

Knowledge Management Critical Success Factors and the Innovativeness of KIBS Companies

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crossref <http://dx.doi.org/10.5755/j01.ee.25.4.6494>

The purpose of this paper is to examine the influence of two critical success factors for knowledge management (i.e. leadership and support by the management, motivational practices) on the innovativeness of knowledge-intensive business service (KIBS) companies in the SMEs sector. A sample of 400 companies (KIBS SMEs) located in the Pomeranian District in Poland was selected. The questionnaire was designed to measure knowledge creation and knowledge sharing, team working, professional development and innovation performance. The findings indicate that companies with stronger leadership and support by the management and which employ motivational practices are more innovative than their competitors. This paper provides evidence of the significance of the critical success factors selected for KM in innovation processes. The research opens up the discussion on the relationship between KM critical success factors and company innovativeness. On the basis of the findings, managers in KIBS companies would do well to pay attention to managerial practices which foster the knowledge and professional development of employees, as these practices influence a company's innovativeness. For academics, this paper sketches out fields for further research in this area to be conducted in other countries and sectors.

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Keywords: *Innovativeness, Knowledge Management, Knowledge-Intensive Business Services, Small to Medium-Sized Enterprises, Critical Success Factors.*

Introduction

In the face of knowledge-based economic development, knowledge has been considered a strategic asset and a source of competitive advantage for many decades now (Palacios Marques *et al.*, 2013; Magnier Watanabe *et al.*, 2011; Ndlela & Du Toit, 2001). Due to this fact, companies are more and more focused on knowledge management (KM) practices (Palacios *et al.*, 2009; Anantamula & Kanungo, 2006; Darroch, 2003). These companies are not only large firms, which started introducing KM quite early, but also enterprises from the SME sector (Purcarea *et al.*, 2013; Rehman *et al.*, 2010; Salojarvi *et al.*, 2005; Uit Beijerse, 2000; Wickert & Herschel, 2001; Bozbura, 2007; Desouza & Awazu, 2006). It is important for such companies to know how to introduce KM successfully and which factors they should concentrate on. This is why the stream of research devoted to the analysis of critical success factors (CSFs) in introducing KM in SMEs has appeared (Wong & Aspinwall, 2005; Wong, 2005; Migdadi, 2009).

With the increasing interest in knowledge management, a growing attention to innovation management can also be observed (Purcarea *et al.*, 2013; Darroch, 2005). This results from the fact that knowledge and the management of it can help companies in being innovative (Palacios *et al.*, 2009; Palacios Marques *et al.*, 2013; Quintane *et al.*, 2011; Taminiau *et al.*, 2009; Wang *et al.*, 2010). Innovation and knowledge management are undoubtedly interrelated concepts and their mutual influence is well-reported in the literature (Zhou & Li, 2012; Andreeva & Kianto, 2011;

Castro, Lopez Saez & Delgado Verde, 2011; Aramburu, Saenz & Rivera, 2006).

Companies for which knowledge and innovation management have particular importance are called knowledge-intensive business services (KIBS). KIBS have been examined by researchers for almost two decades now. A growing interest in this research area has resulted from both quantitative measures – e.g. sales and employment figures (Chadwick *et al.*, 2008), and qualitative ones – e.g. the characteristics of the sector (being based on knowledge and knowledge management) and its influence on the innovativeness of other sectors and whole economies (Evangelista *et al.*, 2012; Forsman, 2011; Muller & Doloreux, 2009).

Therefore, the *scientific problem* discussed in this article is as follows: what is the relationship between critical success factors (CSF) for implementing knowledge management (KM) and the innovativeness of a company? One might expect that there is a strong link between CSFs and company innovativeness as proper implementation of KM should result in an increase in company innovativeness.

The *aim of this article* is to examine the relationship between CSFs for implementing KM and the innovativeness of a company among small and medium-sized companies in the KIBS sector located in the Pomeranian region in Poland.

The *research method* applied to fulfil the aim of the article is a quantitative research analysis based on 96 valid questionnaires obtained from SMEs representing the KIBS sector.

The *novelty of the article* results from the fact that it presents a study on knowledge and innovation management in SMEs in the knowledge-intensive business services sector. Although the topic of the knowledge management concept as a supporter of innovations has been previously explored (e.g. Andreeva & Kianto, 2011; Grey, 2006; Purcarea *et al.*, 2013; Zhou *et al.*, 2012), the influence of CSFs for knowledge management on innovations has not been examined in the KIBS context. In addition, the literature also lacks empirical studies on this topic.

Other significant input results from the fact that there is still not much known about KM and innovation practices in SMEs in Poland. This area of research remains underexplored.

The structure of the article is as follows. First, it presents an analysis of the literature on KIBS, innovation management and knowledge management, with a focus on the linkages between these concepts. Second, it describes two KM critical success factors (i.e. leadership & support by management and motivational aids) and their potential influence on company innovativeness. On this basis, hypotheses are drawn. Third, it explains the research methodology and presents the results. It concludes with a discussion of the major findings.

Theoretical framework and hypotheses Knowledge-intensive business services

Knowledge-intensive business services (KIBS) are "services that involve economic activities which are intended to result in the creation, accumulation or dissemination of knowledge" (Miles *et al.*, 1995, p.18). KIBS rely on professional knowledge to a high extent and they are either themselves primary sources of information/knowledge or they use knowledge to produce intermediate services for their clients' production processes (*Ibid.*).

An increasing interest in KIBS results from the fact that they play a significant role in the development of modern economies (Rodriguez, 2013). Many publications stress the close relationship between KIBS and the levels of innovation and performance of the whole economy (e.g. Hipp, 1999; Tomlinson, 1999; Aslesen & Isaksen, 2007). It is an increasingly common belief that KIBS not only perform innovation activities in the service of the manufacturing sector but they are also "bridges of knowledge" or "innovation bridges" connecting the manufacturing sector, science and customers (Czarnitzki & Spielkamp, 2003). They are often sources of innovation, intermediaries in the transfer of knowledge to innovative companies, or the coordinators of different types of expert activities (Zieba, 2013). KIBS contribute to the growth of innovation not only through increased innovation in their clients' businesses but also through innovating in their own organizations, providing jobs requiring high qualifications and helping to improve productivity and faster economic growth. Moreover, a company offering KIBS plays a pivotal role in the transformation of its client companies into learning organizations and supports a build-up of capacity for knowledge distribution (Kempila & Mettanan, 2004).

To conclude, the rationale for carrying out research on knowledge and innovation management in such companies is for the following reasons:

1. They deal with knowledge on a regular basis and they should be efficient and effective in its management;
2. Analysis of KM critical success factors should be possible in such companies as they need to manage knowledge to be successful in their market;
3. They are often innovative and an analysis of their innovation management should also be possible.

Innovation management

Innovation management in SMEs is a widely discussed topic. There is a well-defined stream of research devoted to knowledge and knowledge management as prerequisites for the generation and implementation of innovation in SMEs. This research stream has examined many different areas: knowledge acquisition and absorptive capacity (Gray, 2006; Wang *et al.*, 2010), growth of knowledge (Consoli & Elche Hortelano, 2010) and knowledge sharing (Taminiau *et al.*, 2007). Taking into consideration the importance of knowledge in the innovation process, it seems difficult to generate any innovation without a solid organizational knowledge base and proper management of it (Zhou & Li, 2012; Yuan, 2011; Sedziuviene, 2010; Salojarvi *et al.*, 2005). This is, for example, confirmed by the research carried out by Amara *et al.*, (2009), who proved that enhancing knowledge resources contributes to increasing the likelihood of various innovation types. Castro *et al.*, (2011) in an editorial propose a useful framework for the integration of KM and innovation – i.e. a knowledge-based view of firm innovation. A conceptual model of the influence of KM on competitiveness and innovations is proposed by Carneiro (2000). Du Plessis (2007) identifies the drivers for the application of knowledge management in innovation. Sedziuviene & Vveinhardt (2010) analyze the cohesion of knowledge management and innovations within a modern organization in depth.

As can be concluded from the above-cited literature, the role of knowledge and the management of it in innovation processes cannot be underestimated. Therefore, the CSFs for KM should also contribute to company innovativeness.

KM critical success factors

A review of the literature also sheds some light on the critical success factors for the implementation of knowledge management in SMEs. According to Wong (2005) and Wong and Aspinwall (2005), the critical success factors forming the basis for KM in SMEs include: leadership and support; culture; strategy and purpose; resources; processes and activities; training and education; human resource management; information technology; motivational aids; organizational infrastructure; and measurement. Wong and Aspinwall (2005) engage two groups of respondents in their research (CEOs/Managing directors in SMEs and academics/consultants/practitioners in the KM field) to create a prioritized list of CSFs. The importance of various CSFs differs between these two groups, and is presented in Table 1.

The critical success factors proposed by Wong and Aspinwall (2005) were later applied by Migdadi (2009) to develop a conceptual model of research comparing these factors with company results. According to Migdadi (2009), there is a positive correlation between critical success factors and the following company outcomes: systematic knowledge-related activities, employee development, customer satisfaction, good external relationships and success of the organization. This positive correlation was confirmed for all of the above-mentioned company results, based on a study of 25 SMEs in Saudi Arabia examined by means of 418 questionnaires.

Table 1

Ranking of critical success factors in the implementation of knowledge management

Factors	CEOs/Managing directors	Academics/consultants/practitioners
Leadership and support	2	1
Culture	1	2
IT	8	7
Strategy and purpose	5	3
Measurement	11	11
Organizational infrastructure	10	10
Processes and activities	3	5
Motivational aids	9	9
Resources	4	4
Training and education	7	8
HRM	6	6

Source: Wong and Aspinwall, 2005.

This article conducts an analysis of two critical success factors. The first factor examined is leadership and support by management, which was ranked as the most important by the academics/consultants/ practitioners group. The second factor – selected for contrast – is evaluated as one of the least important factors – motivational aids. It was ranked in 9th place out of 11.

The importance of leadership and support by management for KM initiatives has been reported in previous studies (Ribiere & Sitar, 2003; Holsapple & Joshi, 2000; Wong & Aspinwall, 2005). Organization leaders should support activities devoted to KM, but to do so they need to have an appropriate understanding of KM (Ribiere & Sitar, 2003). If the management possesses such knowledge it should encourage knowledge processes within the organization and spend time supporting employees in these processes. Therefore, leaders need to provide an environment that promotes knowledge creation, sharing and use (Migdadi, 2009; Wong & Aspinwall, 2005). Leaders also need to set an example to their employees with regard to KM activities and they should share their knowledge with others (Migdadi, 2009). This is why leaders need to provide their co-workers with time when they need it. Motivational aids shall be wisely applied in a firm desiring to promote KM initiatives. As employees in companies in the KIBS sector create the value of the company by generating and sharing knowledge, they need to be motivated to share this

knowledge within the organization. If companies do not promote a free transfer and sharing of accurate and valuable knowledge, their success in KM implementation might be hindered (DeTienne *et al.*, 2004). One way of promoting knowledge sharing is rewarding employees who behave in this way. In general, as (Zack *et al.*, 2009, p. 397) state, “*organizations that value their employees for what they know, and reward employees for sharing that knowledge create a climate that is more conducive to KM*”.

To facilitate innovation, firms should engage human capital. If they want to create new products or services, they should develop organizational expertise (Chen & Huang, 2009). Two of the critical success factors for KM analysed above, i.e. leadership and support by management together with motivational aids, help in eliciting the willingness of employees to develop their expertise in innovation. As (Chen & Huang, 2009, p. 105) state, “*Although a firm has access to the knowledge, skills and expertise of employees, it may need to possess good capacities in managing the knowledge management tools in place to ensure effective utilization of the human capital in the development of organizational expertise at innovation*”.

Taking all the above into account, it would be justifiable to state that both leadership & support by management and motivational practices should influence the innovativeness of a company. On this basis, the following hypotheses are proposed:

H1. Leadership and support by management for KM initiatives should result in innovativeness of a company.

H2. Motivational practices should result in innovativeness of a company.

In the next step, sub-hypotheses are formulated as follows:

H1a. Managers' knowledge of the KM concept supports the innovativeness of a company.

H1b. Managers encouraging knowledge creation, sharing and use supports the innovativeness of a company.

H1c. Managers giving time to employees when they need it supports the innovativeness of a company.

H2a. Rewarding employees for sharing and using knowledge supports the innovativeness of a company.

H2b. Valuing employees for what they know supports the innovativeness of a company.

H2c. Offering career advancement opportunities to employees supports the innovativeness of a company.

Methodology

To verify the above hypotheses, we conducted research among selected companies from the SMEs sector offering KIBS located in the Pomeranian district in Poland. These companies were selected because their main economic activity was among those proposed by Balaz (2004). The companies were contacted by telephone and an online interview was conducted with an appropriate person during the telephone call. In some cases, the respondents requested a link to the questionnaire, which was sent to them by e-mail. The total number of valid questionnaires returned was 96, meaning a response rate at the level of 24 %. The majority of the companies which refused to take part in the study gave lack of time as the reason. Other reasons were as follows: lack of willingness to take part in the study, absence

of the person who could answer the questions (on leave), and company policy not to take part in any studies. The KIBS SMEs that took part in the research varied with regard to their economic activity. The majority of the items in the questionnaire were adapted from the literature on knowledge management and innovation. Most of the items were measured using a five-point Likert scale ranging from “1 – strongly disagree” to “5 – strongly agree”. Because of the distribution of answers, i.e. very low numbers obtained for some categories, they were eventually integrated into two categories, “Yes” and “No”. The question concerning innovations introduced in the organization within the last two years could only be answered “Yes” or “No”. Questions concerning leadership and support by the management and motivational aids were mainly adapted from (Ribiere & Sitar, 2003; Wong & Aspinwall, 2005; Zack *et al.*, 2009; Kmiecik *et al.*, 2012). Questions on innovations and innovation performance originated from (Oke *et al.*, 2007).

Each CSF examined was researched using 3 measures based on the questions listed in Table 2. For leadership and support by management, the measures were: knowledge of the KM concept possessed by managers (LS1); encouraging creation, sharing and use of knowledge among employees (LS2); and managers giving their time when an employee needs it (LS3). For the second CSF, motivational practices, the measures were: rewarding employees for sharing and using knowledge (MP1); valuing employees for what they know (MP2); and offering employees career advancement opportunities (MP3). Innovativeness of companies was broken into four aspects relating to the subject (products/services or processes) and type (incremental or radical). The influence of each CSF measure on those four aspects was examined. A standard chi-squared test was applied to verify the relationships postulated. In cases of insufficient cardinalities, Yate’s correction for continuity was used. Each sub-hypothesis was accepted if the relationship between a CSF measure and at least one aspect of innovativeness was statistically significant.

Table 2

Variables examined in the research and questions to examine them

Leadership and support by management	In our company, managers: (a) know the knowledge management (KM) concept (LS1) (Ribiere & Sitar, 2003); (b) encourage knowledge creation, sharing and use (LS2) (Wong & Aspinwall, 2005); (c) give their time when an employee needs it (LS3) (Kmiecik <i>et al.</i> , 2012).
Motivational practices	In our company, employees: (a) are rewarded for sharing and using knowledge (MP1) (Zack <i>et al.</i> , 2009); (b) are valued for what they know (MP2) (Zack <i>et al.</i> , 2009); (c) are offered career advancement opportunities (MP3) (Wong & Aspinwall, 2005).
Innovations introduced by the company	In the last two years, has your company introduced: (a) any improvements or adaptations to existing products/services? (incremental product/service innovation – IPSI); (b) any new products/services to the market? (radical product/service innovation – RPSI); (c) any improvements or adaptations to existing processes? (incremental process innovation – IPI); (d) any new processes? (radical process innovation – RPI); Adapted from: Oke <i>et al.</i> , 2007.

Research results

Managers knowing KM concept (LS1) clearly support the innovativeness of their firms. As can be seen in Table 3, for three out of four aspects of innovation activity, knowledge of KM concept among managers is linked with introducing innovations. This is particularly visible in case of incremental innovations, both with regard to products or services and processes. More than 90 % of managers knowing the concept of KM claim that incremental innovations of both types are introduced in their companies.

Table 3

Managers knowing the KM concept (LS1) and KIBS innovativeness

CSF name: LS1	Type of innovation:		
	Incremental product/service innovation		
	No	Yes	Total
No	33 %	67 %	100 %
Yes	6 %	94 %	100 %
p-value = 0.001			
CSF name: LS1	Type of innovation:		
	Radical product/service innovation		
	No	Yes	Total
No	58 %	42 %	100 %
Yes	32 %	68 %	100 %
p-value = 0.014			
CSF name: LS1	Type of innovation:		
	Incremental process innovation		
	No	Yes	Total
No	24 %	76 %	100 %
Yes	6 %	94 %	100 %
p-value = 0.012			

For obvious reasons, radical innovations are not as frequent as incremental ones. However, knowledge of the KM concept among managers turns to be a factor that facilitates this type of innovations regarding products or services offered by examined companies. This can also be seen in Table 4.

The link between managers knowing KM concept and the introduction of new processes has also been examined, but the results obtained in this study lacked statistical significance. Managers encouraging knowledge creation, sharing and use (LS2) do not seem to have a profound influence on any of the examined aspects of innovativeness. There is only a weak link between radical product or service innovations and LS2 (significant at the 0,1 level). This is certainly surprising, as knowledge and the sharing of it is often reported as a preliminary condition for KM (Taminiau *et al.*, 2009; Zhou & Li, 2012). Managers giving time to employees when they need it (LS3) seem to be vital for improvements or adaptations to existing processes (significant at the 0,001 level) – see Table 4. For the other aspects of innovativeness, the link is not strong enough to yield statistical confirmation, even though in all these cases innovations seemed to be more prevalent in firms where employees are offered time and attention.

Table 4

Managers giving time to employees when they need it (LS3) and KIBS innovativeness

CSF name: LS3	Type of innovation:		
	Incremental process innovation		
	No	Yes	Total
No	42 %	58 %	100 %
Yes	8 %	92 %	100 %
p-value = 0,001			

Rewarding the sharing and use of knowledge (MP1) is the least important measure of CSFs analyzed in our research. There is no statistically significant relationship between this measure and any of the four aspects of firm innovativeness. However, it should be noted that for all the aspects the results are quite favourable: there seem to be more innovations in firms rewarding sharing and using knowledge.

Valuing employees for what they know (MP2) is closely related to the introduction of new products or services (significant at the 0,025 level), as it is shown in Table 5. For incremental product/service innovations and radical process innovations, the postulated relationship with this measure of CSFs can also be observed, but it is statistically insignificant. Surprisingly, valuing employees for their knowledge seems to result in decreasing the likelihood of incremental process innovations. This relationship, however, lacks statistical confirmation.

Table 5

Valuing employees for what they know (MP2) and KIBS innovativeness

CSF name: MP2	Type of innovation:		
	Radical product/service innovation		
	No	Yes	Total
No	67 %	33 %	100 %
Yes	36 %	64 %	100 %
p-value = 0,025			

The last measure of CSFs analysed, i.e. career advancement opportunities (MP3), shows that there is quite a strong relationship between these opportunities and innovativeness. A statistical significance of this relationship can be found for both examined aspects of incremental innovativeness – see Table 6.

Table 6

Offering employees career advancement opportunities (MP3) and KIBS innovativeness

CSF name: MP3	Type of innovation:		
	Incremental product/service innovation		
	No	Yes	Total
No	31 %	69 %	100 %
Yes	8 %	92 %	100 %
p-value = 0,003			
CSF name: MP3	Incremental process innovation		
	No	Yes	Total
No	25 %	75 %	100 %
Yes	6 %	94 %	100 %
p-value = 0,009			

In general, our research findings show that companies with stronger leadership and support from the management and which employ motivational practices are more innovative than their competitors. More specifically, we were able to observe that for companies' innovativeness the most important measures of CSFs are LS1, affecting three aspects of innovativeness, and MP3, affecting two of them. The analysed CSFs measures facilitate mostly incremental innovations, especially those related to processes. Radical process innovations, even though they are relatively popular in our sample, seem not to be dependent on any of the examined CSFs measures.

The data seem to support four out of six our hypotheses. The exceptions are H1b and H2a, for which we lack statistical confirmation for all four aspects of innovation activity. However, even in those two cases the data were in fact consistent with the postulated relations.

Our study is a preliminary one and is therefore not free from some obvious limitations. One of these originates from the fact that all the companies examined were located in just one region of Poland – the Pomeranian region. Thus, the results obtained here should not be generalized over the whole population of Polish companies or – especially – over companies in other countries. The second limitation results from a relatively small effective sample size. Despite trying to reach 400 companies, we were only able to collect 96 valid questionnaires. Bearing in mind that CSFs are not *sine qua non* conditions for innovativeness, a bigger sample would be required to investigate the statistical significance of the relationships between CSFs and company innovativeness. In our research, we can clearly see a positive influence of CSFs on innovativeness, but due to the small sample size in many cases we lack statistical confirmation – see Table 7.

Table 7

Relations between CSFs and the examined aspects of innovativeness

Hypothesis:		IPSI	RPSI	IPi	RPI
H1a	LS1	+**	+*	+*	+
H1b	LS2	+	+	+	+
H1c	LS3	+	+	+**	+
H2a	MP1	+	+	+	+
H2b	MP2	+	+*	-	+
H2c	MP3	+*	+	+**	+

- +) relation in accordance with hypothesis;
-) relation contradictory to hypothesis;
- **) significant at the 0,01 level;
- *) significant at the 0,05 level.

Another shortcoming of our study is the use of self-reported data. This kind of data should always be handled with care, as it is potentially biased by the subjective opinions of the respondents (Podsakoff, 2003).

Conclusions

In this article we have found that both analysed KM critical success factors influence the innovativeness of KIBS. For the first – leadership and support by the management, which is ranked as the most important CSF by (Wong & Aspinwall, 2005) – two out of three measures influence at least one type of innovation generated in the companies analysed in a statistically significant manner.

The second CSF examined – motivational practices – was ranked as one of the least significant factors in the above-mentioned research (9th position out of 11). In our research this CSF also contributes to the innovativeness of the KIBS analysed, but again – one of its measures (rewarding employees for sharing and using knowledge) lacks confirmation of statistical significance.

Previous studies in the literature also confirm that KM is an innovation facilitator (Lee *et al.*, 2013, Ju *et al.*, 2006, Gloet & Terziovski, 2004). However, in most cases other studies concentrate on KM processes influencing

innovation, like, for example, knowledge acquisition, dissemination and responsiveness to knowledge (Darroch, 2005), organizational learning and knowledge integration (Ju *et al.*, 2006) and knowledge sharing (Taminiau *et al.*, 2009). According to the authors' best knowledge, the study presented in this article is the first to link KM critical success factors to the innovativeness of KIBS firms.

The relationships examined indicate the areas to which SME managers and owners should pay attention. Our results confirm that leadership and support by management, together with motivational practices, contribute to the innovativeness of SMEs in the KIBS sector. This has direct practical implications: attention should be given to these CSFs when introducing KM initiatives in such companies. Furthermore, the research contributes to the theory of knowledge management and innovativeness in SMEs in the KIBS sector – still a much unexplored topic. The article supports discussion of the critical success factors for introducing KM practices in

companies in the SMEs sector. The analysis presented in the article is focused on SMEs in the KIBS sector, but the investigation could be extended to other sectors as well. It would be interesting to compare the differences in the significance of CSFs and their influence on innovativeness between the KIBS sector and other less knowledge-intensive sectors. Moreover, further research possibilities would be analyses of the other CSFs indicated by (Wong & Aspinwall, 2005) and (Migdadi, 2009), not just the two examined in this article.

Acknowledgements

This study was performed within the research project “Knowledge management in small and medium enterprises (SMEs) offering knowledge-intensive business services”. The project was funded by the Polish National Science Centre on the basis of Decision No. DEC/2011/01/D/HS4/04111.

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The article has been reviewed.

Received in February, 2014; accepted in October, 2014.