Krzysztof Borodako

Cracow University of Economics
e-mail: borodako@uek.krakow.pl
ORCID: 0000-0002-7348-8372

Jadwiga Berbeka

Cracow University of Economics
e-mail: jadwiga.berbeka@uek.krakow.pl
ORCID: 0000-0002-3136-2800

Michał Rudnicki

Cracow University of Economics
e-mail: michal.rudnicki@uek.krakow.pl
ORCID: 0000-0003-3310-8117

THE INNOVATIVENESS OF KNOWLEDGE-INTENSIVE BUSINESS SERVICES IN THE CONTEXT OF MARKET NEEDS

INNOWACYJNOŚĆ DOSTAWCÓW USŁUG BIZNESOWYCH OPARTYCH NA WIEDZY W KONTEKŚCIE POTRZEB RYNKOWYCH

Summary: The issue of innovativeness is gaining importance due to rapid changes that enterprises have to face. The aim of this paper is to check if there is a relationship between the innovation level of Knowledge-Intensive Business Services (KIBS) providers and the level of visibility of a given type of business activity on the Internet. In the theoretical part, a review of Polish and English literature devoted to the issue of innovation measures, KIBS and the problem of visibility on the Internet was conducted. To implement the research objective, two research streams were integrated to examine the level of KIBS innovativeness – Statistics Poland data on the number of innovations implemented by individual KIBS suppliers with the results of a netnographic analysis presenting the level of visibility which can be considered as a determinant of the level of relative demand for given services. The results of the analysis show the level of innovation of individual KIBS and point to the weak relationship with the level of visibility on the Internet.

Keywords: innovation, Knowledge-Intensive Business Services, SEO, visibility.

Streszczenie: Problematyka innowacyjności zyskuje na znaczeniu w obliczu dynamicznych zmian, którym przedsiębiorstwa muszą sprostać. Celem pracy jest sprawdzenie, czy istnieją związki między poziomem innowacyjności dostawców usług biznesowych opartych na wiedzy (KIBS) a poziomem widoczności danego rodzaju działalności biznesowej w Internecie. W części teoretycznej przeprowadzono kwerendę literatury polskiej i anglojęzycznej poświęconej zagadnieniom mierników innowacyjności, KIBS oraz problematyce widoczności w Internecie. Dla realizacji postawionego celu badawczego, zintegrowano dwa strumienie badawcze by zbadać poziom innowacyjności KIBS – zestawiono dane GUS dotyczące ilości wdrażanych innowacji przez poszczególnych dostawców KIBS z wynikami analizy netograficznej prezentującej zapotrzebowanie rynku na poszczególne rodzaje usług biznesowych. Wyniki przeprowadzonej analizy ukazują poziom innowacyjności poszczególnych KIBS i wskazują słabe powiązania z poziomem widoczności w Internecie.

Słowa kluczowe: innowacje, usługi biznesowe oparte na wiedzy, SEO, widoczność w Internecie.

1. Introduction

The issue of enterprise innovation has not lost its importance despite the passage of time. It has remained valid and has even acquired new research dimensions in the face of parallel economic transformations that are reflected in the processes of globalisation, the internalisation of economies and the development of new technologies. These phenomena have caused, on one hand, accelerated processes of innovation diffusion as well as mechanisms for copying new solutions and, on the other, have shortened their life cycle. These dynamically changing environmental conditions as well as the need for the constant flexibility of company structures require enterprises to take action, especially on the Internet, to inform customers about the innovations being introduced. This is particularly important in the context of enterprises providing Knowledge-Intensive Business Services (KIBS), which as representatives of professional services must effectively use new technologies in relation with other market participants (existing and potential clients).

The aim of this article is to check the relationship between the level of innovation of knowledge-intensive business services providers and the activity of these enterprises on the Internet as part of their marketing activities. These activities can be measured by the level of visibility which expresses the relative demand for a given service. The second measure is SEO (Search Engine Optimisation) and the difficulty indicator which also shows the level of competitiveness of companies with a similar nature of activity. These studies contribute to understanding the specificity and analysis of the innovativeness of Polish companies that provide specific types of professional services.

This issue is taken up extremely rarely in literature. To fill this research gap, a combination of two data sources were used to achieve the assumed goal. The

research used both Statistics Poland data showing the number of innovations introduced by selected types of KIBS, as well as a netnographic analysis based on data from Google Trends, Google Adwords and KeyWords Finder.

2. Innovation measures of service enterprises

The issue of innovativeness is widely described in foreign and Polish literature. Many authors have provided definitions, including J. Schumpeter, P. Drucker, Ph. Kotler, A. Pomykalski, R.A. Weber, Z. Pietrusiński and many others. One of the most widespread sources, the Oslo Manual, defines innovation as [OECD 2018]: "the implementation of a new or significantly improved product (product or service) or process, a new organisational method or a new marketing method in business practice, workplace organisation or external relations".

When analysing the innovativeness of companies, A. Pomykalski distinguished the following measures [2001, p. 15]:
- measures with specific effects, e.g. number of patents, or scientific publications as "knowledge output generated by the company",
- the number of new products – which determines the success of product innovations,
- the measure of action quality, expressed, e.g. in consumer satisfaction surveys,
- the effects of strategic success, where part of the economic rent obtained results from the introduced innovations.

Several measures of company innovations were also developed, among which the CIS (Community Innovation Survey) created by the European Union (resulting from the Oslo methodology), and measures of the Boston Consulting Group deserve special attention.

What distinguishes service innovation is the fact that it is the result of a change process or a process related to a product characterised by a high degree of immateriality, the need for contact between the service provider and the customer, or the integration of external factors in connection with heterogeneity resulting from the high contribution of the human factor [OECD 2018]. Therefore service companies, in the process of creating innovation, try to make the most of the knowledge and competences of their employees [Szarucki 2011]. In the literature [Dąbrowska, Janoś-Kresło 2009; Śmigielska Wiśniewska 2016], it can be noted that, just like in manufacturing, four types of innovations can be distinguished: a product (referring to the introduction of a new service on the market by the company); a significant improvement of already offered services (in terms of their characteristics or destination); a process (meaning the application of a new or significantly improved method of an existing service provision); organisational (referring to the implementation in the company of a new method of organising its business activities, a new workplace organisation or a new organisation of external relations) and

marketing (including significant changes in the service itself, its positioning, promotion, pricing policy or business model).

Innovation-oriented competences (which occur in the areas of resource allocation, technology, employee development and innovative ventures and markets) [Siguaw et al. 2006] lead to innovation results, indicating at the same time the direct links between the level of innovativeness and a company's performance [Chen et al. 2009; Hooley, Greenley 2005; Theoharakis, Hooley 2008]. It should be emphasised that the ability to use the latest technologies (i.e. the appropriate combination of human and technological resources) define and determine the company's long-term operation. The use of available technologies, e.g. in the field of company marketing (which is expressed by the positioning and increasing recognition of the product offer on the Internet) should be an element in the strategy of service companies, especially business service providers. The literature identifies four areas that create the basis for the development of innovativeness within service enterprises requiring continuous investment and development: innovative culture, enterprise structure flexibility, capital capabilities and company knowledge, and understanding environmental dynamics [Norris, Ciesielska 2019]. Technologies penetrate all these areas, determining the level of innovation at a given company, and thus determining its high competitive position [Dobni 2010].

3. The need for innovation among KIBS

Knowledge-Intensive Business Services (KIBS) have a substantial positive impact on client innovation – these services are actively integrated with other company innovations through joint knowledge development with their clients [Gadrey, Gallouj 1998; He, Wong 2009; Landry et al. 2012]. KIBS providers' efforts to innovate extend far beyond their internal organisation to the service relationship and directly into the domain of service clients by providing competence-enhancing knowledge services to their clients [Wong, He 2005, p. 27]. In order to be able to effectively initiate and support the innovative processes of their partners, KIBS must be innovative in their own right.

KIBS are becoming a major force in promoting innovation and that effect is highly related to the average level of human capital [Shi et al. 2014]. They support and create innovations and "customisation," or atypical solutions referring to "tacit knowledge", which is the domain of the human factor. Thanks to new communication technologies, they show a high degree of interaction between suppliers of KIBS and their clients [Muller, Doloreux 2009, p. 68]. These key aspects of KIBS have a significant influence on client innovation and are thus perceived as facilitators (supporting the client firm in innovation processes), carriers (playing a role in transferring existing innovations from one firm/industry to another, client firm/industry), and last but not least as sources of innovation (playing a major role in

initiating and developing innovations in client firms, mostly in close interaction with those firms) [Doloreux, Shearmur 2012; Martinez-Fernandez 2010; Sundbo, Toivonen 2012].

The rapid assimilation and application of new knowledge by KIBS providers is the lifeblood of their clients. KIBS support companies and organisations by meeting their need for outside sources of cognition, and, as such, knowledge is both the main input and primary output of such providers [Hertog 2000; Gallouj 2002]. Thus it has been suggested that KIBS are core catalysts in the promotion of innovations in two ways: innovations emerge in KIBS and through the use of KIBS [Gallouj 2002]. A special feature of KIBS is that their innovative activities are usually informal and highly iterative. Moreover, due to the incomplete shape of the product (services) being introduced on the market, suppliers of these services often do not perceive them as innovations. This leads to a situation in which KIBS consider themselves less innovative than they really are.

4. New technologies as a space connecting supply and demand

New technologies are treated as enabling factors for business development [Cohen, Amorós 2014]. One of these involves information and communication technologies that influence company performance due to the improvement of process capabilities, new product development, communication and innovation capability [Pavlou, El Sawy 2006; Dong, Yang 2015; Palacios et al. 2015].

It is widely acknowledged that the Internet currently plays a very important role in various aspects of company functioning, as is the case with search engines. Every second, Google alone processes over 40,000 search queries, which reflects the interest of people worldwide [GSS 2019]. By analysing these data, researchers can get a picture of useful information in the field of economics or business. Access to information in a knowledge-based economy becomes crucial, and industries with a high level of information intensity can more easily adapt ICT-based innovations [Neirotti, Pesce 2019].

One of the ways service companies compete is marketing carried out on the Internet. Many studies of consumer behaviour on the Internet confirm that most users only view the first page of search engine results, while the third page of search engine results is viewed by only a few people [Enge et al. 2012; Hopkins 2012; Chuklin et al. 2013]. For this reason, companies use the available IT tools to analyse what keywords related to their business are most often entered into search engines [Luh et al. 2016]. Then they try to optimise the content of their pages to increase the chances of being displayed on the first page of results and thus increase the level of traffic on their web page. Terms (key words) that are more difficult to position, because many companies are trying to include them on their page for the search engine, are characterised by so-called SEO Difficulty. The higher the level of

difficulty, the greater the competition in this area and the higher the cost of marketing effectiveness.

With the development of the Internet and new technologies, running one's own website (or social media profile) has now become a business standard, while visibility on the Internet has become a key problem and challenge [Dreze, Zufryden 2004; Wolk, Theysohn 2007]. Research by Wang and Vaughan [2014] focused on the visibility of websites of individual companies. In the era of digital economy and e-business, it seems interesting to undertake research on the aggregate visibility of service industries – dominating in many developed economies worldwide. The visibility of industries in the Internet as a research concept has not yet been explored, and the presented research can contribute to the development of this type of analysis. Considering that the visibility of industries on the web reflects interest in given industries/services, it is possible to determine the level of relative demand for given services in e-commerce and offline shopping (orders offline).

Research based on data available in Google Trends of the fifty largest companies in the United States confirms that publicly available, free data collected as a result of analysing the number of queries in search engines can be used as business information, and can also reflect real business data of companies [Vaughan 2016]. Based on this assumption, further research was undertaken that, based on this type of data, make it possible to analyse mutual comparisons between KIBS.

5. Methodology

In this research a triangulation of sources and methods was applied. There were two sources of data: secondary data acquired from Statistics Poland and search engine data. Data concerning innovations are very sensitive, so it was not possible to get data directly from companies. Data were collected from 2012-2016. Available data from public statistics were used to analyse the following KIBS types: information technologies, data mining and web page management, architectural services, engineering services, scientific research and development in the field of natural and technical sciences, social science research, market research, advertisement services and media representation.

For the analysis, one of the most important measures of measuring enterprise innovativeness were used, [Bielski 2000; Pomykalski 2001; Rutkowska-Gurak 2010], for which statistical data collected by the Polish Statistics Office were obtained: the number of new services, market innovations, new or improved methods of service provision, new or improved methods/systems supporting company processes, and cooperation with other companies or institutions in innovation development. The data refers to companies where any type of innovation was reported and the number and type of innovations. Time series analysis was conducted.

In order to analyse individual types of KIBS and groups of these services, the following classification of services (group and type of services) was used:

- market services (market research, advertising, social research),
- company services (legal, accounting, job placement, business and management consulting and public relations),
- technical services (architectural, IT, engineering),
- event services (congress and exhibition services, incentive travel agencies, catering and audio-video services) [Borodako et al. 2018].

The data for netnography analysis were collected in a two-step procedure. In the first step, the authors collected the data for all types of KIBS with Google Trends. After that, by using Google Adwords the authors found the keywords that are most frequently used by Internet users when they are looking for particular types of KIBS. The next step involved KW Finder to collect data (from the period 11.2016-10.2017) about the number of queries and SEO Difficulty for particular terms. All these data were analysed by comparative approach and by the implementation of basic statistics.

The Pearson correlation coefficient was calculated to check the relation between innovation measures and the ASV results.

6. Innovativeness of selected types of KIBS suppliers

The analysis of secondary data for 2012-2016 obtained from the Polish Statistics Office leads to a number of conclusions. Taking into consideration the following indicators: number of new services (see Figure 1), number of innovations for the market (see Figure 2), number of new methods of service provision (see Figure 3), number of new methods/systems supporting company processes (see Figure 4),
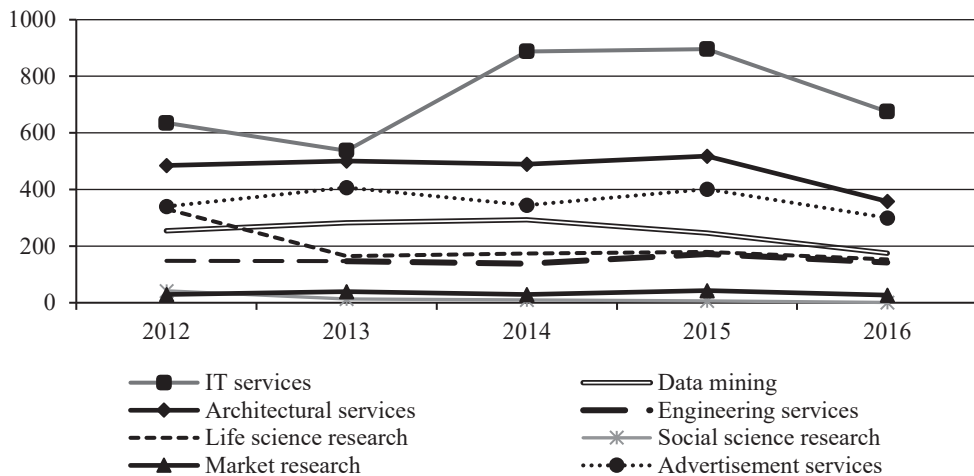

Fig. 1. Number of innovations per year offered by selected types of KIBS
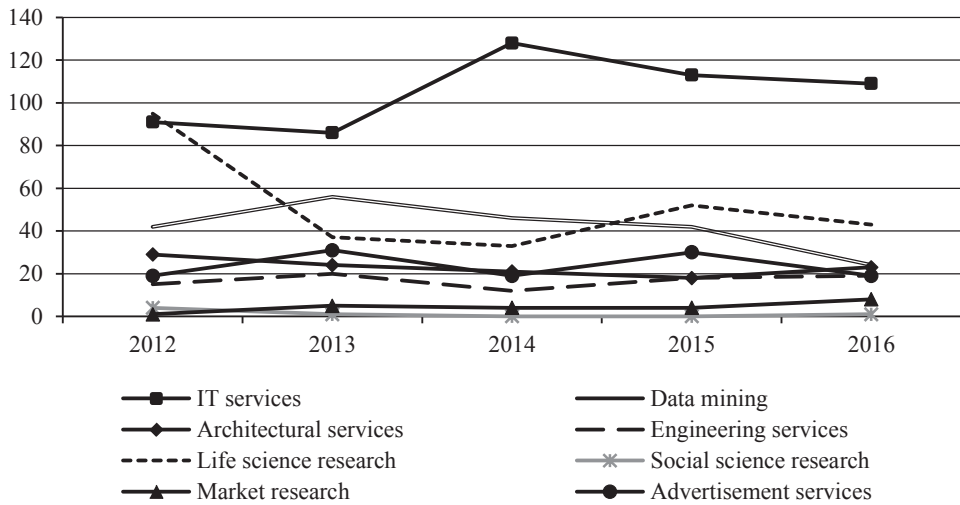
Source: own calculations.

Fig. 2. Number of new innovations on the market per year offered by selected types of KIBS
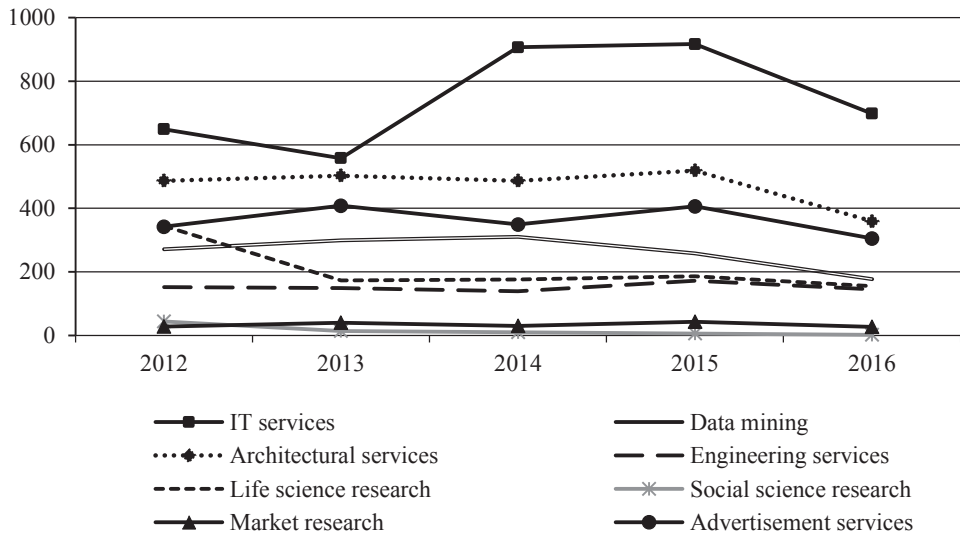
Source: own calculations.

Fig. 3. Number of new methods of service creation per year offered by selected types of KIBS

Source: own calculations.

cooperation with other companies or institutions with respect to innovation development (see Figure 5), it becomes clear that all the values were highest for companies representing information technologies services. They dominated over all other KIBS types.
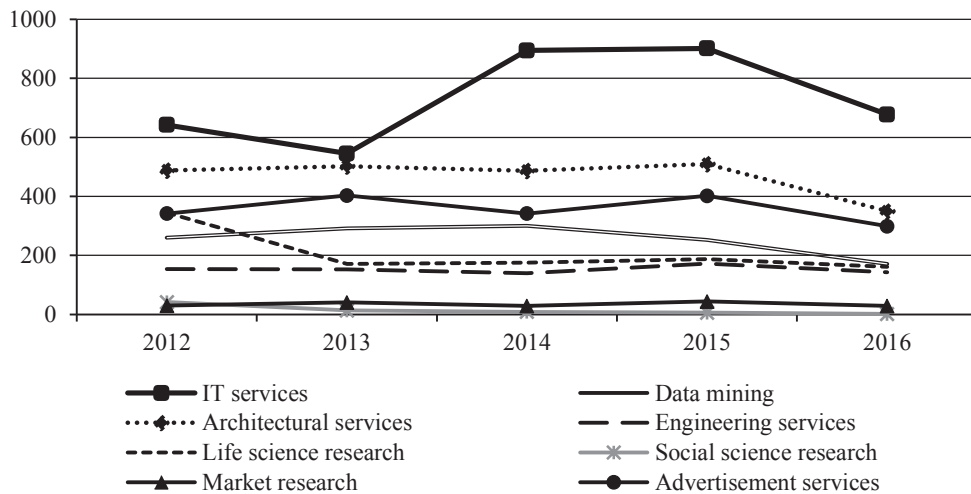
Fig. 4. Number of new methods supporting processes in selected types of KIBS
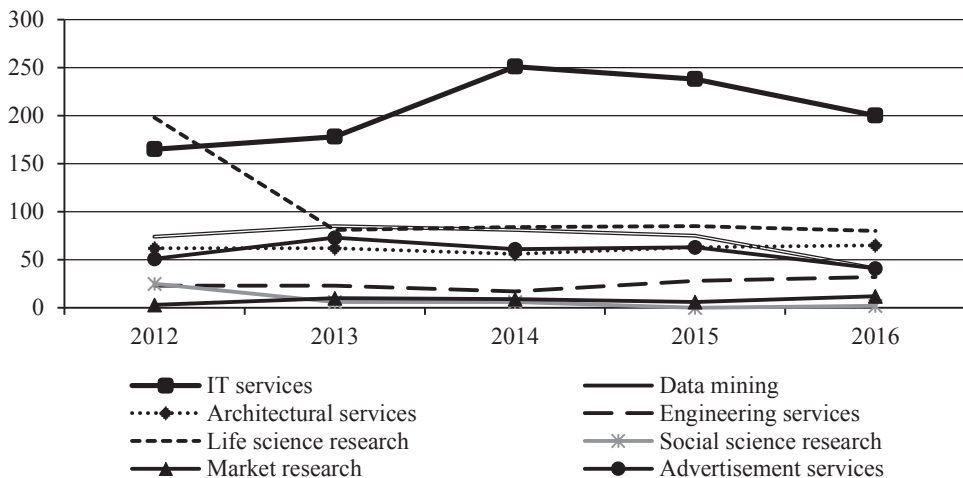
Source: own calculations.

Fig. 5. Number of cooperation agreements in the area of innovation in selected types of KIBS

Source: own calculations.

The second type of KIBS with relatively high indicators of innovation comprised architectural services. They occupied second place in new services and new methods/systems supporting company processes. For the remaining indicators, while second place by technical science research. All the other KIBS types ranked lower with similar results.

Analysis of all these indicators for 2012-2016 shows a decrease, starting in 2015.

7. Online visibility of Knowledge-Intensive Business Service industries

In the era of the digital economy, companies increasingly rely on IT solutions in cooperation with the market. To reach new clients and business partners, firms use modern internet services, including the classic solution of positioning their websites (including social media profiles) in search engines.

Presenting a product offer on the Internet is a convenient and relatively easy way to convey information to potential clients. However, companies operate in a competitive environment and their competitors take the same or similar actions, which means that the product offer of one company leads the search engine results, followed by those from other companies lower on the same or subsequent pages. It is worth mentioning that some terms (key words) are more often searched (and thus can lead to the website of a given company), while other more specialised terms are less often used for searches.

Table 1. Average monthly search volume for types of KIBS with level of visibility in the consecutive 12 months (11.2016-10.2017)

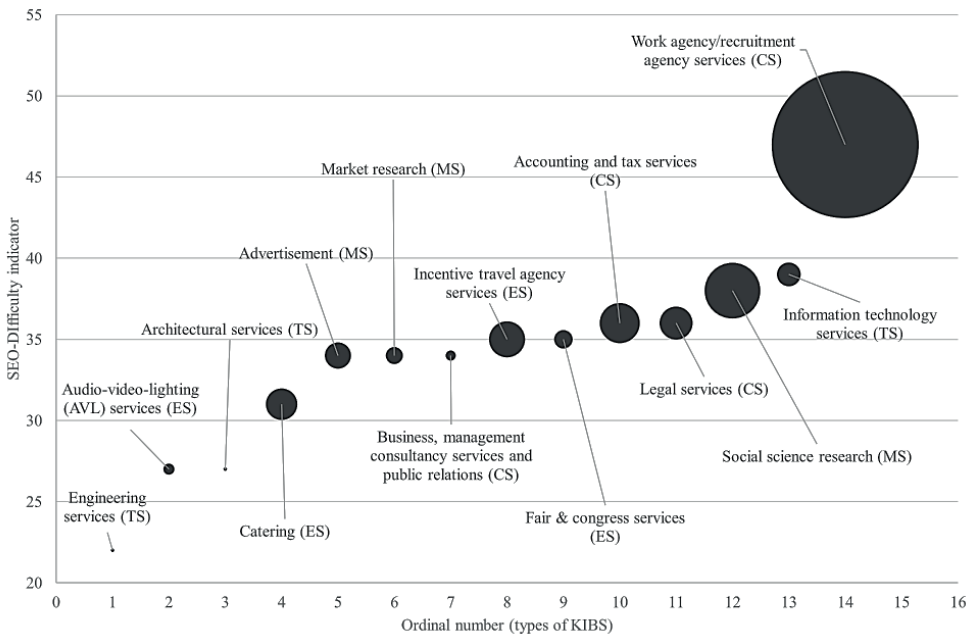| Types of KIBS	Average monthly search volume for three most popular keywords (in Polish)	Level of Visibility
Work agency/recruitment agency services (CS)	91,667	Level 1
Social science research (MS)	13,167	
Accounting and tax services (CS)	6,839	Level 2
Incentive travel agency services (ES)	5,520	
Legal services (CS)	4,630	
Catering (ES)	4,223	
Advertisement (MS)	2,917	Level 3
Information technology services (TS)	2,393	
Fair & congress services (ES)	1,460	
Market research (MS)	1,247	
Audio-video-lighting (AVL) services (ES)	528	Level 4
Business, management consultancy services and public relations (CS)	437	
Architectural services (TS)	53	
Engineering services (TS)	51	

where: CS – company services, MS – market services, TS – technical services, ES – event services.

Source: own elaboration.

Empirical research on the activities of KIBS online was carried out using tools to determine the average monthly number of queries per keyword over the last 12 months. Information on the number of inquiries reflected, on one hand, the visibility of given product offers and online content (the more inquiries, the more likely that

the offers of companies related to them would be found by the internet user), and on the other, painted a picture of the mutual relations between the demand for individual types of services. It should be emphasised that this is a measure of the relationship between individual services, not the actual value of demand on the service market.

The conducted research allowed to gather data which show the very wide range among particular types of services. This demonstrates the determination of the level of visibility of a given type of services on the Internet from the perspective of a search engine. Four levels of visibility were identified (Table 1). Two types of services had the highest level – employment services (91,000 queries) and social research services (more than 13,000 queries). In the second group (level 2), the number of inquiries was between 4,000 and 7,000, which was much lower than the first group. This group consists of four types of services, two of which belong to company services (CS), while the other two are event services (ES). The third level identified in the survey includes services characterised by a small number of inquiries

where: CS – company services, MS – market services, TS – technical services, ES – event services.
        The size of the wheel represents higher volume of AMSV (Average Monthly Search Volume).

Figure 6. The relation between the SEO Difficulty and the average monthly search volume for types of KIBS

Source: own elaboration.

in the range of 1,000-3,000 and represents three groups of services – market (two types of services), technology and event. The fourth group from the point of view of visibility on the web are services that on average per month do not exceed 600 queries. It is worth noting that these are two types of technical services (architectural and engineering) and (technical) services provided as part of the organisation of events as well as management consulting and public relations. To sum up, it can be stated that the demand illustrated by the number of inquiries for knowledge-intensive services is relatively low for technical services (TS), while services from the groups of company services (CS) are the most popular (see 6).

The research on the use of business services also took into account the relationship between two significant values, i.e. the level of difficulty in competing for a high position in search engine results (referred to as SEO Difficulty) and the previously mentioned monthly average number of queries (AMSV). The ranking of individual types of services according to the increasing level of difficulty in search engine positioning and the presentation of mutual relations of query volumes (AMSV) allowed to identify important dependencies. First of all, it is not a rule that the more visible the online services (with a large number of search engine queries – the size of the wheel), the more they are characterised by a higher level of competition in positioning (the higher the positioned wheel – see the example of IT or legal services). Secondly, there are certain factors (not identified in this study) that cause increasing difficulty in positioning to be often accompanied by alternating sizes of search engine queries – as the image of the large and small balls on the chart from left to right illustrate. There is some deviation in the case of two market services – advertising and market research (Figure 6).

8. Discussion and conclusions

Analysis of the innovativeness of the investigated types of KIBS reveals huge differences. From 2012-2016, more than 800 innovative services (896 in the peak year of 2015), were offered by information technology suppliers, nearly twice as many as by architectural services suppliers (518 in the peak year of 2015) and three/ four times more than by advertisement agencies or technical science research. The least innovative services were offered by social science research suppliers and market research agencies. The number of innovations and new market innovations can be treated as product innovation, so they highlighted the position of particular KIBS types in service innovation market product offers.

The results appear consistent with those of Rodriguez and Camacho [2010], Miles et al. [2017] and Bumberova and Milichovsky [2019], who identified technology as a factor reflecting a company's orientation towards product innovation.

The innovative dominance of IT service firms was also supported by other indexes, like new methods of production/delivery and new systems supporting processes, which reveals that this type of KIBS was also the most active in process

innovation. These results do not support the conclusions of other authors who claimed that a large portion of technological KIBS are not active innovators [Bumberova, Milichovsky 2019; Miles et al. 2017].

Our results represent the first empirical investigation of innovativeness of particular KIBS types in Poland, so it is not possible to compare them with previous studies.

The changes in innovation indicators during the analysed period, in particular their decrease since 2015, could decrease the competitiveness of the whole economy, which is a worrying signal. The number of companies offering new (or significantly improved) innovations among all types of KIBS has been decreasing since 2015 and, for most KIBS types, reached a level lower than in 2012. This may be explained by the lack of effective incentives on the market or the deterioration of the innovation business climate in Poland. On the other hand, results from Russia suggest that innovation by KIBS (of no technological character) appears precisely under negative market and knowledge conditions [Chichkanov et al. 2019] and firms in such circumstances are more liable to develop non-technological innovations. This means the reason for fewer KIBS innovations may vary and should be the subject of future research.

The attempted to investigate the relations between public statistics and SEO research, although there were some difficulties. Some elements of both samples differ and one can only compare one (the most recent) year. However, it can be concluded that types of innovative KIBS (like IT services) are not intensively searched for online. This may be due to the sequence of activities connected with the product (service) life cycle – products are more likely to be researched online not in the first stage, but in subsequent stages when they are better promoted.

When one limits the sample to the same types (omitting types which are not represented in both samples) and check the correlations between innovation indicators and Average Search Volume, Pearson's correlation coefficient is $r = 0.42$-$r = 0.43$ for all indicators, except the cooperation index, which is even lower at $r = 0.38$. This means there are no strong correlations between the innovativeness of types of Polish KIBS providers and the search frequency of these types of services online. Therefore that demand is not the only driver of innovation, and it can be assumed that internal factors (like strategy) and other external (like competition) are more influential.

This last conclusion is also supported by the analysis of SEO and innovation indicators. The most innovative KIBS type – IT services – has a high search difficulty, which means this business activity is characterised by intense competition. The conclusion is that in Poland the competiveness of the IT service market is the incentive for innovation.

The authors distinguished two different groups. There are KIBS types with moderate innovativeness indexes and moderate SEO (Advertisement services), which is in accordance with the previous conclusion that market competitiveness influences company innovativeness. However, another group can be differentiated:

KIBS types characterised by high innovativeness indicators and low SEO (engineering and architectural services). This can be explained that for these types of services, relationships with partners and long-term contracts have the most important impact on online positioning which makes competition in this arena less intense.

The research has its limitations. The researched time periods were not long and the business environment in Poland has been changing, thus necessitating the need for further research. Moreover, netnography research was conducted for one year and secondary data described that period of time, so the comparison was limited to only a short time.

Bibliography

Bielski I., 2000, *Przebieg i uwarunkowania procesów innowacyjnych*,Oficyna Wydawnicza Ośrodka Postępu Organizacyjnego Sp. z o.o., Bydgoszcz.

Borodako K., Berbeka J., Rudnicki M., 2018, *Events KIBS on the business services market – a netnography analysis,* European Journal of Service Management, vol. 27(3), pp. 7-14.

Bumberova V., Milichovsky F., 2019*, Business Development Patterns of Small Knowledge Intensive Enterprises from the Czech Republic*, Innovation Management, Entrepreneurship and Sustainability (IMES 2019).

Chen Y.-S., Lin M.-J. J., Chang C.-H., 2009, *The positive effects of relationship learning and absorptive capacity on innovation performance and competitive advantage in industrial markets*, Industrial Marketing Management, vol. 38, pp. 152-158.

Chichkanov N., Miles I., Belousova V., 2019, *Conditions for innovation in KIBS: Evidence from Russia,* Basic Research Program Working Papers Series: Science, Technology and Innovation WP BRP 92/STI/2019, National Research University Higher School of Economics, Moscow.

Chuklin A., Serdyukov P., De Rijke M., 2013, *Modeling clicks beyond the first result page*, Proceedings of International Conference on Information and Knowledge Management, San Francisco, CA, USA, pp. 1217-1220.

Cohen B., Amorós J.E. 2014, *Municipal demand-side policy tools and the strategic management of technology life cycles*, Technovation, vol. 34(12), pp. 797-806.

Dąbrowska A., Janoś-Kresło M., 2009, *Budowanie społeczeństwa informacyjnego*, [In:] A. Dąbrowska, M. Janoś-Kresło, A. Wódkowski (eds.), *E-usługi a społeczeństwo informacyjne*, Difin, Warszawa.

Dobni C.B., 2010, *The Relationship between an innovation orientation and competitive strategy*, International Journal of Innovation Management, vol. 14 (2), pp. 331-357.

Doloreux D., Shearmur R., 2012, *How much does KIBS contribute to R&D activities of manufacturing firms?*, Economia Politica, vol. 29(3), pp. 319-342.

Dong J., Yang C., 2015, *Information technology and organizational learning in knowledge alliances and networks: evidence from the US pharmaceutical industry*, Information & Management, vol. 52(1), pp. 111-122.

Dreze X., Zufryden F., 2004, *Measurement of online visibility and its impact on internet traffic*, Journal of Interactive Marketing, vol. 18(1), pp. 20-37.

Enge E., Spencer S., Stricchiola J., Fishkin R., 2012, *The Art of SEO: Mastering Search Engine Optimization*, O'Reilly Media, Sebastopol.

Gadrey J., Gallouj F., 1998, *The provider-customer interface in business and professional services*, The Service Industries Journal, vol. 18(2), pp. 1-15.

Gallouj F., 2002, *Knowledge-Intensive Business Services: Processing Knowledge and Producing Innovation*, [In:] J. Gadrey, F. Gallouj (eds.), *Productivity, Innovation and Knowledge in Services*, Edward Elgar, Cheltenham, UK, Northampton, MA, USA, pp. 256–284.

GSS, 2019, *Google Search Statistics*, https://www.internetlivestats.com, (10.09.2019).

He Z.L., Wong P.K., 2009, *Knowledge interaction with manufacturing clients and innovation of knowledge-intensive business services firms*, Innovation: Management, Policy & Practice, vol. 11, pp. 264-278.

Hertog den P., 2000, *Knowledge-intensive business services as co-producers of innovation*, International Journal of Innovation Management, vol. 4(4), pp. 491-528.

Hooley G.J., Greenley G.E., 2005, *The resource underpinnings of competitive positions*, Journal of Strategic Marketing, vol. 13, pp. 93-116.

Hopkins L., 2012, *Online reputation management: Why the first page of Google matters so much*, www.leehopkins.net (access: 26.05.2019)

Landry R., Amara N., Doloreux D., 2012, *Knowledge exchange strategies between KIBS firms and their clients*, The Service Industries Journal, vol. 32(2), pp. 291-320.

Lengton M., Verzijl D., Dervojeda K., Netherlands P., Probst L., Frideres L., 2015, *Internet of Things connected cars*, Business Innovation Observatory Contract, no 190.

Luh C.-J., Yang S.-A., Huang T.-L.D., 2016, *Estimating Google's search engine ranking function from a search engine optimization perspective*, Online Information Review, vol. 40(2), pp. 239-255, doi.org/10.1108/OIR-04-2015-0112.

Martinez-Fernandez C., 2010, *Knowledge-intensive service activities in the success of the Australian mining industry*, The Service Industries Journal, vol. 30(1), pp. 55-70, doi:10.1080/02642060802317820.

Miles I., Belousova V., Chichkanov N., 2017, *Innovation configurations in knowledge intensive business services?*, Foresight and STI Governance, vol. 11(3), pp. 94-102.

Muller E., Doloreux D., 2009, *What we should know about knowledge-intensive business services,* Technology in Society, vol. 31(1), pp. 64-72.

Neirotti P., Pesce D., 2019, *ICT-based innovation and its competitive outcome: The role of information intensity*, European Journal of Innovation Management, vol. 22(2), pp. 383-404, https://www.emeraldinsight.com/doi/10.1108/EJIM-02-2018-0039 (12.032019).

Norris D., Ciesielska M., 2019, *Towards a framework for innovation orientation within business and management studies*, Journal of Organizational Change Management, vol. 32(1), pp. 123-44.

OECD, 2018, *Oslo Manual: Guidelines for Collecting, Reporting and Using Data on Innovation*, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris/Eurostat, Luxembourg.

Palacios D., Soto P., Merigo J., 2015, *Online social networks as an enabler of innovation in organizations*, Management Decision, vol. 53(9), pp. 1906-1920.

Pavlou P., El Sawy O., 2006, *From IT leveraging competence to competitive advantage in turbulent environments: The case of new product development*, Information Systems Research, vol. 17(3), pp. 198-227.

Pomykalski A., 2001, *Innowacje*, Wydawnictwo Politechniki Łódzkiej, Łódź.

Rodriguez M., Camacho J. A., 2010, *Are knowledge-intensive business services so "hard" innovators? Some insights using Spanish microdata,* Journal of Innovation Economics & Management, vol. 1(5), pp. 41-65.

Rutkowska-Gurak A. 2010, *W poszukiwaniu miar innowacyjności rozwoju*, Acta Universitatis Lodziensis – Folia Iuridica, vol. 246.

Shi X., Wu Y.R., Zhao D.T., 2014, *Knowledge intensive business services and their impact on innovation in China*, Service Business, vol. 8, pp. 479-498.

Siguaw J.A., Simpson P.M., Enz C.A., 2006, *Conceptualizing innovation orientation: A framework for study and integration of innovation research*, Journal of Product Innovation Management, vol. 23, pp. 556-574.

Sundbo J.F., Toivonen M., 2012, *User-Based Innovation in Services*, Edward Elgar, Cheltenham.

Szarucki M., 2011, *Orientacja innowacyjna przedsiębiorstwa a jego sukces*, Prace i Materiały Wydziału Zarządzania Uniwersytetu Gdańskiego, vol. 4/3, Sopot, pp.189-197.

Śmigielska G., Wiśniewska S., 2016, *Innowacje marketingowe w handlu detalicznym*, Problemy Zarządzania, vol.14/1 (1), pp. 57-70.

Theoharakis V., Hooley G., 2008, *Customer orientation and innovativeness: Differing roles in New and Old Europe,* International Journal of Research in Marketing, vol. 25, pp. 69-79.

Vaughan L., 2016, *Discovering business information from search engine query data*, Online Information Review, vol. 38(4), pp. 562-574.

Wang F., Vaughan L., 2014, *Firm web visibility and its business value*, Internet Research, vol. 24(3), pp. 292-312.

Wolk A., Theysohn S., 2007, *Factors influencing website traffic in the paid content market,* Journal of Marketing Management, vol. 23(7-8), pp. 769-796.

Wong P.K., He Z.L., 2005, *A comparative study of innovation behavior in Singapore's KIBS and manufacturing firms*, The Service Industries Journal, vol. 25, pp. 23-42.

Acknowledgement