?
- Q10. How does the company care about its image and brands?

APPENDIX 1 ICM interview protocol for software companies

(4/4)

Questions about relational capital

- Q1. What actions does the company take for improvement of its organizational culture and atmosphere?
- Q2. Which 3-5 advantages does the company have towards its employees comparing to company's competitors?
- Q3. What are the 3-5 main approaches which the company uses for attraction of new customers?
- Q4. What are the 3-5 main factors which make the company significantly different from other organizations, from the customers' point of view?
- Q5. Which principles does the company follow when establish prices on its services for the customers?
- Q6. Which 3-5 advertising types/approaches does the company use?
- Q7. What are the 3-5 methods used by the company to maintain its relationships with the third-party technical communities?
- Q8. What are the 3-5 methods used by the company to maintain its relationships with the technical Universities and other educational institutes?
- Q9. What are the 3-5 methods used by the company to attract graduates and young professionals?
- Q10. Which relationships does the company have with its main competitors?
- Q11. Which methods does the company use to improve its relationships with its partners?
- Q12. What are the 3-5 factors which, by your opinion, are the most critical for the company's success?
- Q13. Which company's activities result in the largest increasing of its profits?