UNIVERSITY OF MARIBOR
FACULTY OF ECONOMICS AND BUSINESS

Doctoral dissertation

RELATIONSHIP BETWEEN KNOWLEDGE MANAGEMENT INFORMATION SOLUTIONS AND HUMAN RESOURCE MANAGEMENT IN IT COMPANIES

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Odnos med informacijskimi rešitvami za upravljanje znanja in upravljanje človeških virov v IT podjetih

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Abbreviations

CVR – content validity ratio

EOS – Encouraging and opportunity structures

ECDF – Empirical distribution function

HRD – Human Resource Development

HRM – Human resource management

HDI – Human Development Index

IS – Information Systems

IT – Information Technology

ICT - Information and Communication Technology

KM - Knowledge Management

KSA – Knowledge, Skills and Abilities

OC – Organizational Capabilities

OL – Organizational Learning

Q - sort – card sorting

PLS – Partial Leas Square

PM – Performance Management

SHRM – Strategic Human Resource Management

SEM - Structural Equation Modelling

SNA - Social Network Analysis

SME – Small and Medium Enterprises

WDS – Work design structures

r.r. – response rate

Abstract

In today's shift to a knowledge-based and highly competitive business environment in order to achieve sustainable competitive advantage, organizations are trying to facilitate collection, storage and distribution of knowledge with their personnel. New and essential assets reside in the minds of employees, therefore companies have to convince and motivate their workers to create and share knowledge. Knowledge management (KM) and human resources management (HRM) are increasingly regarded as key levelers of competitive advantage in a global environment.

The knowledge has been recognized as currency for organizational sustenance and competitive advantage (Osterloh, Frost, & Frey, 2002; Wiig, 1997) and is the most prominent among traditional factors of production, such as land, labor and capital. The two concepts: people and knowledge are inextricably joined.

Human resources are the key components in every company representing total knowledge, talent, attitude, creative ability, aptitude and belief of an individual involved in the affairs of organization (Dhamija, 2012). HRM includes decisions that affect the success of business, all with aim of achieving long-term goals (Noe, Hollenbeck, Gerhart, & Wright, 2000) which significantly influence company's ability to respond appropriately to the challenges of competition (Treven, 1998). Human resources management has been explored in small, medium and large organizations, as well as in profit and non-profit, through which various authors have defined a range of classification and functions of HR management. These practices and functions differ from industry to industry. Lepak, Takeuchi, & Snell (2003) stated that there is low level agreement regarding the most appropriate aggregation or categorization of HR practices. One of the reasons is the immense number of practices that organizations have to consider, whereas each is associated with many variations, meaning that the same HR practice can be used for vastly different purposes depending on the profile of the organization.

Knowledge management has been described in various ways, but generally it relates to unlocking and leveraging the knowledge of individuals to gain appropriate knowledge from appropriate individuals in appropriate time (Hutchinson and Huberman, 1993) so that this knowledge becomes available as an organizational resource (Anand and Singh, 2011). It is explicit and systematic management of vital knowledge (Anand & Singh, 2011) defined as creating, acquiring, storing, sharing, transferring and utilizing both explicit and implicit forms of knowledge at individual, group, organizational and community level through harnessing of people, process and technology (Madhoushi *et al*., 2010). Territory and aspects of knowledge management have been dominated by two main factors - the supporters of information and communication technology (ICT) and the human resource views.

Technology, along with information revolution and globalization, continues to exert major effects on knowledge management and its development (Chong, 2006). Various developed countries have recognized information and communication technology as drivers of the knowledge-based society. ICTs are accepted as new drivers of change, tools for releasing potential and knowledge embodied in people and it has transformed the ability of both individuals and organizations to augment their intelligence via accelerated learning (Pemberton & Stonehouse, 2000). In its essence, ICT is regarded as the facilitator of knowledge creation in innovative societies (Chase, 1997; Kulkarni, Ravindran, &

Freeze, 2007; Morin et al., 2011; Pan, Hsieh, & Chen, 2001; Sue Young Choi, Heeseok Lee, & Youngjin Yoo, 2010).

One way of HRM to reinvent itself is through contribution to effective linkages between human capital and knowledge management within organizations (Gloet & Berrell, 2003). The aim of knowledge management is to support and enhance employees' knowledge processes and therefore it is important to identify different knowledge management initiatives that HR practices need to support. Importance of knowledge management lies in the fact that it could result in empowerment of individuals and organization itself to accomplish activities effectively through knowledge organization (Jantz, 2001).

If human resources, employees and their effective managing is essential for a company and if people's most more valuable resource is knowledge, then human resources management and knowledge management are closely interrelated (Svetlik & Stavrou-Costea, 2007). Therefore, paying attention to human resources management, its effective factors and functions could be regarded as activities related to knowledge management.

This thesis supports the premise of relationship between HRM and KM with focus on information solutions and aims to elaborate on this link from the aspect of ICT companies. The relationship between HR effective factors and KM issues is still not properly explored in ICT companies and a model of its successful functioning does not exist, a model applicable for ICT companies is proposed in this dissertation based on previous findings and empirical research is conducted by the author.

This doctoral thesis focuses on two aims: the analysis of previous research findings in two perspective fields (human resource management and knowledge management) and developing and testing a conceptual model that would explain the relationship between them. Achieving these aims required a comprehensive preliminary research; involvement of experts in the field of HRM and a whole set of recent statistical techniques and findings to be applied for data analysis and interpretation. This research integrates theoretical and empirical analysis in order to achieve goals. Scientific research methods are used in order to get objective and systematic scientific results and insights. Research study, conducted within the thesis, is founded on three hypotheses and goals. First a conceptual model based on literature findings was presented and filed research in order to statistically prove the model was done.

In this thesis all processes and effective HRM factors are analyzed, which activate for long-term knowledge management as competitive advantage and therefore result in increased performance specifically in ICT companies. The use of information systems helps managing knowledge faster and more efficiently and also HRM can influence, change or encourage employees for higher accomplishments in using information systems, therefore the level of usage of IS, that foster HRM and KM, in ICT companies and ICT departments is explored. HRM is observed through HRM functions (recruitment and selection; training and development; performance appraisal). In addition to functions, various research has been done in the field of *best practices*, which lead to enhancement of HR. These HR best practices are considered as important factors for successful knowledge management development. This thesis tries to present and comprehend the best practices of HRM through literature an classification.

One of the goals of this thesis is the analysis of literature evidence and providing new classification and categorization of the best practice. Accordingly, after literature

analysis, indicators of the HR best practice were categorized into two effective factors: *Work design structures (WDS)* and *Encouraging and opportunity structures (EOS)*.

Work design structures include the design of work and design of relationship so that employees have discretion and opportunity to use their skills in collaboration with other workers according to the structure of their position. WDS incorporates internal and external characteristics concerning employees and it consists of: Design of work and Design of relationships. The design of work includes job diversity, independence, decentralized decision-making, quality of work life and formal employment security. The design of relationships includes trust, organizational commitment, employee attitudes and teamwork. EOS encompasses incentive structures, which embrace motivation and commitment. This can be employment security, employee motivation, empowerment, collaborative or partnership alliances, new ability/skills development. Effective factors and functions of HR have enhancing impact on HR (Attafar et al., 2012) and since the human resources management has impact on knowledge management, it can be stated that effective factors and functions are related to knowledge management. It is presumed that IT managers do not perceive all HR effective factors (work design structures and encouraging and opportunity structures) as equally important. Therefore, it can be stated that certain effective factors are more important to IT managers than others. The aim of this thesis is to define this relationship for ICT companies in Slovenia and Croatia.

Literature states that information technology is one of the most important components of critical success factors of KM (Martin, Hatzakis, Lycett, & Macredie, 2005; Sher & Lee, 2004); (Martin et al., 2005; Sher & Lee, 2004). According to the research (Rašula, Bosilj Vukšić, & Indihar Štemberger, 2008) two elements form the IT component of KM: the ability of IT to capture knowledge and the use of IT tools. Davenport & Prusak (1998) reported that knowledge projects are more likely to succeed when they use technologies and web-based intranets. Such tools provide opportunities for organizational learning and increasing functional specialization (Mathew, Kumar, & Perumal, 2011). Several studies have empirically tested the effect of organizational elements, innovation, organizational learning and culture on IT (Liao & Wu, 2010; Rašula, Bosilj Vukšić, & Indihar Štemberger, 2012; Zareai, Gheshlaghi, Heydari, & Yaghoobzadehpoor, 2013). Thereupon it can be stated that organizational and social elements play a mediating role in the relationship between information solutions and KM. According to Mathew et al (2011), technology used in companies has to support networking, facilitate interaction between employees, either formally or informally, interaction within organizations and between organizations. It is presumed that ICT companies use IS for managing their employees and therefore information solutions have influence on KM processes.

This thesis is divided into three major parts and seven chapters. First part compresses the introduction and literature analysis. The goal is to identify critical success factors, gaps, and elaborate and clarify the link between human resource management and knowledge management. Chapter ‘introduction’ presents the background and overall content of the whole thesis. It introduces the subject matter, research problem and the justification of the research. Research objectives and hypothesis objectives are specified along with an appropriate research methodology. The theoretical part of the study is based on analysis of available and relevant national and international scientific literature in the perspective field, which includes the review of HRM and KM literature from standard books to new references including papers and resources available on the Internet in order to give an insight into previous research and developed theories. Literature review provides a framework for establishing importance of the study and it serves as a benchmark for

comparing results with other findings (Creswell, 2009, p. 25). The aim is to analyses practices and functions of HRM and to present results from literature, which support the relationship between HR and KM.

In the chapter, 'Human resource management', functions and characteristics of human resource management and history development are presented. 'Best fit' of HR functions are also defined which serve further as the basis for empirical research. Apart from HR practices, literature recognizes different factors that have influence on HR and companies' productivity. This chapter provides the list of all HRM practices found in the literature. These practices were analyzed and new classification and categorization into two effective factors (Work design structures and Encouraging and opportunity structures) is presented. This is also one of the major scientific contributions of this thesis. Chapter 'Knowledge Management' presents literature analysis on concepts of knowledge, knowledge management development and knowledge management solutions. In addition, emphasis is placed on information systems and the infrastructure used for managing knowledge. In the fourth chapter the relationship between HRM and KM is analyzed. Through this chapter, mutual impacts between knowledge management and human resource management are explained based on theoretical findings in the literature. First, the findings regarding HRM and KM are presented based on which the conceptual model of the relationship is formed, depicted and explained. At the end of the chapter, a detailed overview of previous studies (empirical and theoretical) in the field of HRM and KM is shown. Second major part is the research. This chapter discusses the methodology and methods of data collection and analysis techniques employed. It consists of two parts: data collection and data analysis. Important issues associated with the design of the questionnaire instrument, measurement scales, questionnaire administration and validation are addressed. This chapter presents a detailed statistical analysis of the data collected from the pilot and the main study. Results of data analysis of statistical tests are reported and compared with some previous work. In addition, the main contribution of this thesis is presented in this chapter. In the last part, the conclusion and recommendations for practice and further research, which emanate from the findings.

Aim of this thesis is to examine the opinion of ICT employees on importance of HR and KM for IT companies. Preliminary theoretical model was done based on literature review, which supports the belief that strong relationships between functions of HRM, effective factors, information solutions and KM can be established. Quantitative research was carried out for which an online questionnaire was used. Collection of primary data was done through self-formed and online-administered questionnaire. The selection of questionnaire resides on previous findings in literature and on desired study population (ICT employees), its geographical distribution (Slovenia and Croatia) and nature of the investigation.

Primary pool of items for this research was formed from analysis of previous research on selected subjects (i.e. research on HRM, KM, IT companies). Items were extracted and analyzed from various questionnaires found in journal articles and several were self-formed based on theoretical analysis of literature findings. As a result, an initial pool of 175 items, with six related construct was created. The initial pool of statements involved all the statements related to the HRM and KM regardless of the perspective employees. After item pool creation, items were screened to remove duplicates and to randomize the order. The list with items was sent to ICT and HR experts, i.e. the judges, per e-mail along with detailed instructions for. Instructions and evaluation form was prepared in Slovenian, Croatian and English language. Judges were asked to score each of the items

using the scale (0 to 3). In addition, judges had to place the item into one of six constructs. Ten experts were involved in the proses of card – sorting. Befor the main research was conducted a pilot study on a smaller number of respondents was done. The questionnaire was sent to small and medium companies in Croatia (from Zagreb and Varaždin County). The aim was to recognize possible anomalous response from potential respondents, as well as potential problems with statistical analysis. In addition, the technical reliability and usability of the online survey system was also tested. After data was collected preliminary analysis was done in order to see if the items fit to construct as it was done by the judges in the process of card - sorting.

After the instrument validation and pilot study final questionnaire was formed. The questionnaire was prepared in Slovenian and Croatian language, both version were language proofed by a native speaker and Slovenian (Croatian) language teacher. Questionnaire was prepared in online survey tool: Lime Survey (version 1.91) (Schmitz, 2014) for which Faculty of Organization and Informatics Varaždin, University of Zagreb, has a license. The online questionnaire consists of six sections, with 27 major question areas. Most of the questions are Likert scale type, and multiple choice questions , usually with a drop down menu, where respondents could choose one or more answers. Questions were formulated in such way that each question addresses specific variable in the research objective. The layout of the questionnaire form was designed to appeal to respondents and it followed logical sequence of the subject.

In order to analyze the HRM and KM in IT companies employees and managers from ICT sector were contacted. In addition, the purpose of this research is to analyzed difference in Croatian and Slovenian IT companies. Two different samples were formed. From the National Chambers of Slovenia (Chamber of Commerce and Industry of Slovenia) and Croatia (Croatian Chamber of Economy), data on companies in the IT sector were gathered. According to the National Occupational Classification in Slovenia and Croatia the ICT sector is the classification '***J - Information and Communication'***. For Croatia, information on companies is available on the official site: Register of Companies (BIZNET). The *J sector* was chosen, and database provided a list with all registered companies. Only one search condition was set that the company submitted a financial report for the year 2013. This ensured that the companies are active and not in bankruptcy or closed. Though in Croatia this information is online available and free, the Slovenian Chamber of Commerce and Industry does not offer the same. Therefore, officer from the Slovenian Chamber of Commerce and Industry was contacted, and a list with companies' names, e-mail addresses was received. The conditions were set on companies with over 50000 € profit and registered e-mail addresses.

Research was conducted from October to December 2014. E-mail were sent out twice, to Slovenian and Croatian companies, with an interval of one month. Most of the answers were collected after the first e-mail, and the second e-mail was just a reminder, from which were excluded companies, that have already answered the questionnaire (if they have left an e-mail or name of the company). Unfortunately a lot of e-mails received from both Slovenian and Croatian Chamber of Commerce were not valid or not active, which significantly decreased the sample size.

A total of 274 completed responses were received from companies. The response rate for Slovenia is 5.681% and for Croatia is 7.899%. This is rather small; though the goal in this research was to gain a minimum of a 200 answers in order to perform the SEM analysis. Collected survey data was analyzed using univariate and multivariate statistical analysis.

The Mann – Whitney U test and Partial Least Square Structural Equation Modelling (PLS-SEM) was used. Descriptive statistics was also used for delivering basic results on sample and population. Statistical package for data analysis SPSS 15.0 for Windows was used for data processing, which supports graphical and tabular presentation of data and is one of the most widely used programs for data analysis. For Partial Least Square analysis, the SmartPLS software package was used.

Data analysis showed that in most case there is not a large difference between Slovenian and Croatian companies when it comes to HRM functions and KM solutions. One of the major contributions is the analysis of literature evidence and providing new classification and categorization of the HRM best practice. Accordingly, after literature analysis, indicators of the HR best practice were categorized into two effective factors: *Work design structures* (sub-factors: *Design of Work* and *Design of relationship*) and *Encouraging and opportunity structures*. Second contribution are the hypothesis testing through which relationship between effective factor and knowledge management, and HRM functions, information solutions and knowledge management was analyzed.

The research for developing appropriate empirical model to explore the relationship between human resource and knowledge management is a big task mainly because of the absence of this kind of empirical research in ICT area in Croatia and Slovenia. The lack of longitudinal study requires caution in the interpretation of results. In addition, similar studies in cultural contexts other than Croatia and Slovenia could produce differing results. Furthermore, this research is constrained by sample size and it depends on the response rate of participants and their willingness to cooperate.

A limitation of this study is the use of a Likert scale as opinion based survey instrument. This type of survey measurement lacks a clear interval scale and is therefore ordinal in nature. Normal parametric statistical analysis was used for this research.

Other external threats to validity can be recognized. External validity threats can occur when participants become too familiar with the outcome measure and their responses are defined in such a way that they support the outcome and do not give their real opinion. The results of the survey are time-bound and cannot be generalized to past or future.

Improving the awareness of significance and challenges of HR issues on KM in ICT organizations is important, as well as development of an appropriate model that can provide support with assessing the impact of human resources issues on knowledge management in ICT companies, with and without the use of information systems.

This dissertation systemizes current literature findings in two perspective field and it offers an inside in the ICT companies form Slovenia and Croatia. Due to the fact that such research has not yet been done in Slovenia and Croatian nor systematization and classifications of best practices has been provided, this dissertation contributes to the field of human research management and knowledge management through theoretical and empirical findings.

Key words: *Human Resources Management, Knowledge Management, Knowledge Management Information Solutions, IT companies, Structural Equation Modelling*

Povzetek

V današnjem prehodu v poslovno okolje, ki temelji na znanju in je visoko konkurenčno, organizacije poskušajo olajšati zbiranje, shranjevanje in distribucijo znanja s svojim osebjem, da bi dosegale trajnostno konkurenčno prednost. Nova in bistvena sredstva temeljijo na zavedanju zaposlenih, zato morajo podjetja prepričati in motivirati svoje delavce za ustvarjanje in izmenjavo znanja. Upravljanje z znanjem (UZ) in upravljanje s človeškimi viri (UČV) se vse bolj obravnavata kot ključna mostova konkurenčne prednosti v globalnem okolju.

Znanje je priznano kot vrednota za organizacijsko preživetje in konkurenčno prednost (Osterloh, Frost, & Frey, 2002; Wiig, 1997) in je najbolj izrazita med tradicionalnimi proizvodnimi dejavniki, kot so zemlja, delo in kapital. Dva pojma, ljudje in znanje, sta neločljivo povezana.

Človeški viri so ključni sestavni del vsakega podjetja, ki predstavlja skupno znanje, talent, stališča, ustvarjalne sposobnosti, nadarjenost in prepričanje posameznika, ki sodeluje pri zadevah organizacije (Dhamija, 2012). UČV vključuje odločitve (Noe, Hollenbeck, Gerhart, & Wright, 2000), ki vplivajo na uspeh podjetja z namenom doseganja dolgoročnih ciljev ki bistveno vplivajo na sposobnost družbe, da se ustrezno odzove na izzive konkurence (Treven, 1998). Upravljanje s človeškimi viri je bilo raziskano v malih, srednjih in velikih organizacijah, kot tudi v poslovnem in neprofitnem sektorju in skozi te raziskave so različni avtorji opredelili veliko klasifikacij in funkcij upravljanja s človeškimi viri. Te prakse in funkcije se razlikujejo od panoge do panoge. Lepak, Takeuchi, & Snell (2003) so izjavili, da je raven strinjanja o najprimernejšem združevanju ali kategorizaciji praks v UČV nizka. Eden izmed razlogov za to je ogromno število različnih praks, ki jih lahko organizacije upoštevajo in vsaka ima veliko variacij, kar pomeni, da se ista UČV praksa lahko uporablja s popolnoma različnimi nameni, odvisno od profila organizacije.

Upravljanje z znanjem je opisano na različne načine, vendar se na splošno nanaša na odpiranje in izkoriščanje znanj posameznikov, da se pridobijo ustrezna znanja od ustreznih posameznikov v primernem času (Hutchinson & Huberman, 1993), tako da postane to znanje organizacijski vir (Anand & Singh, 2011). To pomeni tudi eksplicitno in sistematično upravljanje s ključnim znanjem (Anand & Singh, 2011) definirano kot ustvarjanje, pridobivanje, shranjevanje, izmenjava, prenos in uporaba eksplicitne in implicitne oblike znanja na posamezni, skupni, organizacijski in na skupnostni ravni z vpreganjem ljudi, postopkov in tehnologije (Madhoushi et al., 2010). V področju in vidikih upravljanja z znanjem sta prevladovala dva glavna dejavnika - UZ kot podpornik informacijske in komunikacijske tehnologije (IKT) in pogledi na UZ z vidika človeških virov.

Tehnologija, skupaj z informacijsko revolucijo in globalizacijo, bo še naprej imela značilne učinke na upravljanje z znanjem in njegov razvoj (Chong, 2006). Različne razvite države so prepoznale, da so informacijske in komunikacijske tehnologije pogonska sila na znanju temelječe družbe. IKT so sprejete kot novo gonilo za spremembe, orodja za razkritje potencialov in znanja ljudi in so zato preoblikovale sposobnost posameznikov in organizacij za večanje njihove inteligence skozi pospešeno učenje (Pemberton & Stonehouse, 2000). V svojem bistvu so IKT spodbujevalec ustvarjanja znanja in inovativnih družb (Chase, 1997; Kulkarni, Ravindran, & Freeze, 2007; Morin

et al, 2011;. Pan, Hsieh, in Chen, 2001; Sue Young Choi, Heeseok Lee, & Youngjin Yoo, 2010).

Eden od načinov za prenavljanje UČV-a je vzpostavljanje uspešnih povezav med človeškim kapitalom in upravljanjem z znanjem znotraj organizacije (Gloet & Berrellen, 2003). Cilj upravljanja z znanjem je podpiranje in krepitev procesov znanja zaposlenih, zato je pomembno, da se opredelijo različne pobude za upravljanje z znanjem, ki jih UČV prakse potrebujejo kot podporo. Pomen upravljanja z znanjem je v tem, da bi lahko omogočilo posameznikom in organizacijam samostojno in uspešno izvajanje dejavnosti s pomočjo organizacije znanja (Jantz, 2001).

Če so človeški viri, zaposleni in učinkovito upravljanje z njimi ključnega pomena za družbo, in če je znanje najdragocenejši vir v družbi, nato pa sta upravljanje s človeškimi viri in upravljanje z znanjem medsebojno tesno povezani (Svetlik & Stavrou-Costea, 2007). Zato se pozornost do upravljanja s človeškimi viri, njegovih dejavnikov učinkovitosti in funkcij lahko šteje kot dejavnost, povezana z upravljanjem z znanjem.

Ta teza podpira predpostavko, da obstaja razmerje med UČV in UZ, s poudarkom na informacijskih rešitvah in prizadevanjih za utemeljitev te povezave z vidika IKT podjetij. Odnos med učinkovitimi dejavniki UČV-a in zadevami UZ-a še vedno ni ustrezno raziskan za podjetja v IKT sektorju in zato ne obstaja model uspešnega medsebojnega delovanja UČV in UZ, ki bi se lahko uporabil za ta podjetja. Zato v tej disertaciji na podlagi predhodnih ugotovitev in lastnih empiričnih raziskav, avtorica predlaga model, ustrezen za aplikacijo v podjetjih informacijske in komunikacijske tehnologije.

Doktorska disertacija se osredinja na dva cilja: analizo predhodnih ugotovitev raziskav v dveh perspektivnih področij (upravljanje s človeškimi viri in upravljanje z znanjem) ter razvoj in testiranje konceptualnega modela, ki naj bi razložila razmerje med njima. Doseganje teh ciljev zahteva celovito predhodno raziskavo; vključevanje strokovnjakov s področja upravljanja s človeškimi viri in cel sklop najnovejših statističnih tehnik in dognanj, ki se uporabljajo za analizo in interpretacijo podatkov. Ta raziskava vključuje teoretično in empirično analizo. Uporabljene so znanstveno raziskovalne metode, da bi dobili objektivne in sistematične znanstvene rezultate in vpoglede. Raziskava, izvedena v okviru doktorskega dela, temelji na treh hipotezah in ciljih. Na začetku je bil predstavljen konceptualni model, ki temelji na ugotovitvah iz literature, in terenska raziskava, da bi bila ustreznost modela statistično dokazana.

V doktorski nalogi so analizirani vsi procesi in učinkoviti dejavniki UČV, ki aktivirajo dolgoročno upravljanje z znanjem kot konkurenčno prednost in s tem povzročijo povečano zmogljivost IKT podjetij. Uporaba informacijskih sistemov pomaga v upravljanju z znanjem, ki postane hitreje in učinkovitejše, in tudi UČV lahko vpliva, spreminja, ali spodbuja zaposlene za višje dosežke pri uporabi informacijskih sistemov. Zato je raziskava obravnavala raven uporabe informacijskih sistemov, ki so podpora za UČV in UZ v IKT podjetjih in IKT oddelkih ostalih podjetij. UČV se opazuje skozi UČV funkcije (proces zaposlovanja in izbire kandidatov, usposabljanje in razvoj, ocena delovne uspešnosti). Poleg funkcij raziskave so tudi *najboljše prakse*, ki vodijo h krepitvi UČV. Te najboljše prakse UČV se obravnavajo kot pomembni dejavniki za uspešen razvoj upravljanja z znanjem. Ta disertacija skuša predstaviti in razumeti najboljše prakse UČV s klasifikacijo praks, zasledenih v literaturi.

Eden od ciljev te naloge je tudi analiza dokazov iz literature in vzpostavitev nove klasifikacije in kategorizacije najboljših praks. V skladu s tem so po analizi literature razvrščeni kazalniki najboljše prakse UČV v dva učinkovita dejavnika: Oblikovanje delovnih struktur (ODS) ter spodbudne in priložnostne strukture (SPS).

Oblikovanje delovnih struktur vključuje zasnovo dela in oblikovanje odnosa, tako da imajo zaposleni pravico in možnost, da uporabijo svoje sposobnosti v sodelovanju z drugimi delavci glede na strukturo njihovega položaja. ODS vključuje notranje in zunanje lastnosti zaposlenih in je sestavljen iz dejavnikov, ki so: Delovno okolje in Odnosi oblikovanja. Delovno okolje vključuje raznolikost delovnih mest, neodvisnost, decentralizirano odločanje, kakovost življenja, dela in formalno varnost zaposlitve. Odnosi oblikovanja vključujejo zaupanje, organizacijsko zavezanost, odnos zaposlenih in timsko delo. SPS zajema strukturo spodbud, ki vključujejo motivacijo in predanost. To so lahko varnost zaposlitve, motiviranje zaposlenih, pooblaščanje, sodelovalne ali partnerske povezave, nove sposobnosti / razvoj spretnosti. Učinkoviti dejavniki in funkcije UČV imajo močan vpliv na UČV (Attafar et al., 2012), in ker upravljanje s človeškimi viri vpliva na upravljanje z znanjem, lahko trdimo tudi, da so učinkoviti dejavniki in funkcije UČV povezani z upravljanjem z znanjem. Predpostavlja se, da IKT menedžerji ne dojemajo vseh učinkovitih dejavnikov kot enako pomembnih. Zato je treba ugotoviti, kateri učinkoviti dejavniki so pomembnejši. Namen tega dela je opredeliti ta odnos za IKT podjetja v Sloveniji in na Hrvaškem.

Literatura navaja, da je informacijska tehnologija ena izmed najpomembnejših komponent kritičnih dejavnikov uspeha UZ (Martin, Hatzakis, Lycett, in Macredie, 2005; Sher & Lee, 2004; Martin et al, 2005). Glede na eno raziskavo (Rašula, Bosilj Vukšić, & Indihar Štemberger, 2008) dva elementa tvorita IT komponento UZ: sposobnost IT za zajemanje znanja in uporaba IT orodij. Davenport in Prusak (1998) sta poročala, da imajo projekti znanja večjo verjetnost uspeha, ko uporabljajo tehnologije in spletna notranja omrežja (intranet). Takšna orodja zagotavljajo možnosti za organizacijsko učenje in večjo funkcionalno specializacijo (Mathew, Kumar, in Perumal, 2011). Številne študije so empirično testirale učinek organizacijskih elementov, inovacij, organizacijskega učenja in kulture na IT (Liao in Wu, 2010; Rašula, Bosilj Vukšić, & Indihar Štemberger, 2012; Zareai, Gheshlaghi, Heydari, & Yaghoobzadehpoor, 2013). Zato je mogoče trditi, da igrajo organizacijski in socialni elementi posredniško vlogo med informacijskimi rešitvami in UZ. Po Mathew s sodelavci (2011) morajo tehnologije, ki jih uporabljajo podjetja, podpirati vzpostavljanje mrež, olajšati formalno ali neformalno komunikacijo med zaposlenimi, in omogočiti interakcijo znotraj organizacij in med organizacijami. Predpostavlja se, da IKT podjetja uporabljajo informacijske sisteme za upravljanje s svojimi zaposlenimi in prav zato imajo informacijske rešitve vpliv na procese UZ.

To delo je razdeljeno na tri glavne dele in sedem poglavij. Prvi del vključuje uvod in analizo literature. Cilj je opredeliti ključne dejavnike uspeha, vrzeli, in izdelati in pojasniti povezavo med upravljanjem človeških virov in upravljanja znanja. Poglavje "uvod" predstavlja ozadje in celotno vsebino celotnega dela. To poglavje uvaja predmet, raziskovalni problem in utemeljitev raziskave. Raziskovalni cilji in cilji hipotez so določeni skupaj z ustrezno metodologijo raziskave. Teoretični del raziskave temelji na analizi razpoložljive in ustrezne nacionalne in mednarodne znanstvene literature, ki vključuje pregled področja UČV in literature s področja UZ, od standardnih knjig do novih referenc, vključno z dokumenti in razpoložljivimi viri na internetu z namenom vpogleda v predhodne raziskave in razvite teorije. Pregled literature zagotavlja okvir za vzpostavitev študije in služi kot merilo za primerjavo rezultatov z rezultati drugih

raziskav (Creswell, 2009, str. 25). Cilj je, da se analizira praksa in funkcije UČV in predstavitev rezultata iz literature, ki podpirajo odnose med UČV in UZ.

V poglavju "Upravljanje s človeškimi viri", so predstavljene funkcije in značilnosti upravljanja s človeškimi viri in njegov zgodovinski razvoj. Tukaj so opredeljene tudi najustreznejše ("*Best fit*") funkcije UČV, ki v nadaljevanju služijo kot osnova za empirično raziskavo. Poleg praks UČV literatura priznava različne dejavnike, ki imajo vpliv na človeške vire in produktivnost podjetij. To poglavje vsebuje seznam vseh praks UČV, najdenih v literaturi. Opravljena je analiza teh praks in podana je nova klasifikacija in kategorizacija v dva učinkovita dejavnika (*Oblikovanje delovnih struktur* (pod-dejavniki: Delovno okolje in Odnosi oblikovanja) in *Spodbudne in priložnostne strukture*). To je tudi eden od glavnih znanstvenih prispevkov te disertacije. Poglavje "Upravljanje z znanjem" predstavlja analizo literature o konceptih znanja, razvoju upravljanja z znanjem in rešitvah za upravljanje z znanjem. Poleg tega je poudarek na informacijskih sistemih in infrastrukturi, ki se uporablja za upravljanje z znanjem. V četrtem poglavju je analiziran odnos med UČV in UZ. Skozi to poglavje so razloženi vzajemni vplivi med upravljanjem z znanjem in upravljanjem s človeškimi viri na podlagi teoretičnih spoznanj v literaturi. Na začetku so predstavljene ugotovitve o UČV in UZ in na osnovi teh je oblikovan, upodobljen in pojasnjen konceptualni model njihovega odnosa. Na koncu poglavja je prikazan podroben pregled preteklih študij (empiričnih in teoretičnih) na področju UČV in UZ. Drugi pomembni del disertacije je raziskava. To poglavje obravnava metodologijo in tehnike zbiranja in analiziranja podatkov. Sestavljen je iz dveh delov: zbiranja podatkov in analize podatkov. Ukvarja se s pomembnimi vprašanji, povezanimi z zasnovo instrumenta vprašalnika, merske lestvice, upravljanja z vprašalnikom in potrditve njegove veljavnosti. To poglavje predstavlja podrobno statistično analizo podatkov, zbranih v pilotni in glavni študiji. Predstavljeni so rezultati analize podatkov o statističnih testih in so primerjani z rezultati preteklih raziskav. Poleg tega je v tem poglavju predstavljen glavni prispevek disertacije. V zadnjem delu je prikazan zaključek in priporočila za prakso in nadaljnje raziskave, ki izhajajo iz ugotovitev.

Namen tega doktorskega dela je preučiti mnenje IKT zaposlenih o pomenu UČV in UZ za IKT podjetja. Začetni teoretični model je zastavljen na podlagi pregleda literature, ki podpira prepričanje, da se lahko vzpostavijo močni odnosi med funkcijami UČV, učinkovitimi dejavniki, informacijskimi rešitvami in UZ. Izvedena je kvantitativna raziskava, za katero je bil uporabljen spletni vprašalnik. Zbiranje primarnih podatkov je izvedeno z lastnim spletnim vprašalnikom. Izbor vprašalnika temelji na prejšnjih ugotovitvah v literaturi in raziskovanju populacije (zaposlenih na področju IKT), geografske porazdelitve (Slovenija in Hrvaška), in narave preiskav.

Prvi nabor postavk za raziskavo je bil oblikovan iz analize prejšnjih raziskav o izbranih temah (raziskave o UČV, UZ, IKT podjetjih). Postavke so bile pridobljene in analizirane iz različnih vprašalnikov v člankih iz znanstvenih revij in so bile oblikovane na podlagi teoretične analize literature. Kot rezultat je bil ustanovljen začetni nabor od 175 izjav s šestimi konstrukti. Začetni nabor izjav vključuje vse izjave, povezane z UČV in UZ ne glede na povezave teh z zaposlenimi. Po oblikovanju primarnega nabora so pregledane vse izjave, dvojniki so odstranjeni in je vzpostavljen naključen vrstni red izjav. Seznam z izjavami je bil poslan strokovnjakom na področju IKT in UČV, t.j. sodnikom, po e-pošti, skupaj s podrobnimi navodili. Navodila in obrazci so bili pripravljeni v angleščini, hrvaščini in slovenščini. Sodniki so bili pozvani, da ocenijo vsako izjavo na lestvici od 0 do 3. Poleg tega so morali vsak element pridružiti enemu od šestih konstruktov. Deset

strokovnjakov je bilo vključenih v proces razvrščanja kartic. Preden je bilo izvedeno glavno raziskovanje, je bila narejena pilotna študija na manjšem številu anketirancev. Vprašalnik je bil poslan na mala in srednje velika podjetja na Hrvaškem. Cilj je bil, da se prepoznajo morebitne težave s statistično analizo. Poleg tega je bila preizkušena tudi tehnična zanesljivost in uporabnost sistema spletnega anketiranja. Potem, ko so bili podatki zbrani, je bila opravljena analiza, da bi se videlo, če so izjave ustrezne za vsak konstrukt.

Po potrditvi veljavnosti instrumenta in pilotni študiji je bil oblikovan končni vprašalnik. Vprašalnik je bil pripravljen v angleškem in hrvaškem jeziku in sta bili obe različici jezika pregledani s strani izvirnega govorca. Vprašalnik je bil pripravljen v orodju za spletne ankete: Lime Survey (različica 1.91) (Schmitz, 2014), za katerega imata licenco Fakulteta za organizacijo in informatiko Varaždin in Univerza v Zagrebu. Spletni vprašalnik je sestavljen iz šestih oddelkov, s 27 glavnimi področji z vprašanji. Večina vprašanj je tip Likertove lestvice ali vprašanja z več možnimi odgovori, po navadi s spustnega menija, kjer so lahko anketiranci izbrali enega ali več odgovorov. Vprašanja so bila oblikovana tako, da vsako vprašanje obravnava posebno spremenljivko iz ciljev raziskave. Postavitev obrazca vprašalnika je bila zasnovana tako, da je sledilo logično zaporedje teme.

Da bi analizirali UČV in UZ v IKT podjetjih, so bili vzpostavljeni stiki z zaposlenimi in menedžerji iz IKT sektorja. Poleg tega je bil namen te raziskave tudi analizirati razlike med hrvaškimi in slovenskimi IKT podjetji. Dva različna vzorca sta bila oblikovana. Iz nacionalnih zbornic Slovenije (Gospodarska zbornica Slovenije - GZS) in Hrvaške (Hrvatska gospodarska komora - HGK) so bili zbrani podatki o gospodarskih družbah v IKT sektorju. Po Standardni klasifikaciji dejavnosti (SKD) v Sloveniji in na Hrvaškem je IKT sektor razvrščen v kategorijo "J - Informacije in komunikacije". Na Hrvaškem so informacije o podjetjih na voljo na uradni spletni strani: Register družb (BIZNET). Po izbiri kategorije J je iz podatkovne baze pridobljen spisek vseh registriranih podjetij v tej dejavnosti (IKT sektorju). V iskanju je zastavljen samo en pogoj, to je, da je družba predložila finančno poročilo za leto 2013. To je zagotovilo, da so podjetja, dejavna in ne v stečaju ali zaprta. Čeprav je na Hrvaškem ta informacija na voljo na spletu in brezplačno, Gospodarska zbornica Slovenije ne ponuja enako, zato so bili vzpostavljeni stiki z uradniki iz Gospodarske zbornice Slovenije, in je sprejet seznam z imeni in e-poštnimi naslovi podjetij. Pogoji za izbiro podjetij so zastavljeni na ravni več kot 50.000 € letnih prihodkov in da ima podjetje registrirani e-poštni naslov.

Raziskava je potekala od oktobra do decembra leta 2014. E-sporočila so bila poslana dvakrat v slovenska in hrvaška podjetja v razdobju enega meseca. Večina odgovorov je bilo sprejetih po prvem e-sporočilu in je bilo drugo e-sporočilo samo opomin. Podjetja, ki so že prej odgovorila na vprašalnik, so bila v drugem pošiljanju izključena (če so zapustili e-pošto ali ime podjetja v odgovorih na vprašalnik). Na žalost veliko naslovov e-pošte, ki so pridobljeni od obeh, slovenske in hrvaške gospodarske zbornice, niso bili veljavni ali niso aktivni, kar je občutno zmanjšalo velikost vzorca.

Skupno je bilo prejetih 274 v celoti izpolnjenih odgovorov od podjetij. Stopnja odzivnosti za Slovenijo je 5,681 % in za Hrvaško 7,899 %. To je dokaj malo, vendar zadostuje za načrtovano analizo, kajti namen te raziskave je bil pridobiti najmanj 200 odgovorov za izvedbo strukturalnega modeliranja (SEM analize). Zbrani podatki so analizirani s pomočjo univariantne in multivariantne statistične analize. Uporabljeni sta Mann-Whitneyev U-test in strukturalno modeliranje z delnimi najmanjšimi kvadrati (PLS-SEM). Za predstavljanje osnovnih značilnosti v vzorcu in populacije je bila uporabljena

tudi deskriptivna statistika. Obdelava podatkov je bila narejena s statističnim paketom za analizo podatkov SPSS 15.0 za Windows, ki podpira grafični in tabelarni prikaz podatkov in je eden izmed najbolj razširjenih programov za analizo podatkov. Za strukturalno modeliranje z delnimi najmanjšimi kvadrati je bil uporabljen SmartPLS programski paket.

Analiza podatkov je pokazala, da v večini primerov ni velike razlike med slovenskimi in hrvaškimi podjetji, ko gre za UČV funkcije in UZ rešitve. Eden od glavnih prispevkov je analiza dokazov iz literature in zagotavljanje nove klasifikacije in kategorizacije najboljših praks UČV. V skladu s tem po analizi literature, kazalniki najboljše prakse UČV so razvrščeni v dva učinkovita dejavnika: *Oblikovanje delovnih struktur* (pod-dejavniki: Delovno okolje in Odnosi oblikovanja) in *Spodbudne in priložnostne strukture*. Drugi prispevek je testiranje hipotez, ki analizirajo razmerja med učinkovitimi dejavniki in UZ ter funkcijam UČV, informacijskimi rešitvami in UZ. Podatki za to tezo so zbrani s pomočjo spletnega vprašalnika, poslanega IKT podjetjem v Sloveniji in na Hrvaškem.

Raziskava za razvoj ustreznega empiričnega modela za raziskovanje odnosa med upravljanjem s človeškimi viri in upravljanjem z znanjem je velika naloga, predvsem zaradi pomanjkanja tovrstnih empiričnih raziskav na področju IKT na Hrvaškem in v Sloveniji. Pomanjkanje vzporedne študije zahteva previdnost pri interpretaciji rezultatov. Poleg tega bi lahko podobne študije v drugačnih kulturnih pogojih, kot so tisti na Hrvaškem in v Sloveniji, podale različne rezultate. Hkrati pa je ta raziskava omejena tudi z velikostjo vzorca in je odvisna od stopnje odzivnosti udeležencev in njihove pripravljenosti za sodelovanje.

Omejitev te raziskave je uporaba Likertove lestvice kot merilnega instrumenta za preskušanje mišljenj anketirancev. Ta vrsta merjenja nima jasne intervalne skale in je zato ordinalne narave. Zaradi značilnosti podatkov je bila uporabljena normalno parametrična statistična analiza. Opazne so tudi druge zunanje grožnje, uperjene v veljavnost instrumenta, ko udeleženci postanejo preveč seznanjeni z želenimi izidi in so njihovi odzivi opredeljeni tako, da podpirajo izid in ne dajejo realnega mnenja. Rezultati ankete so tudi časovno omejeni in jih ni mogoče posplošiti na preteklost ali prihodnost.

Zelo je pomembno izboljšanje ozaveščenosti o pomenu in izzivih vprašanj UČV in UZ in IKT podjetij kot tudi razvoj ustreznega modela, ki lahko zagotovi podporo pri ocenjevanju vpliva zadev v povezavi s človeškimi viri na upravljanje z znanjem v IKT podjetjih, z uporabo informacijskih sistemov ali pa brez nje.

Ta disertacija sistematizira dosedanje ugotovitve iz literature z dveh vidikov in ponuja vpogled v notranjost IKT podjetij v Sloveniji in na Hrvaškem. Zaradi dejstva, da takšna raziskava še ni bila opravljena v Sloveniji in na Hrvaškem, niti doslej niso objavljene sistematizacije ter razvrstitve najboljših praks, ta disertacija prispeva k področju upravljanja s človeškimi viri in upravljanja z znanjem s teoretičnimi in empiričnimi ugotovitvami.

Ključne besede: *Upravljanje s človeškimi viri, Upravljanje z znanjem, Informacijske rešitve za upravljanje z znanjem, IT podjetja, Strukturno modeliranje*

1 INTRODUCTION TO THESIS

In today's shift to a knowledge-based and highly competitive business environment in order to achieve sustainable competitive advantage, organizations are trying to facilitate collection, storage and distribution of knowledge with their personnel. Due to the rapidly changing global economy, companies need to consider a serious change in strategy and focus more on knowledge management (Switzer, 2008). New and essential assets reside in the minds of employees, therefore companies have to convince and motivate their workers to create and share knowledge. Vast of the literature on knowledge management is focused on techno-centric point similar to information management, which in essence regards knowledge as an entity that can be captured, manipulated and leveraged through information technology (IT) (Fernadez, Gonzales, Sabherwal, 2004).

Knowledge management (KM) and human resources management (HRM) are increasingly regarded as key levellers of competitive advantage in global, dynamic and complex business environment (Brewer & Brewer, 2010) through which performance, innovation and practices are enhanced (Wang & Wang, 2012). The two concepts: people and knowledge, from the context of knowledge work, are inextricably joined (Oltra, 2005).

In this thesis, aspects of both human resource and knowledge management are analysed and empirically tested for ICT companies in Slovenia and Croatia. The background and research problem with objective and hypothesis and corresponding methodology are presented in the following chapters.

1.1. Background and research problem

Human resources are the key components in every company representing total knowledge, talent, attitude, creative ability, aptitude and belief of an individual involved in the affairs of organization (Dhamija, 2012). HRM includes decisions that affect the success of business, all with aim of achieving long-term goals (Noe, Hollenbeck, Gerhart, & Wright, 2000) which significantly influence company's ability to respond appropriately to the challenges of competition (Treven, 1998).

Human resources management has been explored in small, medium and large organizations, as well as in profit and non-profit, through which various authors have defined a range of classification and functions of HR management. These practices and functions differ from industry to industry. Exploratory analysis and overview of the meaning of HRM in 104 empirical articles published in internationally refereed journals (1994 – 2003) was done by Boselie, Dietz, & Boon (2005). Based on content analysis, their findings revealed that the majority of studies define HRM in terms of HR practices or bundles of practices and there is no fixed list of generally applicable practices. Lepak, Takeuchi, & Snell (2003) stated that there is low level agreement regarding the most appropriate aggregation or categorization of HR practices. One of the reasons is the immense number of practices that organizations have to consider, whereas each is associated with many variations, meaning that the same HR practice can be used for vastly different purposes depending on the profile of the organization.

The knowledge has been recognized as currency for organizational sustenance and competitive advantage (Osterloh, Frost, & Frey, 2002; Wiig, 1997) and is the most prominent among traditional factors of production, such as land, labour and capital. Knowledge management has been described in various ways, but generally it relates to unlocking and leveraging the knowledge of individuals to gain appropriate knowledge from appropriate individuals in appropriate time (Hutchinson and Huberman, 1993) so that this knowledge becomes available as an organizational resource (Anand and Singh, 2011). It is explicit and systematic management of vital knowledge (Anand & Singh, 2011) defined as creating, acquiring, storing, sharing, transferring and utilizing both explicit and implicit forms of knowledge at individual, group, organizational and community level through harnessing of people, process and technology (Madhoushi *et al.*, 2010). Based on the extensive review of literature, Boersma (2002) has identified 10 different knowledge management approaches. These approaches are: strategic approach, human resource management approach, learning organization approach, intellectual capital approach, knowledge technology approach, ICT approach, organizational approach, innovation approach, network approach and quality control approach. This thesis focuses on the human resource approach.

Territory and aspects of knowledge management have been dominated by two main factors - the supporters of information and communication technology (ICT) and the human resource views. The HR view is increasingly gaining more attention in recent years (Brewer & Brewer, 2010), especially in project-based industries (Ahmed & Ahmad, 2012; Bano, 2011) as well as in some specific industries such as construction (Egbu, 2001; Egbu et al., 1998; A. Olomolaiye & Egbu, 2006), universities and libraries (Attafar, Soleimani, Shahnazari, & Shahin, 2012; Mohammadian, Arayesh, Mohammadian, Azizpour, & Zanganeh, 2011) and other. Various researchers (Ahmed & Ahmad, 2012; Attafar et al., 2012; T. H. Davenport & Völpel, 2001; Hussock, 2009; Ishak, Eze, & Ling, 2010; H. F. Lin, 2007; Oltra, 2005; Özbebek & Toplu, 2011; Theriou & Chatzoglou,

2008) have been interested in the area of knowledge management and employees, combining it with perspectives of strategic and project management and information technology.

Technology, along with information revolution and globalization, continues to exert major effects on knowledge management and its development (Chong, 2006). Various developed countries have recognized information and communication technology as drivers of the knowledge-based society. ICT are accepted as new drivers of change, tools for releasing potential and knowledge embodied in people and it has transformed the ability of both individuals and organizations to augment their intelligence via accelerated learning (Pemberton & Stonehouse, 2000). In its essence, ICT is regarded as the facilitator of knowledge creation in innovative societies (Chase, 1997; Kulkarni, Ravindran, & Freeze, 2007; Morin et al., 2011; Pan, Hsieh, & Chen, 2001; Sue Young Choi, Heeseok Lee, & Youngjin Yoo, 2010). The aspect of ICT for the support of knowledge management in organizations has also found its followers (M Alavi & Tiwana, 2003; Allahawiah, Al-Mobaideen, & Nawaiseh, 2013; Becerra-Fernandez, González, & Sabherwal, 2004; Brauner & Becker, 2006; Hirt, 2012; Lindberg, 2012; Madhoushi, Sadati, Delavari, Mehdivand, & Hedayatifard, 2010; Mohammed & Jalal, 2011); (Srikantaiah & Koenig, 2000). Literature states that successful organizations, in order to ensure the survival, need to embrace the knowledge implementation and technology which are the hallmarks of the service and production performance (Allahawiah et al., 2013; Anand & Singh, 2011).

One way of HRM to reinvent itself is through contribution to effective linkages between human capital and knowledge management within organizations (Gloet & Berrell, 2003). The aim of knowledge management is to support and enhance employees' knowledge processes and therefore it is important to identify different knowledge management initiatives that HR practices need to support. Importance of knowledge management lies in the fact that it could result in empowerment of individuals and organization itself to accomplish activities effectively through knowledge organization (Jantz, 2001).

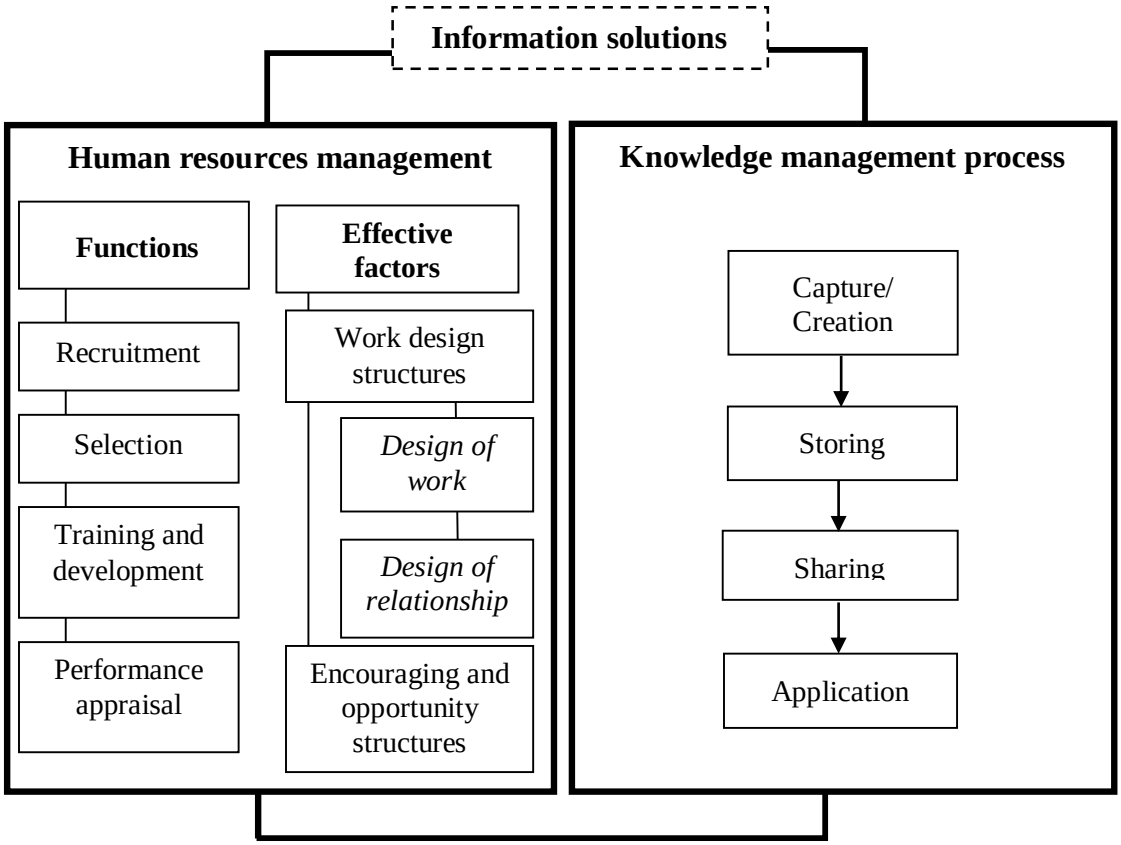
If human resources, employees and their effective managing is essential for a company and if people's most more valuable resource is knowledge, then human resources management and knowledge management are closely interrelated (Svetlik & Stavrou-Costea, 2007). Therefore, paying attention to *human resources management, its effective factors and functions* could be regarded as *activities related to knowledge management.*

This thesis supports the premise of relationship between HRM and KM and aims to elaborate on this link from the aspect of IT companies. The purpose of this research is to suggest and empirically test a conceptual model that explains the relationship between human resources management, described through effective factors and functions and knowledge management, with emphasis on information solutions for both perspectives. With respect to the fact that the relationship between HR effective factors and KM issues is still not properly explored in IT companies and a model of its successful functioning does not exist, a model applicable for IT companies is proposed in this disertation based on previous findings and research on HRM and KM is conducted by the author. As mentioned, the IT area is growing fast and therefore this research is focused on observing IT companies in Slovenia and Croatia.

For the purpose of this research the following HRM practices, derived from the 'best fit' (Armstrong, 2003), have been researched: *Recruitment and Selection, Training and*

Development and Performance Appraisal. In addition to functions of HRM, various authors have also defined *best practices* that lead to enhancement of HR; some of which are: empowerment (Greasley et al., 2005), quality of work, (Cole, 2005; H. F. Lin, 2007), culture (Özbebek & Toplu, 2011); (Hussock, 2009), individual factors (Attafar et al., 2012; H. F. Lin, 2007) learning (Dicke, Holwerda, & Kontakos, 2006) and others. These HR best practices could be considered as important factors for successful knowledge management (Attafar et al., 2012). One of the goals of this thesis is the analysis of literature evidence and providing new classification and categorization of the best practice. Accordingly, after literature analysis, indicators of the HR best practice were categorized into two effective factors: *Work design structures* and *Encouraging and opportunity structures*. Hence, in ICT companies and IT departments in Slovenia and Croatia the relationship between HRM functions and effective factors with knowledge management and information solutions is analysed (see Figure 1).

Figure 1: View of functions and effective factors of HRM and KM processes



The proposed research does not intent to simplify the direct relationship between HRM practices and knowledge management. This relationship has already been examined thoroughly in the past. The main purpose is to highlight all important processes and effective HRM factors, which should activate for long-term knowledge management as competitive advantage and therefore result in increased performance specifically in IT companies. Additionally, the use of information systems helps managing knowledge faster and more efficiently and also HRM can influence, change or encourage employees for higher accomplishments in using information systems, therefore the level of usage of IS, that foster HRM and KM, in ICT companies and IT departments is explored.

Furthermore, the goal is to understand which effective factors and functions of human resource management play a major role in IT companies.

Improving the awareness of significance and challenges of HR issues on KM in IT organizations is important, as well as development of an appropriate model that can provide support with assessing the impact of human resources issues on knowledge management in IT companies, with and without the use of information systems. To conclude as Davenport & Völpel (T. H. Davenport & Völpel, 2001) stated: 'Individuals' human potentials are in the centre of knowledge management, so knowledge management is individuals' management and individuals' management is knowledge management.'

1.1.1. Research objectives

In regards to the above explained theoretical assumptions and purpose of the thesis, the main goals of this research are defined below. Through empirical research, the aim of this thesis is to provide a clear picture on human resource management aspects in knowledge management to gain better insight into IT organizations.

G1: Identify underlying philosophy of knowledge management and human resources and their interplay from both general and IT perspective.
G1.1: Analysis of the best practices in HRM and their classification.

G2: Identify and explore challenges regarding effective managing of human resources in IT companies.
G2.1.List all effective factors found in literature, classification and denomination to appropriate group.
G2.2: Determine the extent to which effective factors of HRM affect the successful exploitation of HR issues and are important for ICT companies.

G3: Explore the challenges and complex ways associated with effective human resources management for knowledge management improvements and its relevance for ICT companies.
G3.1: Identify HR factors that promote or inhibit successful KM initiatives in ICT companies.
G3.2: Determine the extent to which HR effective factors and functions have impact on KM.

G4: Propose and empirically test a model that articulates the role of various key variables regarding knowledge management, information solutions and human resources management.
G4.1: *Development of a conceptual model, that explains the relationship between HR and KM in general based on previous findings in literature.*
G4.2: Assessment of the relationship of HRM, KM and information solutions with strong alignment to specific needs for ICT companies.

G5: Explore information solutions used by ICT companies for knowledge management.
G5.1: Identify the level of usage of IS for managing employees and KM processes in ICT companies.

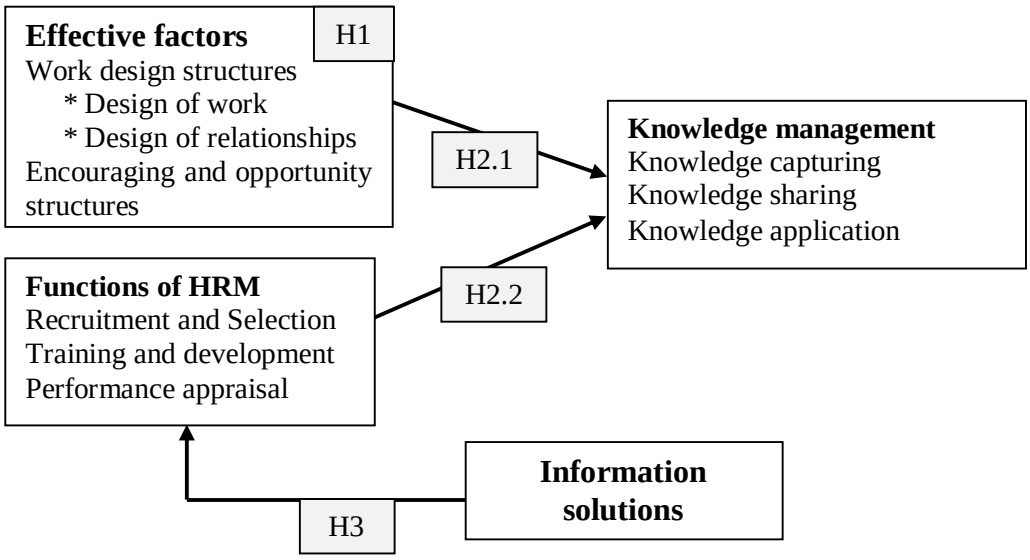
G6: Suggest areas and gaps for further research.

All of this requires of extensive literature review and discussions with researchers and academics in the fields of HRM and KM. Proposed scientific objectives imply potential answers and solutions for defining the relationship of HR and KM for ICT companies and IT departments through this research.

1.1.2. Research hypotheses

This research integrates theoretical and empirical analysis in order to achieve proposed goals. For this reason, scientific research methods are used in order to get objective and systematic scientific results and insights. Research study, conducted within the thesis, is founded on the following hypotheses based on goals and purpose of this thesis.

Figure 2**:** Structural model of the relationship



Preliminary theoretical model was done based on literature review, which supports the belief that strong relationships between functions of HRM, effective factors, information solutions and KM can be established. Hypothesized relationships for empirical research are illustrated in Figure 2. Hypotheses for this research are proposed below. Detailed methodology, data collection and analysis is explained in Chapter 5.

H1: *There are significant differences between IT managers' perception in Slovenian and Croatian companies on importance of HR effective factors.*

It is presumed that IT managers do not perceive all HR effective factors (work design structures and encouraging and opportunity structures) as equally important. Therefore, it can be stated that certain effective factors are more important to IT managers than others. Hypothesis 1 (H1) is related to the goal regarding determination of the extent to which effective factors of HRM affect successful exploitation of HR issues and are of great importance for IT managers (cf. G2.1). For H1 Mann Whitney U test was used.

H2: *Human resource management has a significant positive impact on knowledge management in ICT companies and IT departments.*

Effective factors and functions of HR have enhancing impact on HR (Attafar et al., 2012) and since the human resources management has impact on knowledge management, it can be stated that effective factors and functions are related to knowledge management. The aim is to define this relationship for ICT companies in Slovenia and Croatia. For better understanding of the relationship between HRM and KM, hypothesis 2 (H2) is analysed and verified through two separate hypotheses:

H2.1: *Effective factors of HR have a significant positive impact on knowledge management in ICT companies.*

H2.2: *Functions of HR have a significant positive impact on knowledge management in ICT companies.*

Hypothesis 2 is related to goals regarding exploring the challenges and complex ways associated with effective human resources management for knowledge management process and its relevance for ICT industry (cf. G3; G3.1 and G3.2). Structural equation modelling based on partial least square is used to verify these hypotheses.

H3: *Information solutions applied in HRM are indirectly associated with knowledge management processes.*

Literature states that information technology is one of the most important components of critical success factors of KM (Martin, Hatzakis, Lycett, & Macredie, 2005; Sher & Lee, 2004); (Martin et al., 2005; Sher & Lee, 2004). According to the research (Rašula, Bosilj Vukšić, & Indihar Štemberger, 2008) two elements form the IT component of KM: the ability of IT to capture knowledge and the use of IT tools. Davenport & Prusak (T.H Davenport & Prusak, 1998) reported that knowledge projects are more likely to succeed when they use technologies and web-based intranets. Such tools provide opportunities for organizational learning and increasing functional specialization (Mathew, Kumar, & Perumal, 2011). Several studies have empirically tested the effect of organizational elements, innovation, organizational learning and culture on IT (Liao & Wu, 2010; Rašula, Bosilj Vukšić, & Indihar Štemberger, 2012; Zareai, Gheshlaghi, Heydari, & Yaghoobzadehpoor, 2013). Thereupon it can be stated that organizational and social elements play a mediating role in the relationship between information solutions and KM. According to Mathew et al (2011), technology used in companies has to support networking, facilitate interaction between employees, either formally or informally, interaction within organizations and between organizations. Aligned with results from previous research, the above stated hypothesis is proposed. It is presumed that *ICT companies use IS for managing their employees and therefore information solutions have influence on KM processes*.

Hypothesis 3 (H3) is related to goals regarding identification of the level of usage of IS for managing employees and KM processes in ICT companies (cf. G5). As well as for H2, structural equation modelling is used to test the proposed hypothesis.

1.2. Research methodology

The nature of the research problem and research aims calls for descriptive and prescriptive approach. The study design is determined according to the presented problem. First, the theoretical relevant and recent literature was used on the basis of which the conceptual model was built (see Chapter 2 HRM and 3 KM). Afterwards, the necessary data was obtained through empirical study. For the purpose of investigating HR and KM in ICT companies and IT departments, a mixed method approach was chosen respectively. Mixed methods are 'procedures in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of research problem. It may involve collection of both forms of data, qualitative and quantitative, and then integrating the information in interpretation of the overall results' (Creswell, 2009). This approach combines the results and takes advantage of strengths of both quantitative and qualitative methods (Creswell, 2009; Petz, 2007).

With chosen methodology, it is possible to meet the basic requirements of scientific methods, such as objectivity, reliability, accuracy, necessary and sufficient integrity and universality. In solving issues of proposed complex model of human resources management, it is necessary to examine literature and results of various studies in field of knowledge and human resources management. Cross-sectional analysis is the most appropriate for this study because this analysis provides a snapshot of the variables of success factors at a single point and produce cross classification (Churchill & Iacobucci, 2009). For this cross-sectional study, a three-step research plan with proposed methodology is presented below and every step is presented through aims, research methodology and expected outcomes.

Figure 3 depicts the path diagram for this thesis.

A. Literature analysis

The goal is to identify critical success factors, gaps, and elaborate and clarify the link between human resource management and knowledge management. The theoretical part of the study is based on analysis of available and relevant national and international scientific literature in the perspective field, which includes the review of HRM and KM literature from standard books to new references including papers and resources available on the Internet in order to give an insight into previous research and developed theories. Literature review provides a framework for establishing importance of the study and it serves as a benchmark for comparing results with other findings (Creswell, 2009, p. 25). The aim is to analyse practices and functions of HRM and to present results from literature, which support the relationship between HR and KM.

Outcomes:

- The theoretical part provides an overview of theories and on knowledge management and human resources management.
- Analysis of previous research in order to detect inadequacies and contradictions.
- Definition of the relationship between knowledge management and human resources management and identification of critical factors and gaps.
- Analysis of best practices of HRM and their classification into effective factors of HRM.
- Development of conceptual model of the relationship based on previous research for further empirical analysis.

The literature analysis of HRM and KM and their relationship is presented in chapters 2, 3, and 4. After an extensive literature analysis and development of a conceptual model, which presents the findings on relationship between HRM and KM, the empirical part of the research followed.

B. Research and data analysis

The Goal was to analyse the data received from ICT companies in order to establish the relationship between human resources management and knowledge management and to test the conceptual model.

a. Data collection

The Aim was to examine the opinion and perception managers and employees from ICT companies on importance of HRM and KM. Collection of primary data was done through self-formed and online-administered questionnaire sent out to ICT companies form Slovenia and Croatia.

Outcomes:

- Measurement instrument design for analysis of HRM and KM and its validation.
- Communication with experts in the field of HRM for validation of measurement instrument.
- Conducting a pilot testing in order to validate the measurement instrument.
- Conducting the main research in ICT companies from Slovenia and Croatia.

The instrument design and validation as well as the data collection process is presented in Chapter 5.

b. Data analysis

Collected survey data was analysed using univariate and multivariate statistical analysis (see Table 1: the Mann – Whitney U test and Partial Least Square Structural Equation Modelling (PLS-SEM) was used. Descriptive statistics was also used for delivering basic results on sample and population (e.g. analysis of the distribution of respondents according to various criteria, calculations of means and measures of dispersion and other).

Table 1: Research hypotheses and related research methods

Preposition	Data collection	Data analysis
H1: *There are significant differences between IT managers' perception in Slovenian and Croatian companies on importance of HR effective factors.*	Self-administered online questionnaire.	Mann – Whitney U test
H2: Human resource management has significant positive impact on knowledge management in ICT companies.	Self-administered online questionnaire.	PLS
H3: Information solutions are indirectly associated with knowledge management processes.	Self-administered online questionnaire.	PLS

Outcomes:

- Accept/reject proposed hypothesis and define differences between literature and practice in ICT companies.
- Assessment of conceptual model with strong alignment to the needs and actual situation in companies.
- Testing and developing the empirical model regarding HR and KM after analysis of survey data.
- Detecting the most important effective factors for ICT companies in Slovenia and Croatia.
- Detecting the knowledge management issues from IT managers' perspective.

Statistical package for data analysis SPSS 15.0 for Windows was used for data processing, which supports graphical and tabular presentation of data and is one of the most widely used programs for data analysis. For Partial Least Square analysis, the SmartPLS software package was used. Data analysis and results presentation is given in Chapter 5.

1.3. Organization of the dissertation

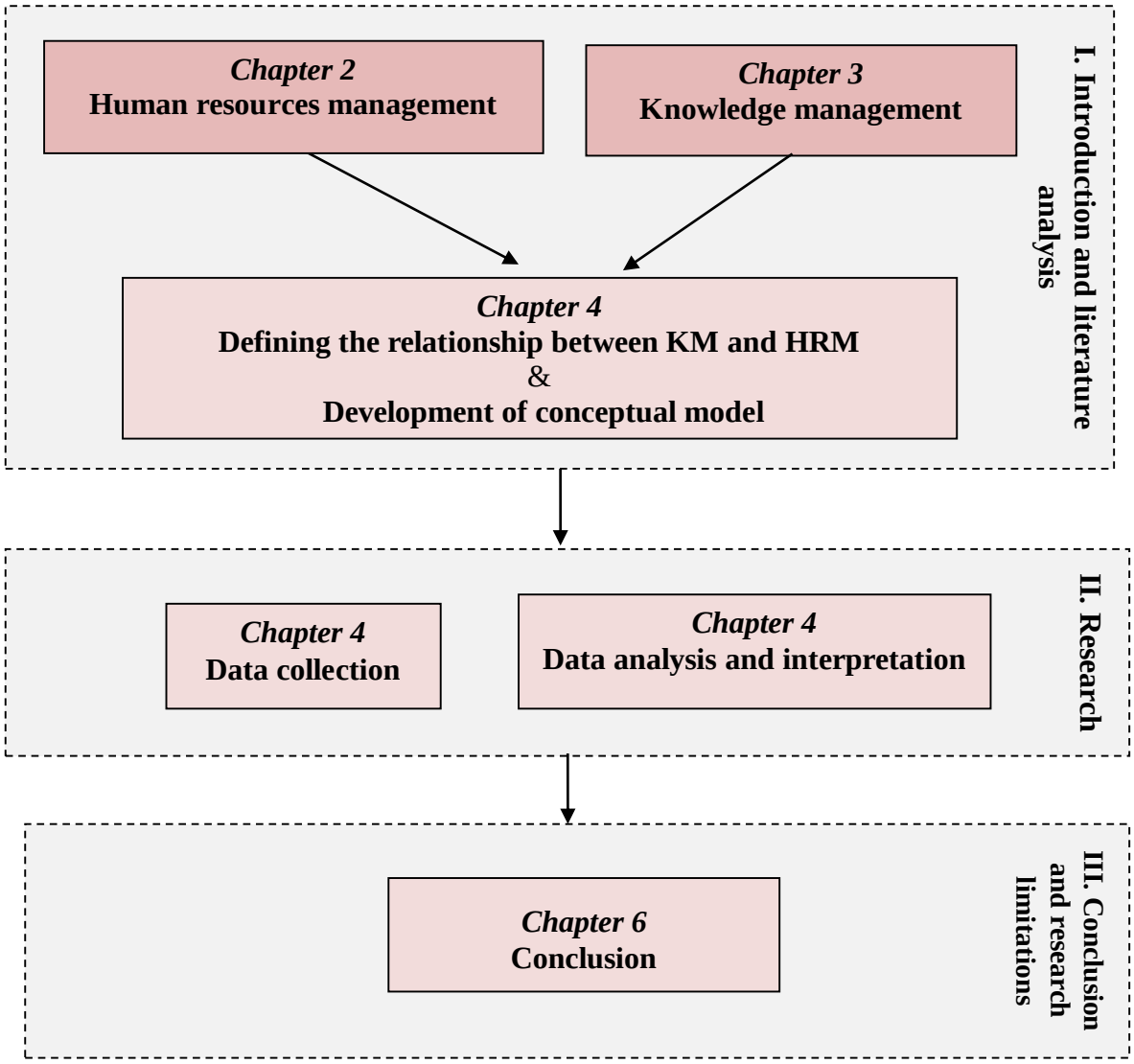
This thesis is divided into three major parts and seven chapters. Chapters are shown in Figure 3 and are explained below.

I. Introduction and literature analysis

Chapter 1: Introduction

This chapter presents the background and overall content of the whole thesis. It introduces the subject matter, research problem and the justification of the research. Research objectives and hypothesis objectives are specified along with an appropriate research methodology.

Figure 3: Path-diagram for this thesis



Chapter 2: Human resource management

Functions and characteristics of human resource management and history development are presented in this chapter. 'Best fit' of HR functions are also defined which further serve as the basis for empirical research. Apart from HR practices, literature recognizes different factors which have influence on HR and companies' productivity. This chapter provides the list of all HRM practices found in the literature. These practices were analysed and new classification and categorization into two effective factors (Work design structures and Encouraging and opportunity structures) is presented. This is also one of the major scientific contributions of this thesis.

Chapter 3: Knowledge management

This chapter presents literature analysis on concepts of knowledge, knowledge management development and knowledge management solutions. In addition, emphasis is placed on information systems and the infrastructure used for managing knowledge.

Chapter 4: Relationship between HRM and KM

In this thesis, HRM is observed from two aspects: (1) *functions of HRM* and (2) *effective factors*. Through this chapter, mutual impacts between knowledge management and human resource management are explained based on theoretical findings in literature. First, the findings regarding HRM and KM are presented, based on which the conceptual model of the relationship is formed, depicted and explained. At the end of the chapter, a detailed overview of previous studies (empirical and theoretical) in the field of HRM and KM is shown in Table 11.

II. Research

Chapter 5: Empirical research and data analysis

This chapter discusses the research methodology and methods of data collection and analysis techniques employed. It consists of two parts: data collection and data analysis. Important issues are addressed associated with the design of the questionnaire instrument, measurement scales, questionnaire administration and validation. This chapter presents a detailed statistical analysis of the data collected from the pilot and the main study. The critical benefits and influences of human resources on knowledge management are explored in the presentation of research results, Results of data analysis of statistical tests are reported and compared with some previous work. In addition, the main contribution of this thesis is presented in this chapter.

III. Conclusion and results presentation

Chapter 7: Conclusion

This chapter presents the conclusions and recommendations for practice and further research, which emanate from the findings.

2 HUMAN RESOURCES MANAGEMENT

Human resources are key components in every organization representing total knowledge, talent, attitude, creative ability, aptitude and belief of an individual involved in affairs of organization (Dhamija, 2012). Management and human resources development should be one of the main components of long-term strategy of each company. Human resources management includes decisions which influence the success of business, all with aim of achieving long-term goals (Noe et al., 2000) which significantly affect company's ability to respond appropriately to challenges of competition (Treven, 1998). Above all, HRM should be directed to achievement of motivation and satisfaction of employees and then to productivity of companies and end-user satisfaction (Marušić, 2006). Human resources management is explored in different industries and companies through which various authors have defined a range of classification and functions of HR management.

In this chapter, functions and characteristics of human resource management are presented. Also 'best fit' of HR functions are defined which will later serve as the basis for empirical research. Besides HR practices, literature recognizes different factors which have influence on HR and companies productivity. These factors are analyzed in this chapter and the new classification and categorization is presented below.

2.1 Theoretical development of Human Resource Management

Globalization leads to 'the circulation of people, goods and information, thereby linking regions and affecting interaction' (Lončar, 2005). In fact, the image of the world is transformed in terms of economic, social, technological and political changes. In the knowledge society, traditional economic resources like land, labor and capital have been replaced by knowledge, where the emphasis is set on education, research and innovation. Given that humans are *the only creative element of every organization* (Bahtijarević-Šiber, 1999, p. 12) and human potentials are impossible to copy, it is very important to recognize the concept of human resources, which admits a superior intellectual ability and power of speech articulation of company's resources.

The expression 'the human resources' is, according to some critics, humiliating for people, because people are matched with the object of management and it states that 'resources' are more important than people (Micunovic 2012). In this thesis, the phrase 'human resources and human resources management' is used. Human resource management can be explored from four aspects (Bahtijarević-Šiber, 1999, p. 33):

- *Scientific discipline*: as an area of research and organization of knowledge aimed at understanding the prediction, changing development of human behavior and potential in social institutions.
- *Managerial function* (also known as *staffing*) is reflected in functions of a manager in employing people with skills, motivating and educating them in order to achieve organizational goals.
- *Business function in company* whose goal is to combine activities and tasks related to employees, their recruitment, selection, training and other activities aimed at employee development.
- *Management philosophy* perceives employees as the most important resource and potential and as key strategic and competitive advantage

HRM can also be seen as part of a wider and longer debate about the nature of management in general and the management of employees in particular (Beardwell, Claydon, & Holden, 2007, p. 38). Human capital 'is creative application of knowledge in every creative activity (Vujic, 2005, p. 46). It is defined through qualities, knowledge, skills, creativity, experience, motivation and business culture, human relations and cooperation with business partners.' Wright, McMahan and McWilliams (P. Wright M., McMahan, & McWilliams, 1993, p. 6) define human resources as a pool of human capital which is controlled by the company and is in direct employment and relationship with the company's management. They also state that there are two aspects of human resources. First aspect focuses on knowledge, skills and abilities (KSA) of individuals who form the organization, while the second aspect relates to characteristics of individuals, which don't bring value to the company unless they are expressed through the workers' behaviour. In fact, both approaches are very important in understanding the interaction between workers' competencies and their behaviour. Accordingly, the KSA is necessary, but not sufficient, in lining employee's behaviour with corporate objectives. Employee's behaviour is a direct way of achieving company's strategy; however, employees must have competencies, which are necessary in order to show certain behaviours.

One of the most comprehensive definitions states that HRM involves 'a series of interconnected activities and management tasks aimed at ensuring an adequate number and structure of employees, their knowledge, skills, interests, motivations and behaviours

necessary to accomplish the actual, development and strategic objectives of the organization' (Bahtijarević-Šiber, 1999). Throughout the literature, HRM is defined and analysed from different aspects. Definitions of various authors on human resource management are presented below:

- Human resource management involves all management decisions and actions that affect the relationship between the organization and employee - its human resource (Beer, Spector, Lawrence, Mills, & Walton, 1999).
- A strategic, coherent and comprehensive approach to management and development of the organization's human resources in which every aspect of that process is wholly integrated within the overall management of the organization. HRM is essentially an ideology (M. Armstrong 1992).
- Perhaps it is best to regard HRM simply as notion of how people can best be managed in the interests of the organization (M. Armstrong 1994).
- A diverse body of thought and practice, loosely unified by a concern to integrate the management of personnel more closely with the core management activity of the organizations (Goss 1994).
- HRM is a discourse and technology of power that aims to resolve the gap inherent in the contract of employment between the capacity to work and its exercise and, thereby, organize individual workers into a collective, productive power or force (Townley 1994).
- HRM is a distinctive approach to employment management, which seeks to achieve competitive advantage through the strategic management of a highly committed and capable workforce, using an integrated array of cultural, structural and personnel techniques (J. Storey, 1995).
- Human resource management is defined as the productive use of people in achieving the organization's strategic business objectives (J. Storey, 1995).
- Concept of human resource management has a built-in management and human resource development issue in the context of strategic management and reflux to the strategic concept (Bahtijarević-Šiber, 1999).
- Human resource management is an approach to employment management that seeks to achieve competitive advantage through the strategic development of a capable and motivated workforce, using an integrated array of generic human resource management techniques (Ehrnrooth, 2002).
- HRM is a process of attracting, developing and maintaining a talented and energetic workforce to support organizational mission, objectives and strategies (Venkateshwara, 2006).
- Human resource management includes embedding of particular notions as the dominant, prescriptive perspective for advanced organizational policies and practices related to the management of employment (Sheldon, Sun, & Sanders, 2014).

Various definitions by different authors and experts in the field of human resource management are presented, but they all have in common that HRM is nothing less than dealing with people and their needs, attitudes and knowledge. People are valuable for the organization and vice versa. Each has effect on the other and through combined activities companies can achieve competitive advantage and growth. Management values are one of the important variables affecting certain HRM practices according to Osterman (2004). Evidence from the United Kingdom shows management tends to be pragmatic, opportunistic and fragmented in the way the managers manage their employees Osterman (2004). By improving all aspects HRM function and concentrating on some of the earlier

recognized weaker areas, management can be able to discover weakness and build on strengths. (Gibb, 2001) assumes that the employees are the 'end users'. That does not mean that the real end users who are usually 'customers' will necessarily be satisfied. In addition, he concluded that reflection upon what employees have to say is relevant and useful when considering HRM in companies.

For a better understanding HRM phenomenon has to be observed from three viewpoints (Beardwell et al., 2007): *strategy*, *style* and *outcome*.

HRM as Strategy

Strategy is seen as one of the touchstones of HRM's viability (Beardwell et al., 2007). As mentioned above, HRM involves 'a series of interconnected activities and management tasks aimed, among others, at ensuring an adequate number and structure of employees to accomplish strategic objectives of the organization' (Bahtijarević-Šiber, 1999).

HRM Style: *hard* and *soft* HRM

One of the most discussed styles of HRM are hard and soft. Authors, mostly British, have explored differences between the Harvard commitment concept of HRM (hard) and the strategic HRM concept (soft) (Edgar & Geare, 2005). *Hard* HRM embodies elements in employment relations (e.g low wages, minimal training, close supervision and monitoring) and puts the emphasis on employee's compliance, quantitative output, managers, task and the development of the organization (Beardwell et al., 2007; Ihuah, 2014; Ivo, 2006). Hard HRM has the harsher understanding and interpretation of strategies associated to cost minimization (Ihuah, 2014) and is mostly concerned with the effective utilization of employees (Edgar & Geare, 2005; Guest, 1997). In contrast, the *soft* HRM favours flexibility, negotiation, performance, quality, recognition of environments and rights in employment relations (Ivo, 2006). It is more strategic, long-term oriented (Analoui, 1999) and fulfills employees' needs through the use of *appropriate* HRM practices (Guest, 1997).

In concordance with communication, motivation and leadership (J. Storey, 1987), soft HRM can result in commitment to the organization and improve its performance. It can be viewed as 'developmental humanism' (Legge, 2005) where the individual is integrated into a work process that values trust, commitment and communication. Table 2 presents the characteristics of hard and soft HRM for HRM functions and effective factors.

Table 2**:** Characteristics of hard and soft HRM

HRM functions and effective factors	Hard HRM	Soft HRM
Recruitment	Based on ability to do the job or trained to do it	Based on attitude and integration with team members
Job description	Narrow scope but in-depth defined	Multi – skilling and innovative
Work Design	Accomplishing the task through best known ways	Reviewing and redesigning job in order to upgrade the efficiency of employees
Culture (workplace)	Hierarchical	Shared culture

Career development	No possibility	Assist in planning carrier paths to provide opportunity to develop employees in the organization
Employee attitudes	Task – focused: to do the given job and nothing else.	People focused. Employees are considered as an valuable resource

Source: (Beardwell et al., 2007; Edgar & Geare, 2005; Ihuah, 2014; Ivo, 2006; Shabnam, 2014)

Issues were pointed out about the possibility whether soft and hard HRM can jointly achieve more or less benefits for the organization. Beardwell et al., (2007), suggested that the *hard* HRM can contain elements of soft approach and soft can deliver hard outputs. This can be summarized through possibility that an element of hard and soft approaches can exist concurrently in any particular strategy of HRM of an organization (Ihuah, 2014). Gratton, et. al., (1999) proved a mixture of both hard and soft HRM in eight different organizations and showed that the borders between the two were not precisely visible.

HRM as an outcome

HRM as an outcome is more concerned with configurations and actions in organizations, which can result with competitive advantage. McDuffie (2000) analysed HR techniques in car industry. In his analysis, he argued that when HRM practices are used together, rather than only for specific effect, superior performance can be achieved. Three factors were noted: *buffers, work system* (work arrangements that complemented flexibility) and *HRM policies*. Another analysis of the relationship between the HR system, outcome measures (e.g. financial performance and HR data on turnover and absence) and the match between HR and competitive strategy in US-owned companies employing more than 100 employees was done by Huselid (1995). Results showed that investments in high performance work practices are associated with a downscale in labour turnover, higher sales performance, improved profitability and higher share valuations. Literature in the field of human resources shows that HRM practices are associated with positive operational outcomes (employee's productivity and company's flexibility) and quality performance outcomes (Ahmad & Schroeder, 2003; P.-L. Chang & Chen, 2002; M. Z. Iqbal, Arif, & Abbas, 2011). Wright and McMahan (1992), drawing on previous research from (Barne, 1991) and his resource-based theory of the company, argue that human resources may be used as a source of sustained competitive advantage when main requirements are met. Firstly, the HR must add value to the company's production processes; secondly, the skills that company demands have to be extraordinary and cannot be easily imitated.

2.2 HRM history development

Human resource management, as a specialized function, appeared at the end of the 19th century. Adam Smith in the 18th century emphasized the importance of individual learning, for the purpose of not only individual wealth and property, but also social wealth. (Bahtijarević-Šiber, 1999, pp. 43–46). One of the first designers of somewhat 'HR function' was Wilson Taylor in 1885. However, it was focused on increasing productivity and not so much on care for employees (Vujić, 2005, pp. 52–54).

One of the first indications of HRM is found in the early 1930s within employment practices associated with welfare capitalist employers in the United States. Welfare capitalists believed that the company, rather than third-party institutions such as the state or trade unions, should provide security and welfare of workers. They often paid efficiency wages, introduced health care coverage, pension plans, provided lay-off pay, conducted regular surveys of employees' opinion, and desired to secure employee commitment through promotion of strong centralized corporate cultures and long-term employment. Such model, thanks to welfare capitalist, was a pioneer of the today known HRM (Beardwell et al., 2007).

The origin of 'real deal' of human resource management starts in the 1950s, when Drucker and McGregor emphasized the need for visionary goal-directed leadership and management of business integration (Armstrong & Armstrong, 2009). Maslow, Argyris and Herzberg succeeded in this in the 'behavioural science movement' in the 1960s. Behavioural science movement emphasized the 'value' aspect of human resources in companies and advocated better quality of working life. Afterwards the 'organizational development movement' initiated by Bennis in the 1970s was formed. Theory of human relations is based on research done by Elton Mayo and his associates. Their study emphasizes the importance of attitudes, informal relationships and leadership style. They were the first to point out the importance of manager trainings to work with employees in order to maximize production performance. Over the years, the relationship with employees has been changing whereby the emphasis was placed on investments in their development.

Presence of human resource management was established in the American business system at the beginning of the 1980s and began to gain external recognition by academics and practitioners (Beardwell et al., 2007). In 1980 the USA economy was challenged by overseas competitors, mostly Japan. Emphasize was being placed on two major issues: 'the productivity of the American worker', compared with the Japanese worker, 'and the declining rate of innovation in American industries' (Devanna et al., 1984 from (Beardwell et al., 2007). The situation in the United Kingdom in the 1980s was similar to the situation in the US - business climate became conducive to changes in the employment relationship, which was partly driven by economic pressure in the form of increased product market competition and recession in the early part of the decade and introduction of new technology. In addition, the important element was the the government's desire to reform and reshape the conventional model of industrial relations, which provided a rationale for development of more employer-oriented employment policies on the part of management (Beardwell et al., 2007). As industry influenced the political changes, growth of technology, demand for economy restructuring and rapid decline in old industries made impact on the scientific literature. As a consequence, concepts of employee commitment and 'empowerment' became another string in the ongoing debate about management practice and HRM. Flamholtz (1974) developed the 'human resource

accounting' (HRA) theory, which found its supporters in the 1980s and was considered to be the origin of HRM as a defined school of thought. Research on HRM, as a new management philosophy began in the 1980s. One of the first studies of HRM was *The Warwick study* in late 1980s. This research program included 15 organizations and 350 in-depth interviews. All respondents were ranged from senior executives to shop-floor employees, although most attention was focused on key line managers. Ten years later research was done on Britain's major companies, *The Loughborough study,* showing that HRM is a resilient phenomenon (J. Storey, 1995).

Considerable controversy as to the origin, characteristics and philosophy of HRM and its capacity to influence the nature of the employment relationship exists in the literature. Beardwell (2007) extracted four predominant approaches, which characterized the debate surrounding HRM:

- HRM is no more than a renaming of basic personnel functions, which does little that is different from the traditional practice of personnel management.
- HRM represents a fusion of personnel management and industrial relations that is managerially focused and derives from a managerial agenda.
- HRM represents a resource-based conception of the employment relationship, some elements of which incorporate a developmental role for the individual employee and some elements of cost minimization.
- HRM can be viewed as part of the strategic managerial function in development of business policy, in which it plays both a determining and contributory role.

Various theories and researchers have been exploring the similarities or differences between HRM and personnel management through above-mentioned approaches. For purpose of this thesis, HRM is explored from a HR core business perspective, which is to develop employees in accordance to business strategy, select and hire people, train them, evaluate their performance, reward and create a culture of learning.

Human resource management is affected by many factors some of which are internal in nature while others are external. They differ because internal management can have influence, while external factors are beyond the will of management. Hence, the management can adjust and follow the external factors but cannot change them (Henaus, 2012).

External factors are primarily *economic system, institutional conditions, technology, culture, society and the labour market*. Economic system applies to all inter-relations of economic agents. It determines access to all necessary resources, among which are also human resources with their rights (Bahtijarević-Šiber, 1999, pp. 77–78). Other important external factors affecting HRM are institutional conditions that represent the laws by which important aspects of a business are determined. They are divided into political, legal, ethical and socio-cultural (Načinović, 2012). Culture of the society affects human resource management, which affects the business of the companies and consequently the behaviour and the relationships between employers and employees. Labour market is an external factor associated with recruitment and selection of employees, which sets the price of labour. If the labour supply is high, the price falls and vice versa (Bahtijarević-Šiber, 1999, pp. 79–84).

Internal factors affecting human resource management are *company size, management style, type of activity the company is engaged in, life cycle, culture, business strategy*, etc. Company size is an important factor in human resource management. HRM practices in

small and medium companies are quantitatively and qualitatively different from the practices in large companies. One of the major determinants of a number of human resource management practices in small and medium enterprises (SME) is the company's size i.e. the number of employees. The type of activity also has an effect because the more challenging the activities, the greater the need for advanced management of human resources.

Due to the fact that each company has its own life cycle and consequently passes through various stages of development, various activities and requirements are expected from HRM (Bahtijarević-Šiber, 1999, pp. 100–111). External factors that influence the companies, specifically IT companies, are technology and development. IT companies are, in contrast to other companies, more related to technological developments and must constantly uphold and continuously implement new technologies. Due to the technological uncertainty, this is becoming increasingly difficult.

2.3 HRM Functions

In today's business environment the success of a company depends mainly on the performance of their human resources (Lippert & Swiercz, 2005). Human resource management practices assist employees' motivation, commitment and improve their performance to the extent that human resources become difficult (impossible) to replace and therefore provide the organization with advantage over its competitors (M. Huselid, 1995). HRM includes decisions that affect the success of business, with the aim of achieving long-term company strategy (Noe et al., 2000). Human resource functions differ from industry to industry. This specific area of management has been explored throughout last few decades and various authors have defined the range of classification and functions of HR management.

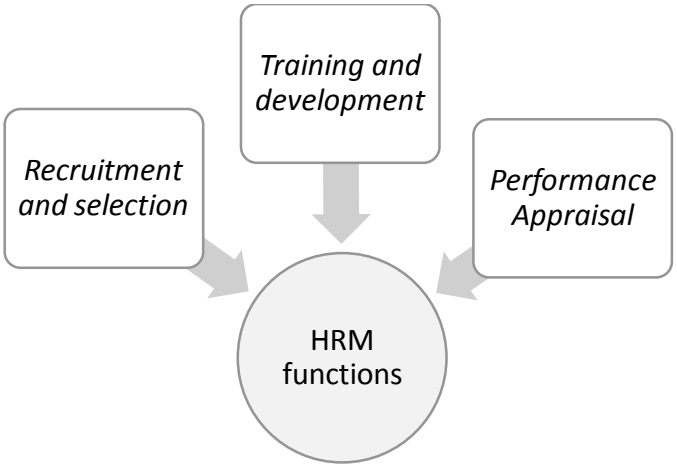
Exploratory analysis and an overview of the meaning of HRM in 104 empirical articles published in internationally refereed journals (1994 – 2003) was done by Boselie et al. (2005). Based on content analysis, their findings have revealed that the majority of studies define HRM in terms of HR practices or bundles of practices. There is no fixed list of generally applicable practices that defines HRM. Lepak et al. (2003) stated that there is a low level agreement regarding the most appropriate aggregation or categorization of HR practices. One of the reasons is the immense number of HR practices that organizations have to consider, whereas each is associated with many variations, meaning that the same HR practice can be used for vastly different purposes depending on the profile of the organization.

Human resources management has been explored in small, medium and large organizations, as well as in profit and non-profit, through which various authors have defined a range of classification and functions of HR management. According to Venkateshwara (2006), HRM includes seven practices as follows: human resources planning, systematic recruitment and selection, training and development, job analysis, performance appraisal, growth plans and strategies and managerial techniques such as continuous improvement, total quality management and benchmarking. Different HR practices like staffing, training and development, compensation systems and others have multiple effects and complement each other as a coherent system to improve companies' performance (Delery & Doty, 1996). Fombrun (1984) summed up "*generic*" HRM functions performed via different HRM practices in an organization:

- HRM policies: developing policies related to company's personnel management;
- Employment: defining recruitment and selection procedures for staffing needs;
- Development: developing strategies for training and development of employees;
- Performance: developing performance appraisal programs;
- Compensation: designing reward systems for the employees.

Taking into consideration that there is no universal prescription for HRM policies and practices and that everything is put into the organization's context, culture and its business strategy, it is important for every company to find the 'best fit'. For the purpose of this research the following HRM practices, derived from the 'best fit' (Armstrong, 2003), are researched (see Figure 4): *Recruitment and selection of employees; Training and development and Performance Appraisal*.

Figure 4: HRM functions analysed for purpose of this thesis



Source: adapted by Scarbrough (2003)

These three functions were presented by Scarbrough (2003) as important in shaping the flow of people and their impact on the development of innovations. Scarbrough also researched the role of KM in the innovation process. One of the important implications of KM in relation to the innovation is the emphasis placed on the role of HRM factors. Every HR function is presented in detail below.

2.3.1 Recruitment and selection of employees

As mentioned above, recruitment and selection of employees are observed as one of the major functions of HRM throughout this thesis. Recruitment and selection are processes through which an organization takes in new members. Recruitment involves attracting a pool of qualified applicants for the positions available and selection requires choosing from this pool the candidate whose qualifications match the job requirements most closely (Treven, 2001). The recruitment and selection of employees in companies are explained below and supported by examples and previous research findings. However, before recruitment process can be engaged, planning of HR is conducted.

Planning of human resources is an important task as it allows achievement of strategic objectives (Buntak, Drožđek, & Kovačić, 2013b, p. 213). It is a part of business planning, therefore, it follows companies' plans, from short to long-term and aims to assess future needs of the company (Bahtijarević-Šiber, 1999, pp. 180–1830). Human resources planning is important, however, many companies neglect its importance. Ignoring planning leads to inadequate HR structure and consequently shortcoming of skills, knowledge and abilities (Jaganjac, 2011). Accordingly, companies which fail to plan human resources have questionable future development and survival (Bahtijarević-Šiber, 1999, pp. 183–185). Furthermore, one of the problems that occurs in HR planning is that the plan is not in accordance with strategic plans (Jaganjac, 2011). Bahtijarević-Šiber (1999, p. 183) highlights several issues related to planning process which are necessary for the selection of adequate human resources:

- What number of people does the company need to achieve business goals?
- Which skills, knowledge, abilities and competencies must potential employees have in order to assist in achieving business plans?
- How to contact required human resource?
- How to familiarize current employees with future business requirements?

IT companies, in particular, stand out when it comes to planning. For them it is necessary to determine and plan employees' skills and abilities to be able to work with new technologies. Given that the introduction of new technology encompasses larger projects with large financial investments, it has to be in line with the strategic goals of the company. Planning of human resources includes job analysis, a study of methods and means of work and linkage with other jobs within the company. Through job analysis, skills and knowledge necessary to perform a particular job are determined. Furthermore, detailed information related to duties and responsibilities are defined (Richards, Škreblin Kirbiš, & Koričan, 2009, pp. 517–518). HR management should be familiar with tasks, responsibilities and individual workplaces and duties of each working station in order to effectively solve problems associated with them (Bahtijarević-Šiber, 1999, pp. 242–244).

To be able to perform a certain job, employee must first be familiar with the job, means and working conditions (Vujić, 2005, p. 111). Three main phases are distinguished in the process of job analysis (Vujić, 2005, p. 111):

- List of all jobs and their descriptions.
- Job analysis and their ranking.
- Job evaluation.

For example, in an IT company, for a job position of a programmer, a set of skills is mandatory, e.g. problem solving, independent learning, naming (relating the appointment variables used in code) and working with people (Sonmez, 2014). Given that the job analysis precedes the selection and recruitment, it has two important roles. First, it provides information about the job requirements, which can then be transferred to potential employees. Second, it establishes criteria for work performance and it leads to information according to which candidates will be selected (Šverko, 2012).

2.3.1.1 Employee recruitment process

Recruitment includes practices and activities carried out by the organization with the aim of identifying and attracting potential employees (Breaugh & Starke, 2000). Labour market is a mechanism through which human labour is bought and sold as a commodity. It constitutes systematic relationship that exists between workers and their working organizations, it presents the means by which labour demand (the number and type of available jobs) is matched with labour supply (the number and type of available workers) (Wilton, 2010). Due to the fact that human resources cannot be imitated, recruitment function distinguishes the company by differentiating company's employees from competitors (McMahan, Bell, & Virick, 1998).

Recruitment requires a lot attention because other functions and organizational units depend on it (Šverko, 2012, p. 47). Interest in the topic of employee recruitment has increased over the last years. In the first edition of the Handbook of Industrial and Organizational Psychology in 1976, less than one page of coverage was filled with the topic of employee recruitment (Breaugh & Starke, 2000). Nowadays articles are overflown with theory and practices of employee recruitment issues. Internet has proved to be immensely powerful tool for different services like HR planning, HR evaluation, HR rewards and HR recruitment (Horvat, Klačmer Čalopa, & Detelj, 2013). Recruitment activities are executed by organizations for following purposes (Barber, 1998):

- to define the target population for satisfying organization's personnel needs;
- to select labour market segments and geographic regions for conducting recruitment campaigns;

- to choose the medium for reaching the target population;
- to deliver messages for disseminating information through the selected medium;
- to prepare final offers for acquiring qualified applicants; and
- to create general policies and actions for managing the overall recruitment function.

Recruitment strategy is defined before obtaining new employees and must be in line with the business strategy. Questions that need answering when establishing the overall recruitment strategy are (Bahtijarević-Šiber, 1999, pp. 290–292):

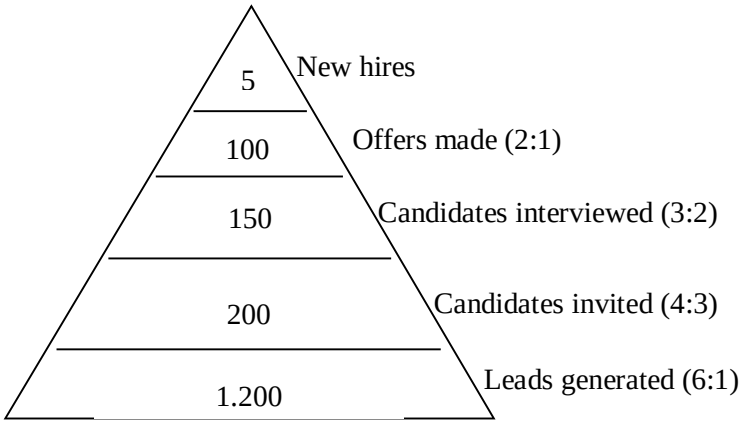
- What kind of people does the company need?
- How will they be recruited (within or outside the company)?
- Will employees adapt to business or business to employees?
- Whether to look for employees who are team players or individuals?
- How much will company invest in ensuring the necessary human resources?
- Which criteria and methods will be used during the recruitment and selection process?

Strategy defines what company is looking for in employees. Some companies are looking for individuals with general skills that are flexible and communicative which is typical for the IT industry where it is important for employees to constantly learn and improve their skills. Accordingly, the knowledge and skills required for a job are not in the foreground (Bahtijarević-Šiber, 1999, pp. 292–293). Given that there are candidates who do not have work experience, companies must define a set of procedures by which they can analyse the level and expertise of candidates. When candidates have work experience, the employer has an insight into past behaviour, but given that this is not always the case, companies are trying to predict the future behaviour of potential employees with certain methods (Šverko, 2012, p. 49). In the process of recruitment, ethic principles need to be taken in account. It is important to define roles and expectations so that potential employees can know what company expects from them and what they can expect from company. Companies require from employees added value and the employees expect fulfilment of certain interests. Furthermore, it is also important that the information presented from both parties is not false (Richards et al., 2009).

The process of recruitment usually begins with notification to management or human resources department about a vacancy. After that, several options are possible: checking if there is an employee in the company whose competencies meet the requirements or a new employee will be hired (Vujić, 2005, pp. 153–154).

In order to select a certain number of potential employees, who meet the requirements, a certain number of applicants needs to be ensured. Often this number is several times higher so that company can to choose the right employee. One way of estimating the number of applicants is ‘the recruitment yield pyramid’. It is based on previous experience, which shows that only one of six applicants comes to the selection process. Figre 5 shows the ratio of applicants, leads and interviewed candidates and those who have received a job offer and those who have accepted it.

Figure 5: Recruitment yield pyramid



Source: (Bahtijarević-Šiber, 1999, p. 290)

These ratios vary from company to company and the above Figure shows one possible example of the recruitment yield pyramid (Bahtijarević-Šiber, 1999, pp. 290–292).

Internal and external recruitments sources

As mentioned earlier, the company can search for potential employees inside or outside the company. Within companies, the management seeks employees who have competencies for vacancies. Through external sources candidates are obtained from labour market, educational institutions and other businesses/organizations (Vujić, 2005, p. 155). Each of the recruitment sources has its advantages and disadvantages. Internal sources are cheaper and faster and have positive impact on employees' motivation and development. Some of the disadvantages are reduced innovation, potential conflicts and less chance of finding the right candidates (Bahtijarević-Šiber, 1999, pp. 302–317). On the other hand, external sources allow the introduction of new knowledge into the company, changes to existing modes, less internal conflict, faster change, new ideas and a greater choice of suitable candidates. Disadvantages include longer time of selection of a candidate with specific competencies and more expensive with higher risk (Vujić, 2005, pp. 155–156). Most common external recruitment sources and methods are (Bahtijarević-Šiber, 1999, pp. 302–317): advertising, direct application, recommendations of employees, employment agencies and educational institutions. One of the interesting sources are the educational institutions, colleges, and universities. The objective is to obtain excellent students with the help of professors (Žganec & Bićanić, 2008).

E-recruitment

Organizations are facing a day-to-day challenge of strong competition for skilled employees while on the other hand they have to cope with decrease in physical, manpower and financial resources for recruitment process (Dileep & Srota, 2012). One of the answers to this problem is becoming recognized in omnipresence and increased availability of ICT, which enabled new worldwide trends for HR functions - online recruitment also known as e-recruitment (Bussler & Davis, 2001). E-recruitment, thanks to online technologies, has evolved into a sophisticated interactive engine that automates and virtualizes all aspects of the hiring process (Dysart, 2000) and has grown rapidly over the past ten years. As (Cober & Brown, 2006) noted, it is now widely used by both recruiters and job seekers across the world. The advantage of acquiring employees online is emphasized through the ability of registering candidates 24 hours a day and 7 days a

week. Furthermore, it allows candidates to fill in the application whenever it suits them (Torres-Coronas & Arias-Oliva, 2009).

The Society for Human Resource Management (2008) has published a report on workplace trends during the 2007-2008 period, which indicates the following:

- A higher demand for skilled workers, e-recruiting tools and mobility of the workforce in today's economy.
- Organizations have found themselves in high competition for a shrinking supply of workers.
- Greater prevalence of HR outsourcing and increased use of HR technology and HR professionals are demanding increased customization of products and services from outsourcing partners.
- An increase in Business Process Outsourcing (BPO) including recruiting and great increase of technology used in recruitment practice.

One of the widespread models of e-recruitment is through company's own websites which is more popular among larger companies and the other one is hosting own requirements on other websites (Bahtijarević-Šiber, 1999, p. 510). That is why there are more specialized websites where job seekers can post their resumes and companies their vacancies.

Various IT applications have been developed in order to help the company and the job seeker in fulfilling their goals. To distinguish employees with low-quality bio-data from the ones that the company needs, the pre-employment testing was introduced. These tools test the employment assessments online and filter the applicants (Sing, 2006). Applicant Tracking Systems (ATS) i.e. web-based ATS makes it easier for the organization to keep track of their job applications and helps them hire the right people. The system is easy-to-use, cost effective and tracks applicants' status as they move through workflow and allows users to retrieve all applicants at a certain stage, thus giving them control over all applicants at all times (Gara 2001). Integrating Human Resource service delivery models and operating HR systems through technology are adding value to the company through time and money saving (Dileep & Srota, 2012). A person's decision to apply for a specific job opening could be affected by self-examining to see if their characteristics fit the observed organizational characteristics (Cable & Judge, 1994). Companies obtain information about their prospective employees and job seekers use available information for developing perception about organizations (Horvat et al., 2013).

Previous research of online available recruitment information has shown that among 200 Croatian companies, only 63.5% have a webpage regarding employment. Also only 26% of them offer an online application. Important element for companies, in order to ensure positive communication with potential employees, is the availability of their webpage in other languages though only 70% of Croatian top companies offer a page in English (Horvat & Klačmer Čalopa, 2012).

2.3.1.2 Selection of employees

It is necessary to carefully select employees in order to minimize problems associated with management (Frajzman, 2007, p. 5). In addition, all companies should keep in mind that bad employees' work does not only have impact on their own work but also on other employees where they can interfere, demotivate, etc. Therefore, wrong choice can have a number of adverse effects (Bahtijarević-Šiber, 1999, pp. 331–332). Frajzman (2007) states that 95% of the success depends on the selected employees.

Many methods of selection have been developed, whereby distinction is made between conventional and unconventional (Cicin-Sain, p. 148). Choice of method depends on the workplace, employment policy, expertise and other factors. Considering that every job has its own responsibilities, it is necessary to determine the competencies of employees that are required. Defined competencies help in choosing selection methods (Bartolić & Prelas Kovačević, 2011).

2.3.2 Employee training and development

Education and employee development is a very important activity when it comes to human resources development. Companies that want to maintain a competitive edge are aware of the fact that continuous education is a requirement, regardless of the economic crisis (Pološki Vokić & Naoulo Bego, 2012). Consequently, companies invest money, time and energy in education of their employees. Theodore Schultz (Singer & Šandrk Nukić, 2013) believes that investments in human resources are one of the most important alternatives when it comes to investing in tangible elements in a company. Such investments bring several times larger effects, unlike other investments (Singer & Šandrk Nukić, 2013). ICT companies have to invest in their people and their knowledge in order to respond to the rapid and complex changes in the industry (Perić & Radić, 2013).

Economic growth of a country will be higher when human resources are more adaptable (Bušelić, 2007, p. 29). Countries with economies that employ knowledge and human capital for economic growth are considered as knowledge-based economies. In such societies knowledge management and innovation contribute to competitive advantage (Karaman Aksentijević, Ježić, & Đurić, 2008). Furthermore, the most advanced countries have a development strategy based on knowledge industry and investment in knowledge. For example, in the United States the priority of development strategy is the increase of education quality (Jurčević, 2007).

Enriching knowledge of human resources contributes to the increase of business excellence. Knowledge allows businesses to act differently in relation to its competitors. Vujic (2005, pp. 221–222) states that none of the investments can pay off so quickly as knowledge.

However, employee education must be aligned with companies' strategic goals in order to meet customer demands and requirements of stakeholders (Bušelić, 2007). A lot of capital is invested in HR education for the following reasons (Bahtijarević-Šiber, 1999, p. 718):

- Changes in technology require new knowledge because old knowledge is not enough.
- Increase of uncertainty and complexity of the business environment
- Modern business.

For ICT companies it is important to constantly introduce new technologies and for this reason IT companies must invest in education. Business environment is becoming more complex, uncertain and requires different and new sets of knowledge (Bahtijarević-Šiber, 1999, p. 718). New knowledge leads to new ideas and good, quality ideas improve marketing, management and shorten the time of business process. Furthermore, innovative ideas are needed for quick problem resolving (Jambrek & Penić, 2008). Even though education is necessary for every employee, it is not feasible for everyone due to financial reasons. Therefore, management needs to assess who should receive education

(Šverko, 2012). Organizations need to create conditions in which it is possible to identify employees' potential and the need for education in order to develop skills (Žganec & Bićanić, 2008).

Croatian Information Technology Society enables Croatian IT companies' to exchange experience and knowledge through forums and various associations. Employees can participate in various forums and thus gain new knowledge. Some forums and associations are: Open computer systems and the Internet (HrOpen), Oracle Technology (HrOUG), SAP Solutions and Linux technologies (HULK).

According to a survey from 2001 done by Pološki Vokić and Vidović, (2007) in large Croatian companies the percentage of employees education amounted to 35.96% and 34.28% in 2005. Education costs have increased in the period from 2001 to 2005 from 1770.00 to 2119.69 Croatian Kuna[1] (HRK). Average number of education hours per employee decreased from 19 hours to 14 hours. Decrease of average number of education hours as well as decline in percentage of educated employees, shows a negative shift in overall employee education in the period of 2001-2005. When comparing these data with the EU, it shows that Croatia is falling behind. Percentage of additional education of employees in the EU in 2001 was accounted for 46.6% (Pološki Vokić & Vidović, 2007). From 2007 to 2011, investments have fallen in the area of IT education and training for about 25%. This was caused by the recession. However, in 2012 there was a slight recovery (Frković et al., 2012, p. 25). Through an empirical study of 110 selected countries, Karaman Aksentijević & Ježić compared the development of HR in Slovenia and Croatia. Croatia needs to invest additional resources into the development of human resources in order to increase labour productivity which in the end can result in reduction of developmental delays (Karaman Aksentijević & Ježić, 2009). Results, among others, showed that Croatia lags behind Slovenia in terms of human resources development (HDI[2] 1988-2006 for is Slovenia 0.5350 and for Croatia 0.3827) and research capacity development. Authors also showed that Slovenia and other neighbouring countries (Czech Republic, Hungary, Estonia, and Poland...) use their technological and innovation capacities insufficiently, and this is the reason why they lag behind the average of the medium-developed countries, and even more behind the average of highly developed countries. Slovenia and Croatia have to make a shift from the scientific and educational policy, primarily focused on reproduction of knowledge, towards a higher degree of scientific and professional research.

2.3.2.1 Education process

Education is increasingly shifting from educational institutions to private organizations, which have developed different programs (Radovanovic, Savić, & Marković, 2012). When discussing about education, several concepts emerge, namely (Bahtijarević-Šiber, 1999, pp. 721–722): learning, training, education and development. Learning is acquiring new knowledge and skills through education. Education means to acquire knowledge, skills and abilities to act independently in certain situations and creates basis for further development. Development is similar to education, but the difference is reflected in the

[1] 1€ = cca. 7,59 HRK

[2] Human Development Index is calculated as a combined index of three indicators: 1. the expected life span; 2. purchasing power of the population; 3. education of the population measured by adult literacy rate and the combined indicator of the share of respective population groups in primary, secondary and tertiary education.

fact that education focuses on the future. Training is acquiring new knowledge and skills to do the job. Some companies implement e-trainings (Torres-Coronas & Arias-Oliva, 2009, p. 630). Those represent programs and training activities supported through web technologies. Education of human resources provides a number of effects in the company. Some of them are (Bahtijarević-Šiber, 1999, p. 724)

- Knowledge increase on foreign competitors.
- Provide knowledge and skills required for employees to work with new technologies.
- Ensure teamwork.
- Provide an organizational culture that focuses on innovation.
- Ensure mutual acceptance and cooperation among employees.

Companies are becoming more decentralized and moving from individual work to group work (Jurčević, 2007). It is necessary to ensure organizational culture in which innovation and creativity are extremely important, so they can be encouraged. It is also important that employees accept each other and cooperate in order to share knowledge. Research done by Bloom, Reenen, (2010) suggests that in 1998, half of Britain's organizations practiced teamwork and in 2004 collaboration increased from 31% to 70%. Education of human resources consists of a series of stages that need to be well implemented because the result depends on them. Goals of education include gaining competitive advantage, increasing work performance, solving problems in the company, directing new employees and meeting individual needs for growth and development (Bahtijarević-Šiber, 1999, pp. 737–741).

2.3.2.2 Methods and techniques of education

Companies apply numerous methods in education of their employees. The choice depends on objectives of the training program (Bahtijarević-Šiber, 1999; Radovanovic et al., 2012; Šverko, 2012): education methods used in the workplace, outside the workplace, formal and non-formal learning.

Formal education appears in the mainstream educational system and it is fixed by special legislation. Another form of education is non-formal education that takes place outside the regular school system (Radovanovic et al., 2012). Non-formal education is not compulsory but people voluntarily decide on it (Kuka, 2012). It extends the knowledge gained through formal education. Some forms of non-formal education are: seminars, conferences, project work, lectures, volunteer work, etc. (Kuka, 2012). According to the UNESCO definition, non-formal education is any activity related to training, which can take place within the educational institution or another institution. Non-formal education can vary in terms of duration and every person that meets the criteria of the training can participate (UNESCO, 2006, p. 1).

Because companies are spending a lot of money on educating employees, various training methods have been developed. For ICT companies the most important training methods are: individual instruction or training at work, job rotation, internships and mentoring (Šverko, 2012).

Apart from the ‘on the job’ method, numerous ‘off the job’ methods were developed, some of which are: lectures, seminars, audio-visual techniques, programmed learning, conferencing, interactive video, etc. (Bahtijarević-Šiber, 1999, pp. 749–753). ICT companies mostly practice conferences, seminars, exhibitions and training courses (Perić

& Radić, 2013). All have pros and cons, but in the end, it all depends on the company and the goals that need to be achieved. IT companies require various certificates from their employees. The nature of the certificate depends on the duration of the course and in the end applicants need to pass an exam. Electronic learning (e-learning) is specific for IT companies (Šverko, 2012). This is a newer form of education and is based on modern technologies.

To conclude, education plays a major role in ICT companies as well as in other industries. Employees must continuously update and expand their knowledge, which is forced by a fast development of technology. However, opportunities for education in the IT industry are many. For example, one of them is EUCIP (European Certification of Informatics Professionals) and European program certification of IT professionals. The program allows developing knowledge in the field of IT, lifelong learning and enhancement of certified experts (Croatian Information Technology Society, p. 3).

2.3.3 Performance appraisal

Performance appraisal is continuous activity for evaluating employee work. Successful implementation of these activities contributes to the improvement of the whole business system. Human resources management system enables communication between management and employees in both directions. If there is no feedback from the manager, the employee may express dissatisfaction and cause conflict (Vujić, 2005). Assessment of work performance will not fulfill its purpose if there is no appropriate collaboration among employees, documentation with updated data and if employees do not receive recognition for achieved good results (Pfeifer, 2008, p. 4).

One goal of performance management is to gain information necessary for decision-making related to employee remuneration. Furthermore, tracking performance allows planning of career development which is in the interest of the company and individual employees (Bahtijarević-Šiber, 1999, pp. 507–509). Performance assessment results in three categories of workers' performance (Tuan, 2011). First, evaluation of employee's abilities and their personal characteristics, the employees' behaviour and finally, the specific job performance. This is necessary for accurate evaluation in order to develop a remuneration system based on the performance of human resource. (Tuan, 2011). There are three main stages of performance appraisal (Bahtijarević-Šiber, 1999, p. 510):

- Determination of work and criteria: this is part of job analysis.
- Assessment: done by work monitoring and evaluation
- Providing feedback: manager plays an important role because at this stage it is necessary to encourage and guide employees in accordance with the evaluation of work performance.

In assessing it is important to note that not all employees have the same ethical principles, temperament, abilities, skills and knowledge (Buntak, Drožđek, & Kovačić, 2013a). Yahoo has introduced a method of forced distribution of performance appraisal and Microsoft removed it. This means that the manager evaluates each employee according to the same criteria. This grading scale is suitable in achieving a competitive spirit among employees, but not for teamwork.

In her research on large companies in Croatia in 2001 Pološki Vokić (2004) showed that performance appraisal in Croatian companies is below the level which is significant for contemporary business relationships. Half (51%) of large Croatian companies monitor

job performance for 40.30% of total employees, while job performance is monitored for only 37% of managers. The question is how are managers assessed and remunerated if there is no performance appraisal. Another study conducted in 2005, also in large Croatian companies with more than 500 employees, shows that the percentage of companies conducting performance appraisal has increased to 71.87%. Percentage of employees who are monitored has increased from 40.30% in 2001 to 41.88% in 2005, which is unfortunately a small increase (Pološki Vokić & Vidović, 2007). In Slovenian organizations, performance appraisal is used for 81% of the management, 82% of professional and technical workers and 83% of manual workers. Slovenian companies use mostly merit or performance pay for manual workers (Mayrhofer, Brewster, & Morley, 2007, p. 368). However, when this data is compared to data available for Europe, it can be noticed that Croatia is far behind Europe, and Slovenia is in a much better position. About 70% of managers are involved in performance appraisal in EU companies and 70.5% of professionals and 65.4% of administrative staff, while the world's best organizations monitor work performance by as much as 87.07% of the workforce (Pološki Vokić & Vidović, 2007).

2.3.3.1 Employee motivation

Carrot and stick are widespread and convincing drivers for human productivity since the begininng of time (Whitmore, 2006, p. 105). Different attempts were made in order to motivate employees to work in accordance with the requirements of employers. It is very important to ensure employee satisfaction that can be achieved through motivation. Motivated employees will contribute to the efficiency of operations. There is a very simple formula: efficient, effective and economical organization = 'satisfied employees' (Jambrek & Penić, 2008). Motivation allows retention of employees in the company and affects employee activity. It stirs desire and directs behaviour (Buntak et al., 2013a). Motivation is influenced by several factors that can be divided into three groups (Vujić, 2005, pp. 206–2008):

- Job characteristics/requirements
- Characteristics of the company
- Individual characteristics

Job requirements include attributes of the specific job, while emphasizing the complexity of the tasks, autonomy and responsibilities. Characteristics of companies are related to the reward system that contributes to business success. Individual characteristics are the personal needs of employees, their views and interests. Given that each employee has different individual characteristics, there are different motives for carrying out tasks. Therefore, some people are motivated through financial rewards, while some want job security and a good business climate (Vujić, 2005, p. 208). If individual interests are fulfilled, productivity will be higher. Interesting study was conducted by Simón, (2007, p. 9) which showed that individual characteristics have a moderate correlation with financial success of the company. Furthermore, research showed that individual productivity is not related to the age and length of service of employees.

Theory of equality appears as a theory of motivation. It is focused on understanding the process of human behaviour. What matters is the relationship between employees and companies where employees invest their knowledge, skills and abilities and in return receive benefits and rewards from the company (Buntak et al., 2013a). A survey was conducted in 2000 by the Institute of Economics in 10 Croatian companies. Table 3 shows ranks of motivational factors (Marušić, 2006, pp. 329–330).

Table 3: Rank of motivation factors

Rank	Motivational factors	Average (%)
1	Salary	83,5
2	Good managers	82,2
3	Interpersonal relationships	78,5
4	Colleague acceptance	75,4
5	Continuity and job security	72,8
6	Interesting job	68,7
7	Responsibility	68,6
8	Working conditions	67,3
9	Validation of capabilities	66,9
10	Advancement	64,5
11	Further education	62,2
12	Status of the company	62,1
13	Participation in profits	60,4

Source: (Marušić, 2006, pp. 329–330)

According to the research, the most important motivational factor is the salary, followed by good managers and human relations. At the bottom are advancement, further education, the status of the company and participation in profits (Marušić, 2006, pp. 329–330). Modern IT companies such as Google and Cisco have particularly special ways of motivation. Some of their *different* ways of motivation allow their employees to bring pets to work, comfortable work spaces, free food, package of benefits such as transportation, haircuts, massages, etc. This allows employees a relaxing work environment through teamwork (Cook, 2012).

2.4 HRM practices and productivity

In the last few decades, various areas of HRM have been explored: practices, performance, functions, effectiveness and productivity in order to either find a relation with companies' size, location or define national preferences. Specific HRM practices that can improve employee motivation and commitment have been target of many studies. Researchers have found that human resources managers can facilitate knowledge management in the organization through several segments (Attafar et al., 2012; Gupta & Singhal, 1993; Nonaka & Takeuchi, 1995): design of work (job diversity, independence, mutual dependence), encouraging elements in the company (salary, performance appraisal, employment security, motivation, empowerment) and developing of employees' proficiencies (education).

Management theorists and practitioners defined factors that can lead to enhancement of HR productivity: empowerment (Greasley et al., 2005), quality of work, (Cole, 2005; H. F. Lin, 2007), culture (Hussock, 2009; Özbebek & Toplu, 2011); individual factors (Attafar et al., 2012; H. F. Lin, 2007) learning (Dicke et al., 2006) and others. These HRM practices are expected to promote attributes in HR which can help companies obtain a competitive advantage and enhance performance (M. Huselid, 1995; Macduffie, 1995; Theriou & Chatzoglou, 2008). Practices, in this case referred to as high-performance or involvement HR practices, are expected to support achievement of companies' goals encouraging learning and innovative capabilities of individuals (Pastor, Santana, & Sierra, 2010).

Pfeffer (1998) identified seven dimensions of effective people-oriented management which can lead to substantially enhanced profitability. According to Pfeffer (1998) these seven dimensions are: employment security, selective hiring, self-managed teams, organizational performance-based high compensation, extensive training and reduced status distinctions and barriers and extensive sharing of financial and performance information. Wright, Dunford, & Snell (2001) suggested that HRM practices form the basis of dynamic capability, knowledge management and intellectual capital, leading to the achievement of core competencies. This implies that HRM practices are important tools in harnessing core competencies and performance of organizations. Huselid et al. (1997) analysed the effect of HRM on the performance of corporate sector. Accordingly, HRM effectiveness can be divided into two types: the first type of HRM effectiveness includes compensation, recruiting and training, employee and industrial relations, selection tests, appraisal and employee attitudes and so on. The second type is the strategic HRM effectiveness that includes teamwork, employee participation and empowerment, employee and manager communications, management and executive development. Huselid et al. (1997) showed a positive link between strategic HRM effectiveness and performance; although technical HRM effectiveness is not related to performance, authors found a positive relationship between HRM effectiveness and productivity.

Mohammadian, Arayesh, Mohammadian, Azizpour, & Zanganeh (2011) researched determined factors on HR productivity at the Islamic Azad University. The data was analysed using correlation and multiple regression analysis. Results showed that several factors have direct and meaningful relationship with productivity. For example: personal training relationship ($r = 0.58$); knowledge and skill ($r = 0.41$); benefits and salary ($r = 0.43$); experience and work experience ($r = 0.54$); work desire ($r = 0.28$); using the suitable way of punishing and encouraging by the managers ($r = 0.40$); the rate of decision

participation (r = 0.42); the presence of the level of evaluation standards (r = 0.37); intimate relationship with the managers (r = 0.47); job security (r = 0.63); and freedom in action and independence (r = 0.37). These all have a direct and meaningful relationship with the productivity.

2.4.1 Best practices of HRM

Two dominant normative models influence how companies make strategic decisions in workforce management: the 'best-fit' and the 'best-practice' model (Boxall & Purcell, 2000). The 'best practice' model displays universalism and adopts 'best practice' in labor management. The 'best-fit' model emphasizes that HR strategies can be more effective if they fit certain critical contingencies in business environment (social, industry and organizational factors). The use of best HR practices has also showed a strong association with the productivity in high growth industry (Datta, Guthrie, & Wright, 2003).

Various authors present distinctive sets of different *best practices of HRM* and there is enough evidence that supports the positive association with productivity (Theriou & Chatzoglou, 2008). These practices lead to higher performance and were given different names (Theriou & Chatzoglou, 2008): *best HRM practices*, *high performance work systems or practices*, *high-involvement practices*, *high commitment practices* and *higher productivity and product quality practices*. This was discussed in significant body of research, for example (Attafar et al., 2012; M. Huselid, 1995; Macduffie, 1995; Pfeffer, 1998; Theriou & Chatzoglou, 2008) and others.

These best practices vary from research to research and there is no fixed list of all practices, which have been placed in connection to human resource management. For the purpose of this thesis these best HRM practices are congregated from various sources and empirical research found in literature. A comprehensive list of practices varies and includes all typically mentioned best practice models:

- high levels of teamwork;
- performance-related pay;
- decentralized decision making;
- comprehensive employee recruitment and selection procedures;
- limited status differences;
- extensive training;
- employee involvement and internal communication arrangements;
- internal career opportunities;
- broadly defined job descriptions;
- employee/industrial relations
- employee attitudes
- employee empowerment;
- quality of work life;
- organizational commitment
- individual factors;
- ability (gained through training and development)
- motivation (regards and appraisal)
- opportunity (trusting collaborative relationship)
- collaborative or partnership alliances
- knowledge- based HRM practices
- and others…

Sources: (Attafar et al., 2012; Cole, 2005; Delery & Doty, 1996; Dicke et al., 2006; Dunham & Burt, 2011; Greasley et al., 2005; M. Huselid, 1995; M. A. Huselid et al., 1997; Hussock, 2009; J. M. P. Kok, Uhlaner,

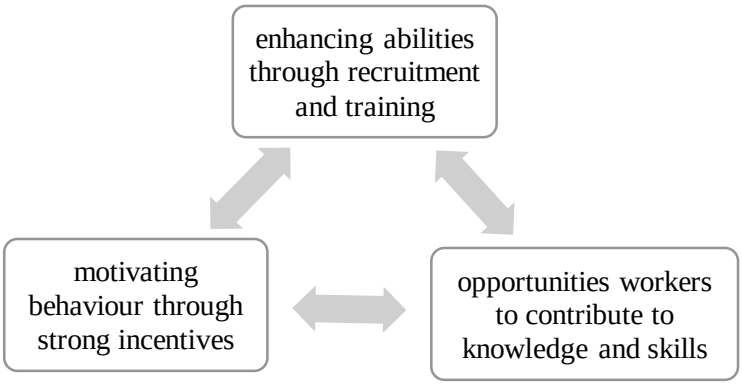
& Thurik, 2003; David P. Lepak & Snell, 2002; Lopez-Cabrales, Pérez-Luño, & Cabrera, 2009; Macduffie, 1995; Pastor et al., 2010; Pfeffer, 1998; Schuler & Jackson, 1987; Theriou & Chatzoglou, 2008)

HRM practices were described and analysed through various papers and means, but they generally round up around the ability, motivation and opportunity, based on the classic premise that performance is a function of the three dimensions (M. Huselid, 1995). These three HRM dimensions can be described as (Delery & Doty, 1996; M. Huselid, 1995):

- skill development to affect employees' ability to understand and combine new knowledge;
- an incentive structure that embraces motivation and commitment;
- design of work and relationships so that employees have discretion and opportunity to use their skills in collaboration with other workers

Boxall & Purcell's (2003) best practice models emphasize three factors (see Figure 6). First, these models put emphasis on enhancing employee abilities or knowledge and skills through effective recruitment and strong training.

Figure 6: Best practice models emphasized through three factors



Source: Boxall and Purcell, (2003)

Second, they put emphasis on motivating behaviour, desired by the employer, through strong incentives. And third, best practice models promote opportunities for better trained and motivated workers in order to contribute to their knowledge and skills through work redesign and indirect forms of employee participation (Boxall & Purcell, 2003). Based on literature in knowledge management domain (C.-Y. Fong, Ooi, Tan, Lee, & Chong, 2011), factors that influence HRM can be classified into individual and organizational factors. Individual factors refer to employee motivation, information ownership, benefits and ethics. Organizational factors refer to organizational culture, HRM practices and leadership.

2.4.2 HR Effective factors

As mentioned above, there is no fixed list of *HR practices* and no analysis has been made to examine which element has the most influence on productivity or other sections in the company. This thesis tries to present and comprehend *the best practices* of HRM through literature analysis and classification.

For purpose of this thesis, the term **HR effective factors** is used, referring to all those *best HRM practices* and *policies* which are identified as effective in improving performance and can serve as facilitators of knowledge management. Basic idea of HR effective factors is founded on a particular set of those practices which have the potential to bring about improved organizational performance for all organizations (Marchington & Wilkinson, 2005) and therefore all companies should identify and implement effective factors in order improve their performance (Theriou & Chatzoglou, 2008).

According to Boxall & Purcell, (2003) best practice models should emphasize enhancement of abilities with focus on motivation and employee participation. This is concurring with the dimensions presented by (Delery & Doty, 1996; M. Huselid, 1995). Hence, observing from these prerequisites, the above listed best practices are categorized into two major groups of HR effective factors:

- **Work Design Structures (WDS)**
- **Encouraging and Opportunity Structures (EOS)**

Work design structures (WDS)
Include the design of work and design of relationship so that employees have discretion and opportunity to use their skills in collaboration with other workers according to the structure of their position. WDS incorporates internal and external characteristics concerning employees and it consists of:

- **Design of work**: which includes job diversity, independence, decentralized decision-making, quality of work life and formal employment security.
- **Design of relationships**: which includes trust, organizational commitment, employee attitudes and teamwork.

Encouraging and opportunity structures (EOS)
EOS encompasses incentive structures, which embrace motivation and commitment. This can be employment security, employee motivation, empowerment, collaborative or partnership alliances, new ability/skills development.

This categorization of best practices into WDS and EOS effective factors is one of the major theoretical contributions of this thesis. In order to justify the classification, an overview is given below based on HR effective factors and literature evidence, which support the classification (see Table 4).

Table 4: HR effective factors - literature evidence

HR Effective factors	Significant contributions	Key themes
Work design structures (WDS)		
Design of work		
Job diversity, independence, decentralized decision-making, quality of work life and formal employment security	(Ballou et al., 2007; Travis, 1995; Cole, 2005; Lees and Kearns, 2005)	Paying attention to employees' life quality provides more human and healthy working situations (Travis, 1995). Positive impact of employees' quality of work life on their learning and health has been confirmed (Cole, 2005). Positive impact of work life quality on organizational commitment has been confirmed (Lees and Kearns, 2005)
Design of relationships		
Trust, organizational commitment, employee attitudes and teamwork	(Tavari et al., 2009; Lees and Kearns, 2005; Attafar et al., 2012)	Existence of proportion between individual interests and job, existence of proportion between individual proficiencies and job and also having work experience, affect enhancement of human resource productivity considerably (Tavari et al., 2009).
Encouraging and opportunity structures (EOS)		
Employment security, motivation, empowerment, collaborative or partnership alliances, new skills development.	(Travis, 1995; Carllus and Considine, 2001; Kristen, 2008; Greasley et al., 2005; Ruth et al., 2009; Gordon et al., 1992; Sheikhpour, 2001; Sheridan, 1992; Zareei, 1996),	Paying attention to employees' life quality provides more human and healthy working situations (Travis, 1995). Empowered employees are faced with lower conflict and role ambiguity and as a result, they have more job satisfaction (Greasley et al., 2005). Motivation affects enhancement of HR productivity. Lack of motivation is one of the major factors in turnover decision (Ruth et al., 2009). Strong correlation relation between organizational culture and relational performance has been discovered (Sheikhpour, 2001; Sheridan, 1992). Organizational culture, proportional to condition of the environment that develops desirable behavioral model, is effective on increasing of productivity (Zareei, 1996).

These effective factors, which have an impact on enhancement of HR, are to be considered important factors for knowledge management success (Attafar et al., 2012). Therefore, for the empirical part of this thesis, WDS and EOS and their relationship with knowledge management are analysed in ICT companies. Detailed analysis and relationship between effective factors and knowledge management is presented in Chapter 4.

2.5 Human resource information systems

Through the years, development of HRM has been affected by various economic crises, technological developments and changes in business environment etc. Development of human resources management can be viewed from the aspect of knowledge, which has increased from handicraft methods of production to post-industrial society (Ljubic, 2005, p. 188). Post-industrial society, also known as information society, is based on knowledge (Jelčić, 2004, p. 15). Accordingly, as knowledge takes on importance, the importance of human resource management is also growing. Table 5 shows the knowledge percentages for all three-production methods. Other percentages are related to labour and capital.

Table 5: Percentage of knowledge in certain modes of production

Production method	Knowledge (%)
crafting	10
industrial	25
post-industrial society	70

Source: (Ljubic, 2005, p. 189)

In the 21st century, also known as the 'Digital Era', HRM is largely influenced by development of ICT. Since the emergence of the Internet, various business functions were transformed and upgraded (Kanthawongs, 2004). Human resource function is changing rapidly, reacting to changes in social and organizational environment and information technologies (Hendrickson, 2003). Depending on the user of the required information, three groups of information in the company can be defined (Deželjin, 1996):

- Information needed by the HRM and those related to the work process of the employees,
- Information that is necessary and interesting for all employees in the company
- Information required by the owners, stockholders and various government or non-governmental institutions outside the company.

Nowadays, a great number of information software systems and solutions for effective managing of human resources is available. According to experts, *the human resources management system must be tailored to the demands of business strategy* (Ahluwalia, S. 2008). Although companies have the same or at least similar activity, that does not mean they are identical and therefore cannot use the same software solution. In choosing information software, managers have to bear in mind that HRM presents different needs and elements, which have to be taken into consideration when introducing the software systems for HR departments. IT helps companies in managing all HR information: in recording and analysing employees and organizational information and documents, e.g. employee handbooks, emergency evacuation procedures and safety procedure and many others (Fletcher, 2005; Lee, 2008; Ball, 2001; Martinsons, 1994, from Altarawneh & Al-Shqairat, 2010).

The use of information and communication technologies in human resource management departments is becoming an increasingly important phenomenon. Automating HR tasks and practices is transforming the traditional way of executing some HR tasks into more efficient and faster ways. These kind of tasks can enable companies to create a much needed competitive advantage (Marler, 2006). The expectation is that HR departments, using ICTs, may 'be liberated from administrative shackles and be able to focus more on developing intellectual capital, social capital and managing knowledge to improve

organization's competitive advantage'(M. L. Lengnick-Hall & Moritz, 2003). Time is essential to facilitate the work of the HR department because the reports are available simultaneously upon request from the owners and managers of the company. In addition to designing policies to inform employees, education on information systems is very important in order to have a good, healthy and functioning information system.

Information systems for human resource management can be found in literature under terms **Human Resource Information System (HRIS)** and **Human Resource Management System (HRMS)**. Scroggin (2008), an expert in HR software industry, explains the difference between HRIS and HRMS. Accordingly, **HRIS** application is more comprehensive in its capabilities than an HR database but this may, or may not, be true as there are no standards for the terms in this industry. **HRMS** means the same as HRIS. Although, HRMS is perceived as being a more comprehensive HR application than HRIS systems. For the purpose of this thesis the name HRIS (Human Resource Information Systems) is used.

Human Resource Information Systems (HRIS) is a concept concerning the utilization of information technology development and characteristics for effective managing of HRM functions and applications (Altarawneh & Al-Shqairat, 2010). Information system for HR is one of the subsystems of a single integrated information system in company's business system (Deželjin, 1996). It is a database system, that lets managers keep track of all types of information related to human resources. It plays an important role because HRIS functions improve HRM in terms of administrative and analytical purposes (Kanthawongs, 2004). HRIS, in its basic form is a system used to acquire, store, manipulate, analyse, retrieve and distribute information about human resources (Beadles, Lowery, & Johns, 2005). When identifying and designing policies for managing employees, managers should bear in mind the objectives, content, resources and communicators and knowledge as well as abilities that are required by a properly functioning information system. Goals of building or applying a human resources information systems in company are (Deželjin, 1996) as follows:

- Establishment of a unified information system of employees and for the entire business.
- Ensuring the free flow of information.
- Ensuring undisturbed development of employees.
- Securing the rights and obligations and providing training opportunities and promotion of companies' employees.

Basic structure of HRIS in a company fits the structure of certain functions as a business system and should be implemented in the company so that it forms a unique unit. HRIS can be implemented at three different levels (M. L. Lengnick-Hall & Moritz, 2003):

- publishing of information;
- automation of transactions;
- change in the way human resource management is conducted in organization by transforming HR into a strategic partner

Structural activity of HRIS consists of two parts. The first part is data collection from internal and external sources. The second part is data processing and issuing reports for owners, stockholders, managers, employees and other interested parties. Existence of IS facilitates keeping records on employee wages and costs related to their development, education and training. This makes the work of the of HR department much easier. Hence,

it is necessary for a company to have an IS that will be the backbone of every function and dimension of human resources department, so that companies would operate more efficiently. When creating or selecting an IS model for the purpose of planning and development in human resources department, it is necessary to consider the existing structure, employee needs and tasks. Information content about employees is obtained through biographies, interviews, tests, questionnaires, and similar techniques that are used in the process of acquisition and employment of staff. The information required form planning the human resource development, includes (Deželjin, 1996):

- How, when and the number of people that should be employed from which source (internal or external).
- How, when and the number of employees that need to be given an opportunity for higher education or additional tanning.
- How to run the recruitment process, fluctuation and adaptation.
- What is the level of employees' motivation at work and what motivates them and what does not.
- What is the wage system and how does it affect motivation.
- Health care of employees, and what kind of protection do they get at work.
- What is the level of social standard (food, housing, and transport to and from work).
- What is the promotion system at work and how does it work.

The main characteristics of HR information system are public availability, democracy and coordination of information activities. The need for professionalism and ethics of employees and their responsibility in carrying out these functions also needs to be mentioned (Brekić & Brekić, 1983).

Company size is often one of the criteria for lack of some specific resources, like financial, organizational or even human resources. It is a reason why organizations cannot justify HR professionals in the company (Horvat & Klačmer Čalopa, 2012). In addition, the HRM procedures require considerable development costs. That is a reason why companies' size is positively related to the adoption of many HR instruments. From that point of view, small and medium sized companies are less likely to use formal HRM practices supported with HRIS compared to large companies (J. M. P. De Kok & den Hartog, 2006).

2.5.1.1 Researching HRIS

The general consensus of research studies in the field of HRM shows that implementing the right HRM procedures and practices is likely to increase company's performance (J. de Kok & Hartog, 2006). HRIS is used in many organizations to support daily HRM operations (Altarawneh & Al-Shqairat, 2010; Hussain, Wallace, & Cornelius, 2007).

When examining the benefits of HRIS two extremes can be found: the pure administrative use of HRIS and its strategic use (Beadles et al., 2005). HRIS has administration benefits which include enrollment, position changes and personal information that are completely integrated with payroll and other financial software and accounting systems in the organization (Martinsons, 1994; Fletcher, 2005; Lee, 2008; Ball, 2001). It is used in day-to-day operations and usually in the form of records that hold employee information (Beadles et al., 2005). Administrative HRIS can be measured through cost reductions in HR departments (Beadles et al., 2005), though it is difficult to measure the return on

investment and improvements in productivity within the HR departments precisely (Mayfield, Mayfield, and Lunce, 2003, from Beadles et al., 2005). HRIS efficiency and administrative effectiveness can be described as administrative HRIS (Beadles et al., 2005).

Many scholars, especially in the USA and Europe (Yusoff & Ramayah, 2011), have researched HRIS extensively. Previous research shows that IS for HRM are used by HR professionals as a strategic planning tool for decision-making which enhances professional standing (Hussain et al., 2007). HRIS is faced with challenges of demonstrating effectiveness during the period of application in an organization (Hagood et al, 2002).

Various research has been done in order to prove and examine the effectiveness of HRIS and its collaboration with other functions and effective factors in company. One of the interesting studies was done by Duc, Siengthai, & Page (2011). In their exploratory study, authors formed a concept of 'HRIS-Trust'. Through literature analysis, authors found key factors, which influence HRIS-Trust and these include, the following variables: user expectations (*managers' knowledge, skills, abilities & other attributes (KSAOs)*, *trustors' propensity*); organizational structural characteristics (*organizational size, organizational financial condition, and organizational type*), and IT infrastructure. Higher levels of KSAOs lead to increase in HRIS-Trust and larger organizational size leads to increases in HRIS-Trust (among users with higher KSAOs). Higher levels of IT infrastructure lead to an increase in HRIS-Trust among users with higher KSAOs. The relationship HRIS vs. Trust was also studied by Lippert and Swiercz (2005). They consider that in the relationship between HRIS and technology-trust, technology-trust is one of the significant constructs used to justify HRIS effectiveness. They also presented a more focused understanding of how technology trust relates to HRIS deployment and offers the opportunity to develop a broader range of strategies to improve implementation initiatives. Lippert and Swiercz (2005) show that technology adoption, technology utility, and technology usability have a significant effect on HRIS-Trust.

Authors Beadles et al. (2005) analysed the opinion of HR directors on their HIRS through an exploratory study. Results showed positive impact of HRIS in public sector. Directors are generally satisfied with systems that they are using but, unfortunately, don't see many benefits from its usage outside of its effect on information and information sharing. Although this research was done in public organizations, it may be applied on companies in general.

Strohmeier (2006) has found that using information technology for HR purposes may give different results. Some of the results can be centralization or decentralization in organizational structure, increased or decreased headcount, efficiency and effectiveness. Some of the researchers made a conclusion that in the past, HR information systems were expensive and not user-friendly. The capacity of these traditional HRIS was usually insufficient to manage the large amounts of information about human resources in the company, but today's HR information systems are completely improved (Olivas-Lujan, Ramirez, & Zapata-Cantu, 2007). Olivas-Luján (2003) states that ICT technologies have to include HR functional applications and HR extranet application, HR intranet application, employee self- service applications, manage self- service, HR portals and wireless or mobile HR applications and some other sophisticated applications that can help improve communication between employees, or managers and employees.

2.5.1.2 e-HRM versus HRIS

In the mid-1990s, companies have started introducing electronic human resource management, i.e. e-HRM (Alok Mishra, 2009). This phenomena of e-HRM marks higher usage of ICT in human resource departments (Olivas-Lujan et al., 2007). However, different names were used, such as virtual HRM, digital HRM and HRM based on the web, etc. The most common e-HRM is described as a dynamic version of human resources management. E-HRM functions are similar or nearly identical to the functions of traditional HRM. The difference between them is evident in the location of certain processes. E-HRM used the capabilities of the Internet, which helped in the area of performance such as speed, validity, compliance and others. It represents the way strategies, policies and practices of human resources management supported by web technologies are implemented (Alok Mishra, 2009). The benefits of e-HRM implementation are visible through (Alok Mishra, 2009):

- Improvement of the overall efficiency of company
- Improvement of the function of HRM
- Increase of service quality towards employees
- Reduction of the costs associated with human resources
- Increased ability for recruiting, retaining and developing top talents

Watson Wyatt's survey reports (2002) (from Beadles et al., 2005) that it does not take a high progression of e-HR to reach high HRIS performance on the administrative side. Their results showed that a properly integrated e-HR system is the key to the evolution of the system. By properly implementing an e-HR system, an organization should be able to reduce the amount of work for which the HR department is responsible, which would then leave HR professionals free to concentrate on performing more strategic roles for the organization. Duc et al. (2011) presume that trust in HRIS is an important factor which enhances effective deployment of e-HRM system is. The concept of e-HRM systems has been introduced and yet, it has been observed that the efficiency and effectiveness of these systems has not yet fully materialized.

2.5.1.3 Software applications for HR

The aim of HRIS in the company is informing the employees and communication between the employees and the management. This is essential for company's activity and its relations within the scope of the process of labour and management relations (Deželjin, 1996). Information system is related to the development of HR and it depends on the subject of performance and management activities. Software companies specialized in HR provide complete online application which is accessible to all employees from any location with internet access like the office, home or an airport terminal, the so called 'Web Based Application' and these are generally licensed or sold by Application Service Providers. Alternatively, desktop-based software applications have to be installed directly in the office and are running only from the main computer. They are sold by 'seat', hence the number of employees that will be connected to it. HRIS includes all or most of the following applications (http://hrtotal.com/hris.asp):

- Applicant tracking
- Employee Personnel File Management
- Company Related Documents such as employee manuals and safety programs
- Benefits Administration
- Manager and Employee Self Service modules
- Complete reporting for each feature

- Payroll integration and financial Software integration

In forming strategy and structure of managing and developing human resources in a company, different informational content is needed (Deželjin, 1996):

- Information about the structure of activities, tasks and jobs based on the internal division of labor.
- Information about existing and future structure of employees.
- Information needed to determine the ways, forms and means by which the state allows alignment with the structure in all sectors.

Different companies, different industry and different needs – all of that has to be respected when choosing the software tools for human resource management department. In the pool of different HR software systems, it is not an easy job to choose the appropriate one for the company. Through the web search, different consulting HR research centres were found and *compareHRIS.com* (Compare HRIS, 2008) being one of those. *CompareHRIS.com* helps the HR managers, CEO and company owners in the search for the appropriate HRIS for their organization. At their home page, numerous HR information systems and their description can be found. In addition, the comparison of needs and offers is possible for the clients. Some of the offered HRIS are listed below:

Humanic Design

- Vendor: *Humanic Design* (Humanic, 2014)
- Has been delivering results in HRIS /HRMS and Payroll software solutions for over 25 years.
- The focus is on comprehensive and cost-effective human resource software solutions supported by personnel with experience in the HR industry.
- Provides productivity savings and allows HR departments to focus time on strategic talent management initiatives.
- Its reporting and analytics supply the executives with necessary tools to get the most out of human capital, for upgrading business strategies, best practices and profitability.

HRA HRIS

- Vendor:*People Strategy Inc* (People Strategies, 2009)
- It simplifies and shares the tasks of managing employees effectively throughout the organization.
- Contains various Self-Serves, Workflows, well formatted Informational Screens and Report Writer.
- Staff Essential is a complete Employee Information System with different ads like eRecruiting, Time & Attendance and Payroll.
- All Staff Essential products can be purchased and run separately.

Agito eHRM

- Vendor: *Agito LLC* (Agito d.o.o., 2014)
- eHRM is a HR system for people, organizational and structural management with advanced frameworks for comprehensive management of HR.
- Key features: Traceability of key data changes; multilingualism and localization into different local (state) legislations; notifications on important dates (e.g.

termination of part-time contracts, expiration of licenses, birthdays, medical exams...) by e-mail; internal document storage, and many others.
- eHRM supports legislative requirements regarding the security of personal information (data security at several levels).
- The solution is adapted to the customer (compliance with local legislation, internal rules and customer specifics) and is translated into Slovenian, English, Italian, Serbian, and Macedonian.

SAOP

- Vendor: *iCenter* (SAOP LLC, 2014)
- SAOP business software supports core business through customized applications for each process in your organization. Managers have insight into financial performance and other key indicators, so they can take action to reduce costs or improve business processes.
- ERP system iCenter contains a range of customized software solutions, which adapt to business processes of a medium and large enterprise or public institutions. Through automated report analysis of your work processes, iCenter provides you with quick and high-quality information for efficient management decision-making and allows you to reduce operating costs.

BambooHR

- Vendor: *BambooHR* (BambooHR, 2014)
- Executes on business objectives involving workforce costs, planning, and business intelligence.
- Decreases data errors in problems with spreadsheets, paper and file cabinets.
- Delivers a powerful, affordable, and easy-to-use HR business solution that drastically reduces time, cost and complexity of managing and maintaining employee data for small to medium-sized companies.

Companies in Slovenia and Croatia apply HRIS in their human resources departments. Some use SAP (Belupo Croatia), LASER PLA system (Solaris Holiday Resort Croatia), Agito (UniCredit banka, Hypo Leasing and Alpe-Adria-Bank in Slovenia), and SAOP iCenter (Dewesoft, Tift, INCOM and more than 14,000 other companies from Slovenia). Information about used solutions and software tools were gathered through inquiry and examination of the information available online. These human resources information systems are explained in detail below.

System, Application and Products (SAP)

System, Application and Products is one of the leading manufacturers of business solutions and offers comprehensive software and services that can answer any request made by managers. Large number of companies uses SAP products, such as Pliva, INA, Podravka, T-Com, Siemens, Ericsson Nikola Tesla, and many others. SAP deals with the challenges of over 25 different industries, e.g. auto industry, banking, chemicals, defences and security, pharmaceutical industry etc.

Five former IBM employees in Germany formed SAP in 1972; the original name was *'Systeme, Anwendung und Produkte'*. The goal of the company was to provide large companies with the ability to interact with a corporate database in real-time (SAP, 2014).

SAP Business Suite software enables companies to execute and optimize business and IT strategies. SAP Business Suite allows performing essential, industry-specific, and business-support processes with modular solutions that are designed to work with other SAP and non-SAP softwares. Providing best industry practices with industry-specific applications and the core applications of SAP Business Suite are (SAP, 2014):

- SAP Customer Relationship Management
- SAP Enterprise Resource Planning (ERP)
- SAP Product Lifecycle Management
- SAP Supply Chain Management
- SAP Supplier Relationship Management

There is also support for system management such as user administration, configuration management, centralized data management and management of Web services. The driving force of mySAP ERP makes SAP NetWeaver technology platform. It enables organizations to reduce the total cost of ownership, faster ROI and benefits of a more flexible IT infrastructure. In addition, mySAP ERP offers a complete solution, designed to support international operations so that companies effectively and successfully operate in global environment (SAP, 2014).

MySAP ERP HCM

SAP ERP HCM (System, Application and Products; Enterprise Resource Planning; Human Capital Management) solution is a software package that combines enterprise resource planning (ERP) functionality with the market technology platform. It addresses the core and extended business software requirements of midsize and large organizations, regardless of their industry or global reach. *SAP ERP HCM* (ERP Software, 2014) includes full-suite software functionality for analytics, finance, human capital management, operations, and corporate services. SAP ERP HCM supports processes of recruitment, deployment, development and motivation of employees and improves them overall. SAP ERP provides integrated functionality:

- Simplification of Human Capital Management processes and integration of all operations.
- Provides access to information in real time to speed up employees' decision-making.
- Allows assignment of the right people to the right projects at the right time.
- Supports both employees and managers throughout their entire working cycle.
- Allows employees to manage collaborative processes.

Employee planning includes strategic planning, costs simulation and organizational planning. HCM supports managers, workforce and different communication centres in the organizations. Among the corporative service that it provides are: the managing of the corporation; business trips, bonuses and remuneration management; collaboration of information and people; health, safety and environment management. It also manages transactions like HR administration, time management, expansion management etc. (ERP Software, 2014). MySAP ERP HCM supports companies around the globe in managing and optimizing their employees. It is used daily in over 9,000 organizations in 50 countries in managing over 54 million employees.

Laser Line d.o.o. and Laser PLA

Laser Line d.o.o. is a company for informatics engineering with extensive experience in designing and building information systems located in Croatia (Laserline, 2014). Basic

features of the company are the complete implementation of engineering and computer supported information systems, applying the latest achievements in the field of computer technology, system software, as well as software development. The main characteristic of software packages is their simplicity in implementation: due to SQL (Structured Query Language) users can control functions and run queries in the database, depending on their needs. Relational Database Oracle enables running of the same applications on different hardware platforms and different operating systems. The software package LASER PLA – wage calculation allows the calculation of salaries several times a month (optional) and automatic transfer of accounts (Laserline, 2014). Laser PLA- wage calculation includes (Laserline, 2014):

- **Managing general information** - General information is the data on the geopolitical entity (countries, regions, counties, and municipalities), data on business entities, companies, and their hierarchical structure.
- **Management of registry information and keeping data on taxes and contributions** –data based on the employees that is required for wage calculation.
- **Defining types of payments** - Every business has its own vision of wages with a few elements fixed by the collective. Therefore, there is the possibility of defining various types of payments, their grouping for easier monitoring of executive work and costs, as well as various input parameters.
- **Entry of working records** - Periodic data updates are needed; before any salary it is necessary to enter a record of each employee for the desired period, which is defined prior to entry records. Before the final settlement for the period, the records can be controlled and corrected.
- **Processing of data on wages** - Prior to listing the necessary reports and documents, it is important to enter the processing of salaries, with the calculated amounts and taxes, as well as changes in master data. If the amounts do not add up, the process can repeated until it finally closes. It can be repeated for all or only for certain workers.

However, not all employee management systems are comprehensive enough to be named HRIS. If a system only handles one or two functions, it is not a comprehensive HRIS. Human resources management information tools address the key areas of the workforce management in a manner that streamlines the process of collecting information and decisions making. The use of technology speeds up the tasks and enables the company to discover new elements that can lead to more efficient business.

Many different HRIS software packages are available online. Either for download of a free trial, order and pay online, or even calling an expert to the company for consult is possible. These experts usually provide full service and are ready to install the software package when the deal is closed. Apart from the HRIS installation, they offer different help and upgrade information systems for a price.

3 KNOWLEDGE MANAGEMENT

The success of companies and managers depends on the knowledge in performing activities. The 21st century is declared as a century of knowledge (Milanović, 2010) whereas competitive advantage is perceived as a link to knowledge and therefore the interest in knowledge management grows. Based on the extensive review of literature, Boersma (2002) has identified 10 different knowledge management approaches. They are: strategic approach, human resource management approach, learning organization approach, intellectual capital approach, knowledge technology approach, ICT approach, organizational approach, innovation approach, network approach and quality control approach. Knowledge management is a major issue for human resources management and organization, culture and information technology play a crucial role (Staab, Schnurr, Studer, & Sure, 2000).

As managerial philosophy, the knowledge management is perceivable in practices of different organizations and is not an ultimate tool that solves all information and knowledge problems (Jha, 2011). Broad scope of knowledge management and its interdisciplinary nature spans traditional function and professional boundaries ranging from IT professionals, to accountants, marketers, organizational development and change management professionals (Chivu and Popescu, 2008).

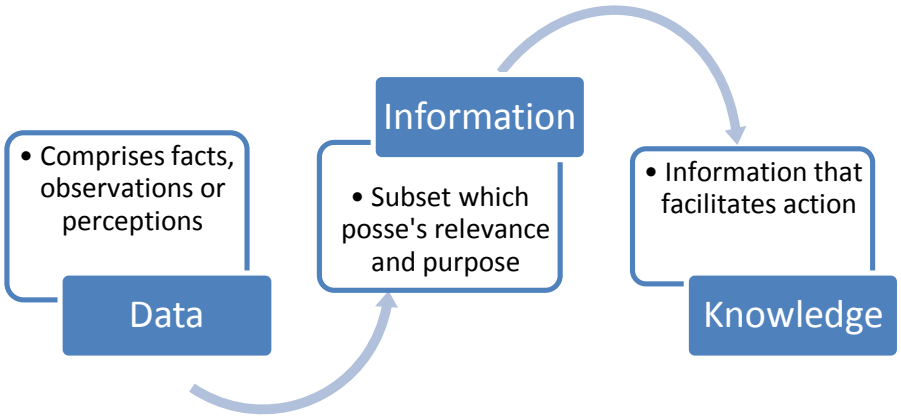
Practice of KM in Slovenia and Croatia was analysed through several studies. One of the researches focused on large Croatian companies and the results indicated underdevelopment of KM practices in Croatia. A study (Vidović, 2008) proves that large Croatian companies have started to manage their knowledge. It also indicates that although IT is highly developed, knowledge management measurement is the least developed segment in Croatian companies. According to another, later study by (Milanović, 2010), Croatian companies are in the second phase of KM development regarding the evaluation criterion of average maturity of KM. An interesting paper was presented by Rašula, Bosilj Vukšić & Štemberger (Rašula et al., 2008). The authors analysed KM in Slovenian and Croatian companies, although they did not report the difference between countries and KM practices. They showed that through creating, accumulating, organizing and utilizing knowledge, organizations could enhance their performance. The authors presented three main components that are important for knowledge management: (1) information technology, (2) organizational elements and (3) knowledge. Empirical research shows that organizational elements (such as culture, climate and collaboration) have a positive impact on knowledge management. A positive indirect effect of IT application on KM adoption through organizational elements was also confirmed.

Therefore, in this thesis one-step further is made in the analysis of knowledge management through theory and empirical research in Slovenian and Croatian companies. This chapter reports literature analysis on concepts of knowledge, knowledge management development and knowledge management solutions. In addition, emphasis is placed on information systems and the IT infrastructure used for managing knowledge.

3.1 Perspectives on Knowledge

Various authors address questions in defining knowledge management by distinguishing *data*, *information* and *knowledge* (see Figure 7) also known as the *knowledge hierarchy* (T.H Davenport & Prusak, 1998; Hicks, Dattero, & Galup, 2006).

Figure 7: Difference between data, information and knowledge



Source: (Becerra-Fernandez et al., 2004)

Although these three terms are sometimes used interchangeably, they are quite distinct. *Data* comprises facts, observations or perceptions, whereas *information* is a subset of data including those data that possess relevance and purpose (Becerra-Fernandez et al., 2004). Unlike the *information*, which is visible, independent of various actions, decisions and environment which can easily be conveyed and duplicated, knowledge is invisible, closely associated with actions and decisions, it identifies itself with existing environment, is transferable through learning and cannot be duplicated (Kumar, 2010). The *knowledge* is information that facilitates action and has been recognized as currency for organizational sustenance and competitive advantage (Osterloh et al., 2002; Wiig, 1997). Knowledge embraces the main place among traditional factors of production, such as land, labour and capital. Its importance has been recognized in the 90's and after that literature began to fill with research and analysis regarding knowledge (Jengard, 2010). Knowledge is perceived as the most important intellectual property and asset of the company (Peng Chan, Pollard, & Puriveth, 2011; Collins, 2010) and also resource that enhances competitive advantages of each organization. Oxford Dictionary and Thesaurus (2007) defines the term knowledge as 'awareness or familiarity gained by experience (of a person, fact, or thing)', 'person's range of information', 'specific information; facts or intelligence about something', or 'a theoretical or practical understanding of a subject'.

Davenport & Prusak (2000) define knowledge as 'fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates from and is applied in the minds of knowers.' Chase (1997) describes knowledge as an input to production, as valuable as the product itself and competitiveness of companies becomes dependent on the ability to harness and exploit knowledge.

There are different kinds of knowledge classified according to several criteria. One of them was presented by Alavi & Leidner (2001) who have defined various perspectives on knowledge. First, one is viewing knowledge as a state of mind, which focuses on enabling individuals to expand their personal knowledge and apply it according to

organizations' needs. The second perspective is an object that posits knowledge that can be viewed as a thing to be stored and manipulated (i.e., an object). In addition, knowledge can be viewed as a process and as a condition of having access to information. The fourth view is knowledge as a capability. This suggests that KM perspective is centred on building core competencies, creating intellectual capital and understanding the strategic advantage of know-how. According to some authors knowledge can be divided into *non-empirical* (occurred through reflection) and *empirical* (created through experience) (Jelkić, 2011). It becomes meaningful for the company when it is available and its value increases with respect to its availability.

Knowledge is one way of differentiation of companies. It grows when shared and gets the value when used. Unused knowledge does not bring benefit (North, 2008, p. 46). For purposes of this thesis knowledge is defined as *information + application + social environment + innovation and research* (Crnković-Pozaić, 2009) whereby it is viewed as a set of information corresponding to a particular context (Burton & Obel, 2004).

Transfer of knowledge throughout the organization is considered as a critical driver of its effectiveness (Dinur, 2011, p. 246). Chan, Pollard, & Puriveth (2004, p. 14) raised the question of how interaction between individuals and groups should be for a successful knowledge transfer. Discussing the key processes in knowledge transfer, they emphasize that organizational effectiveness is limited if individuals are not willing to share knowledge with other employees.

3.1.1 Tacit *versus* Explicit knowledge

Drawing on work of Nonaka, (1994) two dimensions of knowledge emerge in organizations: *tacit* and *explicit*. This typology of knowledge had considerable influence on theory of organizational learning and knowledge management in general (Daud & Yusoff, 2011).

Explicit knowledge is accurate, easy to articulate and therefore easy to code, document in writing or in pictures, easy to carry, share and communicate – it is generally more accessible and systematic than tacit knowledge and relates to the technical knowledge.

In contrast to explicit knowledge, tacit experiential knowledge is subconsciously understood, applied, and difficult to articulate. Tacit knowledge includes an understanding, intuition and arises with experience while explicit knowledge can be transferred (Baković, 2009, p. 49). It is very personal, includes intangible factors that are related to beliefs, experiences and values of employees and working knowledge of employees (Pan & Scarbrough, 1999). Study of tacit knowledge, which was first introduced by Michael Polanyi (Smith, M. K, 2003), can be characterized as 'invisible' and difficult. In his papers, Polanyi dealt with tacit knowledge, which evoked great interest. This resulted in significant numbers of papers and studies and above all disagreements and contradictions about this issue.

Nonaka & Krogh (2009, p. 636) state that tacit knowledge is closely related to senses, movement skills, physical experience, intuition and implicit rules. Tacit knowledge lies in actions, procedures, routines, ideals, values and emotions. If it leans to the explicit side, or if a part of it is explicitly defined, it is available through mind – it means that explicit knowledge is not completely separated from tacit.

These two types of knowledge are in dynamic interaction and are therefore inseparable and complementary (Srikantaiah & Koenig, 2000). In addition, tacit knowledge is usually seen in relation to explicit knowledge. For example, in pronouncing sentence containing explicit knowledge, it is required to have tacit knowledge to be able to express a pause, to form a sound, rhythm and find words (Nonaka & von Krogh, 2009, p. 636). Lowney (2011) widely discussed how tacit knowledge is more or less explicit and that tacit knowledge always has an explicit part.

Finally, significant contribution in the field of tacit knowledge was given by Dinur (2011). He presented tacit knowledge taxonomy based on research on knowledge transfer, which was conducted in six multinational companies. Contrary to Nonaka, Dinur (2011) assumes that the main classification of knowledge into two categories, explicit and tacit, is wrong, because it is impossible to completely separate tacit from explicit and vice versa. Therefore, Dinur presented nine (sub)-types of tacit knowledge and provides deeper understanding of tacit and explicit knowledge. These types are presented below:

- **Skill:** skills that need practice (swimming or playing an instrument).
- **Cause-Effect:** this type of tacit knowledge is related to complex problem solving (i.e. how to diagnose and repair a complex machine).
- **Cognitive:** attitudes, intentions or thoughts, (i.e. as how to know a client is lying or not).
- **Composite:** knowledge aimed at understanding large array of varied, complex information (i.e. human anatomy or playing chess).
- **Cultural:** different cultural concepts that the source of knowledge usually takes for granted; they are often related to collective knowledge (i.e. how to behave when given a business card from a Japanese business partner).
- **Unlearning:** a new way of doing the same thing which requires unlearning past behaviors – previous practice needs to be unlearned.
- **Taboo:** such knowledge 'must be recognized and dealt with in order to change its taboo status'.
- **Human:** important when the use of knowledge requires human relationships and trust.
- **Emotional:** emotions are also type of tacit knowledge.

Transfer of tacit knowledge is associated with channels for tacit knowledge transfer, considering that some channels are less and others more suitable for this purpose. Regarding channels of transmission and its richness and effectiveness – the term channel richness denotes the characteristic of the channel and includes the recipient that is actively involved, while the effectiveness of the channel includes the degree to which the channel is appropriate and fits the type of knowledge transfer (Dinur, 2011, p. 261). Nevertheless, explicit knowledge transfer channels differ from the tacit knowledge transfer channels.

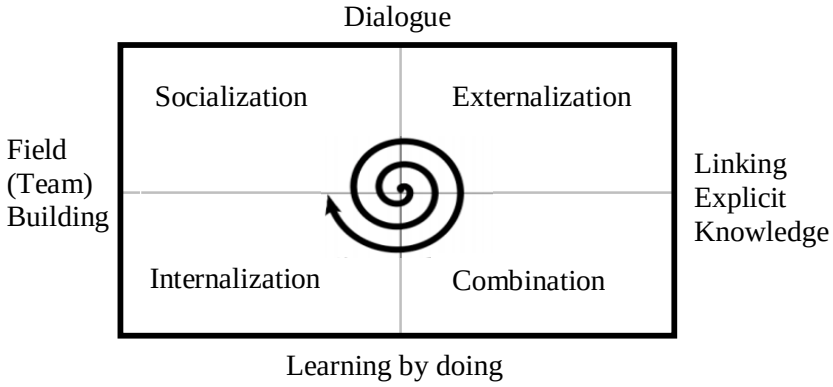
The importance of tacit knowledge transfer among employees lays in relationship with the organizational innovation capability and in networking through employee learning, blending with the organizational culture, creating a specific combination of resources and capabilities by which the organization achieves competitive advantage. It is proved that the transfer of knowledge is precious, intangible resource and a key to competitive advantage. In Uganda a positive correlation has been noticed between the impact of KM and competitive advantage (Kamya, Ntayi, & Ahiauzu, 2010). Similar study by Chan et al. (2011) has shown that the competence of the community and interaction allows

transfer of know-how and that behaviour related to effort of knowledge transfer is significant and positively correlated with the innovation of community members.

3.1.2 Nonaka's model

Nonaka argued that the first step in making a sophisticated knowledge transfer model was to think through how knowledge might actually be transferred, i.e., knowledge has to be transformed into information and only then can it be moved (Sarayreh, Mardawi, & Dmour, 2012). Developing a model of how such information might be transferred, Nonaka proposed a dynamic intertwining of tacit and explicit knowledge, such that tacit knowledge is extracted to become explicit and is then re-internalized as tacit (Nonaka & Takeuchi, 1995). This became Nonaka's signature model (see Figure 8). Nonaka developed these ideas in a series of papers throughout the early 1990's (Nonaka, 1991, 1994), culminating in the 1995 book with Hirotaka, *The Knowledge Creating Company: how Japanese companies create the dynamics of innovation*.

Figure 8: Nonaka's four models of knowledge conversion (SECI model)



Source: (Sarayreh et al., 2012)

It is possible for each type of knowledge to be converted. The model is a clockwise spiral, when viewed as a continuous learning process. A spiral, not a cycle, because as one 'learns', one goes around the cycle and therefore understandingly moves to deeper and deeper levels.

3.2 Definitions and concepts of Knowledge Management

Knowledge management has been defined and explored in various ways, but generally it relates to unlocking and leveraging knowledge of individuals to gain appropriate knowledge from appropriate individuals at an appropriate time (Hutchinson & Huberman, 1994). Therefore, knowledge becomes available as an organizational resource (Anand & Singh, 2011) and helps individuals to share and apply information with regard to organizational performance (Hutchinson & Huberman, 1994). Employees should be observed as investors of their own knowledge. Accordingly, they decide for themselves if they want to invest their knowledge into a company or not. It is important that companies occupy the attitude which will motivate employees and encourage their knowledge investments (Pastor et al., 2010). At its core, KM is trying to harvest insights and experience which make the organization function (Sarayreh et al., 2012).

The popularity of KM has been increasing fast, especially in the late 90's and it has become a central topic of management philosophy and a management tool (I. R. Edvardsson, 2003). The rise of KM is attributed to development of intranets that allowed faster, better and direct communication within organizations (Srikantaiah & Koenig, 2000, p. 25). In the 1995 there were 45 articles on KM in the ABI/information database, 158 in 1998 and 835 in 2002 (I. R. Edvardsson, 2003).

Mark Koenig and Kanti Srikantaiah (2004) define three phases of KM development. First phase began in 1992 and was focused on sharing knowledge and its coordination through company. The goal was to gain additional value from intellectual capital. Features of the first phase of KM are: main focus of the company on IT; organization culture is not suitable for KM; companies do not take care on remuneration of employees and their contribution to KM; company management does not support KM (Koenig & Srikantaiah, 2004; Milanović, 2010). The second phase was between 1992 and 2002 and was based on human and cultural dimension as foundation for knowledge management (Koenig & Srikantaiah, 2004). Features of the second phase are: focus of companies on human and cultural dimension of KM; management supports KM; organizational culture and infrastructure which favor KM are being developed; companies measure utility of KM (Tiwana, 2001). The third phase focused on development of taxonomy and knowledge storage (Koenig & Srikantaiah, 2004). Features of the third phase are: the company deals with all factors that influence the success of knowledge management; special care is devoted to coding and storing of information and knowledge (Vidović, 2003, p. 22)

Some authors argue that the rise and growth of knowledge management is managerial response to various empirical trends associated with globalization and post-industrialism (Harry Scarbrough & Swan, 2001). In organizational terms, they state, that flatter structures, de-bureaucratization and 'virtual' organizational forms characterize the new era. The value of knowledge tends to perish quickly over time and companies need to speed up innovation and enhance creativity and learning (Kluge, Stein, & Licht, 2001). A growing number of organizations adopts team working, organic structures, knowledge-centric cultures (I. R. Edvardsson, 2003) through which the importance of knowledge is highlighted in current organizational theory and contemporary organizational trends.

Early models of KM, which were rather simplistic and very straightforward, focused on the ideas of tacit and explicit knowledge. Through a development of a mechanisms, these models tried to make implicit knowledge explicit, allowing explicit knowledge to be made individually meaningful (Sarayreh et al., 2012). In the past few decades authors

delivered different definitions of knowledge management, but they all have in common that knowledge in organizations is an essential element in defining career success of employees and it combines all of their skills (C.-Y. Fong et al., 2011).

Most definitions of KM include a combination of a management philosophy related to organizational knowledge and a technology based knowledge gathering and sharing systems. Overall accepted definition defines knowledge management as (Thite, 2004):

Creating, acquiring, storing, sharing, transferring and utilizing both explicit and implicit forms of knowledge at individual, group, organizational and community level through harnessing of people, process and technology.

Table 6 gives an overview of several definitions of KM in order to give perspectives and issues from which the KM is observed and researched.

Table 6: Definitions of knowledge management in literature

Knowledge management definition	Authors
Management function that creates or locates knowledge. It manages the flow of knowledge within the organization and ensures that the knowledge is used effectively and efficiently for the long-term benefit of the organization.	(Darroch & McNaughton, 2002)
Knowledge management 'means the strategies and processes of identifying, capturing and leveraging knowledge to help the company compete'.	(Jarrar, 2002)
Knowledge management includes two aspects, 'managing' the knowledge that already exists in the organization and enhancing the ability to create 'new' knowledge.	(Albers & Brewer, 2003)
Knowledge management has a goal of optimal usage of existing knowledge, developing and implementing to the new products, processes and business areas.	(North, 2008, p. 3)
Performing activities involved in discovering, capturing, sharing and applying knowledge so as in the cost – effective fashion, the impact of knowledge on the unit's goal achievement.	(Becerra-Fernandez et al., 2004, p. 2)
A systematic process by which organization identifies, creates, acquires, shares and leverages knowledge.	(Chivu & Popescu, 2008)
KM is defined as creating, acquiring, storing, sharing, transferring and utilizing both explicit and implicit forms of knowledge at individual, group, organizational and community level through harnessing of people, process and technology.	(Thite, 2004)
Set of procedures and technological tools that ensure integrated and systematic approach in identifying, managing and sharing intellectual property of organizations.	(Ajay, 2011)
KM is explicit and systematic management of vital knowledge and is associated with creating, gathering, organizing, diffusion, use and exploitation of the knowledge.	(Anand & Singh, 2011)
Knowledge management is conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information in ways that strive to improve organizational performance.	(O'Dell & Grayson, 2012)

Literature discussing applications of IT to organizational KM initiatives reveals three common applications (Maryam Alavi & Leidner, 2001): (1) Coding and sharing of best practices; (2) Creation of corporate knowledge directories; (3) Creation of knowledge networks. Also Housel and Bell (2001) summarized four main goals of KM: (1) Gathering: bringing information and data into the system; (2) Organizing: associating items to subjects establishing context, making them easier to find; (3) Refining: adding value by discovering relationships, abstracting, synthesizing and sharing; (4) Disseminating: getting knowledge to people who can use it. Knowledge management from an operational perspective, is perceived as systematic process by which an 'organization identifies, creates and acquires, shares and leverages knowledge' (Chivu and Popescu, 2008). The analysis of knowledge management, solution and its components are presented below.

3.3 Knowledge Management Solutions

Knowledge management is explicit and systematic management of vital knowledge and is associated with creating, gathering, organizing, diffusion, use and exploitation of the knowledge (Anand & Singh, 2011). It is not only a necessity, but also a source of competitive advantage and thus an important strategic resource for business organizations. One of the main goals of KM is to take the tacit knowledge, what people carry around, what they observe and learn from experience and what is internalized and therefore not readily available for transfer to another and turn it into explicit knowledge which has been formalized in people's heads, or documented in books and papers (Srikantaiah & Koenig, 2000).

The term knowledge management does not apply only to a set of technologies or methodologies, but also practice and discipline that involve interaction of people, processes and technology. Therefore, when discussing knowledge management and researching the KM initiatives different terms appear: knowledge management *solutions*, *systems*, *models and processes*. These terms are not equivalent, and a below classification and description of each is given below.

(1) *Knowledge management solutions* are comprehended as variety of ways through which KM can be facilitated (Becerra-Fernandez et al., 2004). Solutions can be divided into four broad levels (see Figure 9)

(2) **KM process** is a wider process that helps in discovering, capturing, sharing and applying knowledge. These processes are supported by KM systems and KM subprocesses[3].

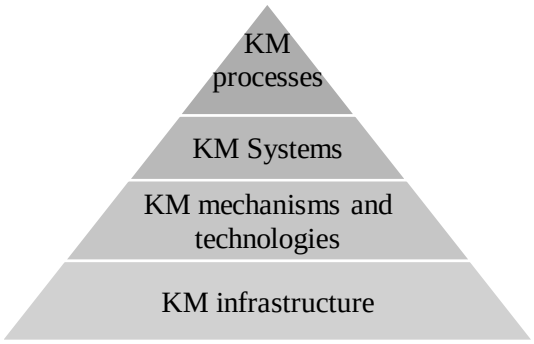
(3) **KM systems** involve integration of technologies and mechanisms. They are developed for all KM process.

(4) **KM mechanisms and technologies** are used in KM systems. Each KM system utilizes combinations of multiple mechanisms and technologies which promote KM. Hence, the same mechanisms and/or technology can in different circumstances support different KM systems.

(5) **KM infrastructure** serves as support for KM mechanisms and technologies. Infrastructure reflects the long-term foundation for KM. It include five major components: *organization's culture and structure*, *communities of practice*, *IT structure* and *common knowledge*. Information technologies infrastructure in an organization is developed to support organization's information systems but it also needs to facilitate knowledge management. IT infrastructure includes data processing, storage and communication technologies and systems. To analyse the IT infrastructure capabilities, which enable KM in enhancing common knowledge and facilitating KM processes, the following needs to be considered: reach, depth, richness and aggregation (Becerra-Fernandez et al., 2004). These aspects of KM are not part of the research body of this thesis.

Figure 9: Overview of KM solutions

[3] Becerra-Fernandez et al. (Becerra-Fernandez, González, & Sabherwal, 2004) proposed a model of four main KM processes and seven subprocesses. KM process and subprocesses are explained in the next chapter.



Source (Becerra-Fernandez et al., 2004, p. 31)

From the bottom up view, KM infrastructure supports KM mechanisms and technologies, which are used in KM systems that enable KM process. All of this can be put under the same heading: *Knowledge Management Solutions*. Knowledge management processes and existing models are explained below, followed by knowledge management systems and technologies.

3.4 Knowledge Management Process

Existing research and conceptual studies in knowledge management filed are identified as dynamic sets of activities (Mehta, 2008). These are called the KM processes. For purpose of this research KM processes have been derived focusing on existing reviews on KM processes. When observing main processes in knowledge management, a unified agreement among KM researchers was not met. Theorists in KM scientific and practical research presented and analysed different KM processes models several of which are presented below (see Table 7). Each of these KM models presents a slightly different focus within the process viewpoint.

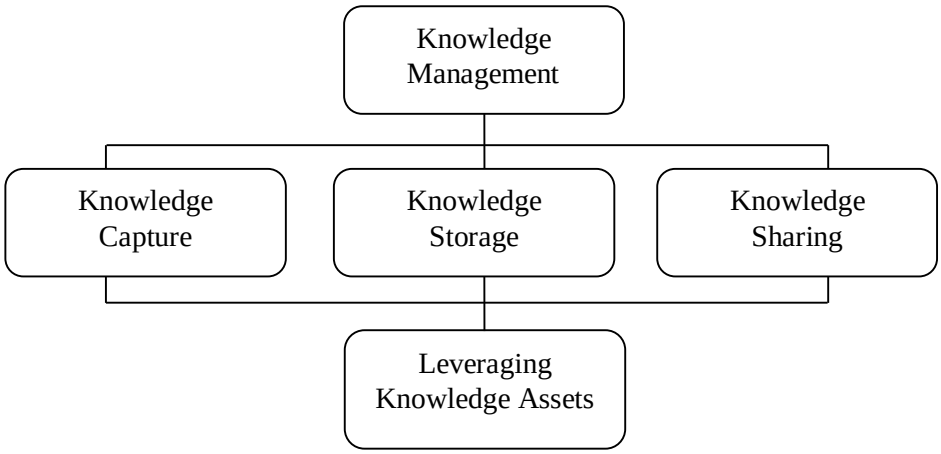
Table 7: Overview of KM processes derived by various authors

Authors	KM processes
(Hedlund, 1994)	Knowledge acquisition, knowledge store, knowledge transfer, knowledge application, knowledge protection
(Quintas, Lefrere, & Jones, 1997)	Process or practice of creating, acquiring, capturing, sharing and using knowledge
(Demarest, 1997)	Knowledge construction, knowledge dissemination, knowledge embodiment, use
(Thomas H. Davenport, De Long, & Beers, 1997)	Four KM project objectives: (1) creation of knowledge repositories, (2) improve knowledge access, (3) enhance knowledge environment and (4) manage knowledge as an asset.
(Becerra-Fernandez et al., 2004, p. 2)	Discovery (Combination and Socialization); Capture (Externalization and Internalization); Sharing (Socialization and Exchange); Application (Direction and Routines)
(Thomas H. Davenport et al., 1997; S. A. Moore, 2010; Plessis, 2007b)	Knowledge capture, storage, sharing and leveraging knowledge assets.
(P. S. Fong & Choi, 2009)	Six KM processes; acquisition, creation, storage, distribution, use and maintaining
(Madhoushi et al. 2010)	Creating; Aquiring; Storing; Sharing; Transferring; Utilizing; Innovation; and Competitive advantage

Source: Adapted by Mishra & Bhaskar (2011) and authors research

For a better understanding of the KM processes, three theoretic definitions of KM process models are presented below. The model used for this thesis is explained in detail later on. Davenport et al. (1997, p. 91) identified four KM project objectives, including: (1) creation of knowledge repositories, (2) improvement of knowledge access, (3) enhancement of knowledge environment and (4) management of knowledge as an asset (see Figure 10).

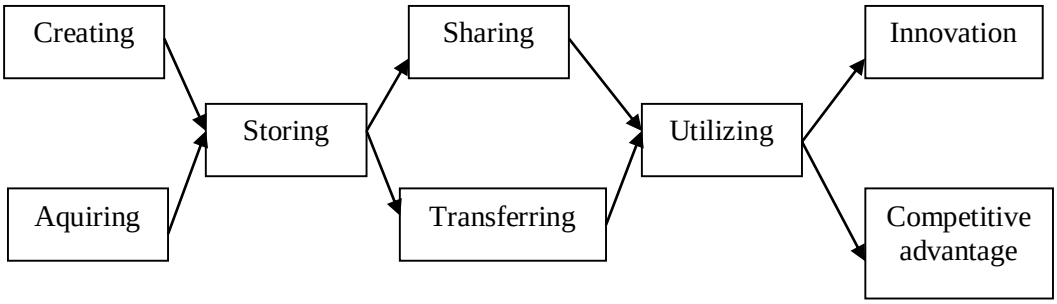
Figure 10: Knowledge management components



Sources: (Thomas H. Davenport et al., 1997; S. A. Moore, 2010; Plessis, 2007b)

Madhoushi et al. (2010) developed a broader perspective on KM processes (see Figure 11). Initiation of KM process involves creation or acquisition of knowledge by an organization or an individual. After new knowledge is created or acquired, it should be stored, formalized and accessible. The next step is sharing or transferring knowledge from a sender to a known receiver. Once the knowledge is shared, it can be used in facilitating innovation or incorporated into organization's products, services and practices to derive a value from it (Madhoushi et al., 2010).

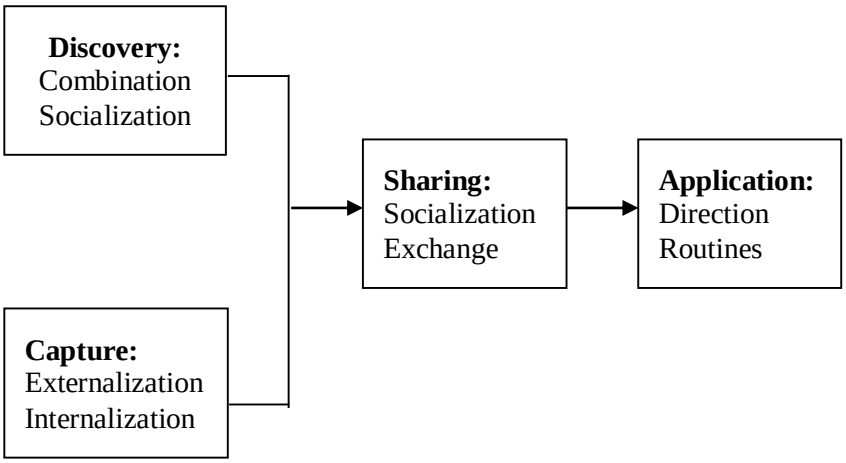
Figure 11: Subsequence of KM process



Source: (Madhoushi et al., 2010)

One of the basic models of KM processes was introduced by (Becerra-Fernandez et al., 2004, p. 2). Figure 12 shows the KM process through which knowledge is discovered or captured, and then shared and applied. These four main KM processes are supported by a set of seven sub-processes: combination socialization, externalization, internalization, exchange, direction and routines. Out of these seven subprocesses, four are based on Nonaka (Nonaka, 1994 from Becerra-Fernandez et al., 2004, p. 33).

Figure 12: Knowledge management process

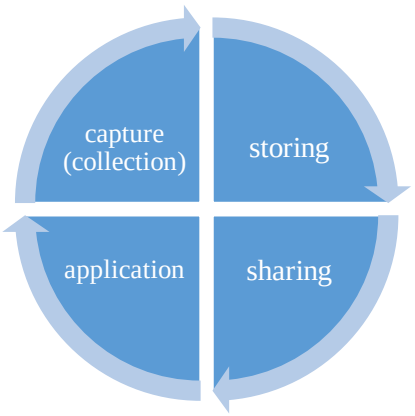


Source: (Becerra-Fernandez et al., 2004, p. 32)

New knowledge is discovered through *combination*, meaning that multiple bodies of explicit knowledge are synthesized in order to create new sets of explicit knowledge (Nonaka, 1994) (Becerra-Fernandez et al., 2004, p. 3). Data mining techniques can be used to uncover new relationships in explicit data, e.g. when creating a new business proposal for a client, explicit data, information and knowledge embedded in prior proposal may be combined into a new proposal. *Socialization* synthesizes tacit knowledge across individuals, usually through joint activities instead of writing or verbal communication (Becerra-Fernandez et al., 2004, p. 33). *Externalization* involves converting tacit into explicit forms of knowledge (words, concepts, visuals or figurative language) (Nonaka & Takeuchi, 1995). For example, writing down everything that the project team has learned about the start-up organizations and market. *Internalization* is conversion of explicit knowledge into tacit (Becerra-Fernandez et al., 2004, p. 33). For example, reading a manual or a book and learning from it. *Exchange* is focused on sharing explicit knowledge (Becerra-Fernandez et al., 2004, p. 33). Knowledge can be applied *directly* and through *routines*, which are subprocesses and explained in the previous section. Direct refers to process through individuals, who have the knowledge, aimed actions and behaviour of another individual without transferring the knowledge underlying the direction (Becerra-Fernandez et al., 2004, p. 35). For example, when a production worker calls an expert to ask them how to solve a problem with a motor or an engine and then proceeds to solve the problem based on the instructions received form the expert (Becerra-Fernandez et al., 2004, p. 35). Another way of being responsive to knowledge are routines which involve employment of knowledge embedded in rules, procedures and norms which guide future behavior (Becerra-Fernandez et al., 2004). Research on KM practices and innovation showed that being responsive to knowledge is an important factor for improving innovation in a company (V.-H. Lee, Leong, Hew, & Ooi, 2013).

For the purpose of this thesis, an adapted view to that of Becerra-Fernandez et al. (2004, p. 2) is used. KM is defined through knowledge creation (collection), knowledge sharing and knowledge storing and knowledge application (see Figure 13)

Figure 13: Knowledge management process



Source: Adapted by (Becerra-Fernandez et al., 2004, p. 2)

This process has to be continuous, as any break in the chain can render KM ineffective in the organization (Anthony Olomolaiye, 2007, p. 51).

3.4.1 Knowledge capture/creation process

In accordance with other authors, for the purpose of this thesis knowledge creation includes knowledge discovery, creation and capture.

Knowledge discovery and creation are defined as development of new tacit or explicit knowledge from data and information or from the synthesis of prior knowledge (Becerra-Fernandez et al., 2004, p. 33). Knowledge capturing is the process of retrieving explicit or tacit knowledge that resides within people (individuals or groups), artefacts (practices, technologies or repositories) or organizational entities (units, organizations or interorganizational networks) (Becerra-Fernandez et al., 2004, p. 33). Capturing is a process by which expert's thoughts and experience are captured (Awad & Ghaziri, 2004, p. 121) in order to elucidate importance or interlinkage (Staab et al., 2000). Capturing tacit knowledge and converting it into rules which can be used by a computer is a costly business (Awad & Ghaziri, 2004, p. 121). This requires extensive time commitment from expert domain and special skills of knowledge developer. Capturing knowledge is strategic organizational ability to bring into existence and originate new knowledge continuously and repeatedly in a circular process with no ultimate end (Anthony Olomolaiye, 2007).

3.4.2 Knowledge storing process

Once knowledge is created, it needs to be stored in a database for subsequent use by employees in different departments (C. Storey & Kelly, 2002). Knowledge storage is defined as a process of structuring and storing of knowledge (Massa & Testa, 2009) and is considered one of essential elements in the KM process as it helps in prevention of losing important information (V.-H. Lee et al., 2013). It is similar to organizational memory and it enables an individual to store, integrate and reuse the information again in the future (V.-H. Lee et al., 2013). Knowledge storing formalizes knowledge and provides the possibility of utilizing it later. Refined and stored knowledge enables employees to retrieve and disseminate knowledge conveniently and therefore proving it to be a valuable element for a company (Gold, Malhotra, & Segars, 2001).

They also discovered that interrelationships between the KM dimensions are positive and significant. (T. J. Chang, Yeh, & Yeh, 2007) examined the relationship between

knowledge storage and organization innovation among managers and business owners. Knowledge storage was found to assist companies in transmission of knowledge. Research showed that employees can obtain knowledge when they need it, resulting in time and cost saving.

In knowledge creation and storage process a distinction between individual and organizational memory can be made. Individual memory is based on a persons' observations, experiences and actions (Maryam Alavi & Leidner, 2001). Collective memory, also known as organizational memory, is means by which knowledge from past experience and events influence present organizational activities and it extends beyond the individual's memory (Maryam Alavi & Leidner, 2001; Stein & Zwass, 1995).

3.4.3 Knowledge sharing process

This is one of the most researched processes of knowledge management. Knowledge sharing is the process of exchanging and communicating knowledge and information between employees in an organization (Xiong, 2008) where people are primary entity. It refers to transmitting knowledge from the place where it is stored to the situation where it is used and vice versa. There are three types of transfer: between individuals, between individuals and storage media and between different knowledge storage mediums. The process of sharing knowledge starts at an individual level and expands to group and organizational level. Talking to colleagues to help them get a better understanding or to find out a solution to your problem is basically knowledge sharing on individual level (H. F. Lin, 2007).

Knowledge sharing is a social interactive culture, involving the change of employee knowledge skills and experience through every department in organizations. It comprises a set of shared understandings related to providing employees with access to relevant information (Hoegl, Parboteeah, & Munson, 2003). Such process of sharing organizational knowledge facilitates exchange of working experiences, technical know-how and individual insights between and among individuals. Knowledge sharing has become essential in organizations because it enables enhancement of innovation performance and reduces the redundant learning efforts (H. F. Lin, 2007). Many researchers have been examining effectiveness of knowledge sharing from different viewpoints focusing on the problem of transferring tacit and complex knowledge across organization parts, on the nature of informal relationships between two parties to transfer knowledge and the problem of searching for knowledge (Ardichvili et al., 2006; Brauner and Becker, 2006; Connelly and Kelloway, 2003; Goh and Hooper, 2009; Hoegl et al., 2003; Jalote, 2003; Lee et al., 2011; C.-P. Lin, 2007; H.-F. Lin, 2007; Martins and António, 2010; Matsuo and Easterby-Smith, 2008; Moorthy and Polley, 2010 and others).

Most authors agree that knowledge sharing depends on individual factors like experience, values, motivation and beliefs (Connelly & Kelloway, 2003; H. Lee & Choi, 2003; H. F. Lin, 2007) Sharing knowledge effectively increases the accumulation of organizational knowledge and develops the capability of its employees for better performance (Jalote, 2003). Organizations can develop knowledge in a variety of technical domains. Due to limited resources, organizations are forced to make a choice. They choose to develop knowledge in one technological domain and so reduce their own possibilities to develop expertise in another field. Such choice affects organization's ability to succeed in the long run (Moorthy & Polley, 2010).

Network model of knowledge transfer draws heavily on communication support systems to establish electronic channels for the efficient transfer of knowledge among individuals (Easterby-Smith & Lyles, 2005, p. 110). Communication support for knowledge transfer can be distinguished as synchronous and asynchronous. The *synchronous* communication support system include online chat, audio and video conferencing, in other words it enables the synchronous exchange of messages among different communication parties. The *asynchronous* communication support for knowledge transfer enables time-delayed communication. It includes e-mails, voice mail and computer conferencing (Easterby-Smith & Lyles, 2005, p. 110). Social dimension in knowledge transfer is very important, it relates to confidence and willingness to transfer knowledge. In the transfer of tacit knowledge in subsidiary companies it has been found that employees who are instructed to transfer knowledge in the branch should promote a trust climate that enhances interactive communication between the sender and recipient of knowledge (Martins & António, 2010).

Lee et al. (2011) found that a number of collaborative knowledge networks and relationships are positively associated with creating and sharing knowledge. Particularly interesting for network transfer are people – when people connect together, multiple paths for creation and flow of knowledge exist. Combining knowledge of different employees creates new opportunities and responds to challenges in innovative ways (Mathew et al., 2011). In addition, (C.-P. Lin, 2007) argues that the survival of a company may be substantially undermined if employees are not willing to share knowledge, by which the very ethics foundations can seriously be affected. To manage this 'knowledge', companies use techniques and methods that are developed as part of knowledge technology to analyse the knowledge sources in an organization. Knowledge Analysis and Knowledge Planning are done through these procedures (Ahmed & Ahmad, 2012). Knowledge sharing has been identified as a major focus area for KM. It provides a link between the level of individual knowledge workers, where knowledge resides and level of organization where knowledge attains its (economic, competitive) value (Hendriks, 1999).

3.4.4 Knowledge application

The process of knowledge application depends on the available knowledge and on the whole KM process. The better the processes of knowledge discovery, capture and storage the higher the chance that the knowledge needed will be available (Becerra-Fernandez et al., 2004, p. 35). Knowledge application, also named knowledge responsiveness, in its basic form means companies responding to different types of information it has access to (V.-H. Lee et al., 2013). Responsiveness refers to the way the company takes in and comprehends important information from its surroundings: customers, competitors, suppliers and others who can affect and are affected by the company's performance (Allameh & Abbas, 2011). For example, knowledge application/responsiveness is when a company obtains knowledge about customers' needs and then responds (immediately) to that information (V.-H. Lee et al., 2013).

3.5 Knowledge Management Systems

In order to support the goals of collecting, storing, sharing and utilizing knowledge, companies can implement a variety of supporting technologies, strategies and mechanisms to connect the knowledge of individual members in the company (S. A. Moore, 2010). These tools used in knowledge management are part of the knowledge management system in organizations.

Knowledge management systems (KMS) are systems developed to support and enhance organizational processes (Alavi and Leidner, 2001). Two underlying models for KMS have been identified (M. Alavi, 2000):

(1) The repository model, which aims at creation and maintenance of stocks of explicit knowledge in organizations.
(2) The network model which aims at using the power of ICT to support the flow of knowledge in organizational settings and among networks of individuals

According to research by Gottschalk (2005, pp. 98–118), the reasons for initiating implementation of KMS in an organization are: (1) Increase of profitability and revenue; (2) Protection of talent and expertise; (3) Improving customer service and satisfaction; (4) Ensuring the company's market share in the struggle with competitors; (5) Entry into new market segments; (6) Reduction of costs and (7) Development of new goods and services. These systems support the network of experts in creating, collecting, structuring, distribution, development and application of knowledge (Milanović, 2010). KM systems can be classified into four systems: *knowledge discovery/capture systems, knowledge storage systems, knowledge sharing systems and knowledge application systems* (Becerra-Fernandez et al., 2004, p. 37).

3.5.1 Knowledge capture systems

Knowledge capture systems support the process of retrieving explicit or tacit knowledge and rely on mechanisms, which support externalization and internalization. Some of these are: learning by doing, on the job training, learning by observing, face-to-face meetings, (Becerra-Fernandez et al., 2004, pp. 33–37). Databases and web-access to data are used for facilitating knowledge combinations discovery systems, and for facilitating socialization video-conferencing and electronic support for communities of practices (Becerra-Fernandez et al., 2004, pp. 33–37).

3.5.2 Knowledge storage systems

For enhancing organizational memory, advanced computer storage technology and sophisticated retrieval techniques, such as query languages, multimedia databases and database management systems are effective tools because they increase the speed at which the organizational memory can be accessed (Maryam Alavi & Leidner, 2001). Groupware enables companies to create intraorganizational memory which can be structured and unstructured information and to share this memory across time and space (Vandenbosch and Ginzberg 1996 from (Maryam Alavi & Leidner, 2001).

3.5.3 Knowledge sharing systems

In sharing knowledge and learning, IT can contribute through long-distance communication (video conferencing and online meetings), when employees cannot meet face to face, also in sharing experiences and ideas through networking and chat. Information technology can assist in business communication, data collection, acquisition

and reutilization through database, *Customer Relationship Management* (CRM), *Supply Chain Management* (SCM), *Marketing Information System* (MIS), *Event - Driven Architecture* (EDA), extranet and other. Larger part of organizational knowledge is implicit (tacit) and that can only be shared through direct interactions. For such KM, organizations have to generate desired culture and environment based on learning, trust, commitment and participation and encourage direct interactions (Pivar, Malbašić, & Horvat, 2012). Technologies facilitating knowledge exchange include groupware and team collaboration mechanisms, Web-based access to data and databases, repositories of information, including best practice databases, lessons learned systems and expertise locator systems (Becerra-Fernandez et al., 2004, pp. 33–37).

Knowledge sharing in IT companies is of great importance. IT companies characterize project teams where employers have different roles. Such approach allows better communication and easier detection of potential problems in all phases of the software product (Olofsson, 2012, p. 27). This process is very important because finding possible errors greatly reduces the cost of correcting them. A common case in IT companies is people from different places working on projects and therefore virtual teams are popular. Members of teams can come from different countries and cultures. However, they need to do business together and at the same time they need to share their knowledge to make projects successful (Olofsson, 2012, p. 27). IT is an important aspect of learning and knowledge transfer and tacit knowledge transfer in face-to-face communication has a large impact; it can be used as an effective means of communication. Research on using *Target Costing Systems* (TCS) infrastructure and information technology (Choe, 2011) showed that companies using such systems can create, upload and share various forms of tacit knowledge among employees to facilitate innovation process. Likewise, mentors can use IT to support their students through direct communication and interaction and thus fulfilling the need for social interaction, in which they know they are communicating with other people (Duh & Krašna, 2011). With IT support in learning, more employees can be involved and geographical distance can be conquered.

3.5.4 Knowledge application systems

These systems are used to support the process of linking of explicit and implicit knowledge among individuals. Mechanisms and technologies support knowledge application systems through routines and direction. (Becerra-Fernandez et al., 2004, p. 37).

3.6 Knowledge Management Technologies

Effective KM involves a combination of technological and behavioural elements (M Alavi & Tiwana, 2003). KM mechanisms present organizational or structural means used to promote KM. The mechanisms can utilize technology and they involve some kind of organizational arrangement or social means of facilitating knowledge management (Becerra-Fernandez et al., 2004, p. 372). KM technologies, as mentioned above, support KM systems and benefit from KM information technology structure[4]. They rely on IT as an important enabler and sometimes tend to overlook the socio-cultural aspects, which underpin KM (Davenport and Prusak, 1998).

Technology, along with information revolution and globalization, continues to exert major effects on KM and its development (Chong, 2006). In its essence, information and communication technology is regarded as facilitator of knowledge creation in innovative societies (Chase, 1997; Kulkarni et al., 2007; Morin et al., 2011; Pan et al., 2001; Sue Young Choi et al., 2010). Information technology is only one of various dimensions of KM and technology itself does not transform information into knowledge (Milanović, 2010). Knowledge projects are more likely to succeed if they are supported by technology and web-based intranets; such tools provide opportunities for organizational learning and increase functional specialization (Madhoushi et al., 2010). The aspect of ICT for support of KM in organizations has found many followers (M Alavi & Tiwana, 2003; Allahawiah et al., 2013; Becerra-Fernandez et al., 2004; Brauner & Becker, 2006; Hirt, 2012; Lindberg, 2012; Madhoushi et al., 2010; Mohammed & Jalal, 2011; Srikantaiah & Koenig, 2000). Literature states that successful organizations in order to ensure their survival and remain strong and effective, need to embrace knowledge implementation and technology which are the hallmarks of service and production performance (Allahawiah et al., 2013; Anand & Singh, 2011).

Knowledge management uses strategies associated with ICT. Based on the fact that intranet is commonly used in KM, their functions are: exchange of information among employees, participation in management, support and development activities, support in educational activities and informal chat communication (Milanović, 2010). These systems could be somewhat appropriate for transfer and learning tacit knowledge,especially when it comes to establishing relationships between employees, exchanging experiences, advice, storytelling through networking and chat. Technology enables personalization and as such has direct responsibility for learning (Ivanišin, 2009).

According to Carvalho and Ferreira (2001), there are ten different categories of software used for KM; these systems refer to a class of IS applied to managing organizational knowledge (Alavi and Leidner, 2001):

- *Systems based on intranet* are the most common used tools in a company.
- *Document Management Systems* - these systems store explicit knowledge (Thomas Davenport & Laurence Prusak, 2000). Information needed by employees to perform daily work is often available in the form of documents, graphics and video clips. Document Management Systems allow management, archiving, administration, search and removal of documents and are often integral to intranet (Milanović, 2010).

[4] KM information technology structure is a part of KM infrastructure which is comprised of organization culture and structure, communities of practice, IT infrastructure and common knowledge.

- *Groupware* are systems that support group work. They should be a synthesis of three aspects: communication (reliance on e-mail system), cooperation (exchange of ideas and databases for more people simultaneously) and coordination (business process automation) (Milanović, 2010). Videoconference can also be used in transmission of such knowledge and learning. For example, India, China & America (ICA) Institute uses various types of technology to collect, create and disseminate knowledge. One of such technologies is *GoToWebinar.com* which is a website that allows users online meetings and document sharing (Russell, Parker, Bolden, & Sherman, 2011). It allows members of organizations from around the world to be present in one place and exchange ideas, experience and plans.
- *Systems based on artificial intelligence*. One of the areas of artificial intelligence, which has found wider application in practice, is called the *expert* system. It represents the embodiment of expert knowledge in a form that the system can independently offer intelligent advice or make an intelligent decision (Milanović, 2010; Wickramasinghe & Lubitz, 2007, p. 156).
- *Systems for mapping skills/knowledge* are like the yellow pages that contain the "who-knows-what" lists (Milanović, 2010). Mapped knowledge is not stored knowledge, but refers to people who possess it and therefore it creates the opportunity to exchange the knowledge. The most widespread application of knowledge maps is in the departments of human resources, because such knowledge map contains competence of members of the organization. It provides expert ability to locate experts who fit to a specific problem or project best. Systems mapping skills are often an integral part of the intranet (Milanović, 2010).
- *Web portals* are places of storage, organization and access to different types of information with the purpose of education. In addition, *Vortals* are vertical portals that gather, organize and provide access to specialized areas (Milanović, 2010).
- *Workflow Management Systems* provide support to standardized business processes. The aim is to establish a workflow system and speed up the monitoring process of each step and following any activities that are part of the process (Carvalho & Ferreira, 2001).
- *Business Intelligence (BI)* represents previously concealed knowledge revealed from routinely collected business data using appropriate calculation-logical methods, usually supported by information technology (Panian, 2007).
- Tools to support innovationare based on the scientific content or patent databases that allow users to invent new products, document design deficiencies and additions to existing ones, identify technological trends or improve business processes (Heneman & Milanowski, 2011).
- *Competitive Intelligence* in a company covers a wide range of knowledge, information and data about its overall competition from identifying corporate objectives of competitors through employee data up to the business strategies of competing companies (Panian, 2007).

After summarizing definitions and issues of KM processes and systems and their support in KM mechanisms and technologies, Table 8 below presents brief summary of their combinations.

Table 8: KM process systems and technologies

KM Process /systems	KM Mechanisms	KM Technologies
Knowledge capture systems	Meetings, telephone conversations and collaborative creation of documents; employee rotation across departments, conferences, brain storming retreats, on-the-job training, face-to-face meetings, learning by doing	Databases, Web-based access to data. Data mining, repositories of information, web portals, best practices, video-conferencing, e-mails, expert systems, chat groups, computer base communication
Knowledge storage systems	Process of storing documents, ideas, brainstorming, documenting and failing	Advanced computer storage technology and sophisticated retrieval techniques, such as query languages, multimedia databases and database management systems
Knowledge sharing systems	Memos, manuals, letters, presentation, employee rotation across departments, conferences, brainstorming retreats	Team collaborative tools, web based access to data, databases and repositories of information, best practices data bases, lessons learned systems and expertise locator systems, video-conferencing, e-mail
Knowledge application systems	Traditional hierarchical relationships in organization help desk, support centres, work practices, standards.	Capture and transfer of experts knowledge, troubling systems, case based reasoning systems, management information systems

Source: (M. Alavi, 2000; Becerra-Fernandez et al., 2004, pp. 33–41; Easterby-Smith & Lyles, 2005; Milanović, 2010; Pivar et al., 2012)

Knowledge and knowledge management systems and technologies have become a key formula for success, because they serve as a basic framework for sustainable strategic development of the company in all aspects of the business (Milanović, 2010). Technology used in companies has to support networking, facilitation of interaction of employees either formally or informally, within an organization and between organizations (Mathew et al., 2011). Various developed countries have recognized information and communication technology as drivers of the knowledge-based society. ICTs are accepted as the new drivers of change, tools for releasing potential and knowledge embodied in people. They have transformed the ability of both individuals and organizations to augment their intelligence via accelerated learning (Pemberton & Stonehouse, 2000).

4 RELATIONSHIP BETWEEN HUMAN RESOURCE MANAGEMENT AND KNOWLEDGE MANAGEMENT

Human resources management is an approach that creates trust and learning atmosphere and helps employees to create, share and utilize knowledge and expertise. The aim of knowledge management is to support and enhance employees' knowledge processes and it is therefore important to identify different knowledge management initiatives that human resource practices need to support. Knowledge management as presented in Chapter 3 is defined as creating, acquiring, storing, sharing, transferring and utilizing both explicit and implicit forms of knowledge at individual, group, organizational and community level through harnessing of people, process and technology (Madhoushi et al., 2010). However, the significant shift towards a systematic and strategic approach to managing people, knowledge processes and knowledge product as primary assets of knowledge economy, is something new (Whicker & Andrews, 2004). Various researchers argued that knowledge depends on people and that HRM issues, such as: recruitment and selection, education and development, performance management, pay and reward; are vital for managing knowledge within companies (Currie & Kerrin, 2003; I. R. Edvardsson, 2003; Foss, Minbaeva, Pedersen, & Reinholt, 2009; Lopez-Cabrales et al., 2009; Minbaeva, Foss, & Snell, 2009; Oltra, 2005; Yahya & Goh, 2002).

For the purpose of this thesis, HRM is observed from two aspects: (1) *functions of HRM* and (2) *effective factors*. Theoretical foundation of (1) and (2) is presented in detail in Chapter 2. Throughout this section, mutual impact between knowledge management and human resource management is explained based on theoretical findings in literature. First, the findings regarding HRM and KM are presented, based on which the conceptual model of the relationship is formed, depicted and explained. At the end of the section, a detailed overview of previous studies (empirical and theoretical) in the field of HRM and KM is given in Table 11.

4.1 Human resource view of knowledge management

The aspects of knowledge management have been dominated by two main factors: (1) the supporters of information and communication technology and (2) the human resource views (Jantz, 2001). Some analysts believe that IT is the main driver for knowledge management, though others disagree and believe that knowledge management is mostly about people and not technology (Soliman & Spooner, 2000).

Literature regarding KM, particularly, has reflected a techno-centric focus which, in essence, regards knowledge that can be captured, manipulated and leveraged through IT (Pastor et al., 2010). This perception is limited and needs to be enhanced with a human-centric focus. Such focus perceives knowledge as a social creation emerging at the interface between people and information and between people themselves (Pastor et al., 2010). From this perspective, KM is concerned with the way organizations create, supplement and organize knowledge around their activities, within their cultures and develop organizational efficiency by improving the use of employees' talent (Pan & Scarbrough, 1999). The HR-view of knowledge management (2) is increasingly gaining more attention in recent years (Brewer & Brewer, 2010), especially in project-based industries (Ahmed & Ahmad, 2012; Bano, 2011) and also in some specific industries such as construction (Egbu, 2001; Egbu et al., 1998; A. Olomolaiye & Egbu, 2006), research at universities and libraries (Attafar et al., 2012; Mohammadian, et al., 2011) and several others. Various researchers (Ahmed & Ahmad, 2012; Attafar et al., 2012; T. H. Davenport & Völpel, 2001; Hussock, 2009; Ishak et al., 2010; H. F. Lin, 2007; Oltra, 2005; Özbebek & Toplu, 2011; Theriou & Chatzoglou, 2008) have been interested in the area of knowledge management and employees, combining it with perspectives of strategic, project and information management.

In the 1960s, the concept of 'knowledge economy' or 'knowledge-based economy' appeared (Dang & Umemoto, 2009). Information technology and knowledge were recognized as important, especially in economic activities. From an HRM perspective, the rise of the knowledge economy had major impact, with a considerable shift from HRM as a bureaucratic *personnel management* operation to the development of discrete HRM functions over the past few decades (Jha, 2011). It was accompanied by integration of these functions to support competitive advantage and a more strategic thrust. Personnel management operations were focused on cost minimization whereas in the new HRM function human experience was considered as important and where knowledge could be generated, shared and leveraged in the learning processes of lived experiences (Gloet, 2006).

Theories of knowledge economy are diverse and one of the reasons are different approaches to knowledge economy from different perspectives of knowledge. Various authors deliver different definitions of knowledge, but they all have in common that knowledge in organizations is an essential element in defining career success of employees and it combines all of their skills (C.-Y. Fong et al., 2011). Literature recognizes three main views of the knowledge economy based on specific assumptions regarding what knowledge is (Dang & Umemoto, 2009): knowledge-as-asset, knowledge-as-relation and knowledge-as-capability approach which appears to be the most appropriate. In *knowledge-as-asset view*, knowledge can diffuse easily from one entity to another. Typical knowledge assets are human resources, blueprints, technology embedded in machines, equipment, installations and technological procedures of business organizations. The *knowledge-as-relation* view observes knowledge as socially

constructed and shared resource and is concerned with social connections, interactions, networks of various actors within an economic system. Knowledge as *capability* denotes 'ability to act'. Capabilities refer to companies' and social capabilities of a nation and are understood in a dynamic process coherent with courses of actions (Dang & Umemoto, 2009).

Knowledge economy can be defined by four key points (Whicker & Andrews, 2004). Observing them together, these characteristics change the landscape in which HRM operates. The key points that define the knowledge economy are as follows:

- **Knowledge is important to organizations** and is acknowledged as critical to organizational success. Globalization and competition in a global market drive companies seeking a sustainable advantage which distinguishes them in their business environments (T.H Davenport & Prusak, 1998).
- **ICT** is deep-seated in almost all human interactions and business transactions. Nowadays, people are more 'technologically savvy' than at any other time in history (Prusak, 2001). IT skills are a requisite for all employees in addition to the speed of learning new software.
- **Relationships** amongst employees are more complex in knowledge economy (Klemp, 2001). New types of business-to-business relationships depend on new developed skills that emphasize interdependence; communication and ability to build strong work relationships. Need for physical contact has been reduced and even eliminated in some cases and the visualization changes the way people interact (Whicker & Andrews, 2004).
- **Time span of discretion**. Major key to competitiveness is speed, but paradoxically, people need to plan for a longer time span. Skills, which are emphasized, are efficiency, analytic thinking and planning (Raven and Stephenson 2001).

New opportunities for HRM emerge through nature and characteristics of work in knowledge economy. In order to maximize benefits from knowledge assets n knowledge economy, the HRM must (Whicker & Andrews, 2004):

- Support expertise in understanding and also defining companies' level of strategic knowledge capabilities;
- Manage knowledge workers through leveraging the *knowing-learning-doing* nexus;
- Build knowledge value as an individual and organizational asset;
- Minimize knowledge risk associated with the loss of requisite capability and knowledge.

Nowadays, the central role of individual and organizational capabilities is significantly strengthened with the onset of knowledge economy (Whicker & Andrews, 2004). Table 1 presents a summary of traditional approaches to HRM and the shift in the knowledge economy.

Table 9: HRM in the Knowledge Economy

Focus of HRM	Traditional HRM	HRM in Knowledge Economy
Strategy	Development of human resource strategy. Coordinating HR strategy and business strategies. (Whicker & Andrews, 2004)	Contribution to business strategy development through as strategic knowledge capabilities: knowledge acquisition, creation and sharing (Whicker & Andrews, 2004).
Recruitment and Selection	Define, find and hire target population for satisfying organization's personnel needs (Barber, 1998).	Goal is to identify, attract and sustain high calibre talent with focus on flexible, agile workforce (Whicker & Andrews, 2004). Employment systems designed to maximize performance in jobs which are most critical to organization's performance (Delery & Doty, 1996).
Training and development	Through planning and coordination, develop individual skills and competences. Employment of financial resources in order to develop and expand skills of employees. (Pološki Vokić, 2004; Whicker & Andrews, 2004)	Development of individual and organisational capability, focusing on personalised capability development embedded in work. Identifying and sharing excellent practices, which can facilitate knowledge networks, and building organisational capability by facilitating knowledge transfer. (Whicker & Andrews, 2004)
Performance Management	Monitoring and modification of individual performance. Goal is to reduce or eliminate undesirable behaviours and set desired behaviours to enhance individual performance. Performance appraisal and motivation trough material assets (financial bonus) (Bahtijarević-Šiber, 1999; Pološki Vokić, 2004; Whicker & Andrews, 2004).	Knowledge worker productivity: managing outcomes characterised by long feedback cycles (rather than managing inputs and processes). Retention of skilled knowledge workers. Enhancement of team/business unit performance. (Whicker & Andrews, 2004).

Source: Adapted from (Whicker & Andrews, 2004) and authors research

These areas represent elements of HRM, which offer the greatest opportunity to acquire, build and retain organizational capability. Transformation from traditional to knowledge starts with viewing HRM through a 'knowledge lens' and repositioning the functions in relation to strategic knowledge capabilities (Whicker & Andrews, 2004).

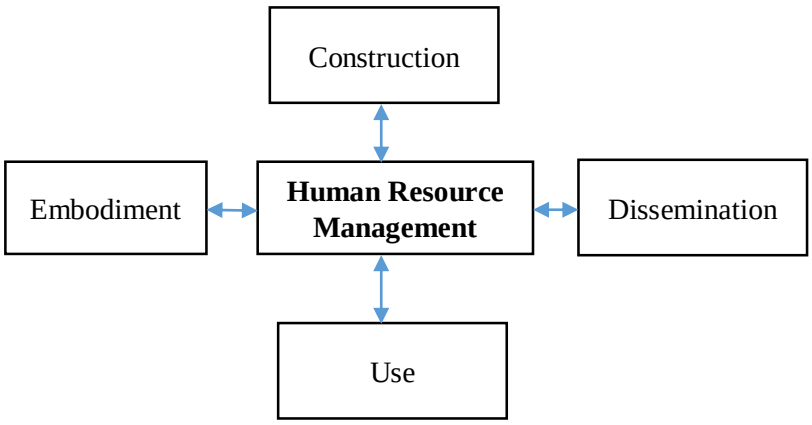
4.2 Relationship between HRM and KM

As mentioned in the first section, KM has been observed from two perspectives: (1) information and communication technology and (2) the human resource (Jantz, 2001). Although IT is the main driver for KM, it should not be the only one. Starting solely from a computer perspective when viewing the KM, it would definitely ensure its failure (Soliman and Spooner, 2000). In this thesis, the focus is set on the human resource perspective in order to gain more comprehensive insight into the relationship between two large areas of management. Literature recognizes various practices, factors and mutual impacts combining two observed research fields of HRM and KM. Since there is no fixed list of generally applicable HR practices which define and enhance KM, the purpose of this thesis is to research, explore, empirically test and analyse chosen functions and effective factors of HRM and their relationship with KM.

The first step towards building a conceptual model of mutual impacts is literature analysis, which recognizes this relationship. In order to develop a model which constitutes the link between HRM and KM, previous research and explored models are presented below. Based on these models, a conceptual model is formed (see Chapter 2, Section 2.4.2) and empirically tested afterwards. At the end of the chapter, an overview of the most significant contributions is given for a detailed literature analysis.

Clark & Staunton (1989) presented a model of the KM process, useful for mapping human resources knowledge (see Figure 14). This model was then modified by Soliman & Spooner (2000) providing a guide to four key concepts which could be mapped through human resources management function in combination with KM processes. The four concepts are: *construction, embodiment, dissemination and use of knowledge*. Figure 14 illustrates the interaction between the HRM function and each of the four knowledge concepts.

Figure 14: Model of HRM role in by Soliman and Spooner (2000)



Source: (Soliman & Spooner, 2000)

Human resource management includes monitoring, measurement and intervention in construction, embodiment, dissemination and use by knowledge workers. Construction represents the creation, theft, bad mouthing and reinterpretation of the information. Dissemination stand for distribution of embodied knowledge throughout the value chain.

Transferring of tacit knowledge into processes and practices, machines, materials and cultures represents the embodiment of knowledge. Usage means applying disseminated,

embodied knowledge to problems to make knowledge work. This model defines which part of knowledge should be mapped and also the level of knowledge mapping (Soliman & Spooner, 2000). Two basic strategies were defined for managing knowledge in organizations: '*codification'* and '*personalization'* strategies (Hansen, Nohria, & Tierney, 1999):

- Codification strategy indicates the codification of explicit knowledge that is formal and objective and can be expressed in words, numbers and specifications.

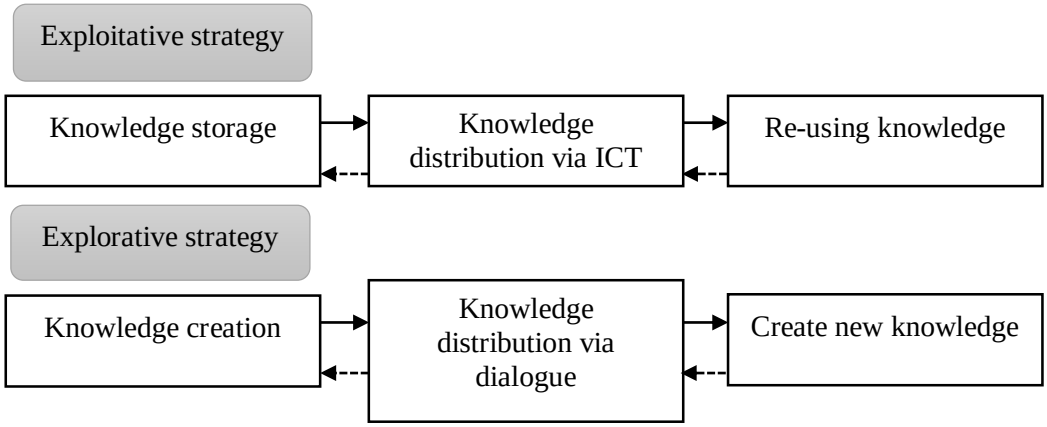
As mentioned in the previous chapter, explicit knowledge can be stored in database form where it can be accessed and used by anyone.

- Personalization strategy refers to personal development of tacit knowledge.

This kind of knowledge is based on insights, intuition and personal skills for solving complex and unique problems where rich, tacit personal knowledge is needed. It is shared through person-to-person contact.

Organizations perusing the codification strategy invest heavily in ICT for projects, intranets, data warehousing and data mining, knowledge mapping and electronic libraries (Ingi Runar Edvardsson, 2008). Focusing on this strategy increases growth and effectiveness (Hansen et al. (1999, p. 110). Using the classification of KM strategies from Hansen et al. (1999, p. 110), Edvardsson (2008) presented classification of KM strategies and HRM practices, showing the fit between HRM practices and organization's approach to manage knowledge (see Figure 15). Edvardsson (2008) showed how to integrate HR strategies into knowledge management systems. He examined the type of HR strategies, which need to be pursued at the probable behaviour effects of such a strategy in creation, distribution and use of knowledge. Identifying two distinct strategies for effective implementation of KM process the author presented as the *exploitative* and *explorative.*

Figure 15: KM strategies, HRM practices, and behavioural outcomes



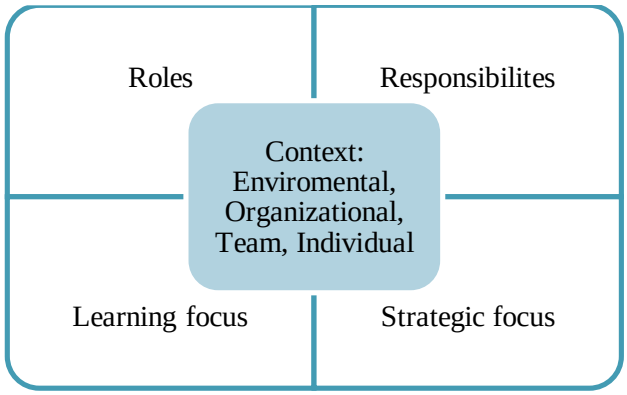
Source: Adapted by Edvardsson (2008), p. 557 – 558

The exploitative strategy as a support in storing (implement mentaity), distribution via ICT (data warehouses, knowledge mapping, e-libraries) and re-using knowledge (to lower costs and increase effectiveness). Every step should be remunerating for the user: rewards to document knowledge, for sharing explicit knowledge through technology applications and rewards for using existing knowledge. *Explorative* strategy serves as a support in knowledge creation (innovative ideas), sharing via dialogue (learning history, communities of practice) and creation of new knowledge (to increase innovation) ((Ingi

Runar Edvardsson, 2008). Exploitative strategy encourages company and people to document their explicit knowledge to databases in order to re-use knowledge and for its success organizations have to create and reinforce the IT-based situation. However, this increases the risk that companies, adopting such strategy, can be locked into past design and are unable to reach for future applications. Though both strategies have behavioural effects, they also have impact on the KM process. In companies, these strategies can be mixed in such way that explorative learning strategy is dominant within R&D, while exploitative learning strategy is usually common within production departments. Explorative strategy places greater weight on knowledge creation and on human interaction to transfer tacit knowledge using knowledge to increase innovation and new learning ((Ingi Runar Edvardsson, 2008). A larger part of organizational knowledge is implicit, meaning it can only be shared through direct interactions; therefore, it can be managed by explorative strategy. For such KM, organizations have to generate desired culture and environment based on learning, trust, commitment and participation and encourage direct interactions (Chivu & Popescu, 2008).

Gloet (2002) had a large impact on the research field of knowledge management and human resources had. With relationship model of KM and HRM, Gloet (2002) specified the need to revitalize HR function to answer the demands of knowledge economy and to develop linkage with KM which requires major changes across four key areas: *roles, responsibilities, strategic and learning focus* (see Figure 16).

Figure 16: Mapping the relationship between KM and HRM



Source: (Gloet, 2006)

The first quadrant represents *roles* which can be played by HR in developing knowledge management system. Lengnick-Hall & Lengnick-Hall (2002) stated that in knowledge economy, companies need HRM characterized by a new set of roles which assist in generating and sustaining organizational capabilities. These new HRM roles are *human capital steward, knowledge facilitator, relationship builder and rapid deployment specialist* (explained in Chapter 2). HRM needs to reflect responsibility in developing and sustaining organizational capabilities and activities which overlap with traditional business functions (Jha, 2011). KM on the other hand, can create a new role for HRM and provide means to forge new *relationships* (Gloet, 2002) which reflect shared responsibility among managers, employees, customers and suppliers for HRM (M. Lengnick-Hall & Lengnick-Hall, 2002; Soliman & Spooner, 2000). *Focus* of HRM has to be on development of human capital and management of knowledge. Emphasis on traditional long- term strategic development and long range planning in HRM has to be unpredictable, dynamic, in fluid environments which characterize contemporary business

world (Jha, 2011). Saint-Onge (2001) suggests a strategic capabilities approach where resources are structured across individual capabilities, organizational capabilities and knowledge architecture. An important aspect in knowledge economy is also the need for *learning*, which includes creating and sustaining learning environments and nurturing communities of practice. Therefore, the new role for HRM incorporates managing intellectual capital and developing human capital within the organization itself (Jha, 2011). To conclude, developing and sustaining a learning focus through facilitating continuous learning, identifying sources of employee knowledge, understanding the mediators that facilitate knowledge sharing as well as making information available to employees is an important role of HRM (Lengnick-Hall and Lengnick-Hall, 2002).

One of the leading studies for this thesis of effective factors was done by Attafar, et al. (2012). They explored the relationship between enhancement of HR productivity and KM for Isfahan municipality central library and Mirdamad library in Isfahan province in Iran. The authors investigated the relationship between effective factors on enhancement of HR productivity (empowerment, quality of work life, individual factors, motivational factors, organizational culture) and KM. The main hypothesis of the research presumes the existence of significant relation between effective factors on HR productivity and KM. Secondary hypothesis includes the existence of relation among empowerment, quality of work life, motivational factors, individual factors and organizational culture with knowledge management. Using a descriptive-field method, the survey sample included 45 employees. Positive significant relation was noticed among total factors that enhance HR productivity and KM (0.918) (creation = 0.903, distribution = 0.877; storage = 0.727) in Iranian libraries. KM processes are improved by the set of effective factors on enhancement of HR productivity (empowerment, quality of work life, individual factors, motivational factors and organizational culture). Organization's attention to quality of work life, empowerment and motivation and individual factors facilitate knowledge management application while enhancing their effectiveness and productivity (Attafar et al., 2012).

4.3 Development of a conceptual model

Individuals' human potentials are in the centre of knowledge management, so knowledge management is individuals' management and individuals' management is knowledge management (T. H. Davenport & Völpel, 2001). If human resources and their effective managing is essential for a company and if people's most valuable resource is knowledge, then HRM and KM are closely interrelated (Svetlik & Stavrou-Costea, 2007).

In the previous section a relationship between HR and KM, established through empirical and conceptual research, has been illustrated. The connection between human resource management and knowledge management represents a series of interconnected activities focused on the strategy and tactics of human capital and development of knowledge, skills and competencies of employees through education and training and gaining work and professional experience (Vidović, 2008, p. 277). Organizational capital like HR information systems give corporations ability to capture new information required for proper implementation (Dicke et al., 2006). ICT can be effectively used to facilitate codification, integration and dissemination of organizational knowledge (Song, 2002 from (H. F. Lin, 2007). Groupware, online database, intranet and virtual communities for communicating and sharing knowledge has been the focus of various researchers (Koh & Kim, 2004).

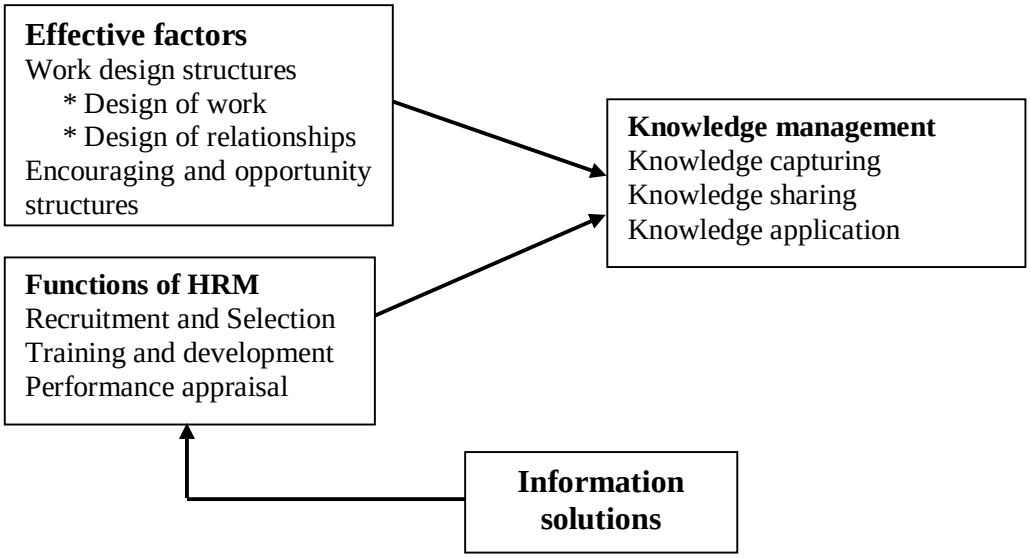
Analysis of literature regarding specified areas of HRM, and consequently effective factors and functions and their relation to KM and IS, has shown that there is an unquestionable relationship. Based on literature findings the contribution of HRM to KM is at the high end of value chain as it is primarily used to create and sustain a culture that fosters innovation, creation, creativity and learning (Chivu & Popescu, 2008). The importance of knowledge management lies in the fact that it could result in empowerment of individuals and organization itself to accomplish activities effectively through organizing of knowledge (Jantz, 2001). Therefore, paying attention to human resources management, its effective factors and functions it could be regarded as activities related to knowledge management. Knowledge management activities should result in improving productivity, enhancing business environment and increasing levels of innovation among employees (Soliman & Spooner, 2000), but also the need to assist the organization in addressing HRM problems on local as well as global levels and transform HR managers into knowledge practitioners or facilitators all with the goal of developing employee competence (Gustafson & Kleiner, 1994)

From a resource based view it can be concluded that organizations need to combine distinctive, sustainable and superior assets, including sources of knowledge and information, with complementary competencies in leadership and human resource management and development to fully realize the value of their knowledge (Jha, 2011). Although it may seem that this tie and the relationship has been explored in many papers through various means in different organizations, no research has yet been done in such comprehensive way combining effective factors and functions of HRM with KM processes and information solutions. One of the main contributions of this thesis is the analysis of the above mentioned elements, with emphasis on IT companies. As shown in Table 11, such research has neither been done in Slovenian nor Croatian companies.

Derived from the above presented models and research evidence, preliminary conceptual model supports belief that a strong tie between functions of HRM, effective factors and

KM can be established and empirically confirmed (see Figure 17). Since information systems have a great impact on KM and HRM functions, the link between KM, effective factors of HRM and information solutions is analysed in this thesis.

Figure 17: Conceptual model of the relationship



The function of HRM and effective factors theory background and usage is in detail explained in Chapter 2, Sections 2.3 and 2.4. Knowledge management process and information solutions are presented in Chapter 3, Sections 3.5 and 3.6. Structural theoretical model based on literature review supports the belief that strong relationships can be established between functions of HRM, effective factors, information solutions and KM. Proposed model reflecting the research hypothesis is depicted in Figure 17.

H1: *There are significant differences between ICT managers' perception in Slovenian and Croatian companies on importance of HR effective factors.*

It is presumed that IT managers do not perceive all HR effective factors WDS and EOS as equally important. Therefore, it can be stated, that certain effective factors are more important to IT managers than others. Hypothesis 1 (H1) is related to the goal regarding determining the extent to which effective factors of HRM affect the successful exploitation of HR issues and are of great importance for IT managers (G2.1) (see Chapter 1 Introduction, Section 1.1.1).

H2: *Human resource management has significant positive impact on knowledge management in ICT companies.*

Effective factors (*WDS and EOS*) and functions of HR (*Recruitment and selection of employees; Training and development and Performance Appraisal)* have an enhancing impact on HR productivity (Attafar et al., 2012) and since the human resources management has an impact on knowledge management, it can be stated that effective factors and functions are related to knowledge management. The aim is to define this relationship for ICT companies. For a better understanding of the relationship between

HRM and KM, Hypothesis 2 (H2) will be analysed and verified through two separate hypotheses:

> ***H2.1:*** *Effective factors of HR have a significant positive impact on knowledge management in ICT companies.*
>
> ***H2.2:*** *Functions of HR have a significant positive impact on knowledge management in ICT companies.*

Hypothesis 2 is related to goals regarding exploring the challenges and complex ways associated with effectively managing human resources for KM process and its specifics for ICT industry (G3; G3.1 and G3.2) (see Chapter 1 Introduction, Section 1.1.1).

H3: *Information solutions applied in HRM are indirectly associated with knowledge management processes.*

Literature states that information technology is one of the most important components of critical success factors of KM (Martin et al., 2005; Sher & Lee, 2004); (Martin et al., 2005; Sher & Lee, 2004). According to the Rašula, Bosilj Vukšić, & Štemberger (Rašula et al., 2008) research, two elements form the IT component of KM: the ability of ICT to capture knowledge and the usage of IT tools. Davenport & Prusak (T.H Davenport & Prusak, 1998) reported that knowledge projects are more likely to succeed when they use technologies and web-based intranets. Such tools provide opportunities for organizational learning and increasing functional specialization (Mathew et al., 2011). Several studies have empirically tested the effect of organizational elements, innovation, organizational learning and culture on IT (Liao & Wu, 2010; Rašula et al., 2012; Zareai et al., 2013). Thereupon it can be stated that organizational and social elements play a mediating role in the relationship between information solutions and KM. According to Mathew et al (Mathew et al., 2011) technology used in companies has to support networking, facilitation of interaction of employees either formally or informally, within organizations and between organizations.

Aligned with the results from previous research, the above stated hypothesis is proposed. It is presumed that *IT companies use IS for managing their employees and therefore information solutions have influence on KM processes*. Hypothesis 3 (H3) is related to goals regarding identification of the level of usage of IS for managing employees and KM processes in IT companies (G5) (see Chapter 1 Introduction, Section 1.1.1).

4.3.1 HRM functions and KM

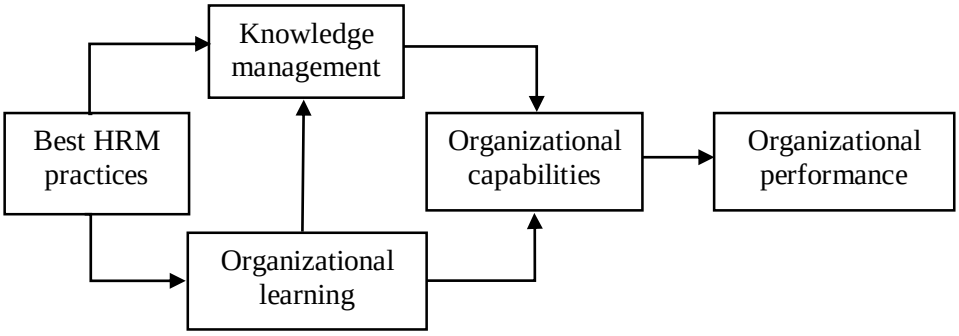
Certain HRM practices are found to be effective in encouraging knowledge sharing behaviour, e.g. staffing, training and development, performance appraisal and compensation (Cabrera & Cabrera, 2005). Some of the models, which had the most impact on forming the conceptual model and hypothesis for this thesis, are depicted and explained in the first part of this chapter. In addition, findings of mutual impact of HRM functions on KM and linkage to information solution is presented in the second part of this chapter.

4.3.1.1 Conceptual models

Literature states that best HRM practices are expected to enhance organizational performance (Delery & Doty, 1996; M. Huselid, 1995; Pfeffer, 1998; Theriou &

Chatzoglou, 2008; Youndt, Snell, Dean, & Lepak, 1996). Theriou and Chatzoglou explored the relationships between best HRM practices, KM, organization learning and organizational capabilities and their impact on organizational performance (see Figure 18).

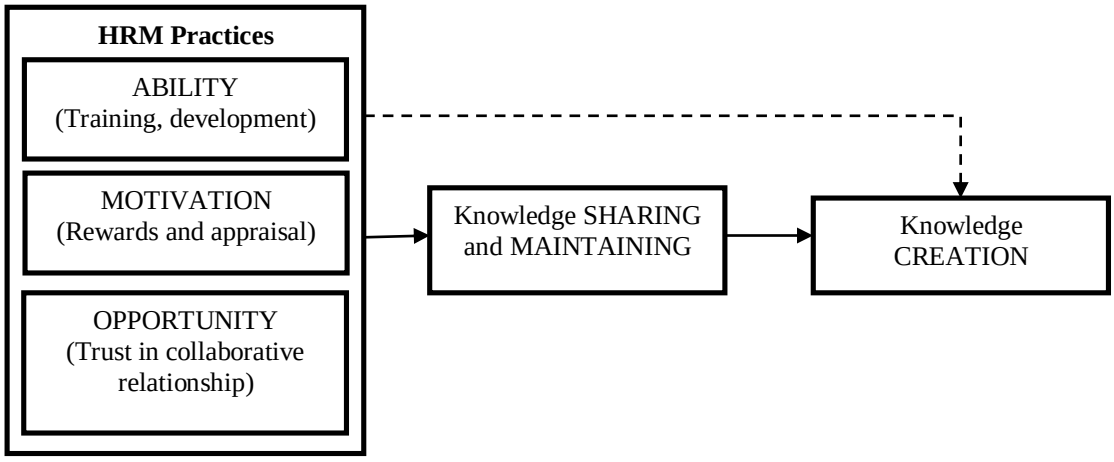
Figure 18: Proposed 'best HR practices' system'



Source: (Theriou & Chatzoglou, 2008)

Through literature analysis authors propose a conceptual model which intends to add to the understanding of the specific processes that mediate between best HRM practices and organizational performance**.** The analysis suggests that KM and organizational learning play a unique role in creating organizational capabilities, which leads to superior performance. Pastor et al. (2010) developed a model differentiating three kinds of HR practices used for managing knowledge sharing, maintaining and creation (see Figure 19): (1) those to make sure that employees have the abilities and competencies needed, (2) those to ensure that employees are motivated to engage with knowledge capabilities and (3) those to provide opportunities for employees to behave as required by knowledge capabilities.

Figure 19: Proposed model by Pastor et al. (2010)



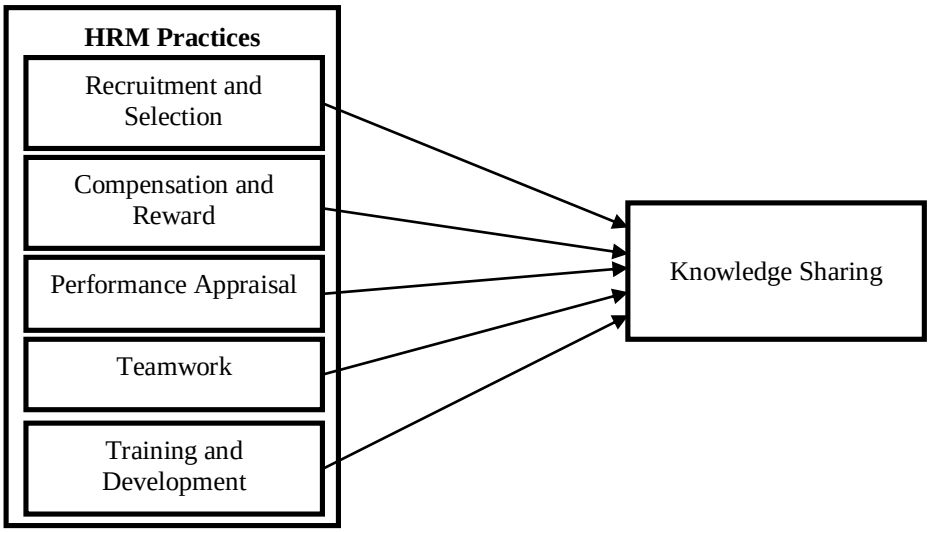
Source: (Pastor et al., 2010, p. 2457)

Pastor et al. (2010) examined how HR practices, which are expected to have an impact on employees' abilities, motivation and opportunity to engage in KM, do so by enabling knowledge sharing, knowledge maintaining and knowledge creation within organizations. Their results support the mediating role of knowledge sharing and maintaining in the relation between effective HR practices and knowledge creation. Findings show the importance of various HR practices in providing employees with the

motivation and the opportunity to leverage knowledge capabilities, which confirm the centrality of HRM in shaping the attitudes, behaviours and relations of employees towards knowledge work.

In developing a conceptual model for better understanding of KM and HRM functions, the main reference point was the framework of the relationship between HRM and knowledge sharing done by Fong et al. (2011) presented in the research paper 'HRM Practices and Knowledge Sharing: An Empirical Study (see Figure 20).

Figure 20: Theoretical model by Fong et al., (2011)



Through an empirical study in Malaysian manufacturing and service organizations (sample size 252 companies) authors analysed the relationship between five HRM practices (1) recruitment and selection; (2) compensation and reward; (3) performance appraisal; (4) teamwork; and (5) employee training and development and knowledge sharing. Organizations from the Federation of Malaysian Manufacturers directory (year 2009) were selected and managers from manufacturing and service organizations in Malaysia that have implemented the HRM program were the target sample. A 5- point Likert scale was used for measuring knowledge sharing and HRM practices, whereas SEM was used for data analysis. The five HRM practices were chosen because the authors anticipated they would have a substantial positive impact on employee knowledge sharing behaviour (compare with (H.-F. Lin & Lee, 2004). The main contribution is the construction of a measurement system of HRM practices and knowledge sharing (see Figure 20). The results of their research indicate that recruitment and selection, teamwork, training and development and performance appraisal have a positive impact on knowledge sharing. These HRM practice are perceived to be dominant and are significantly related to the knowledge sharing.

4.3.1.2 Evidence on linkage between HRM functions and KM

According to research by Oltra (2005; 2004), selection of employees has been introduced as one of the most important activities of HR in knowledge-oriented organizations and an accurate selection of employees has a significant impact on knowledge management success (K. Y. Wong & Aspinwall, 2005). Selection of the right candidate for the company is of high priority, deployed recruitment methods should enable attracting candidates with knowledge sharing inclination (K. Y. Wong & Aspinwall, 2005). For

example, recruitment process should look for positive and outward looking employees willing to contribute to the collective goals of the organization (C.-Y. Fong et al., 2011). In innovative organizations selection of employees with appropriate skills and attitudes is identified as crucial for the project team's ability to integrate knowledge from diverse sources (H. Scarbrough, 2003). Currie & Kerrin (Currie & Kerrin, 2003) point out that traditional recruitment and selection practices can block knowledge sharing between groups or departments in companies. Studying a pharmaceutical company, they found that selection assessment canters and sales assessment canters as well as marketing assessment canters are run separately. This made knowledge sharing between functions very difficult. In order to influence knowledge sharing, employees who are prone to sharing knowledge need to be selected (Tuan, 2011) through selection methods, tools and testing methods (interview, background check, etc.) which should be carefully designed to ensure validity and reliability in selecting the pro-knowledge sharing employee (C.-Y. Fong et al., 2011). Conventional approaches in selection need to be revised in the light of the unpredictable knowledge flows involved in innovation projects (H. Scarbrough, 2003) and interview and selection processes need to be adapted so that they gather evidence about individuals' knowledge-building behaviours (Evans, 2003). Employers are afraid of losing key people because they would lose knowledge as well. If this knowledge is not shared with other employees, it can cause huge losses company (Kremp & Mairesse, 2004).

After successful selection, employee training and development play a major role for knowledge management. This was confirmed by Lin & Joe (2012) showing that the transfer of tacit knowledge depends on confidence in commitment of employees and organization. Training is planned effort employed by the company in assisting its employees in learning process of job related competencies, such as knowledge, skills, or behaviors which are vital for the success of individual's job performances (Noe et al., 2000). Professional development is essential for professional and knowledge workers; if they want to stay at the forefront of their professional fields, they must constantly be aware of developments within their specific disciplines and professions (M. Robertson & O'Malley Hammersley, 2000). Whereas development refers to formal education, job experiences enhancement, assessment of personality and abilities that help employees prepare for the future (Noe et al., 2008). Training activities are proven to give positive effect on company performance (Valle et al., 2009). This is important in the context of knowledge sharing because employees have the opportunity to exchange information and HRM practices and knowledge sharing (Noe et al., 2008). This all happens during formal training sessions or informal interactions between two or more individuals (Ipe, 2003). Informal training and learning is equally important in knowledge sharing, because external learning takes place when employees communicate with supply chain (Ramirez & Li, 2009). There are insufficient studies that investigate the effect of training and development on knowledge sharing, although it is anticipated that the relationship exists based on the above literature review.

Attitudes of employees on mutual transfer of tacit knowledge also play a significant role. Paying attention to the needs of employees, providing feedback and performance management (PM) based on accurate standards is effective in facilitation of knowledge management process (Attafar et al., 2012). Evaluation of work performance may also contribute to knowledge sharing (North, 2008, pp. 149–150). Previous research showed that motivated employees are willing to share when they think that knowledge sharing will be worth the effort (H. F. Lin, 2007). Results of Lam & Lambermont-Ford (2010)

research showed that external motivational factors help knowledge sharing in organizations. Some of the previous studies have proven that PM is linked to knowledge management and knowledge sharing (Nien-Chi Liu & Min-Shi Liu, 2011). Currie and analysed performance management systems and stated that the performance management system inhibits knowledge sharing, as much of the conflict between different functions was due to the divergent objectives set out for employees in the performance agreements. Better performance appraisal system can help employees obtain information about the requirements of knowledge sharing (Nien-Chi Liu & Min-Shi Liu, 2011). Authors Jaw and Liu (2003) stated that it is important for companies to share the results of the PM with the employees and consequently enforce remedial actions for underperforming employees. Knowledge sharing can help incentive systems, which are measures aimed at increasing employee motivation. Some of the incentives can be: salary increase, bonuses, trips, feedback (evaluation) about the performance of work, independence, promotion, etc. (North, 2008, pp. 149–150). Some companies give bonuses depending on team results and not individually, which motivates employees coming together to better results (North, 2008, pp. 149–150). Therefore, authors encourage giving incentives and rewardsto foster knowledge sharing (Camuffo & Comacchio, 2004; Ingi Runar Edvardsson, 2008). Thus, a PM system may serve as a positive pressure in directing employees to develop better performance through greater knowledge sharing with other employees (C.-Y. Fong et al., 2011).

4.3.2 HRM Effective factors and KM

Based on literature analysis of knowledge management domain, (C.-Y. Fong et al., 2011) stated that factors, which influence HRM, could be classified into individual and organizational factors. Individual factors refer to employee motivation, information ownership, benefits and ethics. Organizational factors refer to organizational culture, HRM practices and leadership. A list of various best practices of HRM, high performance work systems and factors influencing HR productivity is presented in Chapter 2 HRM, Section 2.4.2.

Based on literature findings, one of the major contributions of this thesis is the categorization of those *best practices* of HRM into: *Work Design Structures* (WDS) and *Encouraging and Opportunity Structures* (EOS). WDS include the design of work and design of relationship so that employees have discretion and opportunity to use their skills in collaboration with other workers according to the structure of their position. EOS encompasses incentive structures, which embrace motivation and commitment. It is safe to presume that these effective factors, WDS and EOS have an impact on knowledge management practices. Throughout this section, findings on existing research regarding these factors and knowledge management issues are presented. An overview of significant contributions in this area is presented in Table 10.

Table 10: Significant contributions on the relationship between effective factors and knowledge management

Significant contributions	***Key themes***
Work design structures	
Design of work (Attafar et al., 2012; Bartol & Srivastava, 2002; Horak, 2001; Mary MacNeil, 2004; Taylor & Wright, 2004)	Quality of work life is necessary for knowledge management success (Horak, 2001) and it helps facilitate knowledge management processes (Attafar et al., 2012). Positive impact of work life quality on organizational commitment has been confirmed (Lees and Kearns, 2005) and employees with higher organizational commitment share more their knowledge in the organization (Storey and Quintas, 2001).
Design of relationship (Attafar et al., 2012; Bartol & Srivastava, 2002; Mary MacNeil, 2004; Taylor & Wright, 2004)	Individual factors show significant relation with KM with correlation coefficient equal to 0.480 (Attafar et al., 2012) and lead to facilitation of KM. Reward systems (Bartol and Srivastava, 2002) open leadership climate (Taylor and Wright, 2004) and top management support (Mary MacNeil, 2004) are also linked to knowledge sharing.
Encouraging structures	
(Attafar et al., 2012; Carrión, González, & Leal, 2004; T.H Davenport & Prusak, 1998; Hussock, 2009; Lam & Lambermont-Ford, 2010; H. F. Lin, 2007; Mason & Pauleen, 2003; McLure Wasko & Faraj,	Schaurhofer and Peschl (2005) argue that empowerment of employees is a kind of knowledge processes. Attafar et. al. (2012) fund a significant relation between empowerment and KM. Culture is regarded as an effective factor on knowledge management success in many researches (Carrión et al., 2004; T.H Davenport &

2000; Oltra, 2005; Pan & Scarbrough, 1999; Schaurhofer & Peschl, 2005; van den Hooff & de Leeuw van Weenen, 2004)	Prusak, 1998; Mason & Pauleen, 2003; Nonaka, 1991; Oltra, 2005; Pan & Scarbrough, 1999). Communication climate and employee affective commitment are antecedents for knowledge sharing (van den Hooff & de Leeuw van Weenen, 2004).

Work Design Structures (WDS)

From the aspect of effective factors, the enhancement of quality of work life in the organization helps facilitate knowledge management processes (Attafar et al., 2012) and according to Horak (2001), developing employees' proficiencies in communications, networking, learning, team formation, cooperation and creative thinking are necessary for knowledge management success. Research has shown that motivated employees are willing to share when they think that knowledge sharing will be worth the effort (H. F. Lin, 2007). Results of the Lam & Lambermont-Ford (2010) research showed that external motivational factors help knowledge sharing and knowledge management in organizations. HRM contributes to the sharing of knowledge by different techniques: by encouraging teamwork, employee participation, job rotation, a high-level of training, etc (Tuan, 2011). Judge & Cable (1997) and Kristof (1996) focused on the importance of a fit between new employees and the organization's knowledge culture. Their research is linked to the person-organizational fit literature within HRM, with emphasis on a fit between organizational culture and hiring of a suitable personality, as well as the socialization of individuals into the culture of the company. Empirical research done by Sveiby and Simons (2002) in the field of knowledge sharing among employees in public and private sector organizations showed following conclusions:

- Gender does not influence the cooperation and teamwork;
- Employees with longer years of employment have a greater desire for cooperation;
- Employees of higher qualifications are more inclined to teamwork;
- Employees in larger companies are more willing to cooperate compared to those in small companies;
- Employees in management positions are not well suited for teamwork.

Based on these conclusions, it can be stated that several factors influence collaboration and teamwork, which directly affects the knowledge sharing. Cummings and Cross (2003) analysed a social network of 182 teams working on the development of new products. They concluded that the teams characterized by good connections between members had better results than teams whose members were not exchanging knowledge. To be efficient, knowledge management requires storage of information and knowledge, which enables the organization members to search for critical information, knowledge or the best practices; nonetheless, employing KM, better performance can be achieved through interaction between individuals or groups (Jha, 2011).

Encouraging and Opportunity Structures (EOS)

Culture has been regarded as an effective factor on KM and HR success in many researches (Carrión et al., 2004; T.H Davenport & Prusak, 1998; Oltra, 2005). It plays an effective role in KM effectiveness as the identity and foundation of organization (Attafar et al., 2012) and can have direct effect on employees' empowerment and knowledge sharing behaviour (Özbebek & Toplu, 2011). Culture plays an effective role in KM

effectiveness as the identity and foundation of the organization (Attafar et al., 2012) and is principal determinant of successful knowledge management initiatives (Mathew et al., 2011). Knowledge sharing culture must enable an incentive system to support the participation towards knowledge sharing (for example 'knowledge sharer' of the month or giving out virtual dollars) (Hussock, 2009). Authors Attafar et al. (2012), state that stronger culture influences stronger knowledge management. According to Plessis (2007a) the cultural realities in companies should be taken into account when implementing knowledge management. In a company where success is measured with billable hours, such system leaves little time for knowledge management, therefore the culture is oriented towards financial measurement and knowledge management is not seen as important (Plessis, 2007a). Mathew et. al. (2011) conducted a study, which showed that KM initiative is determined by the organizational culture, structure and technology. They concluded that organizations should have an effect on all three factors in order to successfully exploit knowledge in organization. Research conducted by Daud & Yusoff (2011)suggests that the combination of the KM process, with organizational skills and intellectual capital as a strategic organizational asset, enables the increase of organizational effectiveness.

According to Attafar et. Al. (2012) individual factors show significant relation to KM. Communication climate and employee affective commitment are antecedents for knowledge sharing (Hooff & Ridder, 2004). Research done by Tavari et al., (2009) proves the existence of proportion between individual interests and job, between individual proficiencies and job and also having work experience affects enhancement of human resource productivity considerably. Lin (2007) examined the influence of individual factors (enjoyment in helping others) and organizational factors (top management support and organizational rewards) and technological factors (information and communication technology use) on knowledge sharing processes. Studying 172 small and medium companies in Taiwan, research results showed that two individual factors (*enjoyment in helping others* and *knowledge self-efficacy*) and top management support significantly influence the knowledge sharing processes. The study done by Lin (2007) is focused on the relationship between knowledge sharing enablers which can be individual, organizational and technological and company innovation capability by elaborating on significance of knowledge sharing processes (knowledge donating and collecting). A combination of KM process, organizational skills and intellectual capital and strategic organizational asset, enable the increase of organizational effectiveness (Daud & Yusoff, 2011). Schaurhofer & Peschl (2005) consider empowerment processes as some kind of knowledge processes. Authors Özbebek & Toplu (2011) examined the relationship between empowerment and knowledge sharing in three companies in Turkey's fast-moving consumer goods sector. They distributed 350 questionnaires (per e-mail and by hand), with a return rate of 34% (119 usable responses). Using the five-point Likert scale, the authors tested psychological empowerment (12 items) and knowledge sharing behaviour (28 items). Their results have shown that alpha coefficient of reliability of psychological empowerment scale is 0.739 (acceptance level is more than 0.7) and reliability of knowledge sharing behaviour scale is 0.760. Results have demonstrated that empowerment and knowledge sharing behaviour are statistically correlated ($r = 0.635$, $p = < 0.003$). Similar results were presented by Attafar et. (2012) in a research on HR productivity and knowledge management in Iranian libraries. Significant relation ($r = 0.776$) between empowerment and knowledge management was noticed and the relation between knowledge sharing and empowerment showed statistical significance ($r = 0.079$). The results of these surveys prove that there is a strong link between

knowledge management processes and empowering employees. These results are consistent with researches in financial institutions (Stovel & Bontis, 2002) from a resource based view done by Bollinger & Smith (2001) and Anell & Wilson (2002) and prove that empowered employees are more willing to share knowledge.

4.3.3 Scientific contributions on relationship between human resource management and knowledge management found in literature

Certain HRM practices are found to be effective in encouraging knowledge creating, sharing, storing and using behaviour, e.g. staffing, training and development, performance appraisal and compensation (Cabrera & Cabrera, 2005). Not all HRM practices enhance knowledge management and wrong HRM practices can be harmful especially to knowledge sharing behaviour (Currie & Kerrin, 2003). It is important to choose appropriate HRM practices, which facilitate knowledge management in the best possible way for the organization. Knowledge and knowledge management have been explored in various organizations and companies (service and production) and are associated with innovation, corporate strategies, HRM strategies, HR practices and various other functions, factors and aspects. Table 11 provides an overview of significant contributions made in the literature regarding KM and HRM.

Table 11: Summary of significant contributions on the relationship: HRM and KM

Num.	Significant contributions
1.	**Soliman and Spooner, (2000);** *(Journal article; Conceptual paper)* Clark and Staunton, (1989) presented a model of the KM process, useful for mapping human resources knowledge. This model provided a guide to four key concepts that could be mapped through the HRM function, which was used, by Soliman and Spooner. The four concepts are construction, embodiment, dissemination and use of knowledge. Authors present research finding and theory foundations regarding HRM and KM and strategic guidelines for KM implementation.

2.	**Gloet and Berrell,** (2003) *(Journal article; Conceptual paper)* Authors analysed through literature review two paradigm in the field of KM. The first paradigm states that information technology predominantly influences ideas about KM and the second states that organizational learning has major influence. Companies must build and strengthen linkage between KM, HRM and business development in order to enable that KM contributes effectively to organizational strategy. The dual paradigm nature of KM suggests that strategies driven by technology exhibit different characteristics to those driven by organizational learning (driven by people). HR practitioners have to understand how certain paradigm orientations to KM can lead to different paths into thinking about HRM practices and through that can result in a lack of continuity between various strategic initiatives in companies. Fundamental differences exist between the two main approaches to KM, but authors state that there is no one best way. The key to maximizing the contribution of KM to an established management practices like HRM is to promote awareness and understanding the implications of these essential, deep – seated differences in the KM approach.
3.	**Scarbrough,** (2003) *(Journal article; Exploratory case study of Ebank Globals's KM project)* Author explores Castells' proposition that the innovation process is being progressively intensified by developments in technological and organizational forms – that knowledge is being applied to the generation of knowledge. Focus is on the role of KM in the management of innovation. KM represents one of the most advanced efforts in intensifying innovation. Findings in literature and studying the Europe's largest investors in IT, the Ebank, highlight several implications for the role of KM in the innovation process. These are: (1) KM needs to be managed as a process of innovation and not just as application of a tool; (2) applying knowledge to the generation of knowledge is and can be because the acquisition of knowledge and learning by organizations creates forms of professional specialization, social networks and social identities which embed knowledge in particular settings; (3) integrating knowledge is not a cognitive process. *Researched elements:* Knowledge management and relation to innovation process and the role of HRM. Emphasize is on three aspects of HRM activity: selection methods, compensation strategies and career systems.
4.	**Currie and Kerrin,** (2003) *(Journal article; Research paper: case study of pharmaceutical manufacturing and retailing company in UK)* Currie and Kerrin (2003) presented a case study of pharmaceutical manufacturing and retailing company in UK. Authors, from organizational learning perspective reflect critical problems of managing knowledge. Through a case study, they highlighted employees' unwillingness to share knowledge with others as crucial in determining the contribution of HR practices to manage knowledge. They considers the contribution of HR practices as a mediating functionally based organizational structure and culture in a global pharmaceutical company.

5.	**Shih and Chiang,** (2005) *(Journal article; Research paper: large companies in banking, services and manufacturing in Taiwan)* Paper examines the relationships between corporate strategy, HRM and KM strategy and their interactive influence on KM effectiveness. Findings indicate that companies pursuing cost leadership strategy and buy-bureaucratic HRM strategy are more likely to adopt codification knowledge management strategy. Authors find that fit between KM strategy, corporate and HRM strategy are significantly related to better KM effectiveness in terms of process outcomes, learning capability and organizational outcomes. *Methodology:* Authors studied 147 Taiwanese large companies in banking, services and manufacturing industries. For data analysis ANOVA, correlations and regression was used. *Researched elements:* Corporate strategy, HRM and KM strategy and KM effectiveness.
6.	**Cabrera and Cabrera, (2005)** *(Journal article; Conceptual paper)* Paper focuses on issue of knowledge sharing in order to identify people management practices, which are most effective in fostering knowledge sharing. Authors suggest that intentions to share knowledge are determined by positive attitudes towards sharing knowledge and the perception of norms for sharing. They identified factors that influence attitudes toward sharing: social ties and language; trust, group identification, perceived cost, perceived rewards; expectation of reciprocity. Authors also put emphasize on IT that is designed to enhance the existing human networks.
7.	**Khandekar and Sharma, (2005)** *(Journal article; Research paper: Indian global organizations)* Authors examine the role of organizational learning and strategic human resource management in sustainable competitive advantage. Findings show a positive relationship between organizational learning, strategic HRM and sustainable competitive advantage. Also, HR capability is significant predictor of sustainable competitive advantage. This study contributes to the understanding of HRM as an imperative for strategic and international HRM and presents an insight into the Indian business situation. *Methodology*: Empirical research carried out on a random sample of 300 line or HR managers from nine Indian and foreign global organizations from New Delhi. Pearson's correlation, one-way analysis of variance, inter-item analysis and Cronbach's alpha were used for data analysis.

8.	**Oltra, (2005)** *(Journal article; Case study in knowledge-intensive Spanish companies)* Author, using the case study method, examine the key factors, which explain KM effectiveness**.** This paper helps in better understanding what causes KM success and failure. It tackles KM-related social and cultural issues through a practical HRM perspective. Emphasis is placed on complexity which social and cultural issues pose on KM. Author found systematic patterns regarding impact of critical KM characteristics and KM-related HR practices on KM effectiveness. *Methodology*: Three knowledge-intensive Spanish business units of multinational companies were the target case-study settings. Qualitative methods were used for data collection and analysis.
9.	**Olomolaiye and Egbu, (2006)** *(Journal article; Case study in construction industry, UK)* Authors explore challenges associated with effectively managing HR for KM improvements in construction organizations. Paper is based on an empirical investigation on the role of HRM for KM in construction organizations. Authors argue that knowledge is unique human capability of making meaning from information and therefore employees should be the focus of any KM initiatives. *Methodology*: Semi-structured interviews with twenty-six construction professionals from ten organizations based in Scotland. Qualitative methods were used for data collection and analysis.
10.	**Gloet, (2006)** *(Journal article; Conceptual paper)* Through literature review a framework linking KM and HRM is proposed for development of leadership and management capabilities in order to support sustainability. With model of relationship between KM and HRM, Gloet specified a need to revitalize human resources function in order to respond to demands of knowledge economy and to develop ties with KM, which require major changes across four key areas: *roles, responsibilities, strategic focus and learning focus.*

11.	**Zupan and Kaše, (2007)** *(Research paper; Case study in medium-sized European knowledge intensive company)* Authors examine structural positions of individuals, line managers and HR specialists within relational networks for creating and sharing knowledge and to explore implications for designing and implementing HR practices in knowledge-intensive companies. Findings reveal that line managers who are HR actors are centrally positioned within knowledge networks. The more operational knowledge and information flow is, more thicker the knowledge networks are in the company. Authors suggest that HRM could affect the process of knowledge creation and sharing by implementing HR practices through centrally positioned line managers. Applying the Social Network Analysis (SNA) to HRM field, authors expand the traditional view of HRM into examining the position of HR actors in relational networks and explore their role in effectively executing HR practices. *Methodology*: Exploratory research design conducting a single case study of a knowledge-intensive companies. Authors used network centrality measures and visualization tools (SNA) to examine the structural position of individuals in the research.
12.	**Lin, (2007)** *(Journal article; Research paper: large organizations in Taiwan)* Based on a survey of 172 employees from 50 large organizations in Taiwan, author examines influence of individual factors (enjoyment in helping others and knowledge self-efficacy), organizational factors (top management support and organizational rewards) and technology factors (ICT use) on knowledge sharing processes and their influence on companies innovation capability. This study identified two individual factors (enjoyment in helping others and knowledge self-efficacy) and one organizational factors (top management support) essential for successful knowledge sharing. Results indicate that employee willingness to donate and collect knowledge enables companies to improve innovation capability. *Methodology*: Survey on 172 employees from 50 large organizations in Taiwan. This study applies structural equation modelling.
13.	**Theriou and Chatzoglou, (2008)** *(Journal article; Conceptual paper)* Authors explore relationships between best HRM practices, KM, organization learning and organizational capabilities and their impact on organizational performance. Through literature analysis authors propose a conceptual model which adds to the understanding of the specific processes that mediate between best HRM practices and organizational performance**.** Paper suggests that KM and organizational learning play unique role in creating organizational capabilities, which leads to a superior performance.

14.	**Chivu and Popescu, (2008)** *(Journal article; Conceptual paper)* Authors analysed the implications of KM for HRM in SMEs and the role of HRM in facilitating innovation. They discussed ways in which specific functional areas of HRM (employee resourcing, career management, HR development) can respond to these challenges. Concluding that human resources help organizations to articulate the purpose of KM systems.
15.	**Edvardsson, (2008)** *(Journal article; Conceptual paper)* Discussing the literature on KM and HRM authors attempt to integrate HRM into KM systems and examines the type of HR strategies to be pursued as well as the probable behaviour effects of such a strategy in the creation, distribution and use of knowledge. Findings show that the HRM strategy and general strategy of a company make up the general KM strategies (the exploitative and explorative strategy). Two strategies have impact on KM process and have advantages as well as disadvantages for companies, which adopt them. *Significant contribution*: Analysis of two strategies, which have impact on KM process. *Exploitative strategy, which* sets greater emphasis on knowledge storage, technical skills and distributing explicit knowledge via IT solutions. *Explorative strategy* sets greater weight on knowledge creation and human interaction to transfer tacit knowledge and also to use knowledge in order to increase innovation and new learning.
16.	**Lopez-Cabrales, Pérez-Luño and Cabrera, (2009)** *(Journal article; Research paper in innovative companies in Spain)* Authors test how HRM practices and employees' knowledge influence the development of innovative capabilities and company performance. Results showed that HRM practices are not directly associated with innovation unless they take into account employees' knowledge. Mediating role for the uniqueness of knowledge between collaborative HRM practices and innovative activity was established and a positive influence of knowledge-based HRM practices on valuable knowledge a positive contribution of innovations to the company's profit. *Methodology*: Questionnaire with 40 items (7-point Likert scale) was sent to dept. of innovative companies in Spain (r.r. 14%; 88 valid questionnaires). Structural equation modelling was used.
17.	**Brewer and Brewer, (2010)** *(Journal article; Conceptual paper)* Aim was to identify relationships between HRM, KM and typical knowledge, learning goals of an accredited business education program. A theoretical model proposes a linkage between KM tenets, HRM activities in organizations and Bloom's Revised Taxonomy for planning and evaluating educational goals. Significant c*ontribution*: framework development for higher educational institutions.

18.	**Ishak et al., (2010)** *(Journal article; Conceptual paper)* Examines the strategic relevance of KM in enhancing human capital management in companies based on literature. The authors propose that companies, in order to achieve consistent high performance, should develop and apply strong KM culture.
19.	**Lam and Lambermont-Ford, (2010)** *(Journal article; Case studies in organizations from Anglo-America)* Authors focus on motivation-based perspective in order to explore how organizations resolve the social dilemma of knowledge sharing. Analysis is built on a three-category taxonomy of motivation, adding 'hedonic' motivation to the traditional dichotomy of 'extrinsic' and 'intrinsic' motivation. Through case studies from organizations rooted in the Anglo-American context, authors explore the interactive effects between the different motivators in two different types of knowledge-intensive organizations: professional bureaucracy and operating adhocracy. This paper represents the first attempt to apply a three-category taxonomy of motivation to examine knowledge-sharing behaviour in organizations. Authors emphasized the interaction between the different motivators and provide a basis to integrate further the work of social psychologists and socio-economists on incentives and motivation in the context of knowledge sharing.
20.	**Iqbal, Toulson and Tweed, (2010)** *(Conference proceedings; Conceptual paper)* Authors propose a model which examines the relationships of human resource management practices (hiring, collaboration, team assignments and reward system) through employee's knowledge sharing with organizational capability (knowledge absorption, innovation and learning, knowledge storage). Increasing interest around HRM is a reflection of a significant body of empirical research examining the impact of different HRM practices on organizational capability. Authors present that HRM practices through knowledge sharing, increase organizational knowledge storage by decreasing employees' turnover rate and increasing employees' loyalty.

21.	**Pastor, Santana and Sierra, (2010)** *(Journal article; Research paper: Spanish automotive industry)* Authors examine how the HR practices, which are expected to have impact on employees' abilities, motivation and opportunity to engage in KM, do so by enabling knowledge sharing, maintaining and creation. Authors developed a model by differentiating three kinds of HR practices, which can be used for managing knowledge sharing, maintaining and creation: those to make sure that employees have the abilities and competences needed, those to ensure that employees are motivated to engage with knowledge capabilities and those to provide opportunities for employees to behave as required by knowledge capabilities. Results support the mediating role of knowledge sharing and maintaining in relation between effective HR practices and knowledge creation. Findings show importance of various HR practices in providing employees with motivation and the opportunity to leverage knowledge capabilities. *Methodology*: Questionnaire survey approach was used in collecting data from companies from the Spanish automotive industry (from 64 companies). Using descriptive statistics, factor and regression analysis, collected data was analysed.
22.	**Özbebek and Toplu, (2011)** *(Journal article; Research paper: fast moving consumer goods sector in Turkey)* Authors examined relationship between psychological empowerment and knowledge sharing behaviour in fast moving consumer goods sector. Using Spreitzer's (1995) scale for measuring empowerment and Yi's (2009) scale for knowledge sharing behaviour, results demonstrate that empowerment is positively correlated with employees' knowledge sharing behaviour. *Methodology*: Companies were selected from the 'Turkey's Top 500 Industrial Enterprises 2009' list and 136 responses were received and out of these 119 of them were usable (response rate is 34%). Correlation analysis was used to test the relationship between empowerment and knowledge sharing behaviour.
23.	**Daud and Yusoff, (2011)** *(Journal article; Research paper: multimedia super corridor status organizations from ICT in Malaysia)* Study presents the relationship between KM processes and organizational performance and analyses the mediating effects of intellectual capital on the relationship between KM processes and organizational performance. Results showed that KM processes were confirmed as antecedents of intellectual capital and intellectual capital was established as a mediator between KM processes and organizational performance. Authors suggested that a combination of KM process, organizational skills and intellectual capital as a strategic organizational assets, enable the increase of organizational effectiveness. *Methodology: S*elf-administered questionnaire distributed to owner or senior manager of SME multimedia super corridor status organizations (sample size 289). A series of regression analyses was applied in testing the hypotheses.

24.	**Jha** (2011) *(Journal article; Conceptual paper)* This paper analyses how HRM practices and employees' knowledge influence the development of strategies and company performance. Author identified various studies, which tried to portray the importance of HR practices in strategy building, giving emphasis on knowledge creation and steps of integration of both. Through literature review author investigates several steps taken by HRM for enhancing capturing and utilizing knowledge within the company. Results confirm that KM and HRM practices are complementary to each other. This paper understands the concept of KM and links it to the HRM.
25.	**Mohammadian,, Arayesh, Mohammadian, Azizpour and Zanganeh, (2011)** *(Jorunal article; Research paper: Islamic Azad University, Iran)* Authors analysed effective factors on HR productivity from the region 11 Islamic Azad University. Results showed a direct and meaningful relationship among productivity and explored elements: personal training relationship, knowledge and skill, benefits and salary, experience and work experience, work desire, using the suitable way of punishing and encouraging by the managers, the rate of decision participation, presence of level of evaluation standards, intimate relationship with managers, job security and freedom in action and independence. Though,, individual variables, such as age, level of study, job experience, kind of responsibility and type of employment, did not show meaningful relationship with productivity. *Methodology*: Through random sampling method and semi-structured questionnaire 150 people were included in research. For data analysis, correlation analysis and multiple regression analysis were used.
26.	**Mathew, Kumar and Perumal, (2011)** *(Research paper: Bangalore IT organizations)* Authors address relationship between KM initiatives in Indian IT organizations and their innovativeness. Knowledge management initiatives are measured in the context of cultural, structural and technological interventions. Innovation was measured in terms of organizational behaviour related to sensitivity, learning, newness, trial ability, communicability, risk-readiness and absorption. The results show that initiatives taken by companies to enhance their knowledge assets fall into the culture, structure and technology subsystems. Authors developed conceptual model to assess the relationship between knowledge management initiatives and innovativeness. Results show that technology and culture are strong associated with each other. Learning climate, is found to be the most significant of the variables to influence innovativeness. Risk readiness is not a factor contributing to innovativeness and is not significantly associated with the other variables. Variables like leadership, networking, reward and recognition, structure and technology do not significantly influence innovativeness. *Methodology*: In the sample were included 84 professionals from 20 Bangalore-based IT organizations that had implemented KM initiatives.

27.	**Fong, Ooi, Tan, Lee and Chong, (2011)** *(Journal article; Research paper: manufacturing and service organizations in Malaysia)* Authors investigate association between HRM practices and knowledge sharing in Malaysian industry context. Results of their research indicate that recruitment and selection, teamwork, training and development and performance appraisal, have a positive relationship with knowledge sharing, as perceived by managers in Malaysian manufacturing and service organizations. Main contribution of this study is the construction of a measurement system of HRM practices and knowledge sharing. *Methodology*: Random sampling was used (237 responses). Exploratory and confirmatory factor analysis were used to evaluate the reliability and validity of the measurement model. In order to examine the theoretical framework structural equation modelling was applied.
28.	**Benavides-Espinosa and Roig-Dobón, (2011)** *(Journal article; Research paper: Spanish companies)* Authors discuss issues regarding transfer of knowledge as source of competitive advantage and transfer between organizations through cooperation (joint ventures). Intermediate managers play a very relevant role in knowledge transfer, though research revealed that high-level managers do not play a significant role as this type of process. Research showed that role of HR is an essential element in order to be able to carry out inter-organizational transfer. Authors considered the degree of involvement of resources and its positive influence on knowledge transfer. *Methodology*: A sample of 74 companies (population 1.210) was formed, where 51 of which are Spanish and 23 from the rest of the world. Hypotheses were tested using a structural equation model using.
29.	**Attafar, Soleimani, Shahnazari and Shahin, (2012)** *(Journal article; Research paper: Iranian libraries)* Authors explore relationship between enhancement of HR productivity and KM for Isfahan municipality central library and Mirdamad library in Isfahan province in Iran. Existence of a positive significant relation between set of effective factors on HR productivity and KM was discovered, meaning that there is a positive significant relation among empowerment, quality of work life, individual factors, motivational factors and organizational culture with knowledge management. *Methodology*: random sampling was used and 45 people were included in research. For data analysis descriptive and inferential (correlation) statistics were used.

30.	**Rašula, Bosilj Vukšić and Indihar Štemberger, (2012)** *(Journal article; Research paper: Slovenian and Croatian companies)* Through this paper, authors show that through creating, accumulating, organizing and utilizing knowledge, organizations can enhance organizational performance. Authors present three main components, which are important for knowledge management: (1) information technology, (2) organizational elements and (3) knowledge. Connections between those components are presented through main hypotheses and conceptual model is validated through the empirical research. Empirical research show that organizational elements (such as culture, climate and collaboration) have a positive impact on knowledge management and positive indirect effect of IT application on KM adoption through organizational elements was also confirmed. Authors stated that codification of knowledge in information systems, databases and knowledge repositories does not guarantee efficient KM, but has a potential to influence it in a positive way. Positive effect of KM practices on organizational performance was also confirmed. *Methodology*: In the sample 329 companies (with more than 50 employees) were included, from Slovenia (r.r. 9.6%) and Croatia (r.r. 11.4%). For testing hypotheses structural equation modelling was used.
31.	**Bhanugopan, Aladwan and Fish, (2013)** *(Journal article; Research paper: front-line employees from Jordanian organizations)* Authors examine structure of human resource management practice scales through testing a causal model of HRM practices. They present one combined composite multi-dimensional HRM scale for identification of possible future directions for HRM strategy development and professional practice in Jordan. Research emphasizes the focus on HRM practices and contributes to the knowledge in several grounds: it validates the structure of HRM practices scales in Jordan and improves the understanding of HRM practices, drawing a sample of participants from different sectors (insurance, finance, services, accounting and industry) and suggests that these variables are as equally prominent as others in explaining employees attitudes toward HRM practices. The final model supports a conceptual framework formed of four domains: recruitment and selection, training and development, performance appraisal and rewards and benefits and lends support to construct validity of consolidated HRM practice scale. *Methodology*: Data were collected from 493 front-line employees from Jordanian organizations. Measurement model was tested using exploratory factor analysis. Confirmatory factor analysis was employed in further investigation of the latent structure of the factors.

32.	**Obeidat, Masa'deh and Abdallah, (2014)** *(Journal article; Research paper: consultancy companies operating in Jordan)* Author analyzed HRM, organizational commitment and KM and their mutual relationship in consultancy companies operating in Jordan. Results showed causal links between human resource practices and organizational commitment and organizational commitment and knowledge management processes. No direct relationship between HRM practices and KM process was found. Author explain this through existence of other factors than HR practices which might affect KM process. Fact is that relationship can be motivated by existence of other moderating variables like organizational commitment and support. Results of the SEM analysis indicated that HR practices (recruitment methods, training and development, performance appraisals and reward systems) have a significant influence on organizational commitment (affective commitment, continuance commitment and normative commitment). *Methodology:* Random sample was selected and 220 questionnaires (r.r. 52%) were distributed to consultancy companies operating in Jordan. A theoretical model was proposed and tested using SEM.

5 EMPIRICAL RESEARCH AND DATA ANALYSIS

In previous chapters, all the prerequisites for carrying out the main empirical research were described. All aspects of the human resource and knowledge management concepts were taken into account, studied and elaborated in detail in Chapters 3 and 4 to ensure its thorough comprehension. The author of this dissertation gained profound insight into the functions and effective factors of HRM (see Chapter 3), which provided a solid ground for claiming that knowledge management and human resource management have mutual effects.

This section describes the selection of the research methodology, operationalization of research constructs, development of measurement instruments and data collection procedures.

5.1 Choice of research methodology

Considering there are three main hypothesis in this doctoral dissertation, the research methodology is presented with regard to these goals, with the choice of a respective research methodology justified accordingly. The main hypothesis of this dissertation are identified as follows:

H1: *There are significant differences between ICT employee's perception in Slovenian and Croatian companies on importance of HR effective factors.*

It is presumed that ICT managers do not perceive all HR effective factors *(empowerment, quality of work, culture, individual factors and learning)* as equally important. Therefore, ICT can be stated that with a significant difference certain effective factors are more important to ICT managers than other. Hypothesis 1 (H1) is related to the goal regarding determining the extent to which effective factors of HRM affect the successful exploitation of HR issues and are of great importance for ICT managers (G2.1).

Necessary data for testing the H1 is collected through self-administered online questionnaire sent out to ICT managers. In order to form a random sample, questionnaire was sent to head of ICT department or to a high level manager in ICT companies.

For testing H1 Mann - Whitney U is be used. The nonparametric Mann - Whitney U test assesses whether the means of two groups are statistically different from each other. This analysis is appropriate whenever comparing the means of two groups (Newbold, Carlson, & Thorne, 2010; C. Robertson & McCloskey, 2002). Existence of significant difference (0.05 alpha level) among between Croatian and Slovenian ICT employees' perception on importance of HR effective factors is tested.

H2: *Human resource management has a significant positive impact on knowledge management in ICT companies and IT departments.*

Effective factors and functions of HR have enhancing impact on HR (Attafar et al., 2012) and since the human resources management has impact on knowledge management ICT can be stated that effective factors and functions are related to knowledge management. Aim is to define this relationship for ICT companies in Slovenia and Croatia. Hypothesis 2 (H2), for better understanding relationship between HRM and KM, is analysed and verified through two separate hypotheses:

> ***H2.1:*** *Effective factors of HR have a significant positive impact on knowledge management in ICT companies.*
>
> ***H2.2:*** *Functions of HR have a significant positive impact on knowledge management in ICT companies.*

Hypothesis 2 is related to goals regarding exploring the challenges and complex ways associated with effectively managing human resources for knowledge management process and its specifics for ICT industry (cf. G3; G3.1 and G3.2). Structural equation modelling based on partial least square is used to verify these hypotheses.

H3: *Information solutions applied in HRM are indirectly associated with knowledge management processes.*

Literature states that information technology is one of the most important components of critical success factors of KM (Martin et al., 2005; Sher & Lee, 2004). According to the research (Rašula et al., 2008) two elements form the ICT component of KM: the ability of ICT to capture knowledge and the usage of ICT tools. Davenport & Prusak (1998) reported that knowledge projects are more likely to succeed when they use technologies and web-based intranets. Such tools provide opportunities for organizational learning and increasing functional specialization (Mathew et al., 2011). Several studies have been empirically testing the effect of organizational elements, innovation, organizational learning and culture on ICT (Liao & Wu, 2010; Rašula et al., 2012; Zareai et al., 2013). Thereupon ICT can be stated that organizational and social elements play a mediating role in the relationship between information solutions and KM. According to Mathew et al (2011) technology used in companies has to support networking, facilitation of interaction of employees either formally or informally, within organizations and between organizations. Aligned with results from previous research, the above stated hypothesis is proposed. It is presumed that ICT *companies use IS for managing their employees and therefore information solutions have influence on KM processes*.

Hypothesis 3 (H3) is related to goals regarding identification of the level of usage of IS for managing employees and KM processes in ICT companies (cf. G5). As well as for H2 structural equation modelling is used to test the proposed hypothesis.

5.2 Research methodology

Nature of research problem and research aims calls for descriptive and prescriptive approach. Study design is determined according to presented problem. First, the theoretical relevant and recent literature was used and on the basis of which the conceptual model was built (see Chapter 4, Section 4.3). Afterwards, through a empirical study data is obtained. Respectively for purpose of investigating HR and KM in IT companies, a mixed method approach was chosen. Mixed methods are "procedures in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of research problem. It may involve collection of both forms of data, qualitative and quantitative and then integrating the information in interpretation of the overall results" (Creswell, 2009). This approach combines the results and takes advantage of strengths of both quantitative and qualitative methods (Creswell, 2009; Petz, 2007).

With chosen methodology, it is possible to meet the basic requirements of scientific methods, such as objectivity, reliability, accuracy, necessary and sufficient integrity and universality. In solving issues of proposed complex model of human resources management, it is necessary to examine literature and results of various studies in field of knowledge and human resources management. Cross-sectional analysis is the most appropriate for this study because this analysis provides a snapshot of the variables of success factors at a single point and produce cross classification (Churchill & Iacobucci, 2009) For this cross-sectional study a three-step research plan with proposed methodology is presented below and every step is presented through aims, research methodology and expected outcomes. Figure 3 presents the path diagram for this thesis.

C. Literature analysis

Goal is to identify critical success factors, gaps, and elaborate and clarify the link between human resource management and knowledge management. Theoretical part of study is based on analysis of available and relevant national and international scientific literature in perspective field, which includes the review of HRM, and KM literature from basis of standard books to new references including papers and resources available on internet in order to give an insight into previous research and developed theories. Literature review provides a framework for establishing importance of the study and it serves as a benchmark for comparing results with other findings (Creswell, 2009, p. 25). Aim is to analyse practices and functions of HRM and to present results from literature, which supports the relationship between HR and KM.

Outcomes:

- Theoretical part provides an overview of theories and on knowledge management and human resources management.
- Analysis of previous research in order to detect lacks and contradictions.
- Defining the relationship between knowledge management and human resources management and identification of critical factors and gaps.
- Analysis of best practices of HRM and their classification in to effective factors of HRM.
- Development of conceptual model of the relationship based on previous research for further empirical analysis.

The literature analysis of HRM and KM and their relationship is presented in Chapters 2, 3, and 4. After an extensive literature analysis and forming a conceptual model, which

presents the findings on relationship between HRM and KM, empirical part of the research followed.

D. Research and data analysis

Goal was analyse the data received from ICT companies in order to establish the relationship between human resources management and knowledge management and to test the conceptual model.

c. Data collection

Aim is to examine the opinion and perception managers and employees from IT companies on importance of HRM and KM. Collection of primary data was done through self-formed and online-administered questionnaire sent out to ICT companies from Slovenia and Croatia.

Outcomes:

- Measurement instrument design for analysis of HRM and KM and its validation.
- Communication with experts in the field of HRM for validation of measurement instrument.
- Conducting a pilot testing in order to validate the measurement instrument.
- Conduction main research in ICT companies from Slovenia and Croatia.

d. Data analysis

Collected survey data was analysed using univariate and multivariate statistical analysis. The nonparametric Mann – Whitney U Test and Partial Least Square Structural Equation Modelling (PLS-SEM) was used. Descriptive statistics was also used for delivering the basic results on sample and population (e.g. analysis of the distribution of respondents according to various criteria, calculations of means and measures of dispersion and other).

Table 12: Research hypotheses and related research methods

Preposition	Data collection	Data analysis
H1: *There are significant differences between IT managers' perception in Slovenian and Croatian companies on importance of HR effective factors*	Self-administered online questionnaire.	Mann – Whitney U Test
H2: Human resource management has a significant positive impact on knowledge management in ICT companies and IT departments.	Self-administered online questionnaire.	PLS
H3: Information solutions applied in HRM are indirectly associated with knowledge management processes.	Self-administered online questionnaire.	PLS

Source: authors' research

Outcomes:

- Accept/reject proposed hypothesis and define differences between literature and practice in ICT companies.
- Assessment of conceptual model with strong alignment to the needs and actual situation in companies.
- Detecting the most important effective factors for ICT companies in Slovenia and Croatia.
- Detecting the knowledge management issues form ICT managers' perspective.

For data processing statistical package for data analysis SPSS 15.0 for Windows was used, which supports graphical and tabular presentation of data and is one of the most widely used programs for data analysis. For Partial Least Square analysis, the SmartPLS software package was used.

5.3 Measurement instrument creation and validation

Aim of this thesis is to examine the opinion of ICT employees on importance of HR and KM for IT companies. Quantitative research was carried out for which an online questionnaire was used. Questionnaire is an instrument for data gathering that homogenizes the information received and enables quality of measurement and also ensures adequate reliability and validity of scales (Benavides-Espinosa & Roig-Dobón, 2011). Collection of primary data was done through self-formed and online-administered questionnaire. The selection of questionnaire resides on previous findings in literature and on desired study population (ICT employees), its geographical distribution (Slovenia and Croatia) and nature of the investigation.

Before data gathering, through questionnaire, an important aspect needs to be considered, that is the instrument validation through content validity and inter-rater reliability. Below the steps in defining the questionnaire in order to ensure the validity and reliability are presented. Validity and reliability of the research instrument provides the research with a degree of confidence that used methods are useful and in quest of scientific truth (Straub, Boudreau, & Gefen, 2004). Also before the main research was conducted, instrument was tested through a pilot study. In order to develop a measurement instrument, with good psychometric properties, instrument creation process suggested by (G. C. Moore & Benbasat, 1991) will be followed. They proposed three main steps when developing an instrument *item creation, scale development and instrument testing*.

Item creation

Purpose of *item creation* is to create pools of item for each construct. Number of constructs depends on proposed theoretical model. Goal is to define items which, according literature and experience of the researcher, explain and define the constructs. Primary pool of items for this research was formed from analysis of previous research on selected subjects (i.e. research on HRM, KM, IT companies). Items were extracted and analyzed from various questionnaires found in journal articles and several were self-formed based on theoretical analysis of literature findings. As a result, an initial pool of 175 items, with six related construct was created. The initial pool of statements involved all the statements related to the HRM and KM regardless of the perspective employees.

Scale development and instrument testing

In the scale development process construct and content validity of the measurement instrument is attained. Content validity shows if the measurement instrument (i.e. questionnaire) pulls in a representative manner from all of the ways that could be used to measure the content of given constructs. Content validity is desirable in measurement instruments for assuring that construct are drawn from the theoretical essence of what they propose to measure (Straub et al., 2004) and is established through literature review and panels (Wynd, Schmidt, & Schaefer, 2003). Straub et al. (2004) and Moore and Benbasat (1991) recommend the usage of card sorting process (Q-sort) to ensure content validity. Card – sorting (Q-sort) is process of sorting selected items about concourse in participant's preferred order of preferences (G. C. Moore & Benbasat, 1991). In the card – sorting process different set of judges (panellist) which have the task to sort the items within constructs and/or score the pool to eliminate any inappropriately worded or ambiguous items.

After item pool creation (175 items), items were screened to remove duplicates and to randomize the order. The list with items was sent to ICT and HR experts, i.e. the judges, per e-mail along with detailed instructions for evaluation (see Appendix A) in the form of an MS Excel spreadsheet. Instructions and evaluation form was prepared in Slovenian, Croatian and English language. Judges were asked to score each of the items using the scale: 0 – cannot answer; 1 – not relevant, 2 – important but not essential and 3 – essential. In addition, judges had to place the item into one of six constructs. Ten experts returned the completed sheet. Three of them were KM specialist (educators in knowledge management and IT) and seven were HRM specialist: HR managers, educators in field of SHRM and HRM, and students (PhD students, primarily experienced in HRM).

As mentioned above, to ensure the content validity, the task of the judges was to score the pool of items using scale: 0 – cannot answer; 1 – not relevant, 2 – important but not essential and 3 – essential. This shows which items are essential and which not and should be dropped out of the final questionnaire. Afterwards to define which items are accepted and which not the content validity ration (CVR) was computed for each item using (Lawshe, 1975):

$$CVR = (n-N/2) / (N/2)$$

where n is the frequency count of the number of judges that rated the item as either '2 – Important' or '3 – Essential' and N is the total number of respondents. The CVR for each item is evaluated with statistical significance ($\alpha = 0.05$) which means that more than 50% of judges rated the item as either 'important' or 'essential' (see Table 13) The minimum value of the indicator content validity in relation to the number of experts.

Table 13: Indicator values of the content validity ratio

Number of judges	**Minimum level of CVR**	**Number of** judges	**Minimum level of CVR**
5	0,99	**10**	**0.62**
6	0,99	11	0.59
7	0,99	12	0.56
8	0,78	13	0.54
9	0,75	14	051

For each of the manifest variables the CVR was calculated as well as the average CVR value. Manifest variables whose value of CVR was less than 0.62 (which is the reference value at the significance level 0.05 with 10 judges) were excluded from further analysis. In this research, the calculated mean CVR is 0.842 for all items, which indicates that the agreement among judges was unlikely to have occurred accidentally. The result of the content validity calculation is that 16 items needed to be dropped.

After CVR was assessed, inter-rater reliability needs to be established. This means calculating the 'hit ratio', how many judges have placed the same item in the same construct. Fleiss's Kappa was used to measure the level of agreement between the judges as a part of inter-rater reliability that according to Straub et al. (2004) should be mandatorily performed in research. Fleiss' kappa is a statistical measure for assessing the reliability of agreement between a fixed numbers of judges when assigning categorical ratings to a number of items. In the contrary, the Cohen's kappa is used only when

agreement between two ratters is calculated. Fleiss Kappa is considered as extension to Cohen's kappa (Zaiontz, 2014). Fleiss' kappa specifically assumes that although there are a fixed number of judges (in this case ten), different items are rated by different individuals (Fleiss, 1971). Agreement can be found if a fixed number of people assign numerical ratings to a number of items then the kappa will give a measure for how consistent the ratings are. The kappa, is calculated as:

$$k = \frac{\bar{P} - \bar{P}_e}{1 - \bar{P}_e}$$

The factor $1 - \bar{P}_e$ shows the degree of agreement that is attainable above chance and $\bar{P} - \bar{P}_e$ presents the degree of agreement actually achieved above chance. In the case that ratters completely agree $k = 1$, though if there is no agreement among the $k \leq 0$. Total number of subjects is *N*, and the number of ratings per subject is *n (*indexed by *i* = 1,...*N);* *k* is the number of categories (indexed by *j* = 1, ...*k*) into which assignments were made. In the equation below the n_{ij}represent the number of ratters who assigned the i-th subject to the *j-th* category. First the p_i presents the proportion of all assignments, which were to the *j-th* category:

$$p_j = \sum_{i=0}^{N} n_{ij};\ 1 = \frac{1}{n}\sum_{j=1}^{k} n_{ij}$$

Than P_i the extent to which raters agree for the *i*-th subject, is calculated and afterwards$\bar{P}$, as the mean of P_i and $\bar{P}_e$ are input in the formula for Fleiss's Kappa :

$$P_i = \frac{1}{n(n-1)}\left(\sum_{j=1}^{k} n_{ij}^2 - N_n\right)$$

$$\bar{P}_e = \sum_{j=1}^{k} p_j^2\ ;\ \bar{P} = \frac{1}{Nn(n-1)}\left(\sum_{i=1}^{N}\sum_{j=1}^{k} n_{ij}^2 - N_n\right)$$

Landis and Koch (1977) claim that no general authority exists with respect to required scores, but suggest that, according to literature, scores greater than 0.40 are acceptable (see Table 14). Although table is *by no means* universally accepted. Landis and Koch (1977) supplied no evidence to support it, basing it instead on personal opinion. Therefore, its interpretation depends mostly on the researchers' opinion and perception of using or not using an item.

Table 14: Level of acceptance for Fleiss's Kappa

Fleiss's Kappa	Interpretation
< 0	Poor agreement
0.01 – 0.20	Slight agreement
0.21 – 0.40	Fair agreement
0.41 – 0.60	Moderate agreement
0.61 – 0.80	Substantial agreement
0.81 – 1.00	Almost perfect agreement

For this research Fleiss Kappa was calculated and results showed that overall hit ratio is moderate ($\kappa = 0.455398$). Accordingly, at the value of the total hit ratio is considered acceptable. No items were dropped in this phase of analysis. After content analysis and inter-rater reliability were established, the pilot study was conducted.

Pilot study was conducted on a smaller number of respondents (37). The questionnaire was sent to small and medium companies in Croatia (from Zagreb and Varaždin County). The aim was to recognize possible anomalous response from potential respondents, as well as potential problems with statistical analysis. In addition, the technical reliability and usability of the online survey system was also tested. After data was collected preliminary analysis was done in order to see if the items fit to construct as it was done by the judges. This was confirmed, and several items were dropped and reformulated.

5.4 Final questionnaire

After the instrument validation and pilot study final questionnaire was formed. The questionnaire was prepared in Slovenian and Croatian language, both version were language proofed by a native speaker and Slovenian (Croatian) language teacher. Questionnaire was prepared in online survey tool: Lime Survey (version 1.91) (Schmitz, 2014) for which Faculty of Organization and Informatics Varaždin, University of Zagreb, has a license. The online questionnaire consists of six sections, with 27 major question areas. Most of the questions are Likert scale type (11 questions), and multiple choice questions (11), usually with a drop down menu, where respondents could choose one or more answers, with the option '*other*:' where they could write their own answer. Five questions offered a blank space, were respondents could write down their answer to the question. Generally, respondents were asked to rate their opinion using a five-point Likert scale (with 5 = Strongly agree, 4 = Agree, 3 = Have no opinion, 2 = Do not agree and 1 = Strongly disagree). Keeping the number of response options as small, it allows respondents to make a useful choice from among the listed informative answers (Anthony Olomolaiye, 2007). Questions were formulated in such way that each question addresses specific variable in the research objective. The layout of the questionnaire form was designed to appeal to respondents and it followed logical sequence of the subject. Below an overview of every major part of the questionnaire is given, and the whole questionnaire can be found in Appendix B.

Part One – General information
This section requested general information from the respondents. These include the respondents' gender, job function/position, and education level. In addition, questions regarding the company: location (country and county), number of employees, average number of female employees, and age of the company.

Part Two – Selection and recruitment in the company
This section contains questions regarding selection and recruitment of employees; which IT skills are appreciated most in new employees, sources of recruitment and several other.

Part Three – Training and education of employees
In this section respondents are asked about the training methods, average training cost per year and examples of education.

Part Four – Performance appraisal
This section contains questions about performance appraisal method and motivational goals.

Part Five – Effective factors
This section identified human resource factors that could promote successful knowledge management initiatives in ICT companies. Respondents are asked to indicate the agreement to a list of HR factors: list of elements regarding Work Design Structures and Encouraging and Opportunity Structures factors.

Part Six – Knowledge management and Information systems
This section provided questions regarding quality of information systems and knowledge management (capture, store, sharing and application) and quality of information solutions in IT companies.

Questionnaire is anonymous, meaning no private data was required from the respondents. Optional was the last question, where respondents could leave their companies' name or e-mail address, to ensure that they will not receive addition email or reminders.

5.5 Sample population and main field research

In order to analyze the HRM and KM in IT companies employees and managers from ICT sector were contacted. In addition, the purpose of this research is to analyzed difference in Croatian and Slovenian IT companies. Two different samples were formed. From the National Chambers of Slovenia (Chamber of Commerce and Industry of Slovenia) and Croatia (Croatian Chamber of Economy), data on companies in the IT sector were gathered. According to the National Occupational Classification in Slovenia and Croatia (*slo*: Standardna Kasifikacija dejavnosti (SKD); *hr*: Nacionalna Klasifikacija djelatnosti (NKD)) the ICT sector is the classification '***J - Information and Communication'*** ("Nacionalna Klasifikacija Djelatnosti," 2007, "Standardna Kasifikacija dejavnosti," 2008).

Online questionnaire is used in this research and therefore the name and the e-mail address of the companies from the sector *'J - Information and Communication'* were necessary. For Croatia, information on companies is available on the official site: Register of Companies (BIZNET). The *J sector* was chosen, and database provided a list with all registered companies. Only one search condition was set that the company submitted a financial report for the year 2013. This ensured that the companies are active and not in bankruptcy or closed. Though in Croatia this information is online available and free, the Slovenian Chamber of Commerce and Industry does not offer the same. Therefore, officer from the Slovenian Chamber of Commerce and Industry was contacted, and a list with companies' names, e-mail addresses was received. The conditions were set on companies with over 50000 € profit and registered e-mail addresses. This database from Croatia and Slovenia formed the population. Accordingly, the population sample was established (see Table 15).

Table 15: Population sample overview

	Slovenia	**Croatia**
Number of companies from database	1224	4914
Number companies with contact info (e-mails)	***1224***	***2270***

After securing the necessary data, online questionnaire with appropriate cover letter was sent out. According to Schumacker & Lomax (2004) minimum recommended sample size, when using the Structural Equation Modeling for data analysis is 150 samples and/or 5 respondents per item. Same authors suggest the desirable sample size of 300, 400 or more and/or 10 respondents per item. Aim for this research was to receive a minimum of a 200 responses, to ensure enough data to perform SEM analysis.

Research was conducted from October to December 2014. E-mail were sent out twice, to Slovenian and Croatian companies, with an interval of one month. Most of the answers were collected after the first e-mail, and the second e-mail was just a reminder, from which were excluded companies, that have already answered the questionnaire (if they have left an e-mail or name of the company). Unfortunately a lot of e-mails received from both Slovenian and Croatian Chamber of Commerce were not valid or not active, which significantly decreased the sample size. After the research was conducted the sampling population and response rate was calculated (see Table 16).

Table 16: Population, sample and response rate distribution for this research

	Slovenia	**Croatia**
A. Number of companies from database	1224	4914
B. Number companies with contact info (e-mails)	***1224***	***2270***
C. Number of active e-mails (**sample size**)	1144	2304
D. Number of complete response received	***65***	***182***
E. Number of incomplete response received	83	387
F. Response rate (*(D/C)*100*)	***5.681%***	***7.899%***

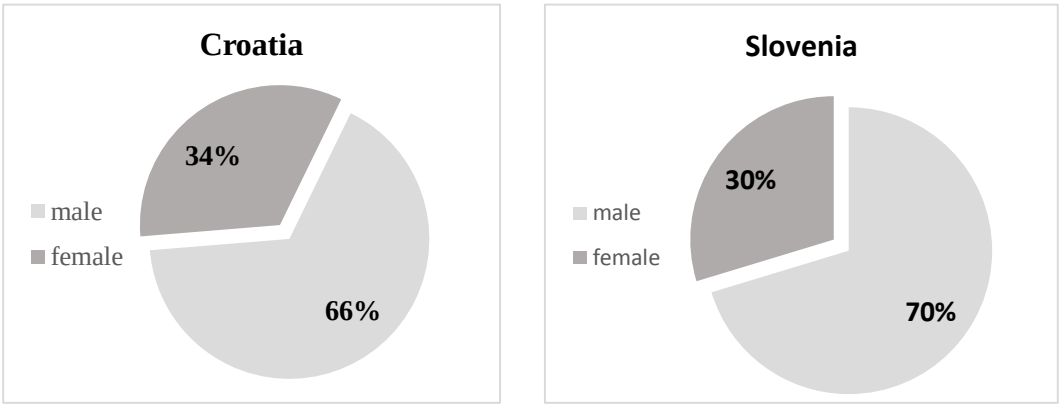
As presented in Table 16 the response rate for Slovenia is 5.681% and for Croatia is 7.899%. This is rather small; though the goal in this research was to gain a minimum of a 200 answers in order to perform the SEM analysis. This goal was achieved through 245 answers (65 +182). Some of the reasons for low response rate can be speculated. The main one is the estimated time needed to complete the survey, which was longer than the recommended threshold of 20 minutes. By designing multiple items per each study construct, this study chose to increase construct validity at the potential risk of incurring a lower response rate. Second, a number of people may not have participated due to lack of insufficient experience or involvement with the knowledge and human resource management to satisfy the survey requirement. Few e-mails returned as undelivered and were flagged as spam also several declining e-mails suggested the e-mail did not pass screenings performed by the executives' assistants. This makes it impossible to estimate the real number of e-mails that actually reached the potential participants. Whether the sample size is sufficient for the estimation of regression analysis is a debatable issue. Hair et al. (1995) (from Obeidat, 2012) recommended that a feasible sample size should be between 100 and 200, in order to be adequate for the data analysis. Although Krejcie & Morgan (1970) provided guidelines for sample size decision, required 201 for a population of 420. Therefore, a return of fully completed 247 surveys indicate an adequate representation.

After data collection, next step was data analysis in order to examine the profile of the respondents and to analyse the hypotheses. Once the initial data screening was concluded, the remaining observations were examined for any systematic bias and patterns of missing data. Lime Survey recognizers 'complete response' as those who answered to each question. Therefore, no missing data was found. In the next section respondents profile and the overview of HRM and KM in Slovenian and Croatian companies is presented. For the purpose of this part, the Microsoft office software - Excel was used. Afterwards data was analysed and computed in SmartPLS for hypothesis testing. Below each of this steps is presented in detailed accompanied by data output and results interpretation.

5.6 Human resource and knowledge management in Slovenia and Croatia (respondents profile)

Online questionnaire was sent to ICT companies in Slovenia and Croatia. A whole of 247 completed (65 – Slovenia, 182 – Croatia) questionnaires were received back. In this section the profile of respondents is presented and analysed. As the research was conducted in Slovenia and Croatia separate, therefore the analysis of respondents profit and opinions is done for each country separate. Distribution of respondents according to gender is presented in Figure 21. The figures show that the gender distribution between Slovenian and Croatian respondents is almost the same: app. 70% of the respondents are female employees and 30% male employees.

Figure 21: Respondents gender distribution for Slovenia and Croatia



Source: authors' research

ICT companies registered at Chamber of Economy in both countries were contacted, though not every company has its residence in Slovenia and Croatia. Table 17 presents the overview of companies' country residence.

Table 17: Respondents companies' country of residence

Country of residence	Croatia	Slovenia
	Number of companies	Number of companies
Denmark	1	0
Croatia	177	0
Slovenia	3	62
Canada	1	0
United States of America	0	1

Source: authors' research

From the Table 17 it is clearly visible that most companies have residence in Slovenia and Croatia. The distribution of education level of respondents is presented in the Table 18. Table shows that 42.19% of respondents from Slovenia have a university degree and accordingly a 50.84% from Croatia.

Table 18: Distribution of education level of respondents

Country	Slovenia		Croatia	
Education level	Frequency	%	Frequency	%
High school	12	18.75	32	17.88
Higher education	8	12.50	28	15.64
University degree (Bachelor and Master)	27	42.19	97	50.84
Completed Master of Science	17	26.56	24	13.41
Achieved PhD	0	0	4	2.23

Source: authors' research

Average number of employees in all companies from selected countries and average number of female employees and average age of the companies are presented in Table 19. In both cases, respondents were mostly from large companies. According to the Law on accounting medium companies from 50 to 250 employees in average per year (*Zakon o računovodstvu,* 2014). Table 19 shows average number of female employees (Slovenia: 39, Croatia: 20) and average age of companies in the sample (Slovenia: 16 years, Croatia: 15 years).

Table 19: Average number of employees

Country	Slovenia	Croatia
Average number of employees	98	102
Average number of female employees	39	20
Average age of the companies	16	15

Source: authors' research

The HR department existence depends mostly on the size of the company and on its needs. In small companies, usually the owner (director, CEO) is in charge for most of HR activity. However, in medium and large sized companies this is not always possible due to the size of the work and employee number.

Table 20: Manager of the activities regarding HR functions in company

HR activities manager	Slovenia (frequency)	Croatia (frequency)	Suma
Legal services	2	12	14
HRM Departments	3	9	12
Owner/CEO	50	139	189

Source: authors' research

Table 20 shows who is responsible for managing employees in companies. It is clearly visible that in most cases (189) the owner (CEO) of the company is in charge of conducting the functions of human resource management. Several respondents stated that they have outsources this function and other mentioned that CEO together with HRM department are in charge of managing employees.

5.6.1 Employee selection and recruitment

After respondents profile was defined, the first section in the questionnaire was about selection and recruitment of employees. Results are presented below and as in previous section results are presented by distinguishing Slovenian from Croatian respondents.

When applying for a vacancy in the company, potential candidates undergo structured interviews (questions related to the job, the same questions are addressed to all candidates). The Table 21 shows that in most companies in Slovenia (81.54%) the potential candidates need to have an structured interview with the employer. Similar situation is in Croatian companies, where 76.92% of employers demand a structure interviews before hiring.

Table 21: Structured interview required when applying for a vacancy

Responses/Country	Slovenia	Croatia
Yes	81.54%	76.92%
No	9.23%	14.84%
Not sure	9.23%	8.24%

Source: authors' research

In the Table 22 an overview of responses regarding employee selection in Slovenian and Croatian companies are presented. Respondents were asked if their candidates need to access a formal test during selection process. In Slovenia and Croatia 45% of companies, demand a formal test. In 17% of companies, both Slovenian and Croatian, applicant must undergo a physical testing. In Slovenia 74% of ICT companies offers a possibility of practical training for students, where only 60% of companies from Croatia do.

Table 22: Selection requirements for candidates

Questions/Response	Country	Yes	No	Not sure
Potential candidates are required to access the formal test during selection process.	Slovenia	46.15%	41.54%	12.31%
	Croatia	45.55%	43.41%	8.24%
Applicants must pass a physical (systematic) testing.	Slovenia	16.92%	67.70%	15.38%
	Croatia	16.57%	72.93%	10.50%
Company offers a possibility of practical training for students.	Slovenia	73.85%	13.85%	12.30%
	Croatia	60.22%	25.41%	14.37%

Source: authors' research

Vacancies can be filled with potential candidates found 'in house' (promotion on the work place), through job rotation, recommendations by current employees (their friends or relatives), or potential candidate from colleges (students practice), through private agencies, press release and open applications sent by people interested to work in the company. Table 23 shows the average recruitment ways used in Slovenian and Croatian companies.

Table 23: Options for filling vacancy

Items/Country	Slovenia %	Croatia %
Promotion on the work place ('in house')		
Do not use	22.03	18.83
Sometimes	33.90	29.87
Use	44.07	51.30
Job rotation		
Do not use	53.70	29.41
Somtimes	29.63	42.48
Use	16.67	28.10
Recommendations by current employees		
Do not use	31.15	30.91
Sometimes	39.34	47.88
Use	29.51	21.21
Colleges (students practice)		
Do not use	31.67	37.42
Sometimes	33.33	36.77
Use	35	25.81
Private agencies		
Do not use	78.33	74.68
Sometimes	11.67	12.66
Use	10.00	12.66
Press release		
Do not use	24.59	36.36
Somtimes	42.62	39.39
Use	32.79	24.24
Open applications		
Do not use	65	52.76
Sometimes	10	21.47
Use	25	25.77

Source: authors' research

Table 23, shows that most common method in Slovenia are 'in house' promotions (44.07%), and student practices (35%). In Croatia, the situation is a bit different. Croatian ICT companies prefer 'in house' promotions (51.30%), and job rotations (28.10%). Student practices, open applications and press releases are on the same level (app. 25%). After choosing the source where to find the potential employees, companies must decide on the method of employee selection.

Theory and practice offer various possibilities, of which most common are: official required forms (e.g. Curriculum Vitae); psychometric tests, tests of knowledge and skills; interviews 'one on one'; estimate centres; references and medical examinations. Table 24 shows which are the most common selection methods in ICT companies.

Table 24: Selection methods - requirements

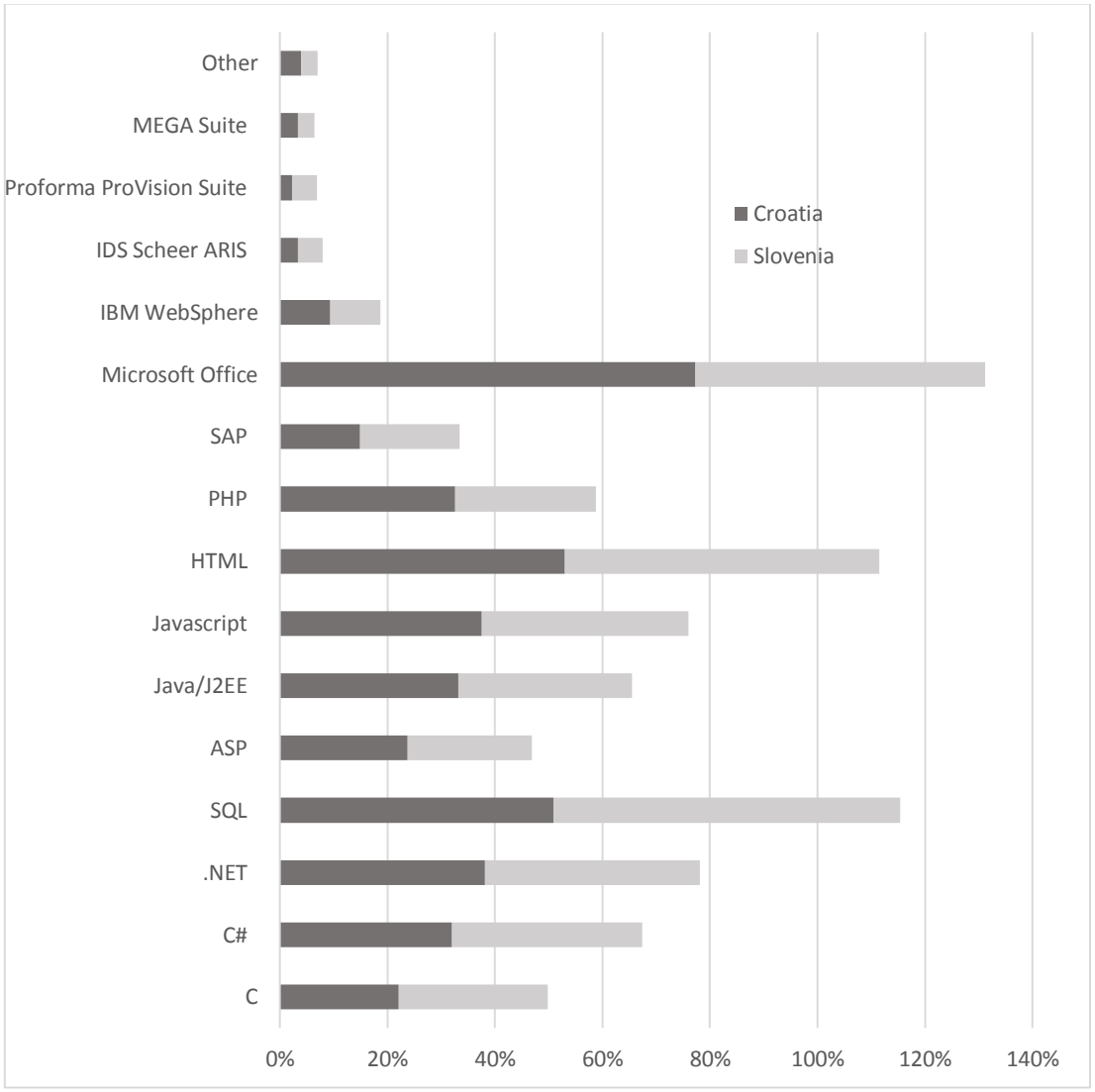
Items	Slovenia %	Croatia %
Required forms (e.g. CVs)		
Always	79.03%	76.88%
Sometimes	17.74%	17.92%
Never	3.23%	5.20%
Psychometric tests		
Always	3.23%	12.50%
Sometimes	29.03%	22.62%
Never	67.74%	64.88%
Tests of knowledge and skills		
Always	31.15%	38.15%
Sometimes	31.15%	38.73%
Never	37.70%	23.12%
Interviews 'one on one'		
Always	93.75%	92.13%
Sometimes	6.25%	5.62%
Never	0.00%	2.25%
Estimate centres		
Always	0.00%	9.49%
Sometimes	13.56%	11.39%
Never	86.44%	79.11%
References		
Always	61.90%	46.86%
Sometimes	36.51%	46.29%
Never	1.59%	6.86%
Medical examinations		
Always	26.67%	8.07%
Sometimes	23.33%	16.15%
Never	50.00%	75.78%

Source: authors' research

The above Table 24 shows that in Croatia most common methods for employee selection in average are interview 'one on one' (92.13%) where the employer talks to the candidates. And employer requires CV from candidates for selection in 76.88% cases in Croatian ICT companies. The same is in Slovenian ICT companies, the interview 'one on one' (93.75%) and the CV requirements (79.03%) are the most common ones.

ICT companies, require specific knowledge and skill from their employees. Companies selected in the sample were asked which of the ICT knowledge and skills they require form their employees (see Figure 22).

Figure 22: Overview of IT knowledge and skills in Slovenia and Croatia



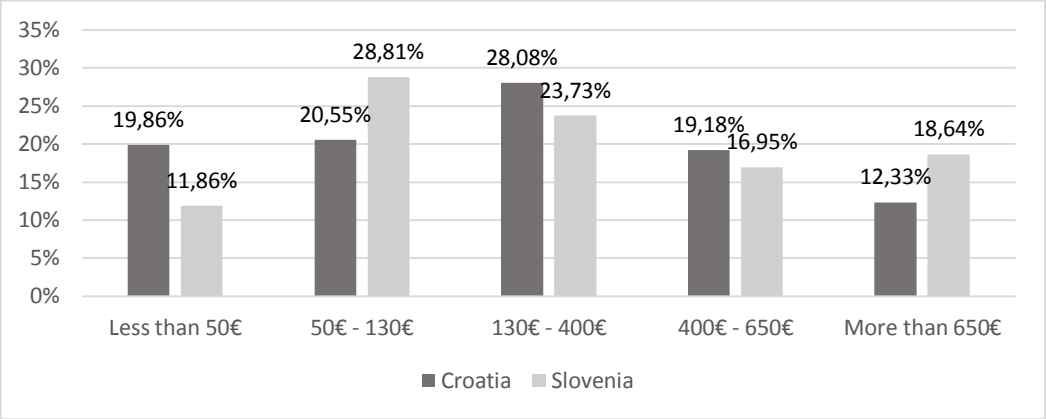
Source: authors' research

As the Figure 22 shows the most interesting for IT, of course, is the Microsoft Office Package (Slovenia = 53.85%, Croatia = 77.35%). SQL (Slovenia = 64.62%, Croatia = 50.83%) and HTML (Slovenia = 58.46%, Croatia = 53.04%). Several respondents mention other skills and knowledge they find important. These are*: C++, Oracle Business Intelligence, SOAP, CMS, WORDPRESS, Nuendo, Wavelab, Linux, Cisco, RegEX, Windows Server, CorelDraw, Data Recovery, Navision, iOS system, System Knowledge, Software tools for 2D and 3D animation, AutoCAD, Cisco education, Dynamics, Hybernate; Oracle, Cpanel, WordPress, Magento, BI Tools, Delphi, Hermes, Windows systems, Linux systems, Firewalls, Cloud technology, AngularJS, Visual basic, Informatica, Cognos, Business Objects.*

5.6.2 Training and development of employees

Employee training and development is important for development of employees and for the whole company. Information technology industry is rapid growing industry and to compete on national and international market it is expected that employees develop their knowledge and skills in various area. Through employee training, companies expand and become more competitive on the market. Usually, the problem in companies are training costs. Figure 23 show average annual costs, which companies spends on their employee education.

Figure 23: Average annual cost for employee education in Slovenia and Croatia



Source: authors' research

In average most companies spend from 130€ up to 400€ per year for employee education (Slovenia = 23.73% and Croatia = 28.08%). Interesting is that more money is spend for education in Croatia than in Slovenia (maximum spent in Slovenia is 50€ - 130€ = 28.81%; and maximum spent Croatia is 130€ - 400€ = 28.08%). Next question that presents it self is: where does money go to? Respondents provided examples of recent educational seminars, conferences and boot camps they have visited in the last year. These are as follows: *Google AdWords; HTML 5 css; Carnet seminar (CUC), Cisco academia, EU CLOSE UP; IBM boot camp; HP boot camp; Java official trening, Oracle university (OBIEE, PL/SQL); Microsoft Win Days; Web fest - weekend media festival; CECIIS, ISD2014; Magento Developers Paradise Mallorca; Meet Magento Poland; OMG Commerce Zagreb; DigiTraining Warsav, Art management Venetia, Audience Development Sofia; London TMFA; Columbia University Summer School; SEO; CASE; Mipro; MS eduaction; ISO9001 training; Superweek - Budapest, WeBIZ-Subotica; SEMPO – London; Cloud Sales Specialist; Microsoft Licencing Academy; ORACE seminars; SymfonyConf; PHP Summer Camp; RRIF,AZURE; NET; Photodays; Black Belt – Bonn; AXIS Communications' Academy, MobilityDay 2014, Office 365 seminar; Green building professional; Windays; Oracle Hroug; IBM forum.* Various seminars and conferences can be found in area of IT. As presented above, Slovenian and Croatian employees often attend meetings and symposium in various segments of ICT.

5.6.3 Performance appraisal

One goal of performance management is gaining information necessary for decision-making related to employee remuneration. Furthermore, the performance tracking allows planning of career development which is in the interest of the company and individual employees (Bahtijarević-Šiber, 1999, pp. 507–509). Assessment of work performance will not fulfil its purpose if there is no: appropriate collaboration among employees, documentation with updated data and if employees do not receive recognition for achieved good results (Pfeifer, 2008, p. 4).

Employee motivation is important part when it comes to managing human resources. Various motivational goals of companies have been established i.e.: attracting quality people; retention of quality people; promotion of work quality; encouraging creativity and change; promotion of company development; insuring interest for development of the company and ensuring the success of the company. Main motivational goals in Slovenian ICT companies are: encouraging activities (75.38%); promotion of company development (72.31%) and promotion of quality (72.31%) followed by retention of quality people (70.77%). In Croatian ICT companies, the ranking of motivational goals is opposite: retention of quality people (86.26%), followed by promotion of quality (79.67%) and promotion of company development (73.63%). Table 25 below shows the answers regarding motivational goals in both countries.

Table 25: Motivational goals in ICT companies from Slovenia and Croatia

Motivational goals	Slovenia	Croatia
Attracting quality people	33.85%	54.95%
Retention of quality people	70.77%	86.26%
Promotion of work quality	72.31%	79.67%
Encouraging creativity	75.38%	67.03%
Encouraging change	27.69%	33.52%
Promotion of company development	72.31%	73.63%
Insuring interest for development of the company	49.23%	57.14%
Ensuring the success of the company	63.08%	72.53%

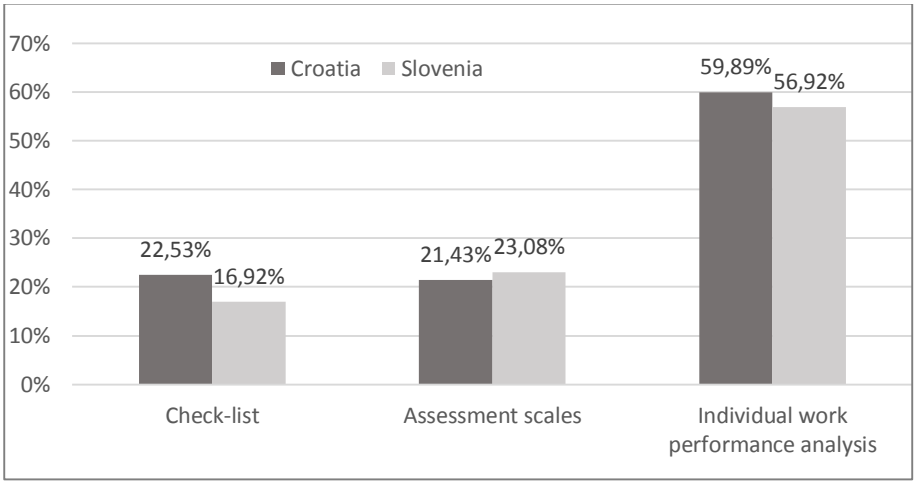
Source: authors' research

Performance needs to be evaluated in order to stir employee behaviour to higher performance and perfection. Companies can choose among different performance appraisal methods:

- Check-list (a number of specific statements that describe different behaviours; this reduces subjectivity in assessing).
- Assessment scales (performance appraisal rating based on pre-defined standards - predefined characteristics or behaviours. The task of the assessor is to determine the level of characteristics in employees).
- Individual work performance analysis - comparison with other employees

Figure 24 show the usage of PA methods in Slovenia and Croatian ICT companies. It is visible that Slovenia uses in most cases individual work performance analysis (56.92%) and Croatian ICT companies as well (59.89%). Assessment scales and checklists are both equally represented in both countries.

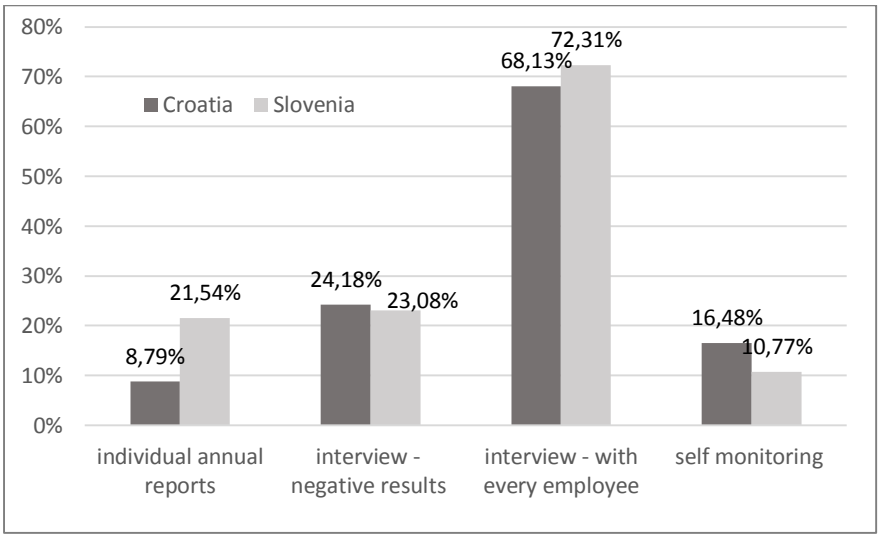
Figure 24: Performance appraisal methods



Source: authors' research

After the performance appraisal was conducted employees need to be inform on their grades/success or other results. For employee informing methods used are: individual annual reports; interview with the supervisor (face2face) when ICT is necessary and/or with every employee. In addition, some companies offer self-monitoring methods with a use of web – based tools. These results (performance data saved by the employee) are than visible to the director board and employees themselves. Figure 25 show which employee PA informing methods are most common in ICT companies.

Figure 25: Performance appraisal informing methods for Slovenia and Croatia



Source: authors' research

Figure 25 shows that most common performance appraisal methods for ICT companies from Slovenia and Croatia is the interview between supervisor and employee (respectively 73.21%; 68.13%). Other methods are not as represented as the interview.

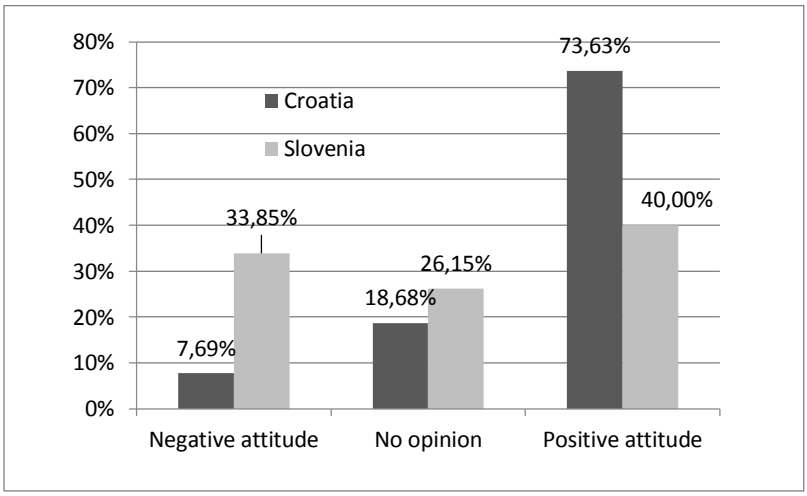
5.6.4 Information systems and Knowledge management

Knowledge management is a major issue for human resources management and organization, culture and information technology play a crucial role (Staab et al., 2000). Therefore, in the sixth part of the questionnaire, focus was on the quality of information systems from the perception of the manager (respondents) and on the knowledge management processes. Respondents were also asked which of the IT KM mechanisms and technologies they use in their companies.

For examining the information systems (mechanism and technologies) for knowledge management the proposed and tested questionnaire by Moffett and McAdam (2009) was combined with own results and items form the pilot study. Authors Moffett and McAdam (2009) proposed a dual theory building/testing approach. Through a development of a multi-factor knowledge management model, known as the MeCTIP model, authors undertook and empirical analysis on a number of UK organizations from engineering, technology and financial services sectors. Using a factor analysis, they proposed factors for each industry regarding KM. Several of these factors (items) were used for this research combined with own research analysis from the pilot study, specifically for evaluation of quality of information solutions. Not all of the items were used due to the expert analysis where a few items were dropped, therefore for examining information system for KM in Slovenian and Croatian companies, eleven items were used. The response analysis is presented below.

Respondents from ICT companies agree that their applications (designed in their own companies) are designed for certain organizational problems. Accordingly, 40% of Slovenian companies have a positive attitude towards own application and 73.63% of Croatian companies (see Figure 26).

Figure 26: IT applications are designed for certain organizational problems

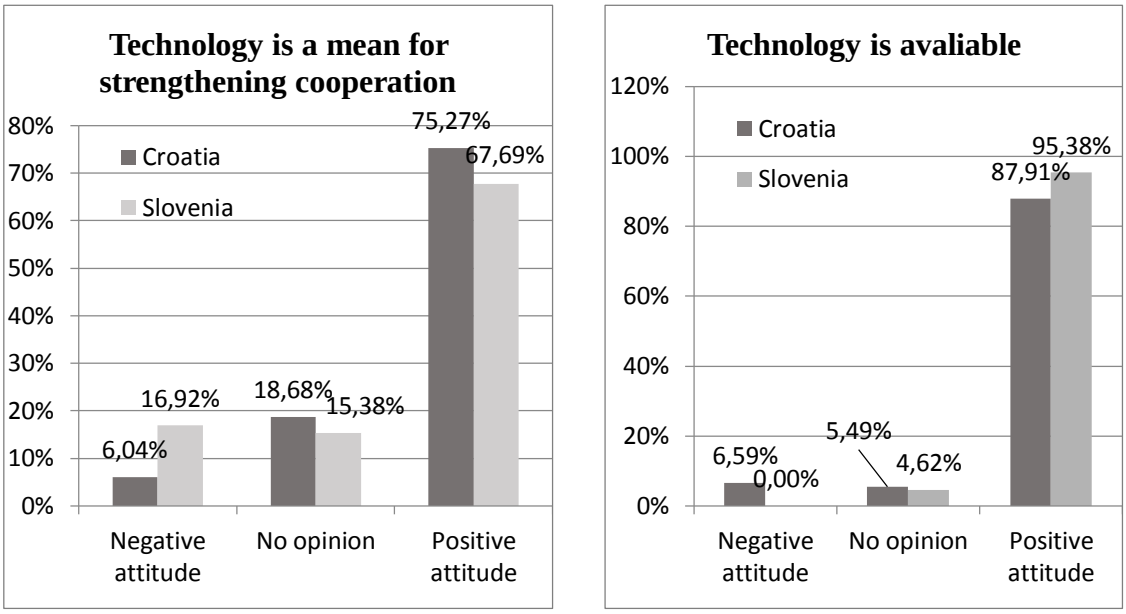


Source: authors' research

Companies' technology (mechanisms) serve as a means to strengthen cooperation. With these statement 67.69% Slovenian companies agree and 15.38% are indifferent. In Croatian companies the situation is similar, where 75.27% of the respondents agree with the statement and 18.68% are indifferent (see Figure 27). From all respondents 95.38%

of Slovenian and 87.91% of Croatian respondents agree that their technology is available to each employee in the company.

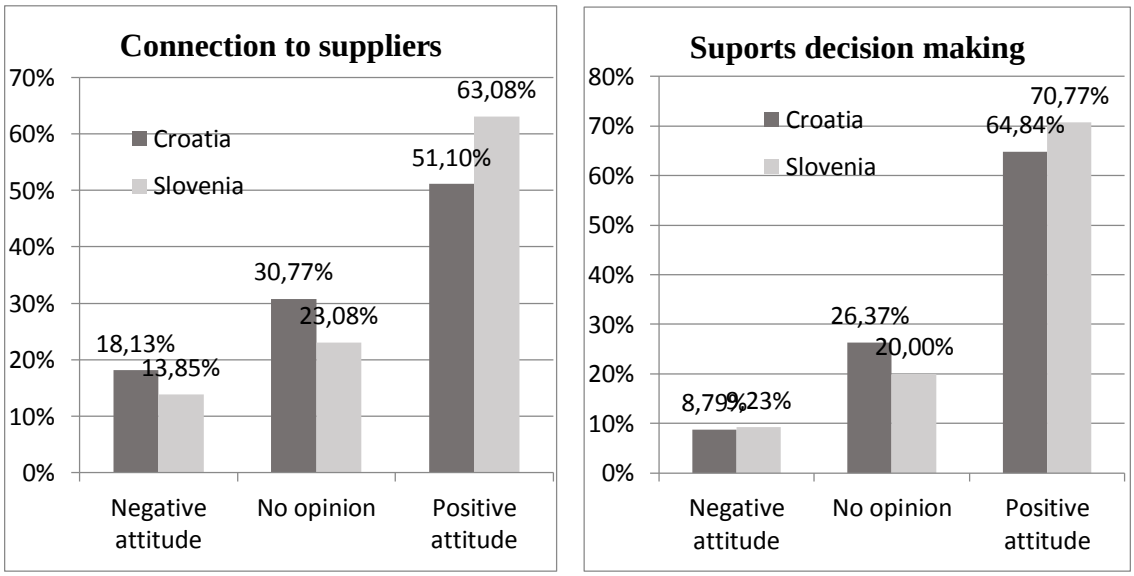
Figure 27: Purpose and availability of technology



Source: authors' research

Information systems can be designed for various purposes. Respondents form Slovenia support the premise that their own IS software helps in communication with their suppliers (63.08%) and that it supports the decision-making process in the company (70.77%). Croatian respondents stated the same. A 51.10% of them stated that IS serves as help to communicate with suppliers and 64.84% have positive opinion when it comes to IS and its support to decision making (see Figure 28).

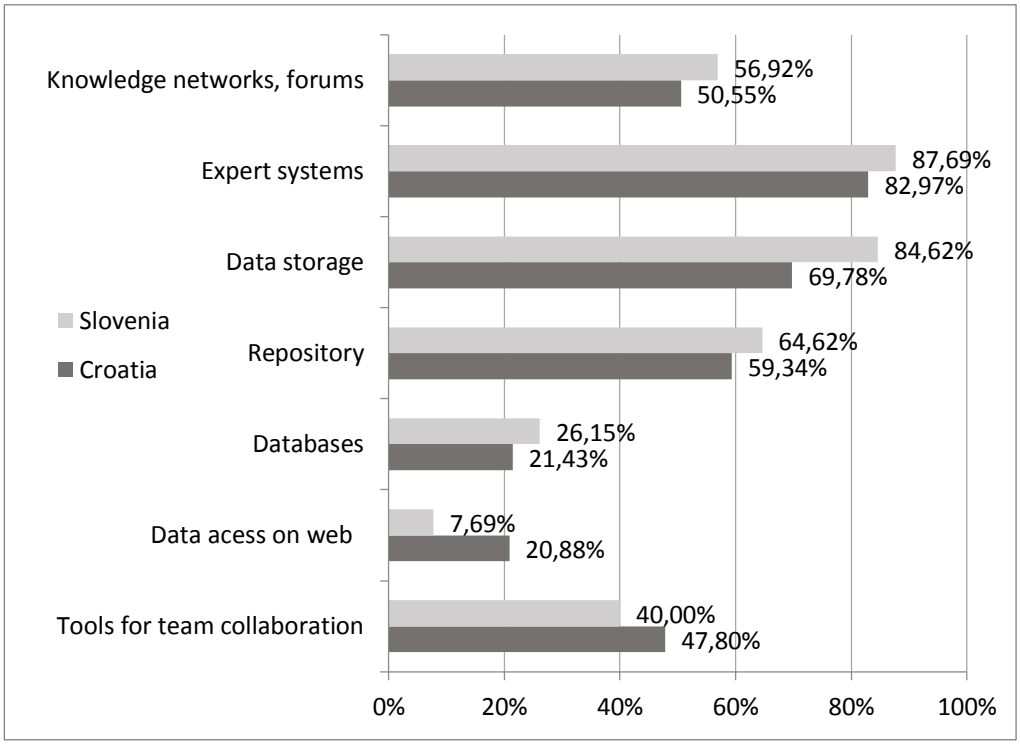
Figure 28: Purpose of own designed information systems in the company



Source: authors' research

Respondents were also asked which technologies they use for knowledge management in the companies. Most common technologies used are: expert systems (Slovenia = 87.69%, Croatia = 82.97%) and data storage (Slovenia = 84.62%, Croatia = 69.78%). Following repositories (Slovenia = 64.62%, Croatia = 59.34%) and knowledge networks (Slovenia = 56.92%, Croatia = 50.55%). The usage of technologies is presented in Figure 29.

Figure 29: Technologies used for knowledge management in the companies



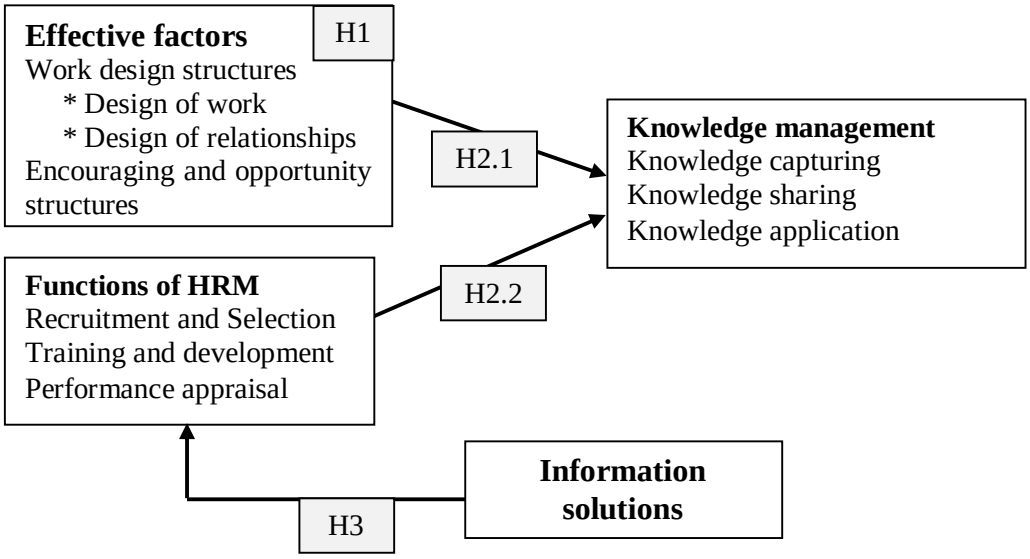
Source: authors' research

The above four sections discuss data collected from ICT companies from Croatia and Slovenia. In most cases, Slovenian and Croatian employees showed similar results regarding employee selection methods for filling vacancies and requirements for job application, average annual cost for employee training, motivational gaols of the company and other. Further, the hypotheses testing, based on the conceptual model derived from extensive literature analysis is presented.

5.7 Human resource and knowledge management in Slovenia and Croatia (hypothesis testing)

Preliminary theoretical model was done based on literature review, which supports the belief that strong relationships between functions of HRM, effective factors, information solutions and KM can be established. Hypothesized relationships for empirical research are illustrated in Figure 30.

Figure 30**:** Conceptual model of the relationship



Hypotheses are tested using data form the main research. Data was analysed using SPSS statistical software tool (H1) and SmartPLS for Structural Equation Modelling (H2 and H3).

Structural Equation modelling

Structural equation modeling (SEM) techniques are considered a major component of applied multivariate statistical analyses and are used by biologists, economists, educational researchers, marketing researchers, medical researchers and a variety of other scientists (Pugesek, Tomer, & Eye, 2003). One reason for the enhanced attention is the availability of specialized SEM programs (e.g., AMOS, EQS, LISREL, Mplus, Mx, RAMONA, SEPATH, SmartPls) (Pugesek et al., 2003).

SEM models represent translations of a series of hypothesized cause–effect relationships between variables into a composite hypothesis concerning patterns of statistical dependencies (Pugesek et al., 2003). The relationships are described by parameters that indicate the magnitude of the effect (direct or indirect) that independent variables have on dependent variables. SEM is a combination of factor analysis and multiple regression (Pugesek et al., 2003). It is used to determine how sets of variables define constructs (i.e. measurement model) and how these constructs are related to each other (i.e. structural model) (Bollen & Long, 1993). It includes a large set of powerful statistical indices for testing measurement and structural models. Its goal is to determine to which extent the model fits the sample data. With SEM, the relationship between measured variables and

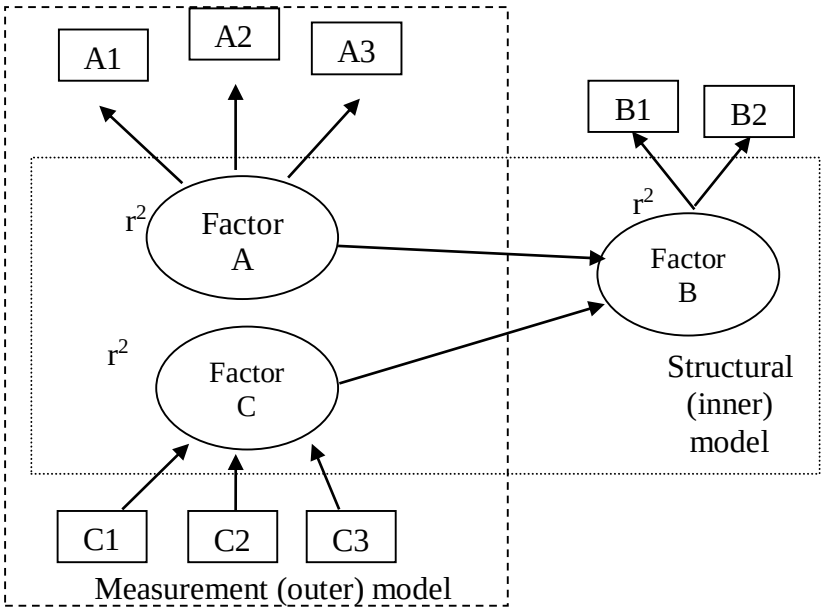
the relationship between unmeasured, hypothetical constructs can be modelled. Two main goals in SEM are (Suhr, 2006):

- To understand the patterns of correlation/covariance among a set of variables,
- To explain as much of their variance as possible with the model specified.

SEM analysis includes confirmatory factor analysis and path analysis. Path analysis, also known as causal modelling, focuses on examining the web of relationships among measured variables (Jackson, Dezee, Douglas, & Shimeall, 2005). Typically, researchers communicate a SEM model by drawing a picture of it. These pictures, path diagrams, are simple mathematical representations (but in graphical form) of the proposed theoretical model (Suhr, 2006). They only aid in the conceptualization and communication of theoretical models, but also substantially contribute to the creation of the appropriate input file (Pugesek et al., 2003). Path analysis tests models and relationships among measured variables.

Structural equation models comprise two components, a measurement model and a structural model (see Figure 31). Model is statistical statement about the relations among variables. The measurement model relates observed responses or 'indicators' to latent variables and sometimes to observed covariates. The structural model then specifies relations among latent variables and regressions of latent variables on observed variables (Skrondal & Rabe-Hesketh, 2005). The purpose of the model is to account for variation and covariation of the measured variables. Path analysis tests models and relationships among measured variables. Structural models are models that elucidate the underlying factors or constructs of observed variables and model the relationship between these theoretical constructs. In the path diagrams, the ovals or circles represent latent variables, while rectangles or squares represent measured variables. Residuals are always unobserved, they are represented by ovals or circles.

Figure 31: Inner vs. Outer Model in a SEM diagram



The measurement model relates observed responses or 'indicators' to latent variables. The structural model then specifies relations among latent variables and regressions of latent variables on observed variables (Skrondal & Rabe-Hesketh, 2005). The purpose of the model is to account for variation and covariation of the measured variables. SEM

includes two kinds of variables: observed and latent. Observed variables have data, like the numeric responses to a rating scale item on a questionnaire such as gender or height. Latent variables are not directly observed, but researchers still want to know about them. The latent variables in SEMs are continuous variables and can have an infinite number of values (Bacon, Bacon & Associates Ltd., & SPSS Inc., 1997). Manifest or observed variables are directly measured by researchers, while latent or unobserved variables are not directly measured but are inferred by the relationships or correlations among measured variables in the analysis (Skrondal and Rabe-Hesketh, 2005). Classification of dependent and independent variables is made on the basis of a theoretical causal model, formal or informal. The causal model is presented in a diagram where the names of measured variables are within rectangles and the names of factors in ellipses. Dependent variables are those, which have one-way arrows pointing to them, and independent variables are those, which do not. Variables that depend on other variables are called dependent. Variables that do not depend on other variables in a model are called independent (Bacon et al., 1997). Independent variables, which are assumed to be measured without error, are called exogenous or upstream variables; dependent or mediating variables are called endogenous or downstream variables.

Two different techniques for structural equation modelling can be applied (Afthanorhan, 2013): covariance-based technique (CB-SEM) and partial least square (PLS-SM). CB-SEM is a covariance-based technique and attempts to minimize the difference between the sample covariance and that predicted by the theoretical model (Pugesek et al., 2003). PLS-SEM increases the explained variance of the endogenous latent constructs (dependent variables) and minimizes the unexplained variance (Afthanorhan, 2013). PLS does not assume the normality of data distribution, and therefore is more suitable for smaller samples. The analysis can also be conducted with several (fewer than three) indicators (items), whereas the CB-SEM assumes that there are more than three indicators (Afthanorhan, 2013).

For purpose of this research the partial least square structural equation modelling is employed and as for the software the SmartPLS 2.0 (Ringle, Wende, & Will, 2005) is used. SmartPLS is one of the main applications for Partial Least Square Structural Equation modelling (PLS-SEM). This software, developed by Ringle, Wende and Will (2005) has a friendly user interface and advanced reporting features and is freely available to academics and researchers.

Internal consistency reliability and high order constructs

For analysis of hypothesis 2 and hypothesis 3 data collected through online questionnaire is used. In analysis presented above Slovenian and Croatian companies were analyzed separately. For the purpose of analyzing H2 (H2.1, H2.2) and H3 data is combined, differences between Slovenian and Croatian companies are not analyzed. After card sorting and experts' opinion, and pilot study, the remaining items for measuring human resource management, effective factors and knowledge management were first tested for internal consistency using Cronbach's alpha statistics. It is an imperative to calculate and report Cronbach's alpha coefficient for internal consistency reliability. Cronbach's alpha does not provide reliability estimates for single item, it is a measure of internal consistency, that is, how closely related a set of items are as a group (Šošić, 2006). A "high" value of alpha is often used (along with substantive arguments and possibly other statistical measures) as evidence that the items measure an underlying (or latent) construct. A threshold for Cronbach's' alpha statistics is a value of 0.7 and higher. This

analysis was done in SPSS. The procedure had to be repeated several time for each construct, until the Cronbach's' alpha reached the highest value. Final Cronbach's' alpha statistics are presented in Table 26 (see results in Appendix C).

Table 26: Reliability Statistics for constructs

Construct	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Knowledge Management	**.814**	.821	9
Human Resource Management			
Selection and recruitment	**.733**	.753	14
Performance appraisal	**.736**	.786	19
Training and development	**.783**	.787	5
HR Effective Factors			
Work design structures			
Design of work	**.817**		
Design of relationships	**.842**	.846	7
Encouraging and opportunity structures	**.898**	.900	8
Information solutions (quality)	**.799**	.807	11

Source: authors' research

Table 26 above show results of reliability analysis for each construct. It is visible that each construct has alpha higher than 0.7, and therefore these construct are reliable for further analysis. Table 27 below gives overview of number of items measuring each construct in questionnaire and after reliability analysis was performed. Due to the various iteration when calculating Cronbach's alpha, several items were dropped in order to achieve internal consistency.

Table 27: Items measuring each construct

Construct	Item name	Items number (questionnaire)	Items number after internal consistency analysis
Knowledge Management	KM	9	9
Human Resource Management	HRM		
Selection and recruitment	SE	17	14
Performance appraisal	PA	23	19
Training and development	TA	6	5
HR Effective Factors	EFF		
Work design structures	WDS		
Design of work	DW		
Design of relationships	RD	7	7
Encouraging and opportunity structures	EOS	10	8
Information solutions (quality)	IS	11	11

Source: authors' research

Effective factors and functions of HR have enhancing impact on HR (Attafar et al., 2012) and since the human resources management has impact on knowledge management, it

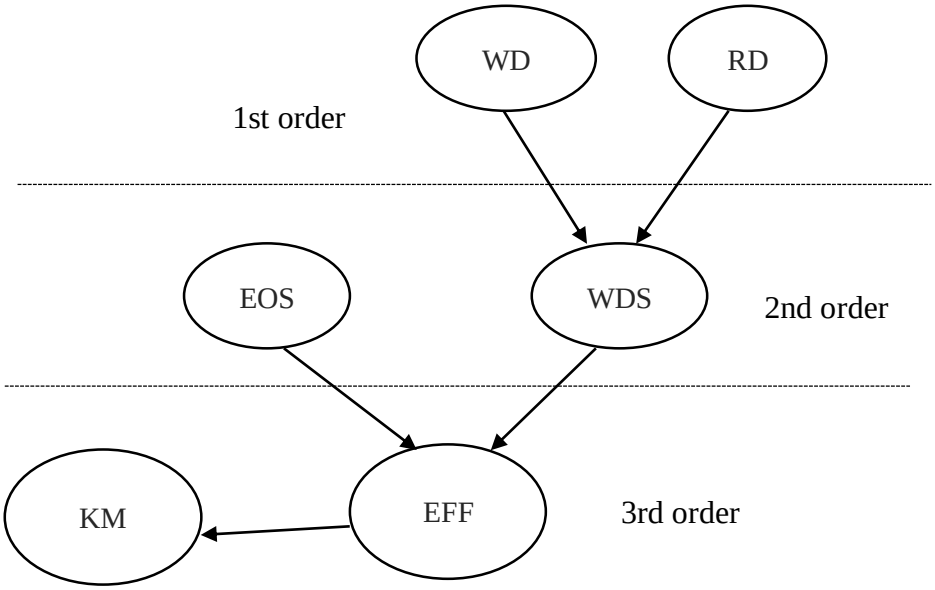
can be stated that effective factors and functions are related to knowledge management. The aim is to define this relationship for ICT companies in Slovenia and Croatia. Human resource management is in this thesis observed through HRM functions (Recruitment and Selection; Training and development; Performance appraisal) and HR effective factors *Work design structures* (which consist of *Design of work* and *Design of relationships*) and *Encouraging and opportunity structures.*

The goal of the hypothesis H2.1 is to test relationship between knowledge management and effective factors (depicted in Figure 30).

H2.1: *Effective factors of HR have a significant positive impact on knowledge management in ICT companies.*

However, effective factors are a high order manifest variables: 3rd level: Effective factors (EFF) and Knowledge management (KM); 2nd level: Work design structures (WDS) & Encouraging and opportunity structures (EOS); 1st level: Design of relationships (RD) and Design of work (WD).

Figure 32: Conceptual model of effective factors and knowledge management



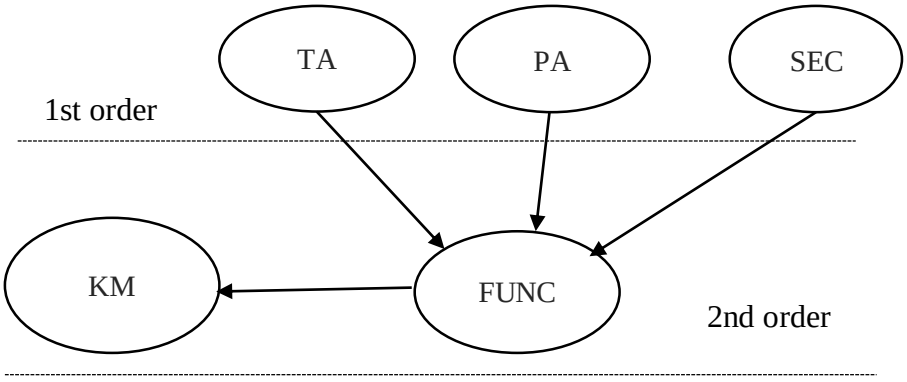
Source: authors' research

The goals of the hypothesis H2.2 is to test relationship between knowledge management and HRM functions.

H2.2: *Functions of HR have a significant positive impact on knowledge management in ICT companies.*

HR functions is also a high order manifest variable. For testing the hypothesis, H2.2 high order manifest reflective variables are: 2nd level: HRM functions (FUNC) and Knowledge management (KM); 1st level: Selection and Recruitment (SEC), Training and Development (TA) and Performance application (PA) (see Figure 33).

Figure 33: Conceptual model for HRM functions and Knowledge Management



Source: authors' research

The use of non-parametric tests of evaluation of internal and external models in the analysis of multidimensional constructs depends on the operationalization of the relationship between the level and within the individual dimensions. Authors Wetzels et al. (2009) present two major problems, which can occur in evaluating the validity and reliability of multidimensional constructs:

1. The increase of the heterogeneity dimension reduces internal consistency of the construct,
2. Validity of the construct due to the large amounts of specific and group variance that is often treated as a variance errors.

Wilson and Henseler (2007) proposed two methods for evaluation of multidimensional constructs: a technique of hierarchical components (eng. Hierarchical Approach Components) and two-stage technique (eng. Two-Stage Approach). Ringle et al. (2012) proposed the implementation of a combination of these two techniques. In the first step, applying techniques of hierarchical components in order to calculate the latent constructs of lower levels. The values (latent variable scores) obtained in the second step are used as manifest variables latent constructs of a higher level and serve for calculating their values. In the second step of the implementation included manifest variables are not included, on the basis of which the calculated values of latent variables lower levels.

Assessing the validity of the structural and measurement model

As mentioned above, a combination of the technique of hierarchical components and two-stage technique for analyzing the hypothesis is used. In the first step, the technique of hierarchical components is applied in order to calculate the latent constructs of lower levels (1^{st} order constructs). Obtained values, the latent variable scores, are used as manifest variables of latent constructs of a higher levels (2^{nd} order constructs) and serve for calculating their values. The combination of both techniques has been proven efficiently in several research (Orehovački, 2013) and is applied for this analysis. After the final model is defined, with path coefficients and coefficient of determination, the reliability and validity of the model need to be asses. First, the measurement model needs to be assessed, and afterwards the structural model in order to accept or reject the hypothesis. For an initial assessment of PLS-SEM model, basic elements need to be reported (Fornell & Larcker, 1981; Šošić, 2006; K. K.-K. Wong, 2013; Yeşil, Koska, & Büyükbeşe, 2013):

Measurement model (outer model)

1. *Indicator reliability* is shown through outer loadings numbers. To find indicator reliability value the square each of the outer loadings needs to be calculated. The

level of 0.70 or higher is preferred. If it is an exploratory research, 0.4 or higher is acceptable.

2. *Internal consistency reliability* is defined through composite reliability, which should be 0.7 or higher. It is a measure based on the correlations between different items on the same test. It measures whether several items that propose to measure the same general construct produce similar scores.
3. *Convergent validity* is analyzed through average variance extracted (AVE) and it should be 0.5 or higher**.** Convergent validity establishes if two similar constructs correspond with one another.
4. *Discriminant validity* is analyzed through AVE numbers and Latent Variable Correlations. Fornell and Larcker (1981) suggest that the square root of AVE of each latent variable should be greater than the correlations among the latent variables. It tests whether concepts or measurements that are supposed to be unrelated are, in fact, unrelated.

Structural model (inner model)

1. Explanation of *target endogenous variable variance*: coefficient of determination, R^2. It is interpreted as the proportion of the variance in the dependent variable that is predictable from the independent variable. In social sciences, R^2 of 0.75 is substantial, 0.50 is moderate, and 0.25 is weak.
2. Inner model *path coefficient*
3. Checking Structural Path Significance in Bootstrapping. SmartPLS can generate *T*-statistics for significance testing of both the inner and outer model, using a procedure called bootstrapping. In this procedure, a large number of subsamples (e.g., 5000) are taken from the original sample with replacement to give bootstrap standard errors, which in turn gives approximate *T*-values for significance testing of the structural path. The Bootstrap result approximates the normality of data.

Analysis of metric characteristics consists out of reliability and validity evaluation of manifest variables at all levels of the multidimensional conceptual model. Evaluation of reliability of reflective manifest variables consists of standardized factor loadings analysis and the evaluation of the reliability of manifest variables. This is done through significance analysis of standardized factor and cross loadings. All the data needed to analyzed the structural and measurement model is provided by SmartPLS software. In the process of analyzing the hypothesis the data which supported the decision on the hypothesis is accordingly presented and supplied in appendix.

5.7.1 Perception on importance of effective factors (H1)

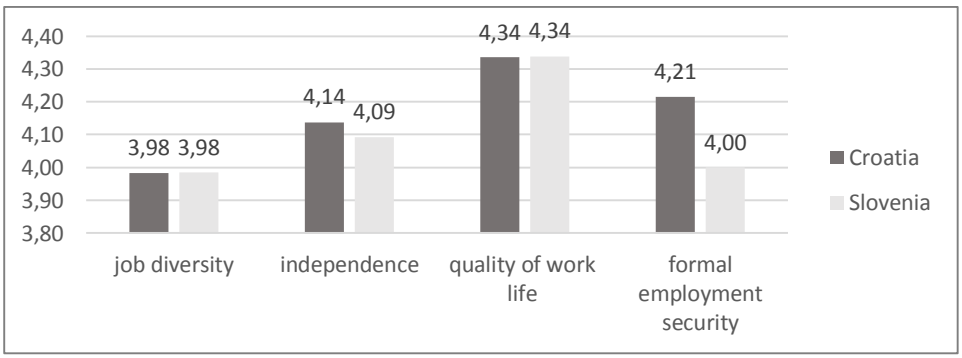
It is presumed that ICT employees do not perceive all HR effective factors (Work design structures and Encouraging and opportunity structures) as equally important. Therefore, it can be stated that certain effective factors are more important to ICT employees in Slovenia than in Croatia.

H1: *There are significant differences between IT employees' perception in Slovenian and Croatian companies on importance of HR effective factors.*

Hypothesis 1 (H1) is related to the goal regarding determination of the extent to which effective factors of HRM affect successful exploitation of HR issues and are of great importance for IT employees (cf. G2.1).

Respondents were asked to decide which of the effective factors they consider important or not important for their business. Figure 34, 34 and 35 show the average score for each effective factor for Slovenia and Croatia. *Work design structures* which consist of *Design of work* and *Design of relationships*, were both measured with four items, and *Encouraging and opportunity structures* were measured with three items. Likert scale (1 – not important at all to 5 – very important) was used. The higher the average score the higher the importance from respondents' perspective.

Figure 34: Respondents' opinion on design of work factor (average score)

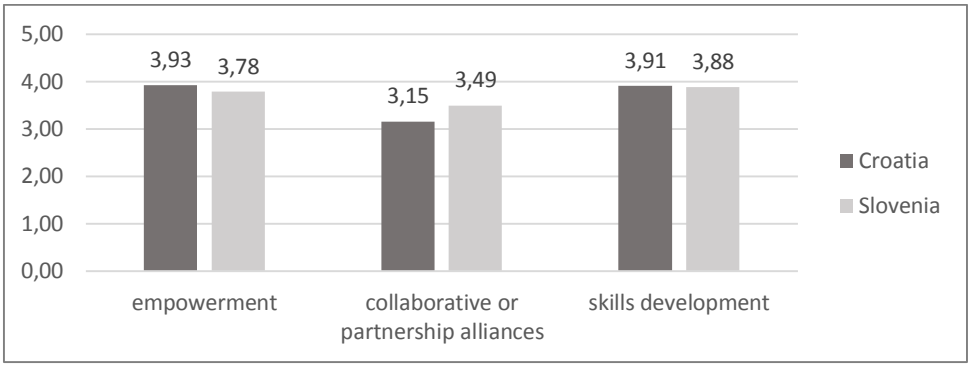


Source: authors' research

Figure 35: Respondents' opinion on design of relationship factors (average score)

Source: authors' research

Figure 36: Respondents' opinion on encouraging and opportunity structures (average score)



Source: authors' research

As seen in the Figures 33, 34 and 35 Slovenian and Croatian respondents mostly agree with importance of each factor. Observing the *design of work* factor (see Figure 34) Croatian and Slovenian respondents consider it equally important (Slovenia, Croatia average score = 4.34). Croatian respondents considered formal employment security more important as Slovenian respondents (average score: Slovenia = 4.00; Croatia = 4.21). When observing *design of relationship factors* Slovenian companies prefer trust (4.46), employee attitudes (4.32) and organizational commitment (4.17), and Croatian prefer trust (4.34), teamwork (4.30) and employee attitudes (4.23) (see Figure 35). Although teamwork is more praised in Croatian (4.30) than in Slovenia (4.09). Every item has an average score over 4, meaning that respondents presume that they are important. In the case of *encouraging and opportunity structures*, both Slovenian and Croatian respondents are positioned between score of 3.15 and 3.91 (see Figure 36). Meaning that they do not have high or very low importance perception on these tree items (most respondents answered 3 – I don't care). To sum up the above three figures and eleven items, in the Table 28 the average score for each individual factor and for each country is presented.

Table 28: Average score for effective factors for Slovenia and Croatia

Effective factors	Slovenia	Croatia
Work design structures	4.17	4.21
• design of work	4.10	4.17
• design of relationship	4.24	4.26
Encouraging and opportunity structures	3.66	3.72

Source: authors' research

In order to accept or reject the H1, additional testing must be done using statistical test for two independent samples. To test two independent sample (Slovenian and Croatian respondents) data needs to be tested for normality using SPSS software package. First the data of Slovenian respondents and afterwards Croatian. For testing the normality of data, Kolmogorov-Smirnov test is used. There are eleven effective factors in total for Slovenia (2) ranging from SLO_EFF_1 to SLO_EFF_11 and for Croatia (1) ranging from CRO_EFF_1 to CRO_EFF_11.

The Kolmogorov-Smirnov test is used when the sample size is larger than 50 (if the sample size were 50 or less the Shapiro-Wilk statistic would be used instead). The Kolmogorov-Smirnov test is used to decide if a sample comes from a population with a

specific distribution and is based on the empirical distribution function (ECDF) (Chakravarti, Laha, & Roy, 1967). The null hypothesis, for the test of normality, states that the distribution of the variable is equal to the expected distribution, this means that the variable is normally distributed (Šošić, 2006). Main reference point is the p – value. In order to accept the null hypothesis that data is normally distributed, p – value must be higher than 0.05. Effective factors in this case are dependent variable and country was the independent variable. Table 29 and 30 show the results of normality testing in SPSS. Full SPSS output can be found in Appendix C.

Table 29: Kolmogorov-Smirnov test for normality of data for Croatian respondents

Factors	CRO	Kolmogorov-Smirnov[a]		
		Statistic	df	Sig.
CRO_EFF_1	1	,371	182	,000
CRO_EFF_2	1	,344	182	,000
CRO_EFF_3	1	,352	182	,000
CRO_EFF_4	1	,267	182	,000
CRO_EFF_5	1	,270	182	,000
CRO_EFF_6	1	,286	182	,000
CRO_EFF_7	1	,309	182	,000
CRO_EFF_8	1	,265	182	,000
CRO_EFF_9	1	,350	182	,000
CRO_EFF_10	1	,221	182	,000
CRO_EFF_11	1	,353	182	,000

a. Lilliefors Significance Correction

Source: authors' research

Table 30: Kolmogorov-Smirnov test for normality of data for Slovenian respondents

Factors	SLO	Kolmogorov-Smirnov[a]		
		Statistic	df	Sig.
SLO_EFF_1	2	0,385	65	,000
SLO_EFF_2	2	0,358	65	,000
SLO_EFF_3	2	0,331	65	,000
SLO_EFF_4	2	0,315	65	,000
SLO_EFF_5	2	0,317	65	,000
SLO_EFF_6	2	0,349	65	,000
SLO_EFF_7	2	0,266	65	,000
SLO_EFF_8	2	0,331	65	,000
SLO_EFF_9	2	0,319	65	,000
SLO_EFF_10	2	0,317	65	,000
SLO_EFF_11	2	0,373	65	,000

a. Lilliefors Significance Correction

Source: authors' research

Kolmogorov-Smirnov tests states if the p – value is less than 0.05 than data is not normally distributed. Since the probability associated with the test of normality is less

than the level of significance (0.05), in both cases, the null hypothesis is rejected and it is concluded that data regarding perception on importance of effective factors is not normally distributed for Slovenia (see Table 29) nor for Croatia (Table 28).

Next step in testing hypothesis (H1) was the independent two sample test. Due to the previous findings a non-parametric test Mann – Whitney U test is used. Nonparametric statistics or distribution-free tests do not rely on parameter estimates or precise assumptions about the distributions of variables (Howell, 2011). The Mann-Whitney U test compares the medians of two groups of ordinal, non-parametric data to determine if they are statistically different (Šošić, 2006). Results of the Mann – Whitney U test are presented in Table 31. Sub-scores on Mann – Whitney test U are in Appendix C.

Table 31: Output for Mann – Whitney U test for effective factors

Effective Factors	**Mann – Whitney U test**			**Hypothesis (no difference)**
	Mann - Whitney U	**Z - score**	**P - value**	
Design of work	3636,000	-0.500	0.617	Rejected
Design of relationship	3341,500	-1.376	0.169	Rejected
Encouraging and opportunity structures	3676,000	-0.378	0.706	Rejected

Source: authors' research

Table 31 shows the results of Mann – Whitney U test statics, Z – score and p-values for effective factors in order to examine if there is significant difference between perception of Slovenian and Croatian respondents regarding the effective factors. Null hypothesis states that there is no significant difference between the two samples. A threshold is the Z – score, which needs to be between -1.95 and 1.95 in order to reject the null hypothesis and p - value must be lower than 0.05. As shown in Table 29 and Table 30 for every factor the null hypothesis was accepted. This means that no significant difference is found between IT employees' perception in Slovenian and Croatian companies on importance of HR effective factors. The hypothesis H1 of this research is therefore rejected.

5.7.2 Analysis of the conceptual model for effective factors and knowledge management

Effective factors and functions of HR have enhancing impact on HR (Attafar et al., 2012) and since the human resources management has impact on knowledge management, it can be stated that effective factors and functions are related to knowledge management.

H2: *Human resource management has a significant positive impact on knowledge management in ICT companies and IT departments.*

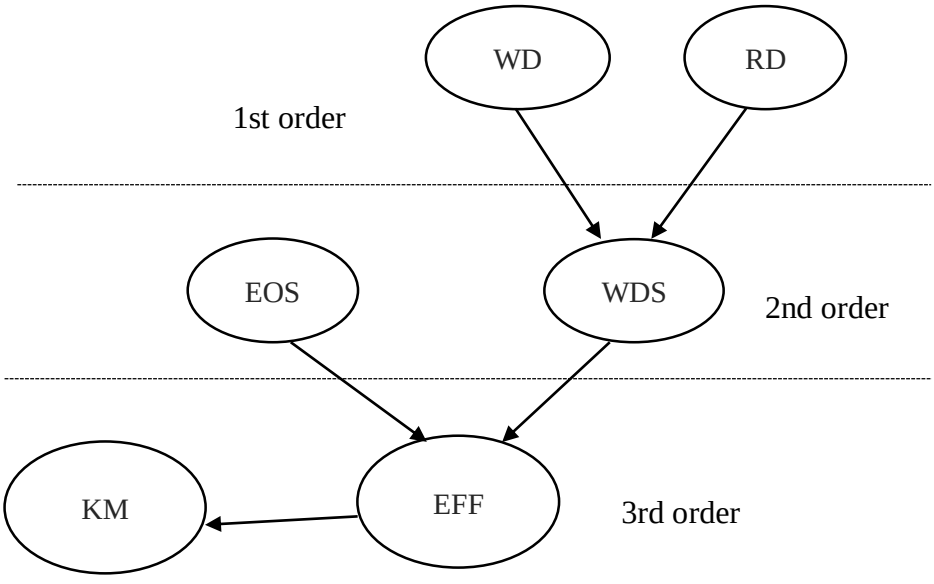
The aim is to define this relationship for ICT companies in Slovenia and Croatia. For better understanding of the relationship between HRM and KM, hypothesis 2 (H2) is analysed and verified through two separate hypotheses:

H2.1: *Effective factors of HR have a significant positive impact on knowledge management in ICT companies.*

H2.2: *Functions of HR have a significant positive impact on knowledge management in ICT companies.*

Effective factors are a high order manifest variables: 3rd level: Effective factors (EFF) and Knowledge management (KM); 2nd level: Work design structures (WDS) & Encouraging and opportunity structures (EOS); 1st level: Design of relationships (RD) and Design of work (WD).

Figure 37: Conceptual model of effective factors and knowledge management

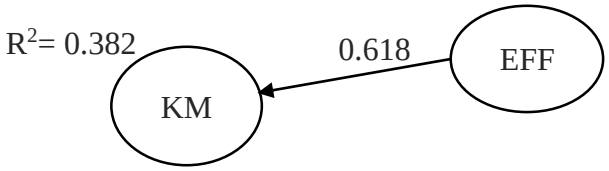


Source: authors' research

The goals of the hypothesis H2.2 is to test relationship between knowledge management and HRM functions.

The coefficient of determination is 0.3802 for the KM endogenous latent variable. The inner model suggests that effective factors have strong effect on knowledge management (0.618). The hypothesized relationship between knowledge management and effective factors is significant due to the high standardized path coefficients which needs to be higher than 0.1 (Wong, 2013). Consequently, the hypothesis H2.1 is accepted showing that HR effective factors have a significant association with knowledge management.

Figure 38: Structural model with path coefficients



Note: (KM: Knowledge Management, EFF: effective factors)

Smart PLS also assesses the psychometric properties of the measurement model and estimates the parameters of the structural model (Yeşil et al., 2013). Results of the discriminate validity testing of the measurement model are presented in the Table 33 and reliability testing in Table 32. The values cross loadings of reflective manifest variables on the first, second and third level in the conceptual model are shown in Table 32. This table presents results summery for the reflective outer models. From the aforementioned table it is visible that the value of standardized factor loadings are in the range from 0.678 to 0.9397. It is clear that all of the indicators have individual indicator reliability values much larger than the minimum acceptable level of 0.4 and are close or exceed the preferred level of 0.7 (see Table 32, column Indicator reliability).

In the next step analysis of internal consistency reliability and convergent and discriminant validity of latent constructs is done. Reliability of reflective latent constructs was evaluated through coefficient of internal consistency reliability (see Table 32, column composite reliability). Composite reliability should be 0.7 or higher 0.70 (Yeşil et al., 2013), though some authors demand a 0.60 minimum level (K. K.-K. Wong, 2013).

Table 32: Results summary for reflective manifest variables outer models (H2.1)

Latent variable	Indicator	Loadings (outer loadings)	Indicator reliability (loadings ^{2})	Composite reliability	AVE
Latent variables of the first level					
Design of work (DW)	REL01	0.6888	0.4744	0.8725	0.5783
	REL02	0.7215	0.5206		
	REL03	0.7235	0.5235		
	REL04	0.7701	0.5931		
	REL05	0.6292	0.3959		
	REL06	0.792	0.6273		
	REL07	0.7175	0.5148		
Design of relationship (RD)	DW01	0.6839	0.4677	0.8836	0.5214
	DW02	0.7728	0.5972		
	DW05	0.7808	0.6096		
	DW06	0.7751	0.6008		
	DW07	0.7851	0.6164		
Latent variables of the second level					
Work design structures (WDS)	RD	0.9397	0.8830	0.9336	0.8754
	WD	0.9315	0.8677		
Encouraging and opportunity structures (EOS)	ENC02	0.7317	0.5354	0.9147	0.5211
	ENC03	0.8244	0.6796		
	ENC04	0.7787	0.6064		
	ENC05	0.7441	0.5537		
	ENC06	0.7777	0.6048		
	ENC07	0.6798	0.4621		
	ENC08	0.7037	0.4952		
	ENC09	0.7983	0.6373		
	ENC12	0.5721	0.3273		
	ENC13	0.5556	0.3087		
Latent variables of the third level					
Knowledge management (KM)	APP01	0.6010	0.9293	0.8513	0.5364
	APP02	0.8285	0.9303		
	CAP02	0.7188	0.3612		
	KS04	0.7168	0.6864		
	KS05	0.7773	0.5167		
effective factors (EFF)	EOS	0.9640	0.5138	0.9636	0.9297
	WDS	0.9645	0.6042		

Source: authors' research

Table 32 shows that composite reliability values are larger than 0.7 and so high levels of internal consistency reliability have been demonstrated among all reflective variables. To check convergent validity, each latent variable's Average Variance Extracted is evaluated. Again, from Table 31 it is found that all of AVE values are greater than acceptable threshold of 0.5, so convergent validity is confirmed. The square root of AVE can be used to establish the discriminate validity of the model (Fornell & Larcker, 1981).

These results are presented in Table 33, as bolded elements in the matrix diagonal. They are greater, in all cases, than the off-diagonal elements (latent variable correlations) in their corresponding row and column. These results indicate that discriminate validity is well established.

Table 33: Discriminant validity assessment of the measurement model (H2.1)

Latent variables of the first level		
	WD	RD
WD	**0.76046**	
RD	0.7511	**0.760460**
Latent variables of the second level		
	WDS	EOS
WDS	**0.935628**	
EOS	0.8594	**0.871873**
Latent variables of the third level		
	EFF	KM
EFF	**0.96421**	
KM	0.6181	**0.732393**

Source: authors' research

SmartPLS generates *T*-statistics for significance testing using bootstrapping. In this procedure, a large number of subsamples (e.g., 5000) are taken from the original sample with replacement to give bootstrap standard errors, which in turn gives approximate *T* - values for significance testing of the structural path (Wong, 2013). The Bootstrap result approximates the normality of data.

Table 34: T-statistics of path coefficients (H2.1)

Path	T-statistics
WD -> WDS	17.4173
RD -> WDS	24.6836
EOS -> EFF	66.3534
WDS -> EFF	18.3365
EFF -> KM	10.1185

Source: authors' research

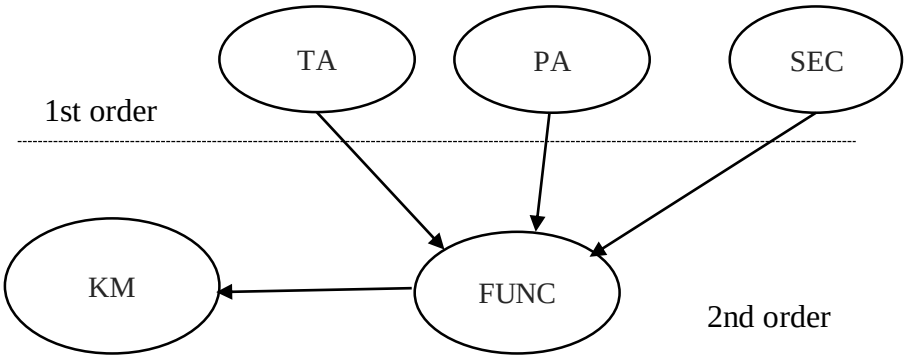
Using a two-tailed *t*-test with a significance level of 5%, the path coefficient is significant if the *T*-statistics is larger than 1.96 (Wong, 2013). In this case, all path coefficients in the inner model are statistically significant (see Table 34). After all the data was analyzed conceptual model tested and internal consistency, reliability and convergent and discriminant validity confirmed it can be stated that the hypothesis: *Effective factors of HR have a significant positive impact on knowledge management in ICT companies, is accepted.*

5.7.3 Analysis of metric characteristics of the conceptual model for functions and knowledge management (H2.2)

As it was shown in analysis of the H2.1, first the model was constructed in SmartPLS (latent and manifest variables) and data analysis was performed. The goal of the hypothesis H2.2 is to test relationship between knowledge management and HRM functions.

H2.2: *Functions of HR have a significant positive impact on knowledge management in ICT companies.*

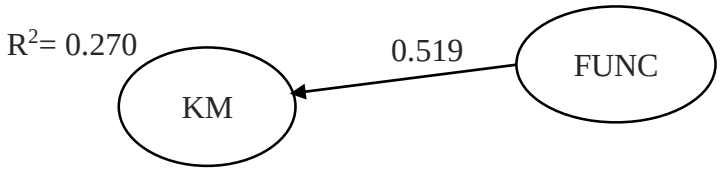
Figure 39: Conceptual model for HRM functions and Knowledge Management (H2.2)



Source: authors' research

As in the H2.1, this model consists of high order reflective variables. Second order reflective variables after data analysis, which represents the hypothesis H2.2, are depicted in. HR functions is also a high order manifest variable. For testing the hypothesis, H2.2 high order manifest reflective variables are: 2nd level: HRM functions (FUNC) and Knowledge management (KM); 1st level: Selection and Recruitment (SEC), Training and Development (TA) and Performance application (PA) (see Figure 39).

Figure 40: Structural model with path coefficients



Source: authors' research
Note: (**KM:** Knowledge Management, **FUNC:** HRM functions)

The beta values of path coefficient indicates a direct influence of predictor upon the predicted latent constructs (see Figure 40). The coefficient of determination is 0.270 for the KM endogenous latent variable. The inner model suggest that HRM functions have a strong effect on knowledge management (0.519). The hypothesized relationship between knowledge management and HRM functions is statistically significant due to the high standardized path coefficients which need to be higher than 0.1 (Wong, 2013).

Psychometric properties of the measurement model and estimates of the parameters of the structural model were also assessed. Results of the indicator reliability (threshold of loadings[2] = 0.4 or higher), internal consistency reliability (threshold of composite

reliability = 0.7 or higher) and convergent validity (minimum accepted AVE = 0.5) are presented in the Table 35.

Table 35: Results summary for reflective manifest variables outer models (H2.2)

Latent variable	Indicator	Loadings (outer loadings)	Indicator reliability (loadings ^{2})	Composite reliability	AVE
Latent variables of the first level					
Selection and Recruitment (SEC)	SE01	0.6491	0.4213	0.8375	0.5648
	SE02	0.7843	0.6151		
	SE05	0.8184	0.6698		
	SE06	0.7437	0.5531		
Training and Development (TA)	TA01	0.6730	0.4529	0.8544	0.5406
	TA02	0.7500	0.5625		
	TA03	0.7174	0.5147		
	TA05	0.7493	0.5615		
	TA06	0.7821	0.6117		
Performance Appraisal (PA)	PA09	0.6330	0.4007	0.9096	0.5598
	PA10	0.7956	0.6330		
	PA11	0.6394	0.4088		
	PA12	0.7884	0.6216		
	PA13	0.8580	0.7362		
	PA14	0.7576	0.5740		
	PA15	0.8006	0.6410		
	PA16	0.6805	0.4631		
Latent variables of the second level					
Knowledge management (KM)	APP02	0.8374	0.701239	0.8504	0.5343
	CAP02	0.6957	0.483998		
	KS02	0.6269	0.393004		
	KS04	0.7290	0.531441		
	KS05	0.7497	0.56205		
HR functions (FUNC)	PA_1	0.8491	0.720971	0.8678	0.6864
	TA_1	0.8312	0.690893		
	SEL_1	0.8046	0.647381		

Source: authors' research

Indicator reliability of reflective latent constructs was evaluated through indictor reliability coefficient. All indicators have a value higher than 0.4. Internal consistency reliability is tested through composite reliability statistics, which in all cases is higher than 0.7. Table 35: Results summary for reflective manifest variables outer models (H2.2) shows high levels of internal consistency reliability among all reflective variables. To check convergent validity, each latent variable's Average Variance Extracted (AVE) is evaluated. Table 35 shows that all of AVE values are higher than acceptable threshold of 0.5, and so convergent validity is confirmed.

Table 36: Discriminant validity assessment of the measurement model (H2.2)

Latent variables of the first level			
	PA	SEL	TA
PA	**0.7482**		
SEL	0.5625	**0.7515**	
TA	0.5444	0.4840	**0.7353**
Latent variables of the second level			
	FUNC	KM	
FUNC	**0.828493**		
KM	0.5193	**0.730958**	

Source: authors' research

The square root of AVE is used to establish the discriminate validity of the model. These results are presented in Table 36 as bolded elements in. They are greater, in all cases, than the off-diagonal elements (latent variable correlations) in their corresponding rows and column. These results indicate that discriminate validity is well established.

Table 37: T-statistics of path coefficients (H2.2)

Path	T-statistics
PA -> FUNC	18,9574
SEL -> FUNC	11,4066
TA -> FUNC	15,9495
FUNC -> KM	8,0764

Source: authors' research

Using a two-tailed *t*-test with a significance level of 5%, the path coefficient is significant if the *T*-statistics is larger than 1.96. In this case all path coefficients in the inner model are statistically significant (See Table 37). The hypothesis (H2.1) has accepted showing that HR effective factors have a significant association with knowledge management. The hypothesized relationship between knowledge management and HR functions is statistically significant due to the high standardized path coefficients. Consequently, the hypothesis (H2.1) is accepted showing that HR functions have a significant association with knowledge management.

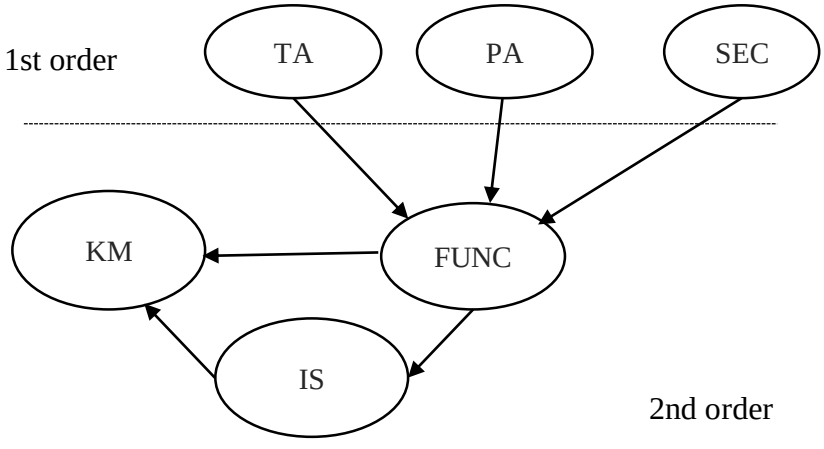
Both hypothesis H2.1 and H2.2 have been accepted show that there is a significant positive relationship between HR effective factors and knowledge management and HR function and knowledge management. Accordingly, hypothesis H2: *Human resource management has a significant positive impact on knowledge management in ICT companies and IT departments;* is accepted.

5.7.4 Analysis of the conceptual model for information solutions, HR functions and knowledge management

Literature states that information technology is one of the most important components of critical success factors of KM (Martin et al., 2005; Sher & Lee, 2004). According to the research Rašula et al. (2008) two elements from the IT component of KM: the ability of IT to capture knowledge and the use of IT tools. Davenport & Prusak (1998) reported that knowledge projects are more likely to succeed when they use technologies and web-based intranets. Such tools provide opportunities for organizational learning and increasing functional specialization (Mathew et al., 2011). Several studies have empirically tested the effect of organizational elements, innovation, organizational learning and culture on IT (Liao & Wu, 2010; Rašula et al., 2012; Zareai et al., 2013). Thereupon it can be stated that organizational and social elements play a mediating role in the relationship between information solutions and KM. According to Mathew et. al. (2011), technology used in companies has to support networking, facilitate interaction between employees, either formally or informally, interaction within organizations and between organizations. Aligned with results from previous research, the hypothesis H3 is proposed: ***H3:*** *Information solutions applied in HRM are indirectly associated with knowledge management processes.*

Hypothesis H3 is related to goals regarding identification of the level of usage of IS for managing employees and KM processes in ICT companies (cf. G5). As well as for H2, the structural equation modelling is used to test the proposed hypothesis. Conceptual model showing the hypothesis 2 is depicted in Figure 41.

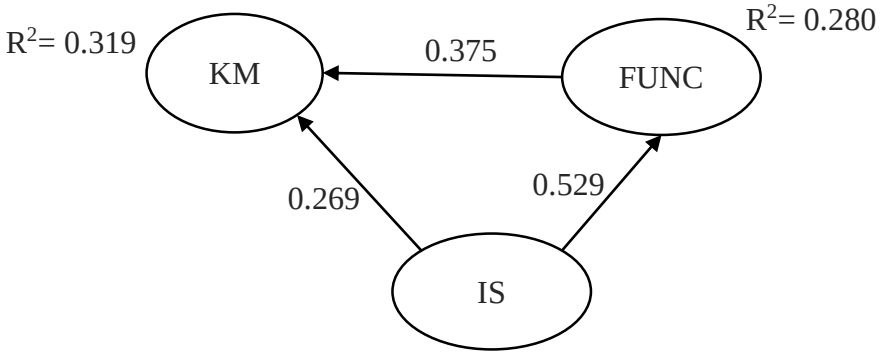
Figure 41: Conceptual model of information solutions, HR functions and Knowledge Management (H3)



Source: authors' research

The goal of the hypothesis H3 is to test relationship between knowledge management, information solutions and HR function (depicted in Figure 41). As in case of H2, HR functions is a high order manifest variable. For testing the hypothesis H3 high order manifest reflective variables are: 2nd level: HRM functions (FUNC), Knowledge management (KM) Information solutions (IS); 1st level: Selection and Recruitment (SEC), Training and Development (TA) and Performance (see Figure 41). Proposed conceptual model was formed in SmartPLS (latent and manifest variables) and data analysis was performed. Results of the analysis are depicted in Figure 42.

Figure 42: Structural model with path coefficients



Source: authors' research
Note: (**KM:** Knowledge Management, **FUNC:** HRM functions)

The coefficient of determination, R^2, is 0.319 for the KM endogenous latent variable. This means that the two latent variables (IS and FUNC) moderately explain 31.9% of the variance in KM. The inner model suggests that FUNC has the stronger effect on KM (0.375), than IS (0.269). Both hypothesized relationships IS and KM, FUNC and KM are statistically significant. This is proven through the standardized path coefficients which are higher than 0.1. Thus, it can be concluded that: IS and FUNC are both moderately strong predictors of knowledge management. Psychometric properties of the measurement model and estimates of the parameters of the structural model were assessed and presented in Table 38.

Table 38: Results summary for reflective manifest variables outer models (H3)

Latent variable	Indicator	Loadings (outer loadings)	Indicator reliability (loadings ^{2})	Composite reliability	AVE
Latent variables of the first level					
Selection and Recruitment (SEC)	SE02	0.7898	0.6238	0.8382	0.5654
	SE03	0.6664	0.4441		
	SE05	0.7944	0.6311		
	SE06	0.7502	0.5628		
Training and Development (TA)	TA01	0.6739	0.4541	0.8544	0.5406
	TA02	0.7494	0.5616		
	TA03	0.7182	0.5158		
	TA05	0.7483	0.5600		
	TA06	0.7819	0.6114		
Performance Appraisal (PA)	PA09	0.6350	0.4032	0.9096	0.5597
	PA10	0.7958	0.6333		
	PA11	0.6371	0.4059		
	PA12	0.7874	0.6200		
	PA13	0.8579	0.7360		
	PA14	0.7586	0.5755		
	PA15	0.8014	0.6422		
	PA16	0.6796	0.4619		
Latent variables of the second level					
Knowledge management (KM)	APP02	0.8354	0.6979	0.8504	0.5342
	CAP02	0.6987	0.4882		
	KS02	0.6288	0.3954		
	KS04	0.7270	0.5285		
	KS05	0.7491	0.5612		
HR functions (FUNC)	PA_2	0.8513	0.7247	0.8717	0.6938
	TA_2	0.8201	0.6726		
	SEL_2	0.8270	0.6839		
Information solutions (IS)	Qua1	0.7438	0.5532	0.7913	0.5584
	Qua11	0.7259	0.5269		
	Qua2	0.7713	0.5949		

Source: authors' research

Results of the indicator reliability (threshold of loadings 2 = 0.4 or higher), internal consistency reliability (threshold of composite reliability = 0.7 or higher) and convergent validity (minimum accepted AVE = 0.5) are presented in the Table 37. Indicator reliability of reflective latent constructs evaluated through indictor reliability coefficient shows that indicators are reliable (all indicator reliability coefficients are higher than 0.4). Internal consistency reliability is presented through composite reliability statistics, which in all cases is higher than 0.7, this means that all reflective variables show a high levels of internal consistency. To check convergent validity, each latent variable's Average Variance Extracted (AVE) is evaluated. Table 38 shows that all of AVE values are higher than acceptable threshold of 0.5, and so convergent validity is confirmed.

Table 39: Discriminant validity assessment of the measurement model (H3)

Latent variables of the first level			
	PA	SEL	TA
PA	**0.7481**		
SEL	0.5683	**0.7519**	
TA	0.5449	0.5083	**0.7353**
Latent variables of the second level			
	FUNC	IS	KM
FUNC	**0.8329**		
IS	0.5293	**0.7473**	
KM	0.5168	0.4669	**0.7309**

Source: authors' research

The square root of AVE is to establish the discriminate validity of the model. These results are presented in Table 39 as bolded elements in the matrix diagonal. They are greater, in all cases, than the off-diagonal elements (latent variable correlations) in their corresponding row and column. These results indicate that discriminate validity is well established. In the end *T*-statistics for significance testing of path model is calculated by SmartPLS.

Table 40: T-statistics of path coefficients (H3)

Path	T-statistics
PA -> FUNC	18,8047
SEL -> FUNC	12,3163
TA -> FUNC	15,7214
IS -> FUNC	7,9242
IS -> KM	3,3323
FUNC -> KM	4,7839

Source: authors' research

Using a two-tailed *t*-test with a significance level of 5%, the path coefficient is significant if the *T*-statistics is larger than 1.96. In this case, all path coefficients in the inner model are statistically significant (see Table 40). The hypothesized relationship between knowledge management and HR functions is statistically significant due to the high standardized path coefficients.

5.7.5 Results discussion

After all data was analyzed (using Excel and SmartPLS) the decision must be presented. The results of hypotheses testing are shown in the columns of Table 41. It was found that three out of four hypothesis are accepted. Relationship between HR effective factors and Knowledge Management ($\beta = 0.618$, $p < 0.001$), relationship between functions of HR and Knowledge Management ($\beta = 0.519$, $p < 0.001$) is statistically significant. Information solutions and HR factors significantly contribute to the knowledge management thus providing support for H3.

Table 41: Summary of hypothesis testing results

Hypothesis testing summary			**Decision**
H1: *There are significant differences between IT employees' perception in Slovenian and Croatian companies on importance of HR effective factors.*			**Not supported**
H2.1: *Effective factors of HR have a significant positive impact on knowledge management in ICT companies.*			
EFF - > KM	$\beta = 0.618$	t-value = 10,1185	**Supported**
H2.2: *Functions of HR have a significant positive impact on knowledge management in ICT companies.*			
FUNC -> KM	$\beta = 0.519$	t-value = 8,0764	**Supported**
H3: *Information solutions applied in HRM are indirectly associated with knowledge management processes.*			
IS -> KM	$\beta = 0.375$	t-value = 3,3323	**Supported**
IS -> FUNC	$\beta = 0.529$	t-value = 7,9242	**Supported**
FUNC -> KM	$\beta = 0.269$	t-value = 4,7839	**Supported**

Source: authors' research

In addition, it appeared that there is no difference between IT employees' perception in Slovenian and Croatian companies on importance of HR effective factors (p - value > 0.05 for all three cases of effective factors of HR); see Table 42.

Table 42: Output for Mann – Whitney U test for effective factors

Effective Factors	**Mann – Whitney test**		
	Mann - Whitney U	**Z - score**	**P - value**
Design of work	3636,000	-0.500	0.617
Design of relationship	3341,500	-1.376	0.169
Encouraging and opportunity structures	3676,000	-0.378	0.706

Source: authors' research

Finally, the proposed model of relationship between information solutions, knowledge management and human resource management has been tested in Slovenia and Croatia. Three hypotheses (two major, and two sub – hypothesis) have been accepted showing that the aforementioned relationship model is valid. As the research was conducted in two different country, the researcher has expected to found difference between the respondents' answers. However, this was not the case. In most answers, respondents have found agreement, and therefore the H1 was not accepted.

6 CONCLUSION

Human resources are the key components in every company representing total knowledge, talent, attitude, creative ability, aptitude and belief of an individual involved in the affairs of organization (Dhamija, 2012). Knowledge management has been described in various ways, but generally it relates to unlocking and leveraging the knowledge of individuals to gain appropriate knowledge from appropriate individuals in appropriate time (Hutchinson and Huberman, 1993) so that this knowledge becomes available as an organizational resource (Anand and Singh, 2011). Technology, along with information revolution and globalization, continues to exert major effects on knowledge management and its development (Chong, 2006). ICTs are accepted as new drivers of change, tools for releasing potential and knowledge embodied in people and it has transformed the ability of both individuals and organizations to augment their intelligence via accelerated learning (Pemberton & Stonehouse, 2000). In its essence, ICT is regarded as the facilitator of knowledge creation in innovative societies (Chase, 1997; Kulkarni, Ravindran, & Freeze, 2007; Morin et al., 2011; Pan, Hsieh, & Chen, 2001; Sue Young Choi, Heeseok Lee, & Youngjin Yoo, 2010).

One way of HRM to reinvent itself is through contribution to effective linkages between human capital and knowledge management within organizations (Gloet & Berrell, 2003). The aim of knowledge management is to support and enhance employees' knowledge processes and therefore it is important to identify different knowledge management initiatives that HR practices need to support. Importance of knowledge management lies in the fact that it could result in empowerment of individuals and organization itself to accomplish activities effectively through knowledge organization (Jantz, 2001).

The relationship between HR effective factors and KM issues is not properly explored in ICT companies and a model of its successful functioning does not exist so far. A model applicable for ICT companies is proposed in this dissertation based on previous findings and empirical research is conducted by the author. This doctoral thesis is focused on two aims: the analysis of previous research findings in two perspective fields (human resource management and knowledge management) and developing and testing a conceptual model that would explain the relationship between them. Achieving these aims required a comprehensive preliminary research; involvement of experts in the field of HRM and a whole set of recent statistical techniques and findings to be applied for data analysis and interpretation. This research integrates theoretical and empirical analysis in order to achieve goals. Scientific research methods are used in order to get objective and systematic scientific results and insights. Research study, conducted within the thesis, is founded on three major hypotheses:

H1: *There are significant differences between IT managers' perception in Slovenian and Croatian companies on importance of HR effective factors.*

H2.1: *Effective factors of HR have a significant positive impact on knowledge management in ICT companies.*

H2.2: *Functions of HR have a significant positive impact on knowledge management in ICT companies.*

H3: *Information solutions applied in HRM are indirectly associated with knowledge management processes.*

Aim of this thesis is to examine the opinion of ICT employees on importance of HR and KM for IT companies. In this thesis processes and effective HRM factors are analyzed, which activate for long-term knowledge management as competitive advantage and therefore can result in increased performance specifically in ICT companies. Preliminary theoretical model was developed based on literature review, which supports the belief that strong relationships between functions of HRM, effective factors, information solutions and KM can be established. Quantitative research was carried out for which an online questionnaire was used. Collection of primary data was done through self-formed and online-administered questionnaire. The selection of questionnaire resides on previous findings in literature and on desired study population (ICT employees), its geographical distribution (Slovenia and Croatia) and nature of the investigation.

In order to analyze the HRM and KM in IT companies employees and managers from ICT sector were contacted. In addition, the purpose of this research is to analyzed difference in Croatian and Slovenian IT companies. Two different samples were formed. A total of 274 completed responses were received from companies. The response rate for Slovenia is 5.681% and for Croatia is 7.899%. The goal in this research was to gain a minimum of a 200 answers in order to perform the SEM analysis. Collected survey data was analyzed using univariate and multivariate statistical analysis. Statistical package for data analysis SPSS 15.0 for Windows was used for data processing, which supports graphical and tabular presentation of data and is one of the most widely used programs for data analysis. For Partial Least Square analysis, the SmartPLS software package was used. Important issues associated with the design of the questionnaire instrument, measurement scales, questionnaire administration and validation were addressed. Detailed statistical analysis of the data collected from the pilot and the main study is presented in the thesis. Results of data analysis of statistical tests are reported and compared with recent previous work.

First part of the thesis compresses extensive literature analysis of human resource management and knowledge management links. The goal was to identify critical success factors, gaps, and elaborate and clarify the link between human resource management and knowledge management. The theoretical part of the study is based on analysis of available and relevant national and international scientific literature in the perspective field, which includes the review of HRM and KM literature from standard books to new references including papers and resources available on the Internet in order to give an insight into previous research and developed theories. Literature review provided a framework for establishing importance of the study. Apart from HR functions (employee selection and recruitment, training and development, performance appraisal), literature recognizes different practices that have influence on HR and companies' productivity. One of the goals of this thesis was the analysis of best practices of HRM found in the literature. After an extensive analysis of current research regarding the best practices, a new term was proposed 'the effective factors' as well as new classification and categorization into two effective factors (Work design structures: design of work and design of relationship and Encouraging and opportunity structures) was presented. This is one of the major scientific contributions of this thesis. Work design structures (WDS) include the design of work and design of relationship so that employees have discretion and opportunity to use their skills in collaboration with other workers according to the structure of their position. The design of work includes job diversity, independence, decentralized decision-making, quality of work life and formal employment security. The design of relationships includes trust, organizational commitment, employee attitudes and teamwork. Encouraging and

opportunity structures encompasses incentive structures, which embrace motivation and commitment. This can be employment security, employee motivation, empowerment, collaborative or partnership alliances, new ability/skills development. Effective factors and functions of HR have enhancing impact on HR (Attafar et al., 2012) and since the human resources management has impact on knowledge management, it can be stated that effective factors and functions are related to knowledge management. Classification of the effective factors served as a part of research for analyzing the hypothesis 1, which states that there is a significant difference between ICT employees' perception in Slovenian and Croatian companies. It is presumed that IT managers do not perceive all HR effective factors (work design structures and encouraging and opportunity structures) as equally important. Therefore, it can be stated that certain effective factors are more important to ICT managers than others. This hypothesis was rejected using Mann – Withney U test for non-parametric tests.

Effective factors and functions of HR have enhancing impact on HR (Attafar et al., 2012) and since the human resources management has impact on knowledge management, it can be stated that effective factors and functions are related to knowledge management. The aim was to define this relationship for ICT companies in Slovenia and Croatia. For better understanding of the relationship between HRM and KM, hypothesis 2 (H2) was analysed and verified through two separate hypotheses: ***H2.1:*** *Effective factors of HR have a significant positive impact on knowledge management in ICT companies;* and ***H2.2:*** *Functions of HR have a significant positive impact on knowledge management in ICT companies.* Hypothesis 2 is related to goals regarding exploring the challenges and complex ways associated with effective human resources management for knowledge management process and its relevance for ICT industry. Structural equation modelling based on partial least square was used to verify these hypotheses. Both hypothesis were accepted showing that there is positive impact on knowledge management regarding HR functions and HR effective factors.

Literature states that information technology is one of the most important components of critical success factors of KM (Martin et al., 2005; Sher & Lee, 2004). According to Mathew et. al. (2011), technology used in companies has to support networking, facilitate interaction between employees, either formally or informally, interaction within organizations and between organizations. Aligned with results from previous research, the third hypothesis stated the *information solutions applied in HRM are indirectly associated with knowledge management processes*. As the two previous hypothesis, this was statistically proven, and the association between IS, KM and HRM was accepted. This is supported by the literature and it stands for Slovenian and Croatian ICT companies.

The scientific contribution of the dissertation is presented in a brief review of procedures undertaken to achieve the aims. The limitations of this study are also brought up, followed by directions for future research.

6.1 Research objectives and results

Expected scientific contributions of the research are partly reflected in defined objectives of the dissertation, but concrete contribution can be summarized as follows:

- Scientific contributions are presented through literature review related to human resources management with emphasis on characteristics and application in IT companies.
- Contributions in the field of knowledge management through an overview of current and significant literature findings.
- Review findings and literature related to knowledge management and its interplay with human resources management, their characteristics and application areas.
    - Based on literature findings, the categorization of *best practices* of HRM is done into two factors: *Work Design Structures* (WDS) and *Encouraging and Opportunity Structures* (EOS) and creating a new nomenclature: the *effective factors*.
    - Analysis and classification of effective factors on enhancement of human resources and issues regarding knowledge management initiatives for ICT companies.
    - Defining challenges regarding effective managing of HR in ICT companies from managers' aspects regarding effective factors and HR functions.

- Conceptual model formation of the relationship between HR and KM.
- Empirical results that confirm the conceptual model of the relationship between HR and KM with emphasis on information solutions.
- Empirical research results that give an inside in the IT companies regarding information solutions, knowledge management and human resource management.
- Comprehensive comparison of data in perspective filed for tow European countries: Slovenia and Croatia.

As one of the major contribution to the theoretical discussion on HRM and KM was a detailed overview of previous studies (empirical and theoretical) in the field of HRM and KM, presented at the end of the fourth chapter.

Finally, the proposed model of relationship between information solutions, knowledge management and human resource management has been tested in Slovenia and Croatia. Three hypotheses (two major, and two sub – hypothesis) have been accepted showing that the aforementioned relationship model is valid. As the research was conducted in two different country, the researcher has expected to found difference between the respondents' answers. However, this was not the case. In most answers, respondents have found agreement, and therefore the H1 was not accepted.

This dissertation systemizes current literature findings in two perspective fields and it offers an inside in the ICT companies form Slovenia and Croatia. Due to the fact that such research has not yet been done in Slovenia and Croatian nor systematization and classifications of best practices has been provided, this dissertation contributes to the field of human research management and knowledge management through theoretical and empirical findings.

Improving the awareness of significance and challenges of HR issues on KM in ICT organizations is important, as well as development of an appropriate model that can provide support with assessing the impact of human resources issues on knowledge management in ICT companies, with and without the use of information systems. If human resources, employees and their effective managing is essential for a company and if people's most more valuable resource is knowledge, then human resources management and knowledge management are closely interrelated (Svetlik & Stavrou-Costea, 2007). Therefore, paying attention to human resources management, its effective factors and functions could be regarded as activities related to knowledge management.

6.2 Limitations of the study

The research for developing appropriate empirical model to explore the relationship between human resource and knowledge management is a big task mainly because of the absence of this kind of empirical research in IT area in Croatia and Slovenia. The lack of longitudinal study requires caution in the interpretation of results. In addition, similar studies in cultural contexts other than Croatia and Slovenia could produce differing results. Furthermore, this research is constrained by sample size and it depends on the response rate of participants and their willingness to cooperate.

A limitation of this study is the use of a Likert scale as opinion based survey instrument. This type of survey measurement lacks a clear interval scale and is therefore ordinal in nature. Normal parametric statistical analysis was used for this research. In the past, only non-parametric analysis was thought to be appropriate for ordinal data. Research today shows that normal parametric analysis are appropriate for Likert scale based surveys with at least five categories and ordinal data can be analysed with parametric techniques with low chance of error if normal analysis conditions are met (Jaccard & Wan, 1996).

Other external threats to validity can be recognized. External validity threats can occur when participants become too familiar with the outcome measure and their responses are defined in such a way that they support the outcome and do not give their real opinion. The results of the survey are time-bound and cannot be generalized to past or future.

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Appendix A

Instructions for experts (card – sorting process)

(English version)

Dear sir/madam,
Thank you for being a part of a team that will be the first to read questionnaire and evaluate it with valuable comments. This questionnaire is an essential part of my PhD thesis and it is of vital importance for it to be correctly designed in order to get valid data from the research. You have been chosen as an expert familiar with Human Resource Management and therefore have the knowledge and ability to make valuable contribution to this questionnaire. This is the first phase of the research and is intended to ensure the content and construct validity of the instrument. The statements listed in Excel table refer to the analysis of the functions of HRM in companies and the quality analysis of the same. In order to make the process of completing the questionnaire as easy as possible, please fined below several guidelines.

In case of any issues or problems, please do not hesitate to contact me any time at jelena.horvat@foi.hr

Main goal of this phase is to ensure that:

a) Instrument contains only necessary statements by rating the importance of each statement
b) All the statements are clear enough for the potential respondents, for which you are invited to add comments and propose reformulated statements.
c) Each statement is assigned to only one category (construct validity).
d) Instrument contains all the necessary statements related to HRM, for which you are invited to add statements that you find are missing or necessary.

Documentation – excel spreadsheet:
1. sheet: User data – contains fields for entering some information about you.
2. sheet: Instrument evaluation – '*main'* worksheet that contains all instrument statements.
3. sheet: Comments – contains fields in which you can post your comments.

Instructions for filling excel**:**

1. **Fill the User data page** with required information (1. sheet: *User data*).
2. **Start with the instrument evaluation** (2. sheet: *Instrument evaluation*).

Please evaluate the statements according to the following instructions:

a) ***Column B contains instrument statements***.

b) ***Rank each statement from 0 (zero) to 3 (three) according to the instructions in column C.***

1 - Not relevant
2 - Important (but not essential for this research)
3 - Essential
0 - cannot answer

Put 0 (zero) if you believe you are not the right person to rank a specific statement. For example, you will put 0 if you are an educator and you believe the statement is intended to be ranked by employer or employees and vice versa.

c) ***If you think the statement should be reworded, please explain why*** (briefly, in few words) in column D. Also, use the same column (D) to explain why you were not able to rank the statement, if this was the case.

d) ***Assign each statement to one of the following categories in columns from E to I***:

1. **Recruitment and selection,**
2. Performance appraisal,
3. Training and development,
4. Work design structure:
a) Design of work environment,
b) Design of relationships,
5. Encouraging and opportunity structures
6. Other

Explanation of each category find below.

Please **consider** that only **one answer per statement** is possible when assigning

Functions of HRM:

1. **Recruitment and selection** functions involve making predictions about future behaviours so that decisions can be made about who will be most suitable for a particular job. These are processes though which organization tries to match individuals to the job.
2. **Performance appraisal** is formal and systematic, structured system of measuring, evaluating job related behaviours and outcomes to discover reasons of performance and how to perform effectively in future so that employee, organization and society all benefits.
3. **Training and development** is a function concerned with organizational activity aimed at bettering the performance of individuals and groups in organizational settings. It refers to the practice of providing training, workshops, coaching, mentoring, or other learning opportunities to employees to inspire, challenge, and motivate them to perform the functions of their position to the best of their ability.

Human resources management can facilitate knowledge management in the organization **through two major segments:**

4. **Work design structures** = internal and external characteristics concerning employees. This includes the design of work and relationship so that employees have the discretion and opportunity to use their skills in collaboration with other workers according to the structure of their position.
    a. **Design of work** = for example: job diversity, independence, decentralized decision-making, quality of work life, formal employment security.
    b. **Design of relationships =** for example: trust, organizational commitment, employee attitudes, teamwork.
5. **Encouraging and opportunity structures** = incentive structures that embrace motivation and commitment. For example: employment security, employee motivation, empowerment, collaborative or partnership alliances, new ability/skills development.

6. **Other** if you believe the statement does not belong to any of the categories from 1 to 5.

f) ***If you find some statements missing but necessary*** for HRM analysis please:

- **Add** them at the end of the instrument (row 110 and below);
- **Rank** them and **assign** them to the corresponding category.

Additional notes:

1. Instrument evaluation worksheet has some fixed parts: *1. Header & 2. Statements*. Scroll with the horizontal slider (at the bottom of the screen): you will notice that statements remain fixed while other columns are moving left or right. This is to make the evaluation process easier.
2. After completing the instrument evaluation, add your comments in the next worksheet (*3.Comments)*

Thank you very much for your effort!
Please feel free to contact me for every question or remark!

Sincerely,
Jelena Horvat
Faculty of Organization and Informatics Varaždin
University of Zagreb, Croatia

Upute za eksperte (kard – sorting proces)

(Croatian version)

Poštovani,
hvala Vam što ste pristali biti dio tima koji će prvi pročitati upitnik i ocijeniti ga. Upitnik je bitan dio moga doktorskog rada, stoga je vrlo važno da bude pravilno oblikovan i formuliran kako bismo dobili kvalitetne podatke iz istraživanja.

Vi ste izabrani kao stručnjak područja za upravljanje ljudskim potencijalima te imate znanje i sposobnosti da pridonesete kvaliteti upitnika. Ovo je prva faza moga istraživanja, a svrha je da se osigura sadržajna i konstruktivna valjanost mjernog instrumenta. Kako bi proces popunjavanja upitnika bio što jednostavniji, u nastavku su kratke upute.

U slučaju bilo kakvih pitanja ili problema, ne ustručavajte se kontaktirati me u bilo kojoj fazi popunjavanja obrasca:
jelena.horvat@foi.hr

Glavni cilj ove faze jest zadovoljiti sljedeće kriterije:

a) Mjerni instrument sadrži samo potrebne izjave, ocjenom važnosti svake izjave.
b) Sve izjave su dovoljno jasne za potencijalne ispitanike. *Ako to nije slučaj, slobodni ste dodati komentare i predložiti promijenjenu (preformuliranu) izjavu.*
c) Svakoj izjavi dodjeljuje se samo jedna kategorija (u svrhu konstruktivne valjanosti instrumenta).
d) Instrument sadrži sve potrebne izjave vezane za upravljanje ljudskim potencijalima. *Ako to nije slučaj, slobodni ste dodati one koje nedostaju ili smatrate da su nužne.*

Dokumentacija - excel tablice:
1. list: Opći podaci - sadrži polja za unos podataka o Vama. U radu će se prikazati sumarni podaci.
2. list: Procjena instrumenta: *'glavni'* list koji sadrži sve izjave.
3. list: Komentari - sadrži polja u kojem možete dodati svoje komentare

Upute za popunjavanje Excel tablica:

1. Popunite tablice koje se odnose na Vaše podatke (*1. list: Opći podaci*).
2. Započnite procjenom mjernog instrumenta (*2. list: Procjena instrumenta*).

Izjave ocjenjujte prema sljedećim uputama:

a) ***Stupac B sadrži izjave o upravljanju ljudskim potencijalima.***
b) ***Rangirajte svaku izjavu od 0 do 3 u stupcu C, prema uputama.***

1 - nije važno,
2 - važno ali ne nužno (izjava je bitna, no nije nužna za ovo istraživanje)
3 - vrlo bitno;
0 - ne mogu odgovoriti;

Stavite nulu (0) ako smatrate da niste u mogućnosti definirati rang za izjavu. Na primjer, stavit ćete nulu (0) ako i smatrate da je izjava namijenjena rangiranju poslodavcima ili zaposlenima.

c) ***Ako smatrate da izjavu treba preformulirati, objasnite zašto*** (ukratko, u nekoliko riječi) ***u stupcu D.*** Također, koristite isti stupac (D) za objašnjenje zašto niste bili u mogućnosti rangirati izjavu, ako je to slučaj.

d) ***Dodijelite svaku izjavu jednoj od sljedećih kategorija (stupci E do I):***

1. **Selekcija i zapošljavanje**;
2. **Ocjena radne uspješnosti**;
3. **Trening i razvoj zaposlenih**;
4. **Dizajn radnih struktura**:
   a) Dizajn radnog okruženja;
   b) Dizajn odnosa;
5. **Poticajne strukture i strukture prilika;**
6. **Ostalo**.

Objašnjenje svake kategorije navedeno je u nastavku.

Napomena: Svaka izjava može biti dodijeljena **samo jednoj kategoriji**. Ako smatrate da jedna izjava može odgovarati dvjema ili više od dvije kategorije, molim da to

Funkcije upravljanja ljudskim potencijalima:

1. **Selekcija i zapošljavanje** uključuju predviđanja o budućim potrebama za radnom snagom i radnim mjestima kako bi se donijele odluke o tome tko će biti najprikladniji za određeni posao. To su procesi kojima poduzeće povezuje pojedinca s poslom.
2. **Ocjena radne uspješnosti** je formalan i strukturiran sustav mjerenja i vrednovanja posla pojedinca i radnog tima, s ciljem otkrivanja načina izvedbe te usmjeravanja na bolje i učinkovitije obavljanje posla na buduću korist zaposlenika, poduzeća i cjelokupne zajednice.
3. **Trening i razvoj zaposlenika** je funkcija koja se bavi usmjeravanjem organizacijskih aktivnosti na poboljšanje performansi pojedinaca i skupina u poduzeću. Odnosi se na praksu pružanja treninga, radionica, mentorstva te drugih mogućnosti obrazovanja koje će zaposlenike potaknuti, motivirati te biti izazov da poboljšaju načine obavljanja poslova.

Upravljanje ljudskim potencijalima može olakšati upravljanje znanjem u organizaciji dvama glavnim segmentima:

4. **Dizajn radnih struktura** = unutarnje i vanjske karakteristike koje se odnose na zaposlenike. Uključuje dizajn radnog okruženja i dizajn odnosa, tako zaposlenici imaju slobodu odlučivanja i mogućnost za korištenje svojih vještina u suradnji s drugim radnicima s obzirom na strukturu radnog mjesta.
   a. **Dizajn radnog okruženja** = primjerice: *raznolikost posla, samostalnost, decentralizirano odlučivanje, kvaliteta radnog života, formalna sigurnost zaposlenja*.
   b. **Dizajn odnosa** = primjerice: *povjerenje, organizacijska predanost, stavovi zaposlenika, timski rad.*

5. **Poticajne strukture i strukture prilika** = poticajne strukture koje potiču motivaciju i predanost. Na primjer: *sigurnost zapošljavanja, motivacija zaposlenika, osnaživanje (empowerment), suradnički i partnerski savezi, razvoj novih sposobnosti i vještina*.

6. ***Ostalo*** ako smatrate da ne pripadaju ni jednoj od navedenih kategorija.

e) Ako ste pronašli izjave koje nedostaju, a smatrate da su nužne za analizu ljudskih potencijala u poduzeću:
   - Dodajte ih na kraj popisa, nakon posljednje izjave (redak 107 i dalje).
   - Rangirajte ih te dodijelite odgovarajuće kategorije.

Dodatne informacije:

1. Tablica za procjenu mjernog instrumenta ima fiksne dijelove: *Zaglavlje i Izjave*. Ako prođete vodoravnim klizačem (na dnu ekrana) primijetit ćete da sve izjave ostaju fiksne, dok su ostali stupci kreću lijevo ili desno. Ovo je kako bi se proces evaluacije olakšao.
2. Nakon završetka procjene instrumenta dodajte svoje komentare u sljedeći radni list (*3. Komentari*).

Hvala puno na Vašem trudu!
Slobodno me kontaktirajte za svako pitanje ili primjedbu!

Srdačno,
Jelena Horvat, dipl. oec.
Fakultet organizacije i informatike Varaždin
Sveučilište u Zagrebu, Hrvatska

Appendix B

Human resources management and knowledge management questionnaire

Dear sir or madam,
Thank you for agreeing to participate in my research on the subject Human Resources Management and Knowledge Management for the purpose of doctoral dissertation. The aim of this research part is to gain insight into the human resources management and knowledge management in companies from the perspective of managers and heads of departments.

Research has no commercial character and is conducted with the sole purpose of obtaining the results needed for the doctoral thesis. The time required for completing the questionnaire is **10-12 minutes.** The questionnaire is ANONYMUS. In the analysis and the report, the summary of data will be used.

For all questions and ambiguities, feel free to contact me.

Sincerely,
Jelena Horvat
Assistant at the Department of Organization
Faculty of Organization and Informatics
Pavlinska 2, Varaždin
Email: jelena.horvat@foi.hr
tel: 042/390-845

General questions
Below are questions relating to the profile of respondents and the company (number of employees, age of the company, etc.).

1 [gender] Select your gender:
Please choose only one of the answers.
Male
Female

2 [Location] In what country is the seat of the company where you are employed?
Please enter your answer here:

3 [County] In which county is your company (where are you doing)?
Please choose only one of the answers (This question relates only to Croatian companies).

- Bjelovarsko - bilogorska county
- Brodsko - posavska county
- Dubrovačko - neretvanska county
- Istarska county
- Karlovačka county
- Koprivničko - križevačka county
- Krapinsko - zagorska county
- Ličko - senjska county
- Međimurska county
- Osječko - baranjska county
- Požeško - slavonska county
- Primorsko - goranska county

- Sisačko - moslavačka county
- Splitsko - dalmatinska county
- Varaždinska county
- Virovitičko - podravska county
- Vukovarsko - srijemska county
- Zadarska county
- Zagrebačka county
- Šibensko - kninska county
- City of Zagreb
- Other

4 What is the main activity of the company where you are employed?
Please enter your answer here:

Help: Please specifically define - sales (which), IT (production/sales, or both), providing of services (which), transport (what kind). Thank you.

5 [function] What is your function (position) in the enterprise? *
Please enter your answer here:

6 [qualification] What is your education level? Please choose only one of the answers.
- *High school*
- *Higher education*
- *University degree (VII / first degree)*
- *Completed Specialist / Master of Science course*
- *Doctoral degree*

7 The following questions relate to general information about the company where you are employed. Please answer them by filling the slot. Please enter your answer here:
- *Number of employees:*
- *The average number of women employed:*
- *When was your company founded (years)?*

8 [department] Who in your company is in charge of human resources management?
Please choose only one of the answers.
- *Human Resources / Legal Service*
- *Department of Human Resources Management*
- *Director*
- *Other*

Selection and employment of the company
This part of the question relates to the management of human resources in your company. Questions include the area of selection and recruitment.

9 [Selection] Questions related to candidate selection and recruitment process of the company!
Please select the appropriate response for each item.
Completely disagree Disagree Neither disagree or agree Agree Completely agree
- Liabilities and description of my job are clearly defined.
- In the company, I did not notice favouring in any employment decision.
- Potential job applicants are informed of the qualifications necessary to do the job.

10 [Selection] Answer the following questions with *YES, NO or Undecided*. Questions are related to candidate selection and recruitment process in your company. Please select the appropriate response for each item.

- Potential candidates undergo structured interviews (questions related to the job, the same questions are addressed to all candidates).
- Potential candidates are required to access a formal test (written or task) during selection process.
- Applicants must pass a physical (systematic) testing.
- Company offers a possibility of practical training for students.

11 [making employment] Who makes the final decision on hiring the candidate? Please select all the options that works for you.

- *Department for Human Resources / Personnel Services*
- *Managers and superior to that position*
- *Management Company / Director*
- *Other:*

12 [source acquiring] Check the sources and methods of obtaining potential employees in your company and specify how often do you use it!
Please select the appropriate response for each item.
never rarely sometimes very often always

- Promotion on the work place ('in house')
- Job rotation
- Recommendations by current employees their friends or relatives)
- Colleges (students practice)
- Private agencies
- Open applications
- Press release

13 [IT skills] Mark the IT knowledge and skills that you value in current or future employees in your company. (You can specify more than one answer!)
Please select all the options that works for you.

- C
- C #
- .NET
- SQL
- ASP
- Java / J2EE
- Javascript
- HTML
- PHP
- SAP
- Microsoft Office package (Word, Excel, PowerPoint, ...)
- IBM WebSphere Business Modeler
- IDS Scheer ARIS
- Proforma ProVision Suite
- MEGA Suite
- None of the above
- Other

14 [technology selection] Specify how often do you use the below mentioned techniques of selection of potential candidates for the job. Please select the appropriate response for each item.

never sometimes always

- Required forms (e.g. CVs)

- Psycho-metric tests
- Tests of knowledge and skills
- Interview 'one on one'
- Centre of estimates
- References

Training and development of employees
The following questions relate to the training and education of employees in the company.

15 [employee training] Please select the appropriate response for each item.
Completely disagree Disagree Neither disagree or agree Agree Completely agree

- Identified training needs are real and are always based on the business strategy of the company.
- Through (internal) training programs employees improve their art of decision-making (they have more self-confidence).
- Company provides trainings focused on team building and developing the skills of team work.
- The company uses jobs rotations to diffuse skills of employees.
- Management motivates employees to participate in informal education systems (e.g. Seminars, courses)

16 [expert seminar] Provide at least two professional project (seminar or conference) where have your employees participated in the last year.
Please enter your answer here:

17 [education costs] How much are average costs of education per employee on annual basis (in HRK): Please choose only one of the answers.
- Less than 400
- 400-1000
- 1000-3000
- 3000-5000
- More than 5000

Work performance measurement
The following statements relate to performance assessment (RU) employees

18 [mot1] Aim of employee motivation for you is: Please select all the options that work for you.
- Attracting quality people
- The retention of quality people
- Promoting quality of work
- Encouraging creativity
- Pushing for change
- Promoting the advancement of operations
- Insurance interest to the continuing development of the company

- Ensuring the success of the company

19 [Rating PA]
The following statements relate to performance assessment (PA) employees in your company.
Please select the appropriate response for each item.
Completely disagree Disagree Neither disagree or agree Agree Completely agree

- Enterprises actively pursues evaluation of work performance of employees (once a year).
- Grades of performance assessment are based on the objective results of the employee (and teams).
- Employees have access to all information on the structure of rewarding.
- Innovations are rewarded in the company.
- Employees have confidence in the grading system of submission to work successfully.
- The system of rewards and penalties is developed.
- Employees are satisfied with the information they receive from superior about their PA. (The information is complete and clear)
- Employees in the company will receive bonuses (financial incentives) based on the success of the entire company.

20 [RU4]
Which method do you use when evaluating work performance of your employees?
Please select all the options that work for you.

- 'Check-list' (a series of concrete statements that describe different behaviours in a job, reduce subjectivity in the assessment)
- Scale assessment (RU rating based on pre-defined standards RU - some predefined characteristics or behaviours. The task of the assessor is to determine how many are present in that which is estimated).
- Rating individual work performance comparison with other employees (employees comparison with each other)
- Other:

21 [RU3] How are employees informed about their evaluation of work performance?
Please select all the options that work for you.

- Annual Report - for each employee separately
- Interview with superiors (Face2Face) only in the case of negative results
- Interview with superiors (Face2Face) - with each employee
- Employees independently monitor their work (web tools) and on the basis that compares planned - realized
- Other:

Effective factors of human potentials
22 [EF_2] Questions related to your perception as managers on issues of relations design and incentive structures within the company with its own aspect and the aspect of employees.
Please select the appropriate response for each item.

Completely disagree Disagree Neither disagree or agree Agree Completely agree

- The need for growth at the individual and organizational level are matching.
- Management of company promotes cooperation and exchange of experience among employees.
- Employees are connecting with other teams / staff to facilitate information and knowledge sharing.
- With a job, I have time to devote to personal / family life.
- I can rely on skills and abilities of colleagues.
- Employees in the company have a strong sense of belonging to 'team'.
- I work with people who are ready and willing to cooperate.
- Employees believe that the company will constantly evolve.
- Superiors encourage open communication with employees.
- Staff easy accepts new technology (applications, systems) in the work.
- I am satisfied with diverse activities offered by my workplace.
- I am satisfied with possibilities of cooperation with other employees of the company.
- I feel little loyalty to the company.

The design of the relationship includes the relationships between superiors and subordinates (eg. The creation of trust), organizational commitment and teamwork. Relations on the workplace affect the exchange of information and work performance. The incentive structures encourage motivation and commitment.

23 [EF_1] Questions related to your perception as managers on issues of designing work structure and environment inside companies with their own point of view and aspect of employees. Please select the appropriate response for each item.

Completely disagree Disagree Neither disagree or agree Agree Completely agree

- Employees have the freedom to customize their approach to the job.
- Employees in the company will receive feedback on their personal characteristics (behavior, attitudes, personal development, etc.).
- Individuals are simply moving from one team to another.
- Employees are provided with formal employment security (indefinite contract).
- Employees have the opportunity to submit a suggestion about improvement of work.
- Employees have the time, resources and support to handle a realization of new ideas.
- Employees in enterprises have confidence in the fairness and consistency of organizational decisions.
- Employees know all the team members.
- Employees are free to express disagreement with senior management / administration.
- Employees in company will have confidence in the decision of his superior.
- Employees in the company cooperate to perform the job effectively and successfully.

Design work environment includes the freedom to decide, formal job security, decentralized decision-making.

24 Literature distinguishes several factors that influence the success of human resources. Down to highlight how, in your, opinion, important are individual factors!

Please select the appropriate response for each item.
Completely disagree Disagree Neither disagree or agree Agree Completely agree

- The diversity of work
- Autonomy in decision-making
- The quality of working life
- Formal job security
- Trust (superior - subordinated)
- Organizational commitment
- The attitudes of employees (about tasks and attitude towards work)
- Teamwork
- Empowerment of employees
- An alliance (group) between employees
- Indirect of development skills

Knowledge Management
Questions below refer to the information systems (IS) and knowledge management (eng. Knowledge management) in the enterprise.

25 [IS_01] Following statements relate to information systems (IS) - quality, impact on efficiency improvement, usefulness and accessibility. Please rate the statements according to their own experience and the perceptions you have of the IS in your company. Please select the appropriate response for each item.
Completely disagree Disagree Neither disagree or agree Agree Completely agree

- IT applications in the companies are designed for certain organizational problems.
- The technology of the company serves as a means to strengthen cooperation.
- The technology is available to all employees.
- Employees are rewarded for the maintenance of IS.
- Information systems are designed to help employees work more efficiently.
- Own IS allows employees to connect directly with suppliers
- Own IS is designed to assist in decision making.
- Priority is given to the IS which serve as a bridge for the transmission of information.
- The technology is used to minimize the geographic / time barriers
- 'User-friendly' information systems are the priority of the organization.
- The users of information systems themselves decide on their content

26 [KM_01] Following questions relate to the creation, design and sharing of knowledge in your company. Please select the appropriate response for each item.
Completely disagree Disagree Neither disagree or agree Agree Completely agree

- Employees routinely share their own ideas.
- Company has processes for distribution of knowledge among business partners.
- Company has standardized system of incentives for knowledge sharing.

- IT tools are used for support the group work (eg. Calendars, video conferencing systems, communication tools).
- In their work, employees rely on written sources (eg. The documentation previously implemented projects, organizational procedures, instructions and other documented sources).
- Employees show enthusiasm and desire to learn and develop skills.
- Employees share their knowledge through formal procedures (eg. Report about the project, organizational instructions and procedures…).
- Employees share and reflect specialized knowledge, skills and expertise that give significant contributions to outcomes.
- Employees share their knowledge orally at meetings or through informal associations (eg. During lunch, in the hallway).

27 [tehnologija_KS] Which technology does your company use to share knowledge? Please select all the options that work for you.

- Tools for team collaboration
- Access to data on the Web
- Databases
- Repository (data store)
- Data Warehouse
- Expert Systems
- Knowledge networks, forums
- Other:

28 [G1_Q0002] The questionnaire is anonymous and answers will be used solely for the purpose of a doctoral dissertation. If you want to get a summary of results after research leave your e-mail address or the name of the company!

Thank you for your understanding.

Please enter your answer here:
Company Name
E-mail (contact)

I appreciate the time you have took for this questionnaire!
For any questions or concerns, feel free to contact me.

Thank you.
Jelena Horvat
jelena.horvat@foi.hr

Appendix C

SPSS and SmartPLS Output

Table 43: Test for normality of data seta – effective factors SLO

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	Slo	N	Percent	N	Percent	N	Percent
SLO_EFF_1	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_2	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_3	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_4	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_5	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_6	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_7	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_8	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_9	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_10	2	65	100,0%	0	,0%	65	100,0%
SLO_EFF_11	2	65	100,0%	0	,0%	65	100,0%

Descriptives

	Slo			Statistic	Std. Error
SLO_EFF_1	2	Mean		3,98	,099
		95% Confidence Interval for Mean	Lower Bound	3,79	
			Upper Bound	4,18	
		5% Trimmed Mean		4,06	
		Median		4,00	
		Variance		,640	
		Std. Deviation		,800	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		0	
		Skewness		-1,482	,297
		Kurtosis		3,468	,586
SLO_EFF_2	2	Mean		4,09	,092
		95% Confidence Interval for Mean	Lower Bound	3,91	
			Upper Bound	4,28	
		5% Trimmed Mean		4,17	
		Median		4,00	
		Variance		,554	
		Std. Deviation		,744	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-1,559	,297
		Kurtosis		4,961	,586
SLO_EFF_3	2	Mean		4,34	,074
		95% Confidence Interval for Mean	Lower Bound	4,19	
			Upper Bound	4,49	
		5% Trimmed Mean		4,37	
		Median		4,00	
		Variance		,352	
		Std. Deviation		,594	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-,726	,297

		Kurtosis		2,160	,586
SLO_EFF_4	2	Mean		4,00	,105
		95% Confidence Interval for Mean	Lower Bound	3,79	
			Upper Bound	4,21	
		5% Trimmed Mean		4,07	
		Median		4,00	
		Variance		,719	
		Std. Deviation		,848	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-1,111	,297
		Kurtosis		1,970	,586
SLO_EFF_5	2	Mean		4,46	,076
		95% Confidence Interval for Mean	Lower Bound	4,31	
			Upper Bound	4,61	
		5% Trimmed Mean		4,51	
		Median		5,00	
		Variance		,377	
		Std. Deviation		,614	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-1,101	,297
		Kurtosis		2,326	,586
SLO_EFF_6	2	Mean		4,17	,075
		95% Confidence Interval for Mean	Lower Bound	4,02	
			Upper Bound	4,32	
		5% Trimmed Mean		4,21	
		Median		4,00	
		Variance		,362	
		Std. Deviation		,601	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-,524	,297
		Kurtosis		1,810	,586
SLO_EFF_7	2	Mean		4,32	,085

		95% Confidence Interval for Mean	Lower Bound	4,15	
			Upper Bound	4,49	
		5% Trimmed Mean		4,39	
		Median		4,00	
		Variance		,472	
		Std. Deviation		,687	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-1,117	,297
		Kurtosis		2,276	,586
SLO_EFF_8	2	Mean		4,09	,100
		95% Confidence Interval for Mean	Lower Bound	3,89	
			Upper Bound	4,29	
		5% Trimmed Mean		4,16	
		Median		4,00	
		Variance		,648	
		Std. Deviation		,805	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-1,099	,297
		Kurtosis		1,478	,586
SLO_EFF_9	2	Mean		3,78	,094
		95% Confidence Interval for Mean	Lower Bound	3,60	
			Upper Bound	3,97	
		5% Trimmed Mean		3,82	
		Median		4,00	
		Variance		,578	
		Std. Deviation		,760	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-,494	,297
		Kurtosis		,244	,586
SLO_EFF_10	2	Mean		3,49	,110
		95% Confidence Interval for Mean	Lower Bound	3,27	
			Upper Bound	3,71	

		5% Trimmed Mean		3,53	
		Median		4,00	
		Variance		,785	
		Std. Deviation		,886	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-,880	,297
		Kurtosis		,637	,586
SLO_EFF_11	2	Mean		3,88	,084
		95% Confidence Interval for Mean	Lower Bound	3,71	
			Upper Bound	4,04	
		5% Trimmed Mean		3,91	
		Median		4,00	
		Variance		,453	
		Std. Deviation		,673	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		0	
		Skewness		-,801	,297
		Kurtosis		1,520	,586

Table 44: Test for normality of data seta – effective factors CRO

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	CRO	N	Percent	N	Percent	N	Percent
CRO_EFF_1	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_2	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_3	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_4	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_5	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_6	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_7	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_8	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_9	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_10	1	182	100,0%	0	,0%	182	100,0%
CRO_EFF_11	1	182	100,0%	0	,0%	182	100,0%

Descriptives

CRO				Statistic	Std. Error
CRO_EFF_1	1	Mean		3,98	,058
		95% Confidence Interval for Mean	Lower Bound	3,87	
			Upper Bound	4,10	
		5% Trimmed Mean		4,06	
		Median		4,00	
		Variance		,613	
		Std. Deviation		,783	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		0	
		Skewness		-1,507	,180
		Kurtosis		3,976	,358
CRO_EFF_2	1	Mean		4,14	,051
		95% Confidence Interval for Mean	Lower Bound	4,04	
			Upper Bound	4,24	
		5% Trimmed Mean		4,20	
		Median		4,00	
		Variance		,473	
		Std. Deviation		,688	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-1,422	,180
		Kurtosis		5,043	,358
CRO_EFF_3	1	Mean		4,34	,041
		95% Confidence Interval for Mean	Lower Bound	4,25	
			Upper Bound	4,42	
		5% Trimmed Mean		4,36	
		Median		4,00	
		Variance		,312	

		Std. Deviation		,559	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-,279	,180
		Kurtosis		,475	,358
CRO_EFF_4	1	Mean		4,21	,059
		95% Confidence Interval for Mean	Lower Bound	4,10	
			Upper Bound	4,33	
		5% Trimmed Mean		4,29	
		Median		4,00	
		Variance		,633	
		Std. Deviation		,796	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-1,335	,180
		Kurtosis		3,132	,358
CRO_EFF_5	1	Mean		4,34	,049
		95% Confidence Interval for Mean	Lower Bound	4,24	
			Upper Bound	4,44	
		5% Trimmed Mean		4,40	
		Median		4,00	
		Variance		,436	
		Std. Deviation		,660	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-,851	,180
		Kurtosis		1,109	,358
CRO_EFF_6	1	Mean		4,10	,051
		95% Confidence Interval for Mean	Lower Bound	4,00	

			Upper Bound	4,20	
		5% Trimmed Mean		4,13	
		Median		4,00	
		Variance		,470	
		Std. Deviation		,685	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-,448	,180
		Kurtosis		,268	,358
CRO_EFF_7	1	Mean		4,23	,048
		95% Confidence Interval for Mean	Lower Bound	4,14	
			Upper Bound	4,33	
		5% Trimmed Mean		4,27	
		Median		4,00	
		Variance		,422	
		Std. Deviation		,649	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-,879	,180
		Kurtosis		2,889	,358
CRO_EFF_8	1	Mean		4,30	,054
		95% Confidence Interval for Mean	Lower Bound	4,20	
			Upper Bound	4,41	
		5% Trimmed Mean		4,37	
		Median		4,00	
		Variance		,532	
		Std. Deviation		,730	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-,969	,180

		Kurtosis		,981	,358
CRO_EFF_9	1	Mean		3,93	,057
		95% Confidence Interval for Mean	Lower Bound	3,82	
			Upper Bound	4,04	
		5% Trimmed Mean		3,99	
		Median		4,00	
		Variance		,586	
		Std. Deviation		,766	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		0	
		Skewness		-1,073	,180
		Kurtosis		2,256	,358
CRO_EFF_10	1	Mean		3,15	,075
		95% Confidence Interval for Mean	Lower Bound	3,01	
			Upper Bound	3,30	
		5% Trimmed Mean		3,17	
		Median		3,00	
		Variance		1,026	
		Std. Deviation		1,013	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		2	
		Skewness		-,282	,180
		Kurtosis		-,621	,358
CRO_EFF_11	1	Mean		3,91	,045
		95% Confidence Interval for Mean	Lower Bound	3,82	
			Upper Bound	3,99	
		5% Trimmed Mean		3,91	
		Median		4,00	
		Variance		,361	
		Std. Deviation		,601	
		Minimum		2	

	Maximum	5	
	Range	3	
	Interquartile Range	0	
	Skewness	-,271	,180
	Kurtosis	,607	,358

Table 45: Mann – Withney U test results for effective factor: *Work design*

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
WD	182	4,1676	,49172	2,00	5,00
Country	182	1,64	,480	1	2

Ranks

	Country	N	Mean Rank	Sum of Ranks
WD	CRO	65	94,06	6114,00
	SLO	117	90,08	10539,00
	Total	182		

Test Statistics[a]

	WD
Mann-Whitney U	3636,000
Wilcoxon W	10539,000
Z	-,500
Asymp. Sig. (2-tailed)	,617

a. Grouping Variable: Country

Table 46: Mann – Withney U test results for effective factor: *Design of relationship*

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
RD	182	4,2445	,51494	1,75	5,00
Country	182	1,64	,480	1	2

Ranks

	Country	N	Mean Rank	Sum of Ranks
RD	CRO	65	98,59	6408,50
	SLO	117	87,56	10244,50
	Total	182		

Test Statistics[a]

	RD
Mann-Whitney U	3341,500
Wilcoxon W	10244,500
Z	-1,376
Asymp. Sig. (2-tailed)	,169

a. Grouping Variable: Country

Table 47: Mann – Withney U test results for effective factor: *Encouraging and opportunity structures*

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
EOS	182	3,663004	,6119227	2,0000	5,0000
Country	182	1,64	,480	1	2

Ranks

	Country	N	Mean Rank	Sum of Ranks
EOS	CRO	65	89,55	5821,00
	SLO	117	92,58	10832,00
	Total	182		

Test Statistics[a]

	EOS
Mann-Whitney U	3676,000
Wilcoxon W	5821,000
Z	-,378
Asymp. Sig. (2-tailed)	,706

a. Grouping Variable: Country

Curriculum Vitae

1. **NAME AND SURNAME:** Jelena Horvat
2. **DATE OF BIRTH:** 27. 07. 1985, Čakovec
3. **NATIONALITY:** Croatian
4. **ADRESS:** Kralja Tomislava 40, HR 40000 Čakovec, Croatia
5. **E-MAIL:** jelena.horvat@foi.hr (jellena.horvat@gmail.com)

6. **EDUCATION:**

Dates	2009 - present
Education	Postgraduate study (Doctorate study)
Institution	Faculty of Economics and Business, University of Maribor
Title of thesis	Relationship between knowledge management information solutions and human resource management in IT companies

Dates	2006-2009
Education	Master of Economics in management and organization (Undergraduate study)
Institution	Faculty of Economics, University of Zagreb
Study programme	Organization and Management

Dates	2004-2006
Education	Bachelor of Economics in accounting and finances (Undergraduate study)
Institution	Faculty of Economics, University of Zagreb
Study programme	Organization and Management

7. **EMPLOYMENT**

Dates	2009 - present
Organization	Faculty of Organization and Informatics, University of Zagreb
Position	Teaching assistant
Activities	Courses: Corporate Governance, Strategic Management, Strategic human resource management, Financial institutions and capital markets, Institutional investors, Capital market

8. **LANGUAGES:**

- Mother tongue: Croatian
- Other languages: proficient user of English and German

9. **OTHER:**

- Computer programs: Microsoft Office, Microsoft Project

- Data analysis: Microsoft Excel, SPSS, SmartPLS

10. AREA OF RESEARCH:

- Knowledge management
- Human resources management
- Strategic management
- Corporate Governance

11. PROJECTS

- EDU-preneur - IPA Slovenia-Croatia (2007-2013) - Module Leader II: Market research and SWOT analysis; and associate the module V: Marketing strategy and sales strategy

12. OTHER:

- 2014 - secretary of the Association of Assistants
- Member of the organizing committee of the conference:
  - Economic and Social Development in Frankfurt, 2012
  - Economic and Social Development in Paris, 2013
  - Economic and Social Development in Wienna, 2014
  - Economic and Social Development in Zagreb, 2014

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