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Knowledge management approaches of small and medium-sized firms: a cluster analysis

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ABSTRACT

Purpose. The paper aims to categorize the approaches to Knowledge Management (KM) by companies. In the literature, there is no consensus on a universal or “best” approach to KM. Especially, the paper singles out and discusses the variegated features that characterize the implementation of KM by small and medium-sized enterprises (SMEs) having different characteristics.

Design/methodology/approach. A cluster analysis was employed to detect the possible distinct traits of companies that have different approaches to KM. The unit of analysis is represented by small and medium sized Knowledge Intensive Business Services (KIBS) firms. Data were collected by means of an extensive survey of 223 companies in different European countries and sectors.

Findings. Three clusters were identified: a) companies showing a relative “unconscious” attention to KM and implementing KM practices without particular awareness; b) companies adopting a more conscious approach, and using a significant number of KM practices; c) companies with a marginal propensity towards KM.

Research limitations/implications. The study considers only KIBS, and future research should include other economic sectors. In addition, a convenience sample was used.

Practical implications. The paper improves awareness of managers of small companies concerning different KM approaches that can be adopted. It highlights that a conscious adoption of a KM strategy involves the introduction of a set of consistent practices.

Originality/value. The topic of KM approaches by small companies is still underdeveloped in the literature. Also, the paper proposes a multi-contextual investigation, that makes it possible to highlight the transversality of KM approaches across different countries or sectors.

Article Classification: Research Paper

Keywords: Knowledge Management, SMEs, KIBS, Strategic adoption, Cluster analysis

1. Introduction

The challenges of today’s economy imply a redefinition of companies and their relationships with clients, suppliers and business partners. Facing the dynamics of innovation and markets requires that organizations exchange knowledge effectively, both internally and with external entities. On the other hand, exploiting and protecting the competencies developed internally is, as well, crucial. All this means that companies need to approach Knowledge Management (KM) appropriately. This is crucial in the case of knowledge-intensive small and medium enterprises (SMEs), where

tangible resources are scarcer in comparison to the bigger companies, and are more concerned with learning than accountability (Gronum et al., 2012)

However, after more than two decades of research in KM, there is no consensus among scholars or practitioners on a universal or “best” approach to KM for all organisations, especially in the case of the smaller companies (Greiner et al., 2007). Therefore, there is still the need to achieve better understanding on this point and, particularly, to single out different possible KM approaches and their traits.

This study addresses this issue with reference to small and medium-sized enterprises (SMEs) because research about KM in SMEs is relatively scarce (Centobelli et al., 2017) and does not provide ultimate results (Durst and Edvardsson, 2012; Massaro et al., 2016). This literature shows that there are some common views of how SMEs implement KM: they are often considered to be less advanced in dealing with KM, to lack formal KM strategies, and to place more emphasis on tacit knowledge. However, all these arguments need to be confirmed by appropriate empirical research.

In order to improve our understanding about this issue, the study aimed to single out recurring approaches to KM by SMEs, their distinctive traits, and possible connections with structural characteristics of companies. A cluster analysis was performed to examine the specific features that characterize small companies in their planning, implementation, and use of KM. The unit of analysis is represented by small and medium-sized KIBS (Knowledge-Intensive Business Services) firms, which constitute an increasingly important sector of today's economy and appear to be a particularly relevant object of analysis here. Their competitiveness, indeed, is substantially based on their cognitive assets and their KM processes (Palacios-Marques et al., 2011; Miles et al., 2018; Strambach, 2010).

The data used in the cluster analysis were collected by means of an extensive survey of more than 200 companies located in 4 different European countries (Italy, Poland, Romania, Spain) and operating in different KIBS sectors. A structured questionnaire was submitted to key informants of these companies, with questions about origin, restraints, promoters, scope, universality, formality, adaptability of the KM practices carried out. Responses were collected between 11.2016 and 10.2017.

The cluster analysis made it possible to single out three different groups of companies in relation to their KM approach: they have been labelled as “Conscious adopters”, “Unconscious adopter” and “Marginal adopters”. This suggests that SMEs cannot be considered as a homogeneous sector as regards KM. Furthermore, contrary to what may be expected, structural characteristics (such as e.g. sector, size, age) do not seem to exert any notable influence on the KM approach adopted by a company.

2. Background

In recent decades, KM has been an important innovation in management (Inkinen et al., 2015). Indeed, effective KM can bring potential benefits such as: better communication, improved customer service, faster response time, enhanced innovativeness, greater efficiency of processes and procedures, and reduced risk of loss of critical capabilities (Wong and Aspinwall, 2005; Handzic, 2004; Edvardsson and Durst, 2013). KM initiatives can also lead to skill increase and staff retention (Migdadi, 2009; Wei et al., 2011), can have a positive influence on human capital, bring about business opportunities, and facilitate new product development (Edvardsson and Oskarsson, 2013). However, there is still no consensus among scholars or practitioners on a universal or “best” approach to KM that can fit all organisations: different ways to approach KM have been identified in the single context of application (e.g. Choi

and Lee, 2003; Hansen *et al.*, 1999; Leidner *et al.*, 2006; von Krogh *et al.*, 2001). Furthermore, while KM has been often considered to be a deliberate activity based on formal plans, predefined processes, and explicit resource allocation (Razmerita *et al.*, 2016), some studies (Van den Hoff and Huysman, 2009; Zięba *et al.*, 2016) show that informality and occasional problem-driven solutions may prevail. Therefore, there is still the need to achieve better understanding of this issue and, particularly, to investigate the different possible KM approaches that companies can adopt.

KM practices are gaining more and more attention not only in large but also in small companies (Tunc Bozbura, 2007; Wei *et al.*, 2011). For SMEs, the implementation of KM initiatives may be even more crucial (Dotsika and Patrick, 2013; Desouza and Awazu, 2006), as knowledge can be their key resource for growth (Salojärvi *et al.*, 2005). However, according to recent literature reviews, the studies that examine KM in the context of small businesses are still insufficient (Durst and Edvardsson, 2012; Ribièrè and Walter, 2013), and offer fragmented insights (Massaro *et al.*, 2016; Durst and Bruns, 2018). Hence, there are several themes that deserve to be addressed: for example, there is the need for cross-country comparisons (Durst and Edvardsson, 2012; Massaro *et al.*, 2016), for empirical investigations that consider SME heterogeneity (Durst and Bruns, 2018), and also for studies questioning consolidated views (Massaro *et al.*, 2016).

Smaller firms have some unique features (e.g. limited financial and human resources, centralized management, focus on day-to-day operations, short term strategy) that deeply influence the way they operate (Torrés and Julien, 2005) and can potentially constrain their propensity to introduce KM practices. Their managers may not be prepared to invest their limited resources in KM initiatives, which may have relatively long term goals and whose added value can be difficult to assess in advance (Nunes *et al.*, 2006). Conversely, SMEs possess some peculiar organizational features (i.e. a flat and flexible structure, an informal management style, and, often, a high innovation potential; Hudson *et al.*, 2001) that might, in principle, stimulate and support knowledge-sharing processes.

Many studies (Nunes *et al.*, 2006; Hutchinson and Quintas, 2008; Edvardsson, 2006; Wong and Aspinwall, 2004) show that, when KM practices are used in a small company, this is mainly done in an informal way, without explicit plans or purposely designed ICT systems (Wee and Chua, 2013). Still, according to Coyte *et al.* (2012), even when a formally documented and deliberately labelled KM strategy is missing, the management of knowledge resources is somewhat governed by an informally managed organizational strategy. Indeed, many small companies end up using KM on an operational level (i.e. at the level of specific daily problems that employees must face) and, hence, they might not even recognize their practices as KM (Salojärvi *et al.* 2005). However, while many authors underline the informal and unplanned nature of KM in small companies, recent studies (Bolisani *et al.*, 2016) also show that this is not always the case.

To sum up, the question on whether and how small firms introduce KM and what are the characteristics of their approach to KM is open, and further studies are needed. This paper contributes to filling this gap through the investigation of the KM approaches of small KIBS companies. The term KIBS denotes private companies whose job consists of collecting, generating, analysing, and distributing knowledge with the purpose to develop customised services to business clients (Miles 2005). These companies are characterised by three key knowledge-related features (Muller and Doloreux 2009; Strambach 2010): a) knowledge is not only their key production factor, but also the kind of “good” they sell; b) the provision of their services requires an in-depth interaction between supplier and client, who are both involved in mutual, cumulative learning processes; and c) they all perform an activity of consulting, under

the form of a problem solving process where they adapt their expertise and knowledge to the specific requirements of the individual client firm.

Particularly, this study investigated the KM approaches of small KIBS companies located in four European countries and operating in different sectors. Three reasons justify this choice. First, KIBS competitiveness is likely to be based on an effective use of KM practices (Palacios-Marques et al. 2011; Lara et al. 2012; Mangiarotti, 2012), because knowledge is their key factor. Second, the KIBS sector is mostly composed of small businesses (Miles et al., 2018), and this is the target of our analysis. Third, by using an internationally-wide and multisector sample, the study responds to the previously recalled lack of cross-country comparisons, and is also based on a potentially more heterogeneous sample of companies (Durst and Edvardsson, 2012).

3. Research questions and method

Small and medium-sized European companies (SMEs) are weak and in many cases lack the resources that large companies have for knowledge-sharing and networking (Bolisani and Scarso, 2016; Civre and Gomezelj Omerzel, 2015; Jordão and Novas, 2017). Therefore, based on what has been illustrated in the previous section, an exploratory research is important to address the following research questions:

Based on what has been illustrated in the previous section, an exploratory research was conducted with the purpose to address the following research questions:

RQ1: Is it possible to identify some recurring KM approaches adopted by SMEs?

RQ2: What are the main characteristics of these approaches?

RQ3: Do companies following the same approach share some structural traits?

Exploratory research was considered suitable for the purpose of the study, because the investigated issue had not been sufficiently explored and there was the need to gather preliminary information to define problems and suggest hypotheses (Shields and Rangarajan, 2013). In particular, a survey and a cluster analysis were conducted in order to explore the possible existence of groups of companies sharing a common approach to KM (Ketchen, and Shook, 1996; Ketchen et al., 2008).

Given the aims of the investigation, a convenience sample was used. Despite its limitations, this is a widely adopted method in social research, and it is particularly recommended in the case of exploratory studies (Leiner, 2017). In detail, a “convenience pool” was used: respondents were from many convenience samples (equal to the number of sectors by the number of countries) in a respondent pool, which allowed to overcome one of the most critical biases of this method - the sample’s homogeneity (Leiner, 2017).

The survey was conducted between November 2016 and October 2017 and involved micro, small, and medium-sized KIBS firms located in the four European countries of the research group’s members: Italy, Poland, Romania and Spain. The initial sample consisted of 223 firms belonging to five main KIBS sub-sectors, namely: ICT services, technical services, professional services, marketing and communication services, R&D services (plus a residual “other” field for additional minor areas).

Companies were contacted based on direct and personal acquaintance of researchers, or by using generic databases. Different contact methods were used (by phone, by email, and also direct) to meet the preferences of respondents: these were owners (25,7% of the contacted companies), executives (18,9%), managers (18,9%) or prominent

professionals (36,5%). In any case, an assessment of their importance in the company, at least for the goal of the research, was also undertaken, based on secondary data and indirect knowledge.

The survey made use of a questionnaire, compiled by drawing inspiration from previous empirical studies of the categories of KM planning approaches followed by small companies (Bolisani *et al.*, 2015; Zięba *et al.*, 2016). In particular, the questionnaire included 22 questions divided into different topics, that investigated: companies' knowledge strategies; practices used to manage knowledge; reasons, promoters and barriers to their introduction; role of ICT applications; levels of formalization, voluntarism, adaptability, integration of KM practices with other tools and methods; diffusion across the company of the introduced practices; and, lastly, companies' level of familiarity with KM concepts and applications. For lack of space, the complete questionnaire can't be reported. However, the tables that illustrate the findings include the variables used in the cluster analysis, which correspond to the questions used in the survey. Further details are also provided in the next section.

After the collection of the responses, the dataset was checked for congruity and integrity, by eliminating mistakes and incomplete records, and then coded for statistical elaboration with SPSS 18. To avoid inconsistent answers (especially in the case of smaller firms), most of the micro-sized companies were eliminated, and the analysis took into account only firms with more than 4 employees. This resulted in a final sample of 216 firms (Table 1 and 2), whose size ranges from 5 to 250: according to the definition of the European Community, these are micro, small and medium-sized enterprises.

<TABLE 1 HERE>

<TABLE 2 HERE>

4. Results and discussion

In order to detect the variables that better explain the behaviour of the sample, we conducted a preliminary ANOVA analysis of the dataset. Analysing the variance of multiple variables made it possible to isolate the group of variables that are responsible for the major part of the differences among firms, in terms of their KM strategies: eight variables were identified as relevant. Moreover, in order to reduce the complexity of the analysis, we decided to run an Exploratory Factor Analysis basing on the Principal Component Method.

The variable "efforts/activities devoted to managing knowledge" summarises the answer given to a group of questions aimed at assessing how much a company considers knowledge a competitive resource and takes care of its management. The value of this variable is between 6 and 30, where 30 indicates that the company manages its knowledge at the highest level. The variable "number of adopted KM-related practices" indicates the number of practices adopted by the company and assumes a value between 0 and 10, while the variable "barriers to the use of the practices" is the sum of the importance given to six different barriers. Its value ranges from 6 to 30, where 6 means that the six barriers are all considered as not significant, and 30 that all they are considered highly significant. The value of the variable "executives are the key promoters of practices" ranges between 1 and 3, and it increases with the importance of executives as key promoters of KM. The remaining variables (i.e. "presence of employees specifically devoted to KM, "knowledge types and sources have been identified", "acquaintance with KM concepts and

1 applications”, “voluntarism in using KM-related practices”) range between 1 and 6, where 6 means that the related
2 aspect is at its maximum.

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4 As it can be seen in table 3 (that reports the rotated factor matrix obtained via the Varimax method and Kaiser
5 normalisation), the mentioned variables were consequently reduced to three uncorrelated factors that explain 62.23%
6 of the total variance, and in particular: 32.8% the first factor, 16.8% the second factor, and 12.63% the third factor.
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9 <TABLE 3 HERE>
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12 Each factor represents a meta-variable that cumulates the effects of different single variables which contribute to
13 explain a specific characteristic of firms (correlated variance), and in addition depicts a particular trait of the whole
14 sample behaviour (overall variance). Therefore, they share a common meaning that we named in a more explicative
15 and representative form with the labels: “Activism”, “Spontaneity” and “Imposition”.

16
17 The first factor, “Activism”, points out a pro-active attitude of companies towards the management of their cognitive
18 resources, that leads to devote specific efforts to numerous KM-related initiatives, particularly the identification of the
19 types and sources of useful knowledge for their business, and the use of specific staff devoted to KM. Such efforts are
20 driven by substantial awareness of KM notions and applications. Activism implies the adoption of a variegated set of
21 tools and KM-related practices. The second factor, “Spontaneity”, accounts for a bottom-up and expectedly less
22 formalised approach to the introduction of KM. Spontaneity reflects a voluntary use of the practices by employees,
23 which often favour and promote their adoption. Finally, the third factor, “Imposition”, accounts for a top-down
24 approach to the introduction of KM activities, substantially driven by the willingness of owners and executives, who,
25 consequently, become more sensitive to the obstacles to their initiative.
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29 By using the extracted factors, a non-hierarchical (k-means) cluster analysis was performed in order to classify the
30 sampled companies into similar groups. This method provided three clusters (scores for each factor are shown in Table
31 4 - in parenthesis the number of firms within each cluster, with 7 companies that couldn't be included in any cluster).
32
33 The distribution of companies in the different clusters is rather uniform, although the most populated cluster is the
34 first one (37% of companies), while the least populated is the third one (around 31% of the sample). Therefore, there
35 does not seem to be one prevalent behaviour.
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41 <TABLE 4 HERE>
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44 Table 4 provides some synthetic information regarding the identified groups, with the presence of negative or positive
45 values that clearly denote the nature of each cluster. Table 5 adds more details by showing the results of an ANOVA
46 variance analysis of the 8 original variables across the identified clusters.
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50 <TABLE 5 HERE>
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52 To improve the understanding of the distinctive traits of the three clusters, a further descriptive analysis of the variables
53 “number of adopted KM-related practices” and “barriers to the use of the practices” was done, by investigating the
54 distribution of their components. In this regard, table 6 shows the diffusion of the individual KM practices within each
55 cluster, which underlines that the difference in the level of adoption between the different clusters mainly regards the
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adoption of those practices that are generally considered the “most KM specific” (like, for instance: adoption of communities of practice, rewarding the sharing of knowledge, creating a supportive environment).

<TABLE 6 HERE>

<TABLE 7 HERE>

In the same way, table 7 shows the average importance (on a scale from 1 to 5) assigned by companies of each cluster to the different barriers. Cluster 1 and Cluster 2 appear to be very similar, and both differ from Cluster 3, where the perception of barriers results to be significantly lower. On the whole, however, barriers are generally considered relatively insignificant, apart from the lack of time, which apparently represents an effective obstacle to KM practices.

Cluster 1, that will be denominated as “*Conscious adopters*”, includes companies characterised by an intentional and active management of their knowledge assets: these companies have analysed and identified the types and sources of knowledge that are used for their business, and have one or more employees specifically devoted to KM-related practices. This can be explained by considering that they declare to have a more than good acquaintance with KM concepts. Their attention to KM is confirmed by the introduction of a relevant number of practices, including those that are more KM-specific (table 6), as e.g. rewarding employees who share knowledge (44.2% - this point greatly differentiates conscious adopters from the other two groups), storing knowledge in electronic repositories (88.3%), creating a supportive environment for sharing knowledge (75.3%), and employing Communities of Practice (48.1%). Promoters of introduction are both executives and employees (their role as promoters has been indicated by the 46.8% of respondents), and their use is mainly on a voluntary basis, probably because employees also play a role in the promotion of KM practices. Companies of Cluster 1 have encountered some moderate barriers to KM practices, and this can be due to the significant number of adopted practices. To sum up, firms of this cluster are consciously managing their knowledge, and apparently tend to spread this awareness of the importance of KM among their staff, considering that they also leave part of the specific KM practices up to the employees’ initiative.

Cluster 2, labelled as “*Unconscious adopters*”, include companies characterised by a relative low attention to knowledge and KM, probably because they have an insufficient acquaintance of KM concepts. In particular, they do not make special efforts to identify types and sources of useful knowledge, neither they have employees that are specifically devoted to KM. However, they declare the adoption of a good number of KM practices, even though they are often the less specific (table 6), as e.g.: email (adopted in 92.6% of cases), or meetings (77.9%). In other terms, it may be assumed that companies of Cluster 2 have introduced these practices because they consider them useful to their business in general, but without making a direct reference to KM itself. The adoption of these practices has been largely promoted by executives and owners (83.8% of cases) and is substantially mandatory for the staff. This can also explain why these companies consider the barriers to adoption to be more important, compared to the other clusters. To sum up, companies belonging to Cluster 2 do manage their knowledge, and owners/managers have a key role in this, but without being really aware that they are doing that. In other words, this cluster seems to be populated by firms that invest more in the formal adoption of some practices than in creating the proper organizational context where these can be exploited effectively: managers demand the use of practices by employees but do not commit the entire firm in building a strong understanding of KM fundamentals.

1 Cluster 3, named as “*Marginal adopters*”, includes companies characterised by a “neutral” propensity towards KM,
2 especially by executives and owners. They introduced a lower number of KM practices, and employees are their main
3 promoters (45.5% of cases). This cluster makes the least use of KM-specific practices, especially “rewarding
4 employees who share knowledge” (26.6%), as well as resorting to Communities of Practice (21.9%). Marginal
5 adopters also make a significantly lower use of meetings (62.5%) and social media (57.4%) in comparison to the other
6 companies. Furthermore, even though KM practices have been introduced thanks to the action of employees, their use
7 becomes rather mandatory. This can be explained by arguing that practices are firstly introduced by employees
8 occasionally (to solve their specific daily problems), but later become the standard use in the company. Cluster 3 also
9 differs from the others as regards the barriers to introduction, that are considered not significant. This can be explained
10 by considering that these companies adopted a limited number of KM practices. To sum up, the third cluster is
11 populated by firms that do not seem to be interested and/or equipped for investing actively and deliberately in KM
12 instruments and strategies.
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20 We need now to verify whether the companies that belong to a specific cluster share similar structural characteristics,
21 in terms of sector, size, and age. To make this analysis, the “R&D” and the “Other services” categories were left out,
22 because the figures are very marginal.
23

24 As table 8 shows, the companies of different sectors are quite evenly distributed across the single clusters. This is an
25 important point: it is hard to affirm that there is a clear and univocal relationship between the belonging to a specific sector
26 and the belonging to a specific cluster. In other words, no cluster – and therefore no specific orientation towards KM – can
27 be clearly identified based on the KIBS sector of a company. In substance, the findings of the cluster analysis confirm the
28 assertion of previous studies (Bolisani *et al.*, 2014; Pina and Tether, 2016) that the sector alone is not enough to reveal the
29 approach and orientation of a company towards KM. Conversely, the traits of the clusters deeply challenge the typical views
30 of KIBS based on a popular classification between T-KIBS and P-KIBS (Miles *et al.*, 2018): T-KIBS are the technology-
31 based services (like e.g. ICT, engineering & architecture) and P-KIBS are the professional services (e.g. legal services, fiscal
32 services, advisory services). In the case of our companies, the largest share of the “engineering & architecture” (i.e. technical
33 services) companies and of the professionals services companies – which should be considered T-KIBS and P-KIBS
34 respectively – both belong to the third cluster. Instead, the largest share of ICT companies (typically included in the T-KIBS
35 category) belongs to the first cluster. This shows that there is no consistent description of companies of the same category
36 if we consider their KM approach.
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47 Considering the size composition of the three clusters (Table 9), again there is no clear relationship between size and
48 cluster. It is true that micro firms (with a size between 5 and 9 employees) appear more in the third cluster - which is
49 sensible, given that the smallest firms have smaller needs and resources to adopt and use knowledge management
50 tools and practices. But the distribution of small (10 – 49 employees) and medium-sized firms (≥ 50 employees) is
51 much less marked and, in any case, contradictory: one would expect that large companies would be relatively more
52 conscious adopters than small companies, but this is not what happens. In short, the size of a company is not a clear
53 factor for predicting its inclusion in a specific cluster (in other words, its KM orientation).
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<TABLE 9 HERE>

Similarly, as regard the age of companies, there is no clear difference between clusters. Companies of cluster 1 and cluster 3 practically have the same average age (14.1 and 13.9 years respectively), and companies of cluster 2 are just a little older (17.7 years). Finally, more difficult to explain is the distribution of clusters among countries (table 10). Some studies have shown that the KM approach within a knowledge-intensive SME can be influenced by the socio-cultural relationships within the country of study (Cegarra-Navarro and Sanchez-Polo, 2010; Cegarra-Navarro et al., 2011). In practice, it has been argued that relationships between managers and employees, the motivations based on rewards or costs, the widespread use of terms like “chief” or (conversely) “community”, might be influenced by international differences in language, culture and context, which in turn can provide differing perceptions of the external environment. In the case of our sample, however, differences of KM approach based on the country of operation are more difficult to detect. Just two points apparently emerge: first, the case of Romanian companies, which stand out for devoting, on the whole, a higher attention to KM than the companies located in other countries. Maybe, this may be explained by considering that these are the youngest companies of the sample (and, therefore, their owners or managers can be more inclined to management innovations), but this is just a hypothesis that should be further verified. Second, a significant relevant share of Polish companies falls in Cluster 2: this may, however, depend on their size (these companies are the biggest of the sample). In substance, as also underlined by Durst and Edvardsson (2012), our analysis confirms that the issue of national differences and country comparisons is a topic that is still open.

<TABLE 10 HERE>

5. Conclusions

This study aimed to investigate the possible ways of approaching KM adopted by small companies. Specifically, by means of a cluster analysis on a sample of more than 200 KIBS firms located in four European countries, we tried to answer three research questions related to this issue.

As regards RQ1 “Is it possible to identify some recurring KM approaches adopted by SMEs?” and RQ2 “What are the main characteristics of these approaches?”, the study allowed to answer both questions. Collected data, in fact, made it possible to identify three distinct approaches to KM that not only show peculiar traits but also seem to recall similar analyses and distinctions that can be found in the strategic literature (Mitzberg, 1987). These clusters were labelled as “Conscious adopters”, “Unconscious adopters”, and “Marginal adopters”. As regards RQ3 “Do companies following the same approach share some common structural traits?”, the study did not highlight any specific correlation between sector, size, or age and a specific KM orientation. Instead, as concerns the relationship with the geographical context of operation, what emerged from the analysis does not allow a univocal interpretation, which leaves this as an open issue. A possible explanation of the above findings may lie in a lack of familiarity with KM notions by companies and in the different options in terms of KM approaches that they can follow.

To sum up, from the academic point of view the study helps to improve our understanding about the ways in which smaller businesses approach KM. In particular, it contributes to question some common beliefs about KM and SMEs as the fact that smaller companies have a homogeneous, not deliberated and substantially informal approach to this

1 management tool. Furthermore, it offers some food for thoughts also to KIBS scholars concerning the validity of the
2 distinction between T-KIBS and P-KIBS when considering their KM approaches.

3 The study also provides some practical lessons. Firstly, its findings can make managers of small companies aware of
4 the fact that they can adopt different KM approaches. Furthermore, it highlights that a really conscious adoption of
5 KM implies the introduction and use of a consistent set of practices: in other words, KM is not simply a matter of
6 adopting a software tool or an electronic repository. Our results also support the argumentation that there are some
7 differences in the way managers deal with KM barriers. Marginal adopters' companies don't find as many barriers as
8 conscious and unconscious adopters. The underlying assumption being made here is that marginal adopters' who have
9 hardly made use of KM structures are more unlikely to be able to understand and see KM barriers and if these can
10 hinder their relationship with new and potential opportunities (Pinget et al., 2015). This is also in broad agreement
11 with the conclusions of authors such as Filieri and Alguezau (2009), Sánchez-Polo et al. (2019) who assert that
12 companies need help to see barriers because otherwise they tend to jump to the most convenient conclusions consistent
13 with their previous experience.

14 The study has also some limitations. On the one hand, it contributes to our understanding of how SMEs manage their
15 knowledge; but on the other hand, given its exploratory nature, further research is needed to examine the topic more
16 thoroughly. The factors that affect the adoption of a specific KM approach must be explained more clearly, especially
17 to give an answer to the third research question. Aspects such as the level of customisation of the provided services,
18 or the kind of organisational structure of a company, can be included in the analysis. Secondly, it should be verified
19 if there are other elements that can be considered as common traits of the three different KM approaches. Thirdly, the
20 last, but not least aspect that deserves further investigations is the effect of the different KM approaches on company
21 performance. Also, our investigation considered only KIBS companies that, by definition, are more aware of their
22 knowledge resources and consequently they usually devote more attention to their management. Hence, future
23 research should include small companies belonging to other sectors, like e.g. traditional manufacturers. Finally, we
24 used a convenience sample: while this approach can be appropriate for exploratory aims, a confirmative analysis
25 should employ a more representative one.

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Table 1 Main descriptive characteristics of the final sample (by sector)

	ICT	R&D	Tech.	Prof.	Mkg.	Other	Total
Number of companies	104	5	30	33	37	7	216
% distribution	48.1	2.3	13.9	15.3	17.1	3.2	100.0
Average size	51	30	65	41	37	55	49
Average age	16.6	9.4	15.4	13.5	13.0	14.1	15.1

Table 2 Main descriptive characteristics of the final sample (by country)

	Italy	Poland	Romania	Spain	Total
Number of companies	59	41	51	65	216
% distribution	27.3	19.0	23.6	30.1	100.0
Average size	44	65	50	42	49
Average age	17.0	15.8	11.3	16.0	15.1

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Table 3 Matrix of extracted factors (values below .40 are blanked)

<i>Variables</i>	<i>Factor 1</i> <i>“activism”</i>	<i>Factor 2</i> <i>“spontaneity”</i>	<i>Factor 3</i> <i>“imposition”</i>
Efforts/activities devoted to managing knowledge	.913		
Presence of employees specifically devoted to KM	.759		
Knowledge types and sources have been identified	.729		
Acquaintance with KM concepts and applications	.624		
Number of adopted KM-related practices	.474		
Voluntarism in using KM-related practices		.724	
Executives are the key promoters of practices		-.607	.595
Barriers to the use of the practices			.696

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Table 4 – Cluster centres values (the number of each cluster's members is indicated between parentheses)

	<i>Cluster 1 (77)</i>	<i>Cluster 2 (68)</i>	<i>Cluster 3 (64)</i>
Factor 1	.73308	-.62716	-.21563
Factor 2	.55436	-.51978	-.11469
Factor 3	.31105	.68795	-1.10518

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Table 5 – Average values of the considered variables for the identified clusters

	<i>Cluster 1</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Whole sample</i>
Efforts/activities devoted to managing knowledge	24.74	19.16	21.16	21.83
Presence of employees specifically devoted to KM	3.66	2.28	2.94	2.99
Knowledge types and sources have been identified	4.31	3.29	3.52	3.74
Acquaintance with KM concepts and applications	3.96	2.82	3.16	3.34
Number of adopted KM-related practices	6.92	6.35	5.50	6.30
Voluntarism in using KM-related practices	3.60	2.65	2.45	2.94
Executives are the key promoters of practices	2.22	2.82	1.72	2.26
Barriers to the use of the practices	18.58	18.91	13.89	17.25

Table 6 – Percentages of companies of each cluster that have introduced the indicated practices

<i>KM practices</i>	<i>Cluster 1</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Whole sample</i>
Capturing/storing knowledge in electronic repositories	88.3%	76.5%	71.9%	79.4%
Email for knowledge sharing and transferring	84.4%	92.6%	82.8%	86.6%
Social Media for publishing and accessing information	66.2%	69.1%	54.7%	63.6%
Building and maintaining employees' expertise	80.0%	76.5%	75.0%	77.5%
Dissemination of best practice	66.2%	64.7%	51.6%	61.2%
Creating a knowledge-sharing supportive environment	75.3%	66.2%	62.5%	68.4%
Rewarding employees who share their knowledge	44.2%	27.9%	26.6%	33.5%
Organizing meetings to share information	77.9%	77.9%	62.5%	73.2%
Using ERP or CRM software	61.0%	51.5%	40.6%	51.0%
Using Communities of Practices to share knowledge	48.1%	32.4%	21.9%	34.1%
Total	69.2%	63.5%	55.0%	63.0%

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Table 7 –Barriers to the practice by cluster

<i>Barriers</i>	<i>Cluster 1</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Whole sample</i>
Limited financial resources	3.34	3.12	2.22	2.92
Limited human resources	3.42	3.53	2.72	3.24
Lack of specialists	3.01	3.46	2.23	2.92
Insufficient number of users	2.53	2.60	1.78	2.33
Lack of time to devote to KM	3.71	3.74	2.97	3.49
Resistance of employees to their use	2.57	2.47	1.97	2.35
Whole sample (average)	3.10	3.15	2.30	3.15

Table 8 – Sectoral composition of the clusters (percentage distribution in proportion with the total number of companies in the cluster)

<i>Sector</i>	<i>Cluster 1</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Whole sample</i>
ICT	53.20%	45.60%	48.40%	49.30%
Engineering & Architecture	11.60%	11.80%	15.60%	12.90%
Professional	14.30%	13.20%	18.80%	15.30%
Marketing & Communication	11.70%	23.50%	15.60%	16.70%

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Table 9 – Clusters composition by size

<i>Size</i>	<i>Cluster 1</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Whole sample</i>
5 – 9	5.2%	13.2%	15.6%	11.0%
10 – 49	63.6%	50.0%	54.7%	56.5%
≥ 50	31.2%	36.8%	29.7%	32.6%
Average Size	49.8	53.7	44.5	49.5

Table 10 – Clusters composition by country

<i>Country</i>	<i>Cluster 1</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Whole sample</i>
Italy	23.73%	37.29%	38.98%	28.23%
Poland	18.42%	42.11%	39.47%	18.18%
Romania	52.94%	35.29%	11.76%	29.19%
Spain	47.54%	19.67%	32.79%	24.40%