Knowledge Intensive Business Services: The Russian Experience

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Knowledge-Intensive Business Services (KIBS) are seen to be a core sector of the so-called 'knowledge economy', and already play an important role in developed economies. The KIBS providers are both innovate themselves and provide their clients with knowledge and learning opportunities.

This paper examines the status of KIBS in Russia, and explores some key issues in their role in innovation using data from surveys of KIBS firms and their clients.

Russia as a Service Economy

The global economy is shifting from agriculture and manufacturing to services, as measured by the percentage of the workforce employed in each sector and the value created by the different sectors. The International Labour Organization reported that for the first time in 2006, more people worked in the service sector worldwide than in either the manufacturing or agricultural sectors [*Spohrer, Maglio*, 2008]. Industrial economies have largely become service economies in these terms. By 2006, the service sector was responsible for over 70% of US and European Union-15 (EU-15) value-added, and just under 70% of Japan's. The share of employment in services was 81.4% in the US, 72.6% in EU-15 and 68.5% in Japan [*European Commission*, 2011].

Russia has been moving in a similar direction, especially since market reforms were introduced in recent decades. In the Soviet era, while manufacturing activities were given numerous privileges and released from hard budget constraints, the service sectors were treated as 'unproductive' and played a minor role in economic and social development. In 1989, the share of services in the USSR's GDP was between 30%–40% [IMF, 1991]. There was an almost complete lack of policies for a service economy .

The situation changed when market reforms started in the early 1990s. Economic liberalization led to domestic producers facing international competition; domestic prices for inputs such as energy have gradually approached world market levels. Many industrial enterprises went bankrupt. The services sector, however, absorbed some of the displaced labour and idle resources, It also provided job opportunities for new labour market entrants, and mobilized additional resources. Importantly, although many service jobs are fairly low skilled, the sector overall absorbed relatively skilled labour and created new incentives for skill formation [*Langhammer*, 2008]. Service industries are very diverse, and feature both low and high-skilled jobs in large numbers.

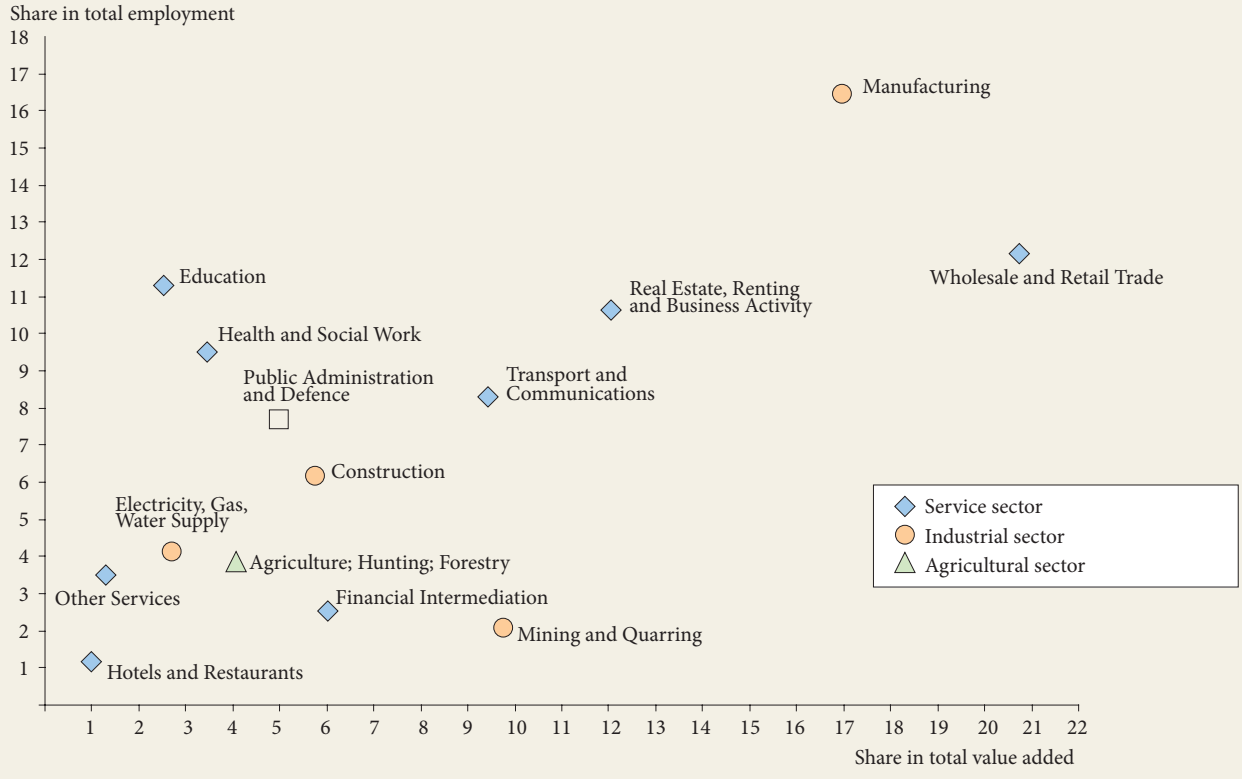
At the dawn of market reforms, Russia suffered from a severe deficiency in a competitive supply of services, especially those service industries supporting businesses. The sharp rise in demand together with a large stock of available resources (primarily human resources) enabled quick growth of the service sector in Russia. Its contribution to the national economy has almost doubled according to recent World Bank data, and now embraces 60% of GDP and 63% of employment. Figure 1 shows that while the manufacturing sector contributes more employment and output than any of the individual kinds of services, market services combined easily outweigh manufacturing. Public services exceed manufacturing in terms of employment, but (due to the statistical calculation methods) appear to lag in terms of value-added.

The KIBS Phenomenon

Business services, as well as the service sector on the whole, have shown substantial growth in the last 50 years, during which time they have become increasingly important elements of most Western economies. We use the term 'business services' in a broad way, understanding that some service sector firms may provide their outputs to consumers as well as to businesses and other organizations that support diverse business processes by providing similar services (for example, telecommunications, transport and financial services). Others may only offer services to organizations. For this reason, we distinguish between 'business-related services' (BRS) — services of all sorts that businesses and other organizations may purchase to support their business processes – and 'business services' (BS) — which are supplied predominantly to support business processes, and are relatively rarely acquired by consumers.

Statistical classifications have adjusted considerably to accommodate the growing importance of BS. In the long-standing *International Standard Industrial Classification* (ISIC) (most) BS were included under Division *K* — Real estate, renting and business activities, which with successive revisions of the ISIC was increasingly treated as a separate category from the 'Major Division' of services (Financing, insurance, real estate and business services). Towards the end of the 20th century, new and more elaborate classification frameworks were introduced, such as NAICS in North America and NACE in Europe. These too have

Figure 1. **The structure of the Russian economy by main economic sectors: 2013** (%)



Source: Federal State Statistics Service (FSSS) database, 2013.

undergone successive revisions. The most recent of revision of NACE (NACE rev. 2, adopted in 2008) provides useful insights on the structure of BS.

NACE rev. 2 divides the economy into 21 'sections'; two of these are particularly relevant to BS: ***M* — Professional, scientific and technical activities**, and ***N* — Administrative and support service activities**. Section *M* has seven divisions — division 69 [Legal and accounting activities]; 70 [Activities of head offices; management consultancy activities]; 71 [Architectural and engineering activities; technical testing and analysis]; 72 [Scientific research and development, R&D]; 73 [Advertising and market research]; 74 [Other professional, scientific and technical activities]; 75 [Veterinary activities]. The last sub-division of section *M* (75) is something of an anomaly. Section *N* covers six divisions, whose activities range from office support through security services and renting and leasing — some of these activities (like travel agencies) might better be considered as BRS, since they often serve consumers. We should point out that Section J — dealing with Information and Communication activities — includes several divisions that mainly support business processes, such as division 62 [Computer programming, consultancy and related activities].

An important feature of the activities in Section *N* (and division 62) is that these are typically activities that require a great deal of professionalism and specialized knowledge. For this reason, they are labeled KIBS (Knowledge Intensive Business Services). Within this category, researchers commonly differentiate between **P-KIBS** (traditional professional services such as accountancy and law, requiring specialized knowledge of organizational structures and regulations), and **T-KIBS** (technology-related services such as computer services and engineering services, requiring specialized scientific and technical knowledge). Recently, there have been suggestions that a third category — C-KIBS ('creative' business services) should be used to capture the distinctive features of activities such as advertising, industrial design, architecture, and a few other KIBS that require aesthetic and creative capabilities, and associated, specialized knowledge.

Most KIBS industries in many Western countries displayed substantially higher rates of growth compared to other market services and the economy as a whole (Table 1). The recent economic crisis has had uneven effects on different KIBS; they are rebounding in countries that have managed to weather the crisis.

Miles [2005] reviewed the major features of KIBS, including the undeniable fact that they tend to employ an unusually high share of graduates. The specialized knowledge that KIBS rely on may not always be acquired in higher education, but many KIBS firms insist employees have a higher education degree. KIBS sectors feature a higher share of small and medium-sized firms than manufacturing sectors: many of which are highly specialized and/or localized because of the need for personal contact and trust between KIBS suppliers and clients). However, most of these sectors also feature a few large, transnational companies which often provide services to transnational clients. Furthermore, KIBS often have higher shares of women in the workforce than the economy as a whole.

KIBS are problem-solvers, dealing with issues arising in different types of business processes, where the client seeks external specialized knowledge. It is often preferable to acquire these services externally, rather than in-house because of cost reasons, rapid changes in the sorts of knowledge required, and the benefits of getting external points of view, etc. The sorts of problems and knowledge involved include:

Table 1. **Share of KIBS in leading economies (%)***

		1975	1985	1995	2005	2006	2007
Value added	EU-15	4.7	6.7	8.7	11.5	11.7	12.0
	USA	…	7.2	9.4	12.9	13.0	13.3
	Japan	2.3	4.3	6.1	7.7	7.8	…
Employment	EU-15	4.0	5.6	8.6	11.9	12.2	12.6
	USA	…	8.2	11.0	13.2	13.4	13.5
	Japan	2.9	4.9	7.1	10.6	10.9	…

* Due to difficulties in comparing regions, KIBS here includes rental services (NACE rev. 1.1 71) alongside NACE rev. 1.1 categories of computer and related activities (72), research and development (73) and other business activities (74).

Source: Table 2.1 in[European Commission, 2011].

- administrative rules and regulations (legal and accountancy services);
- markets, branding and public relations (marketing, advertising, various consultancy services);
- movement, location and storage of goods, equipment and materials (supply chain management, logistics services, repair and maintenance);
- design, safety, effectiveness and related issues of aesthetics and regulation of built environments and infrastructure, goods and services (architectural and engineering services, design services, etc.);
- measurement and adaptation of properties of materials, chemicals, and devices (testing services);
- development of useful knowledge about problems associated with natural or social science and engineering issues (R&D services);
- configuration, integration, maintenance and application of information-processing hardware and software for business processes;
- gaps in skills, human relations, and organizational design (consultancy, counselling, education and training services, etc.).

The use of KIBS reflects several distinct trends. Social, economic and environmental challenges confront organizations of all sorts at some point, both directly and through the need to adapt to regulatory responses to the problems. New technologies also emerge, presenting problems and opportunities. In such cases, organizations may find that they lack sufficient knowledge internally and cannot acquire them rapidly enough. The problems may arise only occasionally or change so rapidly that the most efficient solution is to acquire highly specialized knowledge from external sources. Sometimes KIBS are used because regulatory requirements, informal norms or internal conflicts require disinterested third parties to be brought in. Finally, *outsourcing* is meant to cover the use of BS to focus on core capabilities and reduce the costs of in-house provision of non-core services.

Problem-solving may involve applying specialized skills and knowledge to a client who does not possess such knowledge, or generating new knowledge to address new problems. The view of KIBS as problem-solvers is reflected in arguments that this sector constitutes a 'second knowledge infrastructure', alongside the familiar knowledge infrastructure of universities and government laboratories [*den Hertog*, 2000]. Innovation is often a matter of overcoming problems, providing better solutions to problems, or using existing knowledge to develop new opportunities that lead to the recognition of 'latent' demands. KIBS act to support organizations that are confronting problems in their routine business processes, or are trying to turn a new idea into a commercial or socially useful application which attract attention from innovation practitioners, policy makers, and researchers. R&D services (and some engineering and testing services) are intimately related to innovation; they generate knowledge for their clients. T-KIBS in general often diffuse new techniques and systems to their clients, and are thus significant actors in innovation systems. Even P-KIBS — who can be important for organizational innovation — can play roles in technological innovation. Some KIBS acquire and apply strong competencies that can inform their clients' technology strategies (e.g. accounting and management firms providing IT services for clients, as well as regulatory and market advice for innovation). The point is not just that KIBS know or can create knowledge about solving problems. They are also able to involve their clients by sharing knowledge with them, or actually creating knowledge jointly with them. Thus, we note the presence of learning processes, potentially for both KIBS *and* clients.

The KIBS customer thus enters the equation in an important way. There can be difficulties in terms of service quality when the client has not chosen the most appropriate service supplier, or where they have not even specified their problem adequately. However, there may also be problems arising from a failure to recognize the necessity of engaging substantially with the KIBS supplier and thus to effectively co-produce the service. While it is difficult to estimate how extensive and costly such mismatches between client expectations and the performance of KIBS are, there is much evidence that they occur fairly often.[1] Thus innovation policy makers and educators should not only recognize the importance of KIBS in innovation systems, but should also be aware that improving the contribution of KIBS to national (and regional and local) economies may

[1] For a recent review, see [*Miles*, 2012]; for a perspective on how KIBS firms can manage their clients, see [*Bettencourt et al.*, 2002].

involve more than just promoting the KIBS sectors, their attractiveness as employers, the skills available for their use, and so on. It is also a matter of helping to ensure that potential clients of KIBS are well-informed about the potential opportunities arising from the use of KIBS, and what they need to do to realize these opportunities.

KIBS in Russia

Within the Russian services sector, business services are becoming increasingly visible. In the Soviet period, the majority of BS did not exist while the few that were present did not provide tradable outputs on a market. Some services — like audit, marketing, and logistics — were deemed unnecessary in a planned economy. Others, like legal services, banking, and insurance existed although with a narrower range of operations than now; their quantities and prices were however centrally established to avoid risks and competition. Technology-related services like IT, telecommunication and engineering services lagged behind international counterparts, in part because they were provided within centrally planned value-added chains (when they were not internal functions performed by special departments of manufacturing enterprises).

With market reforms, BS have become important inputs for all Russian businesses. Their contribution to leading economic sectors is comparable with that of traditional factors of production in Russia and Europe (see Table 2). The share of employees in KIBS as a proportion of total employment in the economy has increased from almost zero in the late 1980s to 3.3% in 2013.[2] The figure itself may not seem impressive as it is substantially lower than the EU average (approximately 12%). However, in Europe the landscape is uneven: Western European countries tend to have high shares of BS, while Central and Eastern European countries have substantially lower proportions, often quite comparable with those of Russia [European Commission, 2014, p. 66].

While business services on the whole are measured by both national and international bodies (see, for example, Table 2), KIBS are barely accounted for in Russian statistical publications. The Russian Classification of Economic Activities reserves separate groups and classes for a few, such as auditing (74.12), engineering (74.3 and partially 74.2), advertising (74.4) and recruiting (74.5). Other codes either combine business and consumer services (for example, design: 74.87.4), IT-related activities (72), legal services (74.11) and real estate

Table 2. **Structure of firms' total production costs (%)***

Articles of expenditure	Russia				EU-25			
	Overall	Agriculture	Manufac-turing	Services	Overall	Agriculture	Manufac-turing	Services
Land	0.6	13.0	0.0	0.0	0.1	6.5	0.0	0.0
Unskilled labour	11.3	30.7	8.7	13.7	14.3	32.2	14.2	16.1
Skilled labour	5.3	0.5	1.7	9.6	10.4	2.2	6.0	14.5
Capital	21.4	8.0	16.4	30.9	17.7	14.2	11.1	23.9
Natural resources	2.7	1.4	6.8	0.0	0.1	1.6	0.3	0.0
Agricultural goods	2.8	19.9	3.9	0.8	1.4	11.1	3.3	0.3
Manufacturing goods	28.8	13.4	38.2	22.3	23.7	18.4	44.8	12.1
Services	27.1	13.2	24.3	22.8	32.4	13.8	20.4	33.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Share of services indicates the median from **seven agricultural products** (cereals, vegetables and fruit, oil seeds and plants, meat and fish, milk and dairy products, vegetable oils and fat, sugar); **15** manufacturing industries (beverages and tobacco; food products n.e.c. (not elsewhere classified); forestry and wood products; paper products; publishing; mineral products; textiles; leather products; chemical, rubber and plastic products; base metals and metal n.e.c; motor vehicles and parts; transport equipment n.e.c; electronic equipment; machinery and equipment; and manufacturered products n.e.c.) and **nine service industries** (electricity, trade, sea transport, air transport, communication, financial services n.e.c, business services, insurance, other services).

Source: calculated from Global Trade Analysis Project database, March 2012. Available at: https://www.gtap.agecon.purdue.edu, last accessed: 17.07.2012.

[2] Calculated from the FSSS database using the Eurostat's definition of business services. Business services statistics are classified according to the NACE Rev.1 classification. Until 2001, the business services data covered NACE Rev.1 classes 72.10-72.60, 74.12, 74.13, 74.14, 74.20 and 74.40. From 2003, the data also cover the classes 74.11, 74.30, 74.50 and 80.42. For a discussion of KIBS in NACE, see [*Schnabl, Zenker*, 2013].

services (70.3), or they are partially included in other relevant economic activities (e.g. by reducing marketing services in market research and public opinion polling, 74.13). Thus, current statistics on KIBS are fragmented and present a distorted picture. Alternative estimates of their activities can only be found in a few studies, which are mostly in Russian and use surveys to collect empirical evidence. For example, [*Doroshenko et al.*, 2010] estimated the share of KIBS in Russia's GDP at 3-5% in 2007.

The data used here derive from specialized annual surveys carried out between 2007 and 2010 in Russia. The surveys reached 600–800 producers of KIBS annually.[3] While the surveys were fundamentally similar, some questions were only asked in particular years. Thus, when we report on KIBS characteristics below, we use data from various years according to availability. 55 to 65 market-leading Russian-based KIBS producers (big and medium sized companies)[4] were surveyed each year for each of the observed KIBS sectors. Executives answered questions about their own company and more general market developments. All surveys are anonymous and some firms took part in several surveys (not necessarily successive), but that does not negatively affect the generalisability of the results. The KIBS sectors surveyed are: advertising, marketing, audit, IT services, recruitment, engineering, financial advice, legal advice, property development services, and business design. This list includes most of the industries described as KIBS in the existing literature.

The study is unusual in that we had the opportunity to draw on data about KIBS users as well as suppliers (although we cannot match specific users and suppliers). In 2007 and 2011, a parallel survey covered over 700 business consumers of KIBS (firms that used none of the KIBS in our survey were excluded). Each of the business consumers were asked about their experiences with all KIBS from different sectors, resulting in over 2000 observations by customers about their experiences with KIBS sectors. Each respondent answered questions about all KIBS used by the company. In 2007, the average company used 4.7 services, and in 2011 — 4.2 services. This provided about 3300 answers from the KIBS' clients. The design and analysis of these surveys were also informed by structured interviews, conducted on an annual basis with at least six experts from each KIBS sector. These are drawn from the top executives of the leading provider companies from each sector; their interviews were used to preliminarily discuss research hypotheses, to scale the quantitative answers to be used in the mass surveys, and to inform our interpretations more generally.

Our study confirmed that before the recent crisis, the KIBS sector was growing at 20–25% annually, well above the average economic growth rate.[5]

The severe market crash in 2009 contracted the markets for KIBS, as businesses sought to reduce their costs. Perhaps KIBS inputs were still regarded as something of a novel luxury. The contraction of Russia's KIBS sector is estimated to have been 13% in 2009, and since then recovery has been uneven and uncertain (see Table 3).

Clients, Co-production and Innovation

Tether et al. [2001], using German survey data, discuss variations across service firms and sectors (including KIBS industries) in terms of the extent to which they standardize or particularize (or customize or specialize)[6] their services. The basic idea underlying standardization is to produce a large amount of almost

[3] The surveys were designed by the Institute for Statistical Studies and Economics of Knowledge, National Research University 'Higher School of Economics' (HSE ISSEK) and were conducted by ROMIR Monitoring, using original topic guides and questionnaires developed specially for this research.

[4] Our 2007 survey established that KIBS production in Russia is strongly concentrated, roughly following the Pareto principle: 20% of the companies accounted for 80% of the market. Respondents for the survey in each segment are recruited from the top 200 companies (measured by their turnover). While some of the same companies are surveyed in more than one year, the study was not designed as a panel survey. Indeed, data are provided to us anonymously, so we cannot examine the effect of such multiple representations. Foreign-owned companies are excluded from the study as the large multinationals who do supply Russian markets are believed to provide highly standardized services — this was confirmed by our expert interviewees. Russian companies compete with these multinational firms, in part, through providing more customized services; they would generally fail to compete in the standardized services market on the basis of economies of scale.

[5] GDP in 2000–2008 increased by only 7% per year, according to FSSS data (available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/accounts/#, last accessed: 30.10.2014).

[6] While it is possible to draw useful distinctions between different approaches here — see the discussion of customization later in this paper — there is little consistency in the usage of these terms in the literature.

Table 3. **Annual growth rate of Russian KIBS sectors after the 2009 crisis (aggregated responses, %)**

Question: 'Please estimate the growth rate of your market in the last year'

KIBS Sectors Used	2009	2010	2011	2012	2013	2008 to 2013
Overall	−12.5	3.2	4.3	1.4	3.1	−1.6
Advertising	−17.2	0.0	1.1	−2.3	6.3	−13.1
Marketing services	−15.2	2.6	−0.3	−0.5	3.3	−10.9
Audit	−12.8	−0.6	−2.4	4.3	−2.3	−13.8
Information Technology services	−9.3	9.0	20.5	−1.0	6.0	25.0
Recruitment services	−14.3	4.3	−4.2	4.0	2.4	−8.8
Engineering services	−19.8	−3.9	11.0	−1.1	0.7	−14.7
Financial Advice services	−5.2	12.7	16.8	0.9	1.1	27.3
Legal Advice services	0.1	9.4	−1.6	7.7	7.0	24.2
Development services	−17.8	−2.3	1.2	8.4	3.4	−8.9
Business Design	−14.3	−0.3	6.2	2.3	1.3	−5.9
Annual GDP growth rate (2008 prices)*	−7.8	4.5	4.3	3.4	1.3	5.3

* GDP data from FSSS database (available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/accounts/#, last accessed 30.10.2014).

Source: successive HSE ISSEK — ROMIR surveys of KIBS providing companies.

identical services, and to benefit from economies of scale achieved through routinized service production. Yet standard services are not suitable when the service is providing a solution to a problem that has many particularities and/or a few very critical ones).[7] Such a problem may call for some considerable effort on the part of the KIBS supplier. It may be that the understanding of the problem's root causes by the client, as well as by the KIBS firm, is shifted in the course of this 'diagnosis' phase of the problem. The service, as a solution, is individually tailored and tuned to the needs of the particular customer. This tuning is a knowledge-intensive process, which cannot readily be decomposed into a sequence of predetermined operations.[8] This kind of service production needs highly qualified, creative human resources. These knowledge intensive services are heterogeneous by nature, and highly relevant for a study of the innovative potential of KIBS. Tether et al. [2001], for example, found that in some (but not all) service sectors, high levels of standardization went along with lower levels of reported innovation (including process as well as service innovations).

The Russian survey data of KIBS firms addressed this issue in 2011 with a question asking providers about their experience in replicating service innovations (see Table 4). Surprisingly, over 40% of services were reported as **never** replicated to other customers. Another 24% reportedly were **rarely** replicated in

Table 4. **Replication of innovations (share of responses selecting each answer out of the total surveyed, %)**

Question: 'How often do you manage to supply service innovations to a customer which you co-created with another customer?'

KIBS Sectors Used	Response options			
	often	sometimes	rarely	never
Overall	9.3	25.6	23.6	41.5
Advertising	10.4	23.4	22.1	44.2
Marketing services	18.0	23.0	27.9	31.1
Audit	4.8	30.6	24.2	40.3
Information Technology services	3.3	43.3	18.3	35.0
Recruitment services	6.8	16.9	30.5	45.8
Engineering services	5.8	32.7	38.5	23.1
Financial Advice services	13.0	20.4	22.2	44.4
Legal Advice services	11.7	11.7	15.0	61.7
Development services	10.9	29.1	12.7	47.3
Business Design	8.1	25.8	25.8	40.3

Source: HSE ISSEK — ROMIR survey of KIBS firms, 2011.

[7] In the case of customization, it may simply be a matter of adapting an existing service design to a specific client's requirements, as in the case of many adaptations of standard data base systems to specific customers' requirements that differ from each other only in detail. In the case of particularized services, a more distinctive solution is created that fits the particular problem presented by the client.

[8] Yet KIBS providers may well use project management tools and best practice handbooks to guide them through the stages of problem diagnosis, and service design and delivery.

Table 5. **Distribution of KIBS in Russia by degree of standardization (share of responses selecting each answer out of the total surveyed, %)***

Question: 'What share of your total sales value in 2010 falls into each of these categories of standardization, where 1 = completely standardized, and 3 = fully customized?'

KIBS Sectors Used	Degree of services' standartization		
	Standard	Standard 'nucleus' with a personalized 'shell'	Customized
Overall	36.1 (32.6)	39.2 (31.1)	24.5 (29.6)
Advertising	30.5 (30.9)	43.6 (31.6)	25.3 (28.1)
Marketing services	42.0 (32.5)	43.5 (31.2)	14.4 (19.5)
Audit	45.2 (32.9)	33.4 (29.0)	22.5 (27.6)
Information Technology services	43.8 (28.6)	39.0 (26.0)	17.6 (18.0)
Recruitment services	38.7 (30.2)	44.4 (26.8)	18.2 (19.7)
Engineering services	34.8 (38.5)	30.6 (32.5)	35.0 (39.0)
Financial Advice services	34.5 (31.2)	51.0 (33.6)	14.6 (23.6)
Legal Advice services	32.9 (35.5)	28.5 (30.9)	38.2 (39.1)
Development services	33.5 (35.5)	41.9 (36.0)	21.6 (27.8)
Business Design	25.4 (26.1)	36.2 (28.0)	38.2 (33.1)

*Mean shares shown; standard deviations in brackets.

Source: HSE ISSEK — ROMIR survey, 2010.

this way. Only 10% were reported to be **often replicated**. Due to the non-random nature of our samples, we shall not analyse sectoral variations in detail. However, it is notable that the proportion of KIBS firms that said services were 'often' replicated varied dramatically by sector — from a low of around 3% to a high of around 18%. Those that 'never' replicated services varied from 23% to more than 47%. Moreover, we noted that very different sectors were found at the two extremes of these indicators. This reminds us that KIBS are themselves very heterogeneous, both across and within sectors.

In the previous year (2010) KIBS producers were asked to indicate the share of total sales value of services that services with different levels of standardization contributed. Three levels of standardization were proposed — services that were customized, essentially customized service variants around a standard 'nucleus', or completely standardized. Table 5 demonstrates that, overall, KIBS firms reported more than a quarter of their output, in terms of quantity of services, to be **completely** customized. All of the sectors feature some firms reporting extremely high or low levels of standardization. While in some sectors the great majority of firms report very little output coming from standardization, in others the focus of activity appears to be much more widely distributed, with some firms undertaking considerable degrees of standardization of their product. Interestingly, some of the more technology-oriented KIBS firms in this sample — notably IT services — quite frequently report high levels of standardization. Engineering, legal advice and business design services display less complete standardization, and substantially engage in personalization of a standard product.[9] Customization is much rarer in services like marketing and financial advice.

Generally, high degrees of standardization are uncommon while particularization is common in the Russian KIBS sector, at least among the leading providers that we sampled (we could expect small and very local firms to be providing more routine and elementary services). It follows that the majority of services that they supply can be seen as innovations, in the sense that they are new products during particular supplier-client interactions. In addition, at least a quarter of their output in value terms consists of services that are neither standardized products, nor customized products built around a standard nucleus.

The particularization of a service almost inevitably requires some degree of co-production: the client should at least supply relevant information about the business processes where there are problems that the KIBS firm is helping to address. Quite often, the client is engaged in much more substantial and prolonged dialogue with the KIBS firm, concerning the nature of its problem and the 'fit' of possible solutions (these may be discussed in an abstract way or applied in practice by developing prototypes or testing different options).

[9] Interestingly, we found a prominent number of legal advice firms reporting completely standardized services, alongside their non-standardized peers.

The term 'co-production' refers to the role of the customer in generating services, including many traditional services as well as KIBS. The basic point is that the customers and users of services often have to contribute greater or lesser amounts of effort to the service production process. Sometimes physical presence is enough, but often the client is required to input information and to interact more intensively with the service provider (and sometimes with other clients). Among other things, this can make assessment of service productivity challenging — should we include a customer's labour inputs alongside those of service workers? How do we assess innovations that shift the division of labour between service supplier and user? In the case of business services, the client organization is typically required to provide information to the service provider for the service to be produced; often there will be extensive interchange, as the service is defined and tailored to customer requirements. Information can flow in both directions, with both partners learning from the experience [*Doroshenko*, 2012; *Miles*, 2012].

Co-production can be more or less effective. When co-production works well, the quality of rendered services is high, and customers typically have a positive experience. We can expect that customers learn more, and thus that their innovative potential will increase; because they have learned through the interaction, we can expect them to demand more KIBS in the future since they have come to realize the value of specialized external knowledge. When co-production works poorly, the services that are provided will often be less appropriate to a client's requirements. A negative experience of acquiring low quality services might lead a customer to blame the specific KIBS firm, or indeed seeing that class of KIBS in general as not really up to the job. Alternatively, such an experience could be an incentive mechanism (where the client concludes that better co-production would improve results), which would contribute to improving the level of co-production of these customers in the future.

Poor co-production could result from numerous causes, for example loss of key staff at critical moments, unanticipated organizational crises, poor management procedures, etc. However, we anticipate that ineffective co-production will be most common among inexperienced customers, who have less understanding of the nature of KIBS service. They erroneously see KIBS as homogeneous (standardized) since the service offered to them looks identical to those that they have seen supplied to others in the market (we call this an 'opaque glass' effect: objects and differences between them become less recognizable when seen through an opaque glass). As a result, customers fail to appreciate that customization is feasible and requires co-production.

The Russian surveys allow us to examine the experience of co-production. Thus, KIBS providers were asked to estimate the level of customers' involvement in service production on a scale ranging from 1 (minimum participation, no inputs provided except the terms of reference for the service contract) to 10 (maximum participation i.e. joint project implementation). Table 6 presents data from the 2007 and 2011 surveys: the score for co-production in most sectors exceeds 6 out of 10, indicating that customers do often participate quite substantially in co-production of their services. Moreover, 30% of KIBS firms report scores of between 8 and 10 in both years. Overall, there is mostly very little change over the four year period. Individual sectors move in different directions, but generally in a very limited way, despite the economic downturn.[10] It may be that some KIBS firms are pushed towards more light-touch service provision, while others seek more co-production as a result of market contraction.

The survey also asked about the quality of co-production and the factors explaining why this is sometimes low. Less than half (46.5%) of Russian KIBS producers in 2011 thought that they received *excellent* co-production from their clients. Most respondents who said that co-production was imperfect explained that this was because clients were either unwilling or unable to co-produce, and not so much because they misunderstood the need for co-production (see Table 7).

It is not uncommon to find that clients do not understand the importance of co-production, although this can benefit them. Bettencourt et al. [2002] go so far as to advise KIBS firms about how to better mobilise their clients. We find support

[10] Since we do not have panel data, we cannot test the possibility that there is more volatility at the firm level. However, we think this unlikely.

Table 6. **Co-production of KIBS in Russia* (scoring)***

Question: 'Please estimate on a scale of 1 to 10 the degree to which yourcustomers are on average involved in the production of services, where 1 = provided the terms of reference for the service contract but otherwise minimum participation until we presented our final report, and 10 = full participation, close work in working groups, customer did some of the work themselves'

KIBS Sectors Used	2007	2011
Overall	6.1 (2.4)	6.3 (2.4)
Advertising	5.2 (2.4)	5.9 (2.2)
Marketing services	6.1 (2.1)	6.0 (2.3)
Audit	5.6 (1.8)	7.3 (2.6)
Information Technology services	6.4 (2.4)	6.2 (2.6)
Recruitment services	5.7 (3.1)	6.2 (2.2)
Engineering services	6.2 (2.4)	6.2 (2.1)
Financial Advice services	7.0 (1.7)	6.5 (2.5)
Legal Advice services	5.6 (2.5)	6.0 (2.6)
Development services	6.3 (2.7)	6.4 (2.6)
Business Design	6.5 (2.6)	6.2 (2.4)

*Mean scores shown; standard deviations in brackets.

Source: HSE ISSEK — ROMIR surveys of KIBS firms, 2007 and 2011.

for our 'opaque glass' hypothesis that explains customers' inability to appreciate customization and hence the importance of co-production. Our Russian survey data suggest there is a mismatch of perceptions between suppliers and customers, a feature first noticed in the 2007 survey. Providers and customers differ in their views on the extent to which KIBS services are customized (Table 8). For all KIBS sectors, KIBS producers considered a smaller share of services to be standardized on average compared to consumers.

The most striking result is that, in all KIBS sectors, consumers underestimate the degree of individualization of services compared to the providers' view (the latter's understanding should in theory be based on superior knowledge of how the services actually address customers' specific needs). This *asymmetry in perceptions* differs from the usual notion of asymmetric information as applied to services. The usual argument is that because the service product is not visible before it is produced, the customer will know less about the likely service quality than the supplier.[11] The key difference between the usual notion of asymmetric information and the idea of asymmetric perception introduced here is that the former is isolated from the market — it simply refers to the asymmetry in information between the two parties involved in a single transaction.[12] In contrast, the concept of asymmetric perceptions refers to other services (and goods) of

Table 7. **Reasons for imperfect co-production** (share of responses selecting each answer out of the total surveyed, %)

Question: 'Why have you been unable to achieve the required level and quality of coproduction?'

Response options \ KIBS Sectors Used	Overall	Advertising	Marketing services	Audit	Information Technology services	Recruitment services	Engineering services	Financial Advice services	Legal Advice services	Development services	Business Design
The customers follow the principle 'We pay — you work'	31.9	28.1	34.5	33.3	32.3	22.6	17.4	28.6	28.6	42.3	45.7
Insufficient competencies of customers make them poor co-producers	30.8	28.1	34.5	25.0	32.3	16.1	56.5	33.3	52.4	23.1	20.0
The customers are unwilling to co-produce as they want to save their employees' work time	18.7	15.6	10.3	20.8	16.1	25.8	13.0	33.3	9.5	15.4	25.7
The customers fail to understand why we need co-production	9.9	25.0	6.9	12.5	12.9	16.1	8.7	0.0	4.8	3.8	2.9
The customers do not want to share confidential information on their businesses	8.8	3.1	13.8	8.3	6.5	19.4	4.3	4.8	4.8	15.4	5.7

Source: HSE ISSEK — ROMIR survey of KIBS firms, 2011.

[11] Service marketing often uses the related concept of services that 'lack demonstrability.'

[12] There can be differences in the definition of the information that the parties view asymmetrically: efforts, technology, quality etc. In all cases, though, it is the information available to one party and not to the other party in the same contract or transaction.

Table 8. **Standard services in Russia as seen by service providers and consumers***

Question: 'What was the share of standard services in the total volume of services provided/ordered by your company?'

KIBS Sectors Used	Providers		Customers	
	Share (%)	*N*	Share (%)	*N*
Overall	47.0 (32.2)	612	54.6 (23.0)	2422
Advertising	45.8 (28.6)	68	52.8 (22.8)	515
Marketing services	36.5 (29.2)	59	54.8 (22.2)	187
Audit	60.4 (28.4)	62	59.6 (22.0)	256
Information Technology services	59.7 (29.0)	63	59.3 (22.5)	283
Recruitment services	40.5 (34.9)	53	56.1 (23.6)	236
Engineering services	47.0 (27.6)	60	52.8 (21.2)	196
Financial Advice services	59.2 (29.9)	63	61.1 (23.5)	139
Legal Advice services	50.1 (32.9)	53	52.5 (25.8)	210
Development services	48.4 (33.4)	63	53.1 (21.7)	164
Business Design	23.5 (29.8)	68	46.6 (21.8)	236

* Standard deviations shown in brackets. *N* differs for providers (here it is the number of firms, which equals the number of answers) and for customers (the number of valid answers, which exceeds the number of firms). In 2007, customers used on average 4.2 services.

Source: HSE ISSEK — ROMIR survey of KIBS firms and KIBS customers, 2007.

a similar nature that are provided to other consumers in the market. A customer may be fully informed about the service that has been rendered, but is still liable to consider it identical to the services provided to other consumers (of which they know little). As a result, customers of a tailored service may believe that they have purchased a standard service.

The asymmetry of perception stems from different degrees of awareness of the service process (rather than of the service product). From the viewpoint of the KIBS suppliers, clients frequently underestimate the particularization involved in this process. The producers of services know the technology of the service production thoroughly. They judge the degrees of individualization and innovativeness of the service based on knowledge of how the service was produced. In contrast, consumers will not be fully aware of the technology, work organization and activities involved in service production, although they may be very aware of the characteristics of the service rendered. In estimating the degree of standardization, consumers subjectively compare the service they received with their ideas of similar services supplied to other consumers ('services of the same name'). A comparison of this sort has an *'opaque glass'* effect. When one looks through an opaque glass, similar objects may seem — superficially — identical. Likewise, consumers of KIBS see a vague image of services provided and are unable to differentiate between services to see their individualized features. The 'opaque glass' effect prevents customers from distinguishing between a knowledge-intensive service innovation and a replication.

It is worth noting that asymmetric information and asymmetric perception can co-exist in these cases. To assess a product's particularization, a customer ultimately needs to be able to compare with other products (is there a product in the market that would better suit this particular consumer's needs?). However, such a comparison is not usually feasible. The consumer is not able to compare the service product in advance with other products to know if there is another product on the market that would better suit their particular needs; thus it is not feasible for the customer to assess a service product's particularization. The consumer can neither compare the service with other products, nor observe the process and judge on particularization (as the process is opaque). Making the process more transparent (removing asymmetric information between the two parties) contributes to a better understanding of particularization. It reduces but not entirely eliminates asymmetric perceptions because asymmetry is generated by the limited availability of information about the whole range of (potential) services on the market. We thus expect that if there is knowledge and information transfer during co-production, asymmetric information will be reduced (in the future and possibly during the transaction itself), which will also help to lessen asymmetric perceptions.[13]

[13] The opaque glass does not disappear completely but consumers become more confident that the service provided to them is particularized and thus unlikely to be a replica of other services on the market.

Customers with prior experience in consumption of KIBS should thus have a better understanding of the specifics of particularized services and thus a better appreciation of the role of co-production as a signalling device about the level of particularization. To analyse the effect of experience, we divided KIBS consumers into two groups:

- '*Experienced customers*' — defined as those who had used more than the average number of different services in the last three years (58.1% of the sample);
- '*Inexperienced customers*' — those who had purchased fewer services than average (the remaining 41.9% of the sample).

On average, inexperienced customers as defined above estimate the level of particularization of services to be 10% lower than experienced customers. The perceived particularization of services by consumers strongly correlates with the number of services purchased earlier (the Pearson correlation coefficient is 0.61). This supports our hypothesis that diverse experience with services overcomes the 'opaque glass' effect: the more types of services consumers use, the better they recognize service differentiation. On the contrary, 61% of inexperienced consumers believe services of the same name are standardized.

Co-production should ensure that the service is tuned to the needs of customers and that customers appreciate the usefulness of the service.[14] In order to identify the impact of experience, we asked those providers and consumers of KIBS who had reported incomplete absorption of services (26.5% of service providers and 24.5% of consumers on average across all sectors) why it was that full absorption failed (Table 9). The majority of the respondents (over 50% of service providers and over 60% of consumers) indicated that either the service did not match the customer's needs or that they felt the customer did not really need the service.[15] Both accounts suggest failures in co-production. On average, over 40% of all KIBS consumers reported that they paid for services that did not match their needs. The range across sectors is huge, from as low as 10% for design to as high as 80% for engineering.

Table 9. **Main reasons for imperfect service absorption (share of responses selecting each answer out of the total surveyed, %)***

Question: 'Why were the rendered services not fully absorbed? Choose ONE answer.'

Response options \ KIBS Sectors Used		Overall	Advertising	Marketing services	Audit	Information Technology services	Recruitment services	Engineering services	Financial Advice services	Legal Advice services	Development services	Business Design
Poor quality of the service	P	—	—	—	—	—	—	—	—	—	—	—
	C	11.1	10.0	8.1	0.0	0.0	9.1	0.0	0.0	8.3	50.0	20.0
Service does not match the needs of the customer	P	19.4	16.7	21.1	0.0	20.0	25.0	23.1	41.7	20.0	9.1	10.0
	C	40.5	45.0	56.8	61.5	42.9	36.4	80.0	25.0	33.3	16.7	10.0
The service was not actually needed	P	35.8	33.3	31.6	9.1	40.0	20.0	38.5	41.7	60.0	72.7	40.0
	C	22.8	15.0	10.8	0.0	57.1	27.3	0.0	37.5	25.0	33.3	20.0
Customer unable to implement (absorb) service	P	19.4	27.8	21.1	27.3	20.0	25.0	23.1	8.3	0.0	9.1	10.0
	C	15.7	20.0	18.9	23.1	0.0	27.3	0.0	25.0	16.7	0.0	30.0
The management of the customer company did not care whether or not the service was absorbed	P	17.2	5.6	15.8	54.5	13.3	25.0	7.7	8.3	20.0	0.0	30.0
	C	9.8	10.0	5.4	15.4	0.0	0.0	20.0	12.5	16.7	0.0	20.0
Other	P	8.2	16.7	10.5	9.1	6.7	5.0	7.7	0.0	0.0	9.1	10.0
	C	—	—	—	—	—	—	—	—	—	—	—

* For each suggested answer the table shows the percentage of respondents in the form x/y where upper figure (x) represents the answers of service providers, lower figure (y) represents the answers of the consumers; '—' = option not offered as a possible answer.

Source: HSE ISSEK — ROMIR survey of KIBS firms and KIBS customers, 2010.

[14] Although poor co-production need not necessarily imply poor absorption (a customer can still appreciate and absorb the service even if co-production is poor), the opposite does not hold. Poor absorption suggests failures in co-production. There are usually exceptions to such a rule of course, and here we might cite cases such as those when key members of staff in the customer firm depart, meaning that the co-production effort is poorly reflected in the experience of new staff.

[15] The exact wording for the service providers was 'the service was not needed (ordered for future needs, just in case)', while for consumers the wording was 'the service was not needed / useful.'

If co-production is required to fine tune a service, this unsatisfactory experience should act both as a strong signalling device (indicating insufficient co-production) and as an incentive mechanism (sending the message that it will be beneficial to co-produce in future). Only one of the four factors behind poor co-production mentioned in Table 7 seems to be irreparable: this is the competencies of the customer, which accounts for about 30% of poor co-production. The remaining factors account for about 70% of co-production failures — unwillingness to engage in co-production, customer's desire not to spend own human and time resources on the process, and not to share confidential information on their businesses. All these reasons can be overcome by the customer. We might therefore expect that even customers with unsatisfactory experiences in the past may achieve better experiences in the future.

KIBS as Enablers of Innovation

The topics of co-production and customization are inherently interesting, but also have broader implications for the very important topic of innovation. As we have seen, KIBS have often been identified as critical players in innovation systems, though this has not often been noted in the Russian context.

KIBS' clients can gain knowledge about their own business through interacting with the service providers. The interviews indicate that KIBS suppliers believe their customers often do not know exactly what they need at the outset. The clients have only general and fairly nebulous ideas about the service they require, e.g. 'I need your marketing efforts to promote my new product', or 'We need somebody for the post of project manager.' When the demand is fairly unspecified, it is obviously difficult to produce a tailored service. The KIBS suppliers make efforts to specify particular service parameters; this clarifying process may well last into the later stages of the relationship.

Four opportunities to improve customers' knowledge about their core activities can be identified:

a) Reflecting upon KIBS providers' questions and requests can lead the customers to articulate a more comprehensive understanding of their needs, and the state of their business (One KIBS provider told us that at the beginning of co-operation, a typical client's answer to any question is 'We've never thought about that before').

b) In the process of co-operation, consumers acquire general knowledge about their business environment from information supplied by KIBS suppliers (such as lawyers, financial and marketing consultants, recruiting agencies, etc.).

c) Communication with service providers reveals new opportunities that customers did not know about before or failed to appreciate. For example, recruiting agencies not only find candidates for existing vacancies, but also propose alternative forms of employment; real estate agencies organize 3D virtual tours inside and outside office buildings, etc.

d) Customers may improve their expertise in problem setting. For example, they may find that their initial ideas are unrealistic. Their first approaches may be illegal, liable to face huge opposition, or they may be technically unachievable. They can learn to avoid time-wasting by making more realistic demands from the outset.

Co-production can therefore upgrade KIBS customers' skills. They can learn more about their business and acquire new knowledge beyond their principal activities. Furthermore, they can jointly create innovative services, especially in the case of bespoke production. In this sense, customers acquire additional expertise in knowledge-intensive performance and thus improve their own innovative potential. This argument is supported by survey results. Table 10 summarizes customers' answers about the external effects of using KIBS. They indicate that their general propensity to innovate improves as a result of KIBS use.

Two thirds of consumer respondents reported improvement of their general propensity to innovate due to their experience with KIBS consumption and co-production. The most powerful influences appear to come from marketing consultants, who stimulate positive shifts in readiness to innovate in 80%

Table 10. **Effects of using various KIBS on customers' propensity to innovate** (share of responses selecting each answer out of the total surveyed, %)

Question: 'Please estimate the impact of KIBS consumption on your own company's propensity to innovate'

KIBS Sectors Used	Response options		
	Positive effect	Negative effect	No effect
Overall	65.8	0.8	33.4
Advertising	73.4	0.7	25.9
Marketing services	81.9	0.9	17.2
Audit	56.1	1.5	42.4
Information Technology services	73.7	0.0	26.3
Recruitment services	63.4	0.0	36.6
Engineering services	61.2	0.0	38.8
Financial Advice services	64.6	0.0	35.4
Legal Advice services	47.7	2.5	49.8
Development services	47.1	1.5	51.4
Business Design	72.0	0.0	28.0

Source: HSE ISSEK — ROMIR survey of KIBS company users, 2011.

of customer firms, according to their customers. Consultants in the spheres of business design, IT and advertising reported influencing over 70% of their consumers. Legal services demonstrate a less frequent effect, with just under half of their customers reporting positive effects. Strikingly, a negative impact was reported by less than 1% of respondents — and none at all for several KIBS.

Table 11 presents data for the 66% of the sample who reported that the use of KIBS had improved their innovativeness. They were asked about the intensity of the impact, answering on an ordinal scale ranging from 1 (weak effects) to 3 (radical effects). More than half of these customers reported substantial shifts in their innovation behaviour after obtaining experience with KIBS. The overall average positive impact of experience with KIBS reaches 2.5 (out of a possible 3) points in terms of strength of impact. The most radical improvements appear in the case of business design, legal and IT services.[16]

This evidence suggests that the KIBS sector generates strong external incentives for its clients to innovate. These incentives are likely to originate from new knowledge and skills acquired during service co-production in their principal activities. We would expect that the degree of generality will vary across various kinds of acquired expertise.

Table 11. **Degree of impact of KIBS experience, as seen by customers reporting positive effects of KIBS**

Question: 'Please estimate using a 3-point scale the degree of positive impact of KIBS consumption on your company's propensity to innovate after using marketing services, where 1 = weak impact, and 3 = radical impact'

KIBS Sectors Used	**Estimation of degree of impact** (*share of responses selecting each answer out of the total surveyed, %*)			**Mean grade** (*scores*)
	1	2	3	
Overall	9.3	33.0	57.7	2.5
Advertising	8.4	33.7	57.9	2.5
Marketing services	11.4	38.6	50.0	2.4
Audit	9.6	44.7	45.7	2.4
Information Technology services	11.0	26.4	62.6	2.5
Recruitment services	7.7	38.5	53.8	2.5
Engineering services	17.1	22.9	60.0	2.4
Financial Advice services	12.2	22.0	65.8	2.5
Legal Advice services	1.9	26.4	71.7	2.7
Development services	18.5	33.3	48.2	2.3
Business Design	4.5	28.8	66.7	2.6

Source: HSE ISSEK — ROMIR survey of KIBS company users, 2011.

[16] These answers come from firms reporting positive effects in the previous question. While legal services have the least frequent positive effect among all KIBS, it is one of the strongest effects when the effect is positive. A plausible interpretation of this result is that if legal services support new business start-ups then they are highly relevant for innovations; however if the services refer to more general legal issues, as they presumably do much more often, then there is generally no link to innovation activities.

Accordingly, we asked KIBS customers to estimate the extent of impact upon different types of innovations. The types of innovations are from the *Indicators of Innovation Activities* [HSE, 2010], enabling comparisons with other Russian industries. Their answers are quantified by the same ordinal variables as in Table 11 (from 1 = weak impact, to 3 = radical impact). The results are summarized in Table 12. We see a tendency to report stronger, rather than weaker, impacts in **all** five categories of innovation. The set of innovations where we see a low impact is marketing innovations, despite the fact that the use of marketing KIBS is seen as influential. Indeed, there seems to be a general link between the types of KIBS and the types of innovation.

Conclusions

The evidence from this study on Russia confirms and extends the thesis advanced mainly from studies in Western European countries: that the KIBS sector possesses a high innovative potential. KIBS sectors can generate service innovation of two types: commoditization and personalization of services. In Russia, the KIBS sector's share of innovative outputs is comparable with the most advanced industrial sectors. Importantly, KIBS also supports innovation among its users, and this support is a self-sustaining mechanism. The sector deserves more attention in statistical reporting and studies, and more consideration from policymakers and other potentially interested stakeholders, including management training schools and industry associations. KIBS can be significant sources of export earning and — according to our analyses — make a significant contribution to innovation in the economy as a whole.

Our study explores the issue of asymmetric perceptions of standardized / customized KIBS by providers and consumers, which partly explains the insufficient engagement in co-production by inexperienced customers. As if looking through an opaque glass, inexperienced clients see all services as essentially similar and do not see the benefits of co-production. A lack of co-production, due to customers' failure to understand why it is needed, means that services are not always fully absorbed by the customers. They may be inadequately tuned to the needs of the customer, or customers may be under-equipped to absorb them; both problems can be addressed through meaningful co-production of KIBS. The results of our study support the idea that customers with prior experience in KIBS consumption better understand why they need KIBS and the benefits from co-production. This could be an issue to address in awareness-raising initiatives for KIBS firms as well as other organizations.

Table 12. **Degree of impact of KIBS experience on different service innovations** (share of responses selecting each answer out of the total surveyed, % of responses)*

Question: 'Please estimate the degree of positive impact of KIBS consumption on your propensity for different types of innovations, on a scale of 1 to 3, where 1 = no impact, and 3 = strong impact'

KIBS Sectors Used / Types of Innovation	Overall	Advertising	Marketing services	Audit	Information Technology services	Recruitment services	Engineering services	Financial Advice services	Legal Advice services	Development services	Business Design
Communication	2.39	2.38 (0.7)	2.30 (0.7)	2.15 (0.7)	2.59 (0.6)	2.27 (0.7)	2.44 (0.7)	2.45 (0.7)	2.47 (0.6)	2.52 (0.8)	2.48 (0.7)
Product	2.37	2.37 (0.7)	2.46 (0.7)	2.30 (0.7)	2.43 (0.7)	2.28 (0.8)	2.51 (0.7)	2.18 (0.7)	2.36 (0.7)	2.00 (1.0)	2.60 (0.6)
Technological	2.36	2.25 (0.8)	2.49 (0.7)	2.41 (0.7)	2.42 (0.8)	2.17 (0.8)	2.61 (0.6)	2.19 (0.8)	2.25 (0.8)	2.35 (0.8)	2.59 (0.6)
Organizational	2.34	2.33 (0.7)	2.43 (0.7)	2.31 (0.7)	2.21 (0.8)	2.25 (0.7)	2.08 (0.7)	2.41 (0.7)	2.62 (0.6)	2.44 (0.8)	2.37 (0.7)
Marketing	2.14	2.26 (0.7)	2.41 (0.6)	2.06 (0.7)	1.88 (0.8)	1.94 (0.7)	1.91 (0.8)	2.27 (0.7)	2.22 (0.8)	1.63 (0.7)	2.27 (0.8)

*Mean grades; standard deviations in brackets.

Sources: HSE ISSEK — ROMIR survey of KIBS company users, 2011.

The survey data also supported the point that KIBS use can affect propensity to innovate and finds that when it does, the effect tends to be positive and strong. Increased innovativeness is reported to directly contribute to intentions to consume KIBS further, thus creating a virtuous circle. Conceptually, these effects are linked to knowledge transfer during co-production: customers acquire both specialized and general knowledge, improving their skills and abilities and increasing their innovation potential. This makes them better understand their own needs, and incentivizes them to demand more customized KIBS in the future. Thus KIBS are important players in innovation systems, and policymakers may consider stimulating innovation through support for the KIBS sector.

In the past, it has often been assumed that the public knowledge infrastructure should supply KIBS like services. This assumption, however, runs the risk of diverting universities and laboratories away from their core missions, while failing to provide sufficient quality of services. It is doubtful that such strategies of 'enforcing' or subsidizing provision of KIBS by public bodies contributes to the development of the sector as a whole in many cases. Alternatively, policy could target KIBS consumers, creating incentives for them to make use of KIBS suppliers and actively engage in co-production. Our observations show that a lack of experience (or, possibly, an interruption in experience with KIBS) can be an obstacle for effective co-production, and hence for improving the innovation potential of the KIBS sector.

The public sector can be a significant consumer of KIBS (to support its own business processes). Another step towards the exogenous creation of KIBS experiences could involve outsourcing some public services to KIBS providers (e-Government is one possible example). The policy mix for public-private partnerships in the KIBS sector could be diversified. This will require changes in public procurement procedures, since they tend to emphasize price when selecting service providers. In contrast, the firms studied in this paper are those where price is less important than knowledge intensity and the quality of the outsourced services when selecting KIBS providers. Simply applying competitive, price-based selection procedures in the KIBS sector is rarely possible, and thus procurement policies face a strong challenge here [*Edler, Georghiou,* 2007; *Satzger et al.,* 2009].

Finally, public authorities could support KIBS production and absorption through policies on training and skills development, and through strengthening service quality control (for example, by promoting standards and professional self-regulation although there is a risk that professionals create entry barriers to defend their interests rather than the more general welfare of society). Another key policy area relevant for KIBS is the development of educational and professional standards in this sector. F

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