Key Factors for Knowledge Management: Pilot Study in IT SMEs

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Abstract

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 knowledge. Knowledge management is a major issue for human resources management. Organization, culture and information technology play crucial enabler for various aspects of knowledge management. Aim of this paper is to present findings on knowledge management and factors that contribute to its development. In the empirical part, research on small IT companies is presented. Data was analyzed using PLS –SEM techniques. Findings show that that personal factors, culture and technical factors are substantial predictors of knowledge management, but informational factors do not directly predict knowledge management.

Keywords

Knowledge Management, Culture, SMEs, Structural Equation Modelling

Introduction

The 21st century has been declared as a century of knowledge (Milanović, 2010) wherein competitive advantage is perceived as a link to knowledge and therefore interest in Knowledge Management (KM) grows on. Environment where companies operate has certain properties, according to which companies differ from each other (Belak, Belak, & Thommen, 2014). KM 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 in 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). Key factors for KM are considered to be macro – environment (includes economic, technical and social agents of change); organizational culture (includes organizational structure, strategy, change management); people or personal contributors (include knowledge roles and skills, motivation, empowerment); informational contributors (include information fatigue, information auditing) and technology or technical contributors (include system standardization and technical usability) (Moffett, McAdam & Parkinson, 2003). Each of these factors has influence on KM and can be linked with its performance.

Practice of KM in Croatia was analysed through few studies, although not much research has been done on this. One such research was focused on large Croatian companies and results indicated underdevelopment of KM practices in Croatia. Study by Vidović (2008) proves that large Croatian companies have started to manage their knowledge. It also indicates that although Information Technology (IT) is on a high level of development, knowledge management measurement is the least developed segment in Croatian companies. According to literature, later study done by Milanović (2010), Croatian companies are in second phase of KM development regarding the evaluation criterion of average maturity of KM. This paper, through an empirical pilot study, investigates knowledge management from four different perspectives: technical contributions, informational contributors, people/personal contributors and culture/organizational climate in SME IT

companies of Croatia. For data analysis, the Partial least Square Structural Equation Modeling (PLS-SEM) is used and the results have been reported by SmartPLS software.

In the remaining sections of this paper: literature review, implications of knowledge, KM and its internal factors have been discussed. Following which, the hypotheses of the research and research methodology including information on research instruments, data and analysis were discussed. Limitations of the study and recommendations were also provided at the end.

Perspectives on Knowledge and Knowledge Management

Many researchers have defined KM by distinguishing data, information and knowledge also known as the knowledge hierarchy. Data comprises facts, observations or perceptions, when information is a subset of data including those data that posse's relevance and purpose (Becerra-Fernandez, González, & Sabherwal, 2004). Unlike the information, which is visible, independent of various actions, and can easily be conveyed or duplicated, knowledge is invisible, closely associated with actions and decisions, it identifies itself with existing environment, transferable through learning and cannot be duplicated (Kumar, 2010).The researchers and practitioners of Management Information System (MIS) defined KM as an entity that can be recognized and control using computer-based information systems (Sanghani, 2008). On the other hand management researchers have stated knowledge as a process mostly depended on the individuals and the competencies such as skills and know-how of the organisation they work (Nonaka & Takeuchi, 1994; Davenport & Prusak, 1998). Knowledge embraces main place among traditional factors of production, such as land, labour and capital. Nonaka (1991) has stated in his research that two dimensions of knowledge emerge in organizations namely tacit and explicit.

Transfer of knowledge throughout the organization was considered as a critical driver of its effectiveness. 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). It is not only a necessity, but also source of competitive advantage and an important strategic resource for business organizations. Popularity of KM has been spreading fast, especially after late 90's it has become a central topic of management philosophy and a management tool (Edvardsson, 2003). Most definitions of KM include combinations of management philosophy related to organizational knowledge and a technology based knowledge gathering and sharing systems. Overall accepted definition states knowledge management 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). Existing research and conceptual studies in knowledge management filed are identified as dynamic sets of activities (Mehta, 2008). These are called the KM processes. Knowledge discovery and creation process is defined as development of new tacit or explicit knowledge from data and information or from synthesis of prior knowledge (Becerra-Fernandez et al., 2004). Knowledge capturing is a 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). Once knowledge is created, it needs to be stored in database for subsequent use by employees in different departments (Storey & Kelly, 2002). Knowledge storage is process of structuring and storing of knowledge (Massa & Testa, 2009) and is considered one of the essential elements in the KM process as it helps in prevention of important information loss (Storey & Kelly, 2002). 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).

Knowledge sharing process is a social interactive culture, involving the change of employee knowledge skills and experience through every department in organizations. It comprises set of shared understandings related to providing employees access to relevant information (Hoegl, Parboteeah, & Munson, 2003). Such process of sharing organizational knowledge facilitates exchange of working experiences, technical expertise and individual insights between and among individuals. Organizations can develop knowledge in a variety of technical domains. Due to limited resources, organizations are forced to make a choice. They chose 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 (Becerra-Fernandez et al., 2004). Therefore, it is important to study knowledge management, its factors and their interplay in companies.

Internal Factors and Knowledge Management

Aspects of knowledge management have been dominated by two main factors: (1) the supporters of information and communication technology and (2) the human resource (HR) views (Jantz, 2001). Some authors believe that IT is the main driver for knowledge management, though others disagree and believe that knowledge management is mostly about people and culture and not technology (Soliman & Spooner, 2000). Various authors (Mathew, Kumar & Perumal, 2011; Moffett & McAdam, 2009; Moffett et al., 2003; Plessis, 2007b; Scarbrough, 2003) have dealt with knowledge management, aspects, and factors. According to research by Mathew et al. (2011) KM initiative is determined by the organizational culture and technology and people. They concluded that organizations should have effect on all three factors, in order to exploit the knowledge in organization. Research conducted by Daud and Yusoff (2011) suggests that combination of process of KM, as well as organizational skills and intellectual capital as a strategic organizational asset, enables the increases of organizational effectiveness. As the interaction of technology, techniques and people were unique to any organisation, which is tough for other organisation to trade and imitate, the implications of these interactions has a profound effect and consequences on the management of organisational knowledge (Bhatt, 2001).

People and Technology in Knowledge Management

Knowledge oriented culture challenges people to share knowledge throughout the company (Davenport & Prusak, 1998). People in an organization conform to the culture of the organization. Changes in organizations' culture places demands on employees to change their mindsets. Through education, remuneration and knowledge sharing, people influence the company in all areas: quality advantage and speed of development.

Bhatt (2001) stated in his research, use of high powered computers and communication networks can support an organisation in interpretation but still narrowing of problem was still successfully carried out by the people using the information technology tools, especially in the dynamic business environment, where organisations are prone to naïve and unexpected arising of problems, use and supporting collaboration of IT and people can only be the enablers of turning data into information which can further be embedded as knowledge.

Thus, within the field of organizational change resulting from KM, human issues must be considered as a key factor. This consideration has given rise to the knowledge worker, and key influences on this concept are increased information technology, a shift in markets away from labor intensive manufacturing and an increase in education (Carter & Scarbrough, 2001; Moffett et al., 2003; Pan & Scarbrough, 1999). Technology is viewed as a key contributor and also enabler to the field of KM (Davenport & Prusak, 1998). Collaboration, creativity and performance improvement the factors that induce changes often in way of unexpected and surprising which were usually promoted by organisational arrangement, new workplace environment and the advance of IT in and around the organisations(Wiig, 1997). Based on this, it can be argued that contribution and collaboration of certain internal factors have always been fruitful in inducing improvement and development in the knowledge management perspective. Literature regarding KM, particularly, reflects a techno-centric focus which, in essence, regards knowledge that can be captured, manipulated and leveraged through IT (Pastor, Santana & Sierra, 2010). This perception is limited and needs to be enhanced with a human-centric focus. 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).

Different researchers (Ahmed & Ahmad, 2012; Attafar, Soleimani, Shahnazari & Shahin, 2012; Hussock, 2009; Ishak, Eze & Ling, 2010; Lin, 2007; Özbebek & Toplu, 2011) have been interested in area of knowledge management and employees, combining it with perspectives of strategic, project and information management. Modern companies and development of management support the premise of the "knowledge workers". Key influences on this concept are: increased information technology, a shift in markets away from labour intensive manufacturing and an increase in third level education opportunities (Scarbrough, 2003). Davenport et al. (1998) studied 31 KM projects among 24 companies with the aim of determining the factors associated to their effectiveness by evaluating the performance of projects using indicators to assess the success of any business changes in the environment. They identified 8 common success factors for KM which linked KM to language, economic performance, industry value, knowledge-friendly culture, change in motivational practises, organisational and its technical infrastructure and senior management support. This new research had proved huge arguments among the researchers and many supported to include the new success factors for establishing a strong connection between Knowledge

Management in the organisation. However, Yew Wong (2005), proved that the success factors defined by Davenport (1998) were hypothesis which did not got proved on later studies, this made the other factors to lose its credibility among the researchers and the main internal factors were considered for evaluating the impact on KM in an organisation.

Knowledge Management and Culture

Various factors influence knowledge management in companies (e.g. employees, organizational values, infrastructure, culture, technology, macro environment and others). Organizational culture with its values and norms is of essential meaning for ensuring the long-term success of companies. Culture is a set of achievements of human society: all creations, both material and non-material (Jernej Belak et al., 2014). Considering MER Model of Integral Management (Belak & Duh, 2012) the key success factors are: compatibility, competitiveness, efficiency, culture, credibility, ethics, ecology, entrepreneurship, synergy, and philosophy. Culture of a particular company in this is a wide, complex and multi-faceted phenomenon, which forms the social system and consequently impacts the environments (Belak et al., 2014). More recently, corporate culture has been denoted as encompassing the assumptions, beliefs, goals, knowledge and values that are shared by organizational members (Belak et al., 2014). Employees (people) invest in the circumstances of the evolving knowledge society in developing some specific knowledge or skills, which demands from them to take over a significant risk that authorises them to participate in the governing of their enterprises. The existing tendency of the increasing variable component of employees' remuneration, which is apparent, requires risk sharing between owners and employees (Pučko, 2005). Organizational culture is considered a key element in managing organizational change and renewal (Pettigrew, 1990).

Culture is regarded as an effective factor on KM success in many researches (Carrión, González, & Leal, 2004; Davenport & Prusak, 1998; Nonaka, 1991; Oltra, 2005; Pan & Scarbrough, 1999). Culture of confidence and trust is required to encourage the application and development of knowledge within an organization (Pan & Scarbrough, 1999). 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). Judge and 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 suitable personality, as well as the socialization of individuals into the culture of the company. Culture plays an effective role in KM effectiveness as the identity and foundation of the organization (Attafar et al., 2012). Attafar et al. (2012) state that stronger culture influences stronger KM. According to Plessis (2007a) the cultural realities in companies should be taken into account when implementing KM. In company where success is measured with billable hours such systems leaves little time for KM, therefore the culture is oriented towards financial measurement and KM is not seen as important (Plessis, 2007a).

Knowledge Management Studies on Croatia

Croatia, an economically leading country when compared to South Eastern European countries, is evident from its performance, FDI per capita, lowest rate of unemployment GDP per capita and also high on European Innovation score board. A study conducted by EBRD 2005 suggested that ranks scored by Croatia stays highest in life satisfaction surveys, GDP per capita and GDP growth (Kiessling et al, 2009).Eastern European economies offer business opportunities however with the nature of transitional at economic level, there were high complexities fraught with disposition of social and cultural environment (Kiessling et al, 2009). Importance of Knowledge Management was exacerbated by researchers suggesting differentiation of product can be done using CEE creative capabilities and therefore engineers and technological expertise could be a strategic advantage for MNC's (Manea & Pearce, 2006). Cui et al. (2005) also stated that, a survey of managers of Croatian subsidiaries working for foreign MNCs indicated both market dynamism and competitive intensity influences knowledge management capabilities individually and when studied together, market dynamics seems to be more influencing environmental market conditions than competitive intensity. The author also found a significantly positive relationship between capabilities and performance of subsidiary knowledge management. These studies show a connection between capabilities and performances in knowledge management and the influence of individuals as a part of organisation have major impact on the knowledge and knowledge management. Kiessling et al. (2009) stated in his study that there is huge dearth of research opportunities in regard of knowledge management and it effect for organisational outcomes.

In today's knowledge-intensive organizations, primary objective of information and communication technology is to lead users to the information they need. This includes creating, gathering, storing, accessing and making available the right information that will result in insight for the organizations' users (Davenport & Prusak, 1998). Information technology is essential; it organizes, communicates and creates the life-blood of a modern organization: business critical data and eliminates barriers and boundaries – enabling innovation and competitive advantage (Standards Australia, 2012).

Research Methodology

Aim of this paper is to analyse the inter-relationship between people, technical aspects and knowledge management. Organizational environment factors include: technical contributions, informational contributors, people/personal contributors and culture/ organizational climate (see Moffett et al., 2003). Moffett et al. (2003) proposed a MeCTIP model that portrays five factors (Me – macro environment; C – culture; T – technology; I – information and P – people) which have influence on adoption of KM within organizations. Authors have analyzed and tested this MeCTIP model in various sectors. For the purpose of this research, the relationship between four factors and KM is observed in IT Croatian companies. Accordingly, following hypothesis and conceptual model, based on literature findings were proposed:
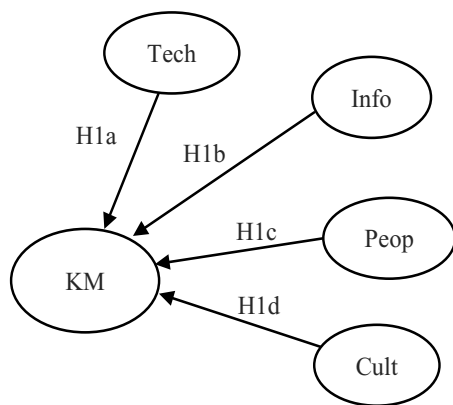
Note: *(**KM:** Knowledge Management, **Tech:** technical contributions; **Info:** informational contributors; **Peop:** people/personal contributors; **Cult:** culture/organizational climate)*

Figure 1. Conceptual Framework

H1: Organizational environment factors have a significant association with knowledge sharing. The above stated hypothesis is divided into

H1a: Technical contributors have a significant association with knowledge management.

H1b: Informational contributors have a significant association with knowledge management.

H1c: Personal contributors have a significant association with knowledge management.

H1d: Culture has a significant association with knowledge management.

For data collection, survey method was used. Accordingly, online questionnaire was formed in GoogleDocs and sent per e-mail with appropriate cover letter, whereas 77 answers were received. Focus was on knowledge management, which was analysed through four main factors: culture, people, information and technology. For culture nine items were used and for people (personal contribution) ten, for informational climate five and technical contribution six. KM, in general, was measured using five items. Responses were measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The PLS-SEM technique was employed to analyse the research model constructed in Figure 1.

Structural Equation Modelling (SEM) techniques are considered to be a major component of applied multivariate statistical analyses which are used in various sciences such as biology, economy, educational researchers, marketing researchers, medical researchers researchers etc. (Pugesek, Tomer & Eye, 2003). For this purpose, several specialized SEM programs are used in order to simplify the calculations, for example 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). 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). With SEM, the relationship between measured variables and the relationship between unmeasured, hypothetical constructs can be modelled. Two different techniques for structural equation modelling can be applied covariance-based technique (CB-SEM) and partial least square (PLS-SM). 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 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.

Research Findings

The structural model reflecting the research hypothesis H1 (H1a, H1b, H1c, H1d) depicted in Figure 1 was analysed using the proposed Smart PLS software. In order to validate the model several indicators regarding factors and KM had to be dropped. So from nine items measuring culture, four had to be dropped. In the final model three indicators explain the information factor, seven (out of ten) explain the personal contributors, and technology is explained by four items, and KM by three.

The beta values of path coefficient indicate direct influences of predictor upon the predicted latent constructs (see Figure 2). The coefficient of determination is 0.409 for the KM endogenous latent variable. The inner model suggest that personal contributors have the strongest effect on KM (0.514), followed by culture (0.290) and technical contributions (0.135). Although, informational contributors have negative effect on knowledge management (-0.275). The hypothesized relationship between KM and personal contributors, culture and technical contributions is statistically significant due to the high standardized path coefficients which need to be higher than 0.1 (Wong, 2013). Though, the hypothesized path relationship between informational contributors and KM is not statistically
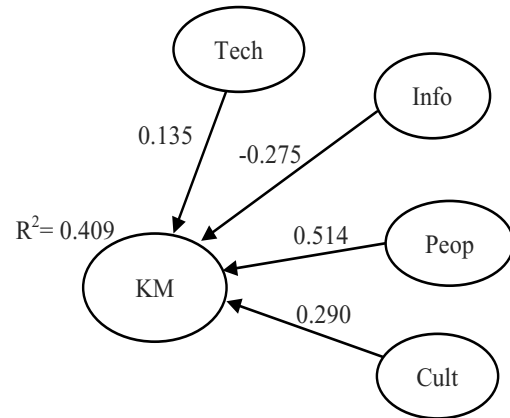

Figure 2. Structural Model with Path Coefficients

The dimensions of knowledge management showed good validity and reliability and thus reflect the overall knowledge management aspects in companies. The four latent variables (personal contributors, culture, technical contributions and informational contributors) substantially explain 40% of variance of knowledge management. It can be concluded that personal contributors, culture and technical contributions are substantial predictors of knowledge management, but informational contributors do not predict knowledge management in companies directly.

Smart PLS also assesses the psychometric properties of the measurement model and estimates the parameters of the structural model (Yeşil, Koska, & Büyükbeşe, 2013). Results of the reliability and discriminate validity testing of the measurement model are presented in the Table 1. As shown, the composite

Table 1. Reliability and Discriminant Validity Assessment of the Measurement Model

Items	AVE	Composite Reliability	R Square	KM	Cult	Info	Peop	Tech
KM	0.6196	0	0.4092	0.9065				
Cult	0.5216	0.8414	0	0.5143	0.72221			
Info	0.6477	0.8461	0	0.347	0.6423	0.8047		
Peop	0.501	0.8714	0	0.5868	0.696	0.7412	0.7078	
Tech	0.5409	0.8183	0	0.4041	0.3271	0.4134	0.5615	0.7354

Source: Authors' research

significant. Consequently, the hypothesis (H1) has been partially confirmed showing that technology, people and culture have a significant association with knowledge management.

reliabilities of measure in the model range from (0.8183) which exceeds the recommended threshold values of 0.70 (Yeşil et al., 2013), though some authors demand a 0.60 minimum level (Wong, 2013). High levels of internal

consistency reliability are demonstrated among all four reflective variables. To check convergent validity, each latent variable's average variance extracted (AVE) is evaluated. As shown in Table 1, it is found that all of the AVE values are higher than the acceptable threshold of 0.5, especially the information contributors show more (0.6477) among all other variables which explains the effect of information and individuals contributing to Knowledge play a major role in KM, and therefore based on AVE the convergent validity is considerably explaining good strength. 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 1 as bolded elements in the matrix diagonal. They are greater, in all cases, than the off-diagonal elements in their corresponding row and column, where Information contributors' variable score 80.47% and high compared to other variables which again confirms the effectiveness of information and individual contributing to knowledge have significant impact on KM in SMEs of Croatian. These results indicate that discriminate validity is well established. Based on the Table and its overall data represented, the instrument used for measuring the hypothesis shows moderately strong values for reliability and validity, this credits the strength of the theoretical framework and hypothesis considered for the study. Thus this study clearly depicts the impact of key factors such as technology, people, information and culture on knowledge management in SMEs of Croatian.

Conclusion

The field of knowledge management continues to grow and expend, bringing new conclusions and discoveries. Individuals, human potentials are in the centre of knowledge management, so knowledge management is individuals' management and individuals' management is knowledge management (Davenport & Völpel, 2001). As managerial philosophy, 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 & Popescu, 2008). Some authors argue that rise and growth of knowledge management is managerial response to various empirical trends associated with globalization and post industrialism (Scarbrough & Swan, 2001). 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). Growing number of organizations adopt team working, organic structures, knowledge-centric cultures (Edvardsson, 2003) through which the importance of knowledge is highlighted in current organizational theory and contemporary organizational trends.

Presented pilot study was conducted in order to analyse knowledge management and its factors in companies in Croatia. Insight in the factors influencing knowledge management can result with understanding how to improve knowledge collection, encourage knowledge sharing culture and effectively store and apply the knowledge. Results showed that in Croatian small companies', main effect on knowledge management have people and their characteristics, followed by cultural and technological contributors. Discriminant validity and reliability of the data was confirmed, and SmartPLS was used for data analysis.

Main limitations of this research is the small sample size and the fact that companies are form just one country which limits' the generalizability of the findings. Therefore, authors recommend further research in companies from countries with increased sample size. Future studies can also include other variables that may affect performance management and knowledge management in general.

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