Knowledge Management Systems in the Polish Private, State and Foreign Owned Companies

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Abstract

The importance of knowledge management for enterprises increased significantly in the recent years. In this paper one element of knowledge management will be considered, namely knowledge management systems (KMS). The main purpose of this paper is to compare the level of use of KMS between Polish private and state owned companies as well as foreign owned enterprises of different size. To measure intensity of use of particular KMS technologies research questionnaire has been created. The sample was selected from Kompass Poland database and more than 1200 questionnaires have been collected. Statistical analysis of differences between target sections was conducted by Mann-Whitney U test. Overall analysis of results showed that foreign owned companies feature greater intensity of use of KMS functions than Polish state owned and private owned enterprises. Detailed results indicated that small and medium Polish private companies utilize discussed systems to a far lesser extent. Nevertheless, large private companies feature higher intensity of use of 4 out of 5 examined KMS than large state owned enterprises.
Keywords: Knowledge Management Systems, KMS, Knowledge Based Economy, Knowledge Management.

1. Introduction

The role and influence of knowledge on the economic processes has changed fundamentally in the recent decades [30]. Liebowitz emphasizes that knowledge is currently, and probably will be in the future, the most valuable resource for companies [27]. These changes are in the literature often called new economy, knowledge economy, but in the recent years the most popular term became knowledge based economy (KBE). Brinkley [9] believes that the driver of KBE are sophisticated goods with high value added. The another characteristic of such Economy is constant change and uncertainty [33].

As a result companies need to put increased attention to their knowledge resources [21]. In the recent decades, many concepts have been developed that are supposed to help companies to make their knowledge processes more effective. One of them stands out – knowledge management (KM) [41]. Bencsik [7] in general considers mentioned concept as "…one of the most popular research areas…" [7]. Trninić, Durković and Raković [43] note that knowledge management is crucial for companies not only to develop innovations but even to secure their competitive position and ensure business survival. The most universal approach to the idea of knowledge management is perception of this concept as the union of processes, people and technology [24]. Similarly, knowledge based economy which to some extent is the reason of emergence of knowledge management is considered to be supported by four pillars: innovation, human capital, companies' dynamics and new technologies [22].

Due to the scope and complexity of knowledge management it is not possible to examine all aspects of the concept in one paper. This article concentrates on its last, but crucial element – information technologies that are used in companies to support knowledge management activities and are often called knowledge management systems (KMS) [35]. They constitute, very important element of "knowledge infrastructure" in companies. So that, the use of these technologies in particular companies is the basis of proper management of their knowledge resources. This article tries to explain, with use of empirical, quantitative data, whether the intensity of use of particular knowledge management systems in Polish companies differs depending on their ownership and size.

The reason of undertaking this particular topic is the fact that the efficiency of state owned and private owned companies is the subject of ongoing debate in Poland and other countries such as China [44] or Spain [4]. This article tries to bring small contribution to this debate. Taking into account the significance of knowledge management systems as the basis of knowledge processes, these technologies may constitute important element of competitive advantage of enterprises. Moreover, the comparison of this particular characteristic of private and state owned companies has not been carried out in the literature before.

Consequently, the purpose of this paper is to examine and compare the level of use of knowledge management systems in Polish private and state owned enterprises. In this article it is hypothesized that the ownership of companies along with their size influences their use of knowledge management systems. Although the paper concentrates on Polish companies, for the reference purpose foreign owned businesses were also examined.

The following section provides theoretical background concerning the issues touched in the article. The methodology section presents the details of KMS typology applied, the characteristics of the quantitative research and statistical tests employed. Research results section shows the outcome of empirical research. Conclusion summarizes the most important findings.

2. Literature review

The use of all sort of computer technologies in companies rapidly increased since the late 1980-ties [5]. Fast deployment of information and communication technologies enabled enterprises to increase efficiency and effectiveness of their business processes [3]. Koskinen and Pihlanto [23] emphasize that these technologies generally simplified knowledge flow in companies. Furthermore, many authors underline their role in development of the concept of knowledge management [15] [19] [42].

This article uses the term knowledge management system which means information technologies that support knowledge management processes in the enterprise. This definition is consistent with the dominant approach in the literature, although some authors adopt sociotechnological or social perspective [35] [25] [13]. Knowledge management systems are composed of various tools, with different functions [25]. Their importance and usefulness in terms of overall knowledge management activities in companies are subject of the extensive discussion in the literature.

Bansal, Chandwani [6] underline that advancement of information and communication technologies made knowledge management activities more effective. Trninić, Durković and Raković [43] consider various information technologies such as business intelligence systems, communication tools and content management tools as very helpful in the implementation of knowledge management strategy in organizations. Ribino et al. [34] emphasize that information technologies in case of knowledge management facilitates knowledge diffusion and increases the efficiency of teamwork. The importance of information systems has also been confirmed in the empirical research. The study of 162 firms in Spain proved that information technologies competency directly influences knowledge management processes. Moreover, the study confirmed that information technology competency also influences knowledge management indirectly. It facilitates the development of organizational structures of companies in the way that helps to expand their knowledge [28].

Nevertheless, the significance of information technologies is sometimes overestimated in the literature [14]. In many cases it is forgotten that they are only tools supporting particular knowledge management processes and they do not constitute and should not be identified with entire knowledge management activities undertaken in the enterprise. Moreover, overreliance on information technologies is often the reason of failure of KM projects in organizations [32]. Martinez [29] notices that companies' management staff often think that investments in knowledge management technologies simultaneously create proper culture in the enterprise which favors knowledge flow. Unfortunately, it is much more complex task. Liebowitz [27] even regards that 80 percent of knowledge management activities concern people and processes and only 20 percent refer to technology. Some authors even coin the opinions that knowledge is exclusive domain of humans [10]. Boughzala and Ermine [8] underline that information and communication technologies are powerful knowledge management tool provided that they are used in a proper way.

For example electronic communication tools are often useful, but in many cases they are not able to replace face to face meetings [18].

To conclude, in the literature there are many disputes concerning the role of information and communication technologies in knowledge management processes. Nevertheless, one should note that the great majority of criticism concerning the role of KMS in knowledge management processes concerns approaches that identify all processes in this matter with computer technologies. Most of authors agree that in the current economic conditions characterized by fast changes, KMS are not sufficient but necessary tool. They constitute crucial basis for knowledge management activities in every enterprise. Nevertheless, their extensive presence and operation does not ensure proper implementation of knowledge management processes but constitutes important "infrastructure" for them. This raises an interesting issue – how this "infrastructure" looks like in various types of companies.

As mentioned before, in the introduction, the effectiveness of private and state owned enterprises is the topic of ongoing debate in Poland, but also in other countries including, for example Spain [4] or China [44]. Taking into account the importance of knowledge management, and technologies supporting this concept, in the current economic conditions, this study has a chance to contribute some empirical evidence to this debate. The only studies, that investigate merely the general characteristics of knowledge management in enterprises according to various ownership forms have been conducted by Sheung, Canon [38] and Saiz Alvarez, Olalla Caballero [37] but mentioned authors concentrated only on family owned businesses. Another study exploring this topic, although in a very specific way, has been carried out in Turkey by Sahin and Ansal [36] amid "knowledge intensive businesses". These authors find that "…nature of ownership is strong determinant of using knowledge" in examined companies [36, p. 37]. The scope of this article is much narrower, but it concerns the very basic and crucial aspect of knowledge management, therefore it has a chance to thoroughly explain the particular, detailed problem.

3. Methodology

The primary challenge encountered while constructing the research questionnaire was creating simple, understandable for respondents, categorization of functions that may be provided by particular knowledge management systems. The difficulty resulted from substantial number of such technologies. There are various typologies of such utilities available in the literature. Their main disadvantage is their extension. Just to mention, in the year 2006 David Skyrme Associates indentified 80 categories of such tools [39]. Due to the fact that none of the typologies available in the literature was adequate for this particular quantitative research, new simple typology has been created (table 1). The main desirable characteristic of newly created division was simplicity. It was designed for quantitative research so it had to be quickly and easily understandable. Typology had to be also transparent for respondents which were managers that not necessarily were IT specialists. The created typology is based on those existing in the literature but concentrated on particular functions that IT tools might deliver. Nevertheless, these functions in the created typology, in some places,

might not be entirely separate due to simplicity which was the priority. Typology has also been consulted with computer scientists whose remarks were taken into account [40].

No.	***The types of Knowledge Management Systems***
1	*Basic computer systems* (Internet, e-mail, text editors, spreadsheets)
2	*Data storage systems* (e.g. systems that collect, provide access and manage documents and other data, CRM systems, data warehouses)
3	*Communication Systems* (e.g. corporate portals, intranet, corporate forums, newsgroup)
4	*Group cooperation systems (groupware/collaboration)* (comprehensive systems that support team work)
5	*Decision support systems, expert systems* (Business Intelligence, Executive Information Systems)

Table 1. Knowledge Management Systems typology.
Source: [40] on the basis of: [2], [16], [17], [20], [31].

Data for this paper have been obtained as part of the project financed by Polish National Science Center[1]. All questions in the survey questionnaire used 5-grade Likert scale. While constructing the research tool the main goal was to create as simple as possible instrument. This helped to receive relatively large number of filled questionnaires.

In order to examine all presented types of enterprises the quantitative research has been conducted. The sample of enterprises was selected from Kompass Poland database. The research has been conducted in Poland among enterprises operating in this country. It consisted of two stages. First, relied on Internet based questionnaire that used custom made electronic surveying system. Second stage of the research was conducted with the use of traditional – paper based questionnaire, due to the database

[1] The research has been financed by Polish National Science Center, Preludium 2 grant, no. 2011/03/N/HS4/00429.

license that allowed electronic dispatch of questionnaires to selected businesses only. The results of both stages were analyzed together.

Enterprise ownership form / *Enterprises' size*	*Private owned (Polish)*	*State owned (Polish)*	*Foreign owned*	*All*
All	1017	97	134	1248
Small enterprises (up to 49 employees)	734	37	70	841
Medium enterprises (between 50 and 249 employees)	237	42	39	318
Large enterprises (above 250 employees)	46	18	25	89

Table 2. The quantity of enterprises in each group.
Source: own study.

In the research more than 1200 filled questionnaires have been received, but some were eliminated due to incompleteness or the fact, that businesses were outside the area of interest of this study. Finally, 1248 entities have been taken into account and studied in this research. The exact number of enterprises in each group has been presented in the table 2. The research has taken place in the second and third quarter of year 2012 and at the beginning of year 2013.

Among many methods of quantitative analysis, adequate for collected data had to be selected. Intensity of use in the questionnaire was measured with ordinal scale, however the aim of analysis was to measure difference between two independent groups. Moreover the choice was limited to non-parametric tests because the distribution of analyzed variable was not similar to normal. Taking into account all constraints, to compare the intensity of use of particular knowledge sources in above mentioned types of enterprises, Mann-Whitney U test has been used. This test is described in the most of statistical handbooks and it belongs to the group of non-parametric, statistical tests [11] [26], thus no assumptions concerning distribution are required.

The Mann-Whitney U test checks whether two populations (groups) have identical distribution. The null and alternative hypotheses for this test are as follows:

- H_0: the means of two population are identical,
- H_1: the means of two population are not identical.

To compute test statistic U we need to rank all observations (combined two populations) from smallest to largest. In case of tie, the average rank of the tied observations is assigned. Then ranks within population are summed. Based on mentioned sums U statistic is computed. After standardization we get a z-value which can be compared to normal approximation [1].

In the next step we have to choose significance level – α. In the article three levels of α are considered: α=0.01, α=0.05 and α=0.1. Significance level is inherently connected with p-value, the lowest significance level at which the null hypothesis can be accepted. Based on these two values: α level and p-value, the decision about the acceptance or rejection of null hypothesis is made. P-value lesser than alpha means that there is a basis to reject null hypothesis. In such case two compared groups are considered as statistically significantly differ [12].

Depending on the assumed significance level we can distinguish three stages of rejection null hypothesis that have been used in the article:

- p-value < 0.01 – very strong presumption against null hypothesis (***),
- p-value < 0.05 – strong presumption against null hypothesis (**),
- p-value < 0.1 – low presumption against null hypothesis (*).

4. Findings

The research results are presented in the four parts. First of them shows the overall comparison of three examined types of companies: Polish private owned, Polish state owned and foreign owned. The remaining three parts present more detailed perspective, under them companies of the same size are compared. The size of firms is determined by their employment. In this respect, three types of enterprises have been applied:

- small enterprises (up to 49 employees),
- medium enterprises (between 50 and 249 employees),
- large enterprises (above 250 employees).

4.1. General comparison

Table 3 presents the intensity of use of particular KMS technologies in three diverse kinds of companies with different ownership types. It can be seen that the more advanced KMS function the lower its average level of utilization by particular types of enterprises.

In general, as we may conclude from the mentioned table, foreign owned businesses characterize with the highest intensity of use of all examined technologies. Among featured categories, one of them stands out – basic computer systems. The difference is that it is generally extensively utilized by all distinguished groups of

businesses. Nevertheless, foreign owned companies exploit even basic systems significantly more intensively than Polish firms.

Among Polish businesses, state owned companies feature the highest level of use of studied technologies. Nevertheless, the differences between foreign owned and Polish state owned enterprises in two categories: 'computer communication systems' and 'decision support systems, expert systems' are very small. The least intensive use of KMS characterize Polish private owned companies. The intensity of their activities in the studied matter is very low, particularly in terms of advanced technologies – such as communication, comprehensive cooperation and decision support systems. Moreover, one may note that Polish state owned companies in case of KMS are more similar to foreign owned businesses than to their Polish private owned counterparts.

Knowledge Management System / *Enterprises' ownership form*	*Basic computer systems*	*Data storage systems*	*Computer communication systems*	*Comprehensive group cooperation systems (groupware/ collaboration)*	*Decision support systems, expert systems*
Private owned *(Polish)*	4.42	3.33	2.64	2.14	1.74
State owned *(Polish)*	4.45	3.62	3.12	2.31	2.09
Foreign owned	4.77	3.85	3.14	2.49	2.10

Table 3. The intensity of use of particular elements of knowledge management systems in private, state and foreign owned enterprises.
Source: own study.

Table 4 reveals much more detailed comparison of usage intensity of particular KMS functions in featured types of companies. It also shows statistical significance of each difference. One may note that between foreign and Polish state owned firms exists only one statistically significant disparity. On the other hand the comparison of Polish private owned and foreign owned businesses reveals considerable and statistically significant differences in case of all featured KMS functions. The collation of Polish state owned and Polish private owned companies shows statistically significant differences in most of categories. The exception are basic computer systems and comprehensive group cooperation systems.

The data presented up to this point show relatively general picture of the issue. The following analyses will be more detailed as they take into account the size of the enterprises. Companies with similar levels of employment will be compared.

Knowledge Management System / *Difference, statistical significance*	*Basic computer systems*	*Data storage systems*	*Computer communication systems*	*Comprehensive group cooperation systems (groupware/ collaboration)*	*Decision support systems, expert systems*
State owned – private owned					
Difference (state owned – private owned)	0.03	**0.29**	**0.48**	0.17	**0.35**
Statistical significance	0.613	**0.012****	**0.001*****	0.159	**0.001*****
Foreign owned – state owned					
Difference (foreign owned – state owned)	**0.32**	0.23	0.02	0.18	0.01
Statistical significance	**0.000***	0.169	0.913	0.382	0.785
Foreign owned – private owned					
Difference (foreign owned – private owned)	**0.35**	**0.52**	**0.50**	**0.35**	**0.36**
Statistical significance	**0.000*****	**0.000*****	**0.000*****	**0.006*****	**0.001*****

Table 4. The statistical significance of differences of use intensity between particular elements of knowledge management systems in private, state and foreign owned enterprises[2].
Source: own study.

4.2. Small enterprises (up to 49 employees)

Table 5 presents the collation of intensity of KMS in small enterprises – up to 49 employees. These businesses feature, on average, less intensive usage of examined technologies in comparison to those presented in previous, general analysis. The sort of outcomes that has been received is understandable as such businesses normally possess less financial resources than other, larger companies. Moreover, their

[2] *p<0.1, **p<0.05, ***p<0.01.

knowledge management processes due to fewer employment are less complicated and do not require as many technologies.

The interesting aspect in presented results is that in case of small enterprises Polish state owned firms more intensively than foreign owned businesses utilize two types of knowledge management systems – communication systems and decision support systems. Only in the case of small enterprises, the type of Polish enterprises utilizes some of KMS more extensively than foreign owned businesses. Nevertheless, the use of the remaining three categories by foreign owned companies even among small companies is still higher than among Polish private and state owned businesses.

Knowledge Management System / *Enterprises' ownership form, scope of operation, statistical significance*		*Basic computer systems*	*Data storage systems*	*Computer communication Systems*	*Comprehensive group cooperation systems (groupware/ collaboration)*	*Decision support systems, expert systems*
Private owned *(Polish)*	*Small enterprises (up to 49 employees)*	4.39	3.18	2.57	2.05	1.64
State owned *(Polish)*		4.51	3.59	2.95	2.30	2.11
Foreign owned		4.86	3.94	2.81	2.37	1.87

Table 5. The intensity of use of particular elements of knowledge management systems in small private, state and foreign owned enterprises.
Source: own study.

The more detailed statistical analysis of knowledge management systems usage by small enterprises has been presented in the table 6. One may note that basic computer technologies are, in general, more intensively used by all types of enterprises. Nevertheless, there are statistically significant differences in their use between Polish companies (both state and private owned) and foreign owned enterprises. That is the only statistically significant difference between state and foreign owned enterprises.

However, it should be noted, that there are many statistically significant disparities between private owned and remaining groups of firms. It proves that intensity of use of KMS in private owned companies is on average substantially lower than in Polish state owned and foreign owned enterprises.

Knowledge Management System / *Difference, statistical significance*	*Basic computer systems*	*Data storage systems*	*Computer communication systems*	*Comprehensive group cooperation systems (groupware/ collaboration)*	*Decision support systems, expert systems*
State owned – private owned *Small enterprises (up to 49 employees)*					
Difference (state owned – private owned)	0.12	**0.41**	**0.38**	0.25	**0.47**
Statistical significance	0.302	**0.041****	**0.094***	0.175	**0.002*****
Foreign owned – state owned *Small enterprises (up to 49 employees)*					
Difference (foreign owned – state owned)	**0.35**	0.35	-0.14	0.07	-0.24
Statistical significance	**0.003*****	0.279	0.610	0.887	0.189
Foreign owned – private owned *Small enterprises (up to 49 employees)*					
Difference (foreign owned – private owned)	**0.47**	**0.76**	0.24	**0.32**	**0.23**
Statistical significance	**0.000*****	**0.000*****	0.138	**0.051***	**0.074***

Table 6. The statistical significance of differences of use intensity between particular elements of knowledge management systems in small private, state and foreign owned enterprises. Source: own study.

4.3. Medium enterprises (between 50 and 249 employees)

Medium size companies employ between 50 and 249 people. They are considerably bigger organizations than small companies. The cooperation of employees in such entities and knowledge management processes are much more difficult. That is why, as empirical results confirm, these companies on average more often rely on advanced KMS such us 'comprehensive group cooperation systems' and 'decision support and expert systems'.

In terms of comparison of medium size companies with particular ownership forms in the field of KMS use, these businesses are much more similar to each other than small and large firms. The differences in the intensity of use of distinguished technologies in examined companies, with one exception, are generally small.

Knowledge Management System / *Enterprises' ownership form, scope of operation, statistical significance*		*Basic computer systems*	*Data storage systems*	*Computer communication systems*	*Comprehensive group cooperation systems (groupware/ collaboration)*	*Decision support systems, expert systems*
Private owned *(Polish)*	*Medium enterprises (between 50 and 249 employees)*	4.44	3.61	2.80	2.38	1.98
State owned *(Polish)*		4.50	3.62	3.24	2.40	2.10
Foreign owned		4.62	3.74	3.44	2.59	2.33

Table 7. The intensity of use of particular elements of knowledge management systems in medium private, state and foreign owned enterprises.
Source: own study.

Knowledge Management System / *Difference, statistical significance*	*Basic computer systems*	*Data storage systems*	*Computer communication systems*	*Comprehensive group cooperation systems (groupware/ collaboration)*	*Decision support systems, expert systems*
State owned – private owned *Medium enterprises (between 50 and 249 employees)*					
Difference (state owned – private owned)	0.06	0.01	**0.44**	0.02	0.12
Statistical significance	0.640	0.593	**0.065***	0.913	0.441
Foreign owned – state owned *Medium enterprises (between 50 and 249 employees)*					
Difference (foreign owned – state owned)	0.12	0.12	0.20	0.19	0.23
Statistical significance	0.529	0.636	0.512	0.526	0.489
Foreign owned – private owned *Medium enterprises (between 50 and 249 employees)*					
Difference (foreign owned – private owned)	0.18	0.13	**0.64**	0.21	0.35
Statistical significance	0.208	0.263	**0.004*****	0.336	0.127

Table 8. The statistical significance of differences of use intensity between particular elements of knowledge management systems in medium private, state and foreign owned enterprises.
Source: own study.

Statistical tests that have been performed by authors show that there are only statistically significant differences in terms of 'computer communication systems'. One may note that Polish private companies utilize these systems to a far lesser extent. They are considerably more often used by Polish state and foreign owned businesses. In other cases, the differences were not large enough to be considered as statistically significant.

4.4. Large enterprises (above 250 employees)

Large enterprises are entities that employ more than 250 employees. Such businesses in order to ensure proper knowledge management require the most extensive KMS. The collected empirical data confirm that Polish private and foreign owned companies of this size, on average, more intensively use particularly advanced KMS in comparison to medium and small businesses of the same ownership type.

Knowledge Management System / *Enterprises' ownership form, scope of operation, statistical significance*		*Basic computer systems*	*Data storage systems*	*Computer communication systems*	*Comprehensive group cooperation systems (groupware/ collaboration)*	*Decision support systems, expert systems*
Private owned *(Polish)*	*Large enterprises (above 250 employees)*	4.67	4.13	3.02	2.37	2.11
State owned *(Polish)*		4.22	3.67	3.22	2.11	2.06
Foreign owned		4.76	3.76	3.60	2.68	2.36

Table 9. The intensity of use of particular elements of knowledge management systems in large private, state and foreign owned enterprises.
Source: own study.

Unexpected results have been received in the case of Polish state owned companies (table 9). Empirical data show that the use of almost all KMS by large Polish state owned companies is less intensive than in case of medium companies of the same ownership type. Moreover, in case of 3 out of 5 examined KMS even small Polish state businesses utilize them more intensively. In all previous comparisons Polish state owned companies on average characterized with higher intensity of KMS use than Polish private businesses. In case of large firms the results are very different – the latter use almost all types of examined KMS more intensively. The results of large Polish private and state (table 9) are particularly interesting when we collate it with results of their small counterparts (table 5). In case of small enterprises the comparison of KMS use intensity was strongly in favor of state enterprises.

The another interesting fact revealed by the study is that the use of KMS in small, medium and large Polish state owned companies does not differ to a large extent. The differences in case of Polish private and foreign owned companies are greater and in general there is a rule – the larger the company, the more intensive use of KMS. Nevertheless, this rule is not applicable to Polish state owned firms.

Knowledge Management System / *Difference, statistical significance*	*Basic computer systems*	*Data storage systems*	*Computer communication systems*	*Comprehensive group cooperation systems (groupware/ collaboration)*	*Decision support systems, expert systems*
State owned – private owned *Large enterprises (above 250 employees)*					
Difference (state owned – private owned)	**-0.45**	-0.46	0.20	-0.26	-0.05
Statistical significance	**0.025****	0.121	0.545	0.467	0.770
Foreign owned – state owned *Large enterprises (above 250 employees)*					
Difference (foreign owned – state owned)	**0.54**	0.09	0.38	0.57	0.30
Statistical significance	**0.018****	0.538	0.292	0.280	0.488
Foreign owned – private owned *Large enterprises (above 250 employees)*					
Difference (foreign owned – private owned)	0.09	-0.37	**0.58**	0.31	0.25
Statistical significance	0.656	0.407	**0.078***	0.447	0.530

Table 10. The statistical significance of differences of use intensity between particular elements of knowledge management systems in medium private, state and foreign owned enterprises.
Source: own study.

Table 10 shows the differences and their statistical significance among large companies with different ownership. The results reveal that despite the existence of rather considerable differences that can be observed in some places not so many of them are statistically significant. One of them is particularly low difference in use of basic computer systems by state owned companies. Private owned businesses on the other hand to a lesser extent than other large firms use computer communication systems. Nevertheless, in this respect, only the difference between private owned and foreign owned companies is statistically significant.

5. Conclusion

The results show that the basic computer technologies are intensively used by the vast majority of examined companies. Data storage systems and communication technologies are also utilized in many enterprises, although much less intensively. The last two and most advanced functions of KMS: comprehensive group cooperation systems and decision support and expert systems are applied by sparse elite of businesses, which consists of rather large companies.

The results show, in general, that Polish companies – private and state owned – on average use KMS rather less intensively than foreign owned companies. Nevertheless, the general comparison shows that Polish state owned companies characterize with only slightly less intense use of examined technologies than foreign owned businesses. However, one need to emphasize that the overall comparison shows only generic picture. The collation of companies of particular sizes – small, medium and large – brings much more interesting conclusions.

It should be noted that among small companies there are considerable differences between level of KMS use between Polish private owned companies and other businesses. The use of examined technologies by mentioned enterprises is very low. However, private owned companies demonstrate considerably higher intensity of KMS when we take into account larger entities. There are relatively even differences among all categories of examined technologies between small and medium, as well as medium and large private owned companies. Among large, private owned companies the intensity of use of some technologies is even higher than amid foreign owned businesses. Still, the most interesting findings relate to Polish state owned companies.

In case of state owned enterprises there are no considerable differences between use of KMS among small, medium and large companies. These entities, regardless of the size utilize examined technologies in the similar extent. Moreover, the differences between them that exist do not fit logical scheme observed among private owned companies – the bigger the enterprises are, the more intensive is their use of KMS. Quantitative data reveal that the use of almost all examined technologies by large state owned companies is less intensive than among medium size companies of the same ownership type. Furthermore, 3 out of 5 studied technologies are even more intensively used by small Polish state owned companies than their large counterparts.

6. Practical implications and future research

Knowledge resource is currently key element in forming competitive advantage of any company and it must be managed well. Today it is difficult to do it effectively without appropriate systems. Therefore, the results of the article indicate that Polish companies should concentrate more on KMS if they wish to compete with foreign owned businesses. This relates in particular to Polish small and medium, private owned firms. For example the level of use of computer communication systems in the Polish medium, private owned firms is considerably lower in comparison to other examined types of companies. Such entities are quite big (50-249 employees), so that

it is difficult for them to form competitive advantage in the current knowledge based economy without efficient electronic communication tools that enable smooth flow of knowledge inside organization. The use of KMS should also be enhanced in large Polish, state owned companies (250 employees or more). These entities are the most difficult to reform. Nevertheless, they also are the most in need of examined technologies to be competitive due to their size.

Analogous research should be performed in other states, but one may expect to receive similar results in countries comparable to Poland such as Hungary, Czech Republic or Turkey. Moreover, future research should also concentrate on detailed examining the influence of KMS on competitive advantage of particular types of companies. The influence of knowledge management on competitiveness of firms widely recognized in the literature, but the influence of its particular elements such as KMS on particular types of companies should be analyzed in more detail. The further research should also focus on the analysis of described phenomenon in companies operating in various industries. This would allow identification of sectors in which special emphasis on the use of knowledge management systems exists. Such analysis would certainly provide a number of interesting conclusions.

7. Limitations

The presented study characterized by certain limitations. They concern mainly the method of data collection and the data itself. Firstly, a simple questionnaire was created based on questions measured on a five-options Likert scale. Thanks to such design survey was easily understood by respondents. However, due to the fact that it provides 5 different answers it is hard to definitely say whether the space between each choice is the same in all cases. It is also difficult to measure the true respondent attitude. Moreover, it happens that respondents avoid selecting extreme values.

Another complaint may concern sample selection. Kompass database of businesses was used, which is not perfect database of active companies in Poland. Moreover, the aim of the study was to find some general patterns of behavior of companies. It was assumed that these patterns exist regardless of the sector in which companies operate. However, it may happen that in a certain group of companies use of knowledge management systems may be more or less intensive than in other.

Another very important limitation is the small representation of companies in some of the analyzed groups. In particular cases, it can greatly affect on the results.

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