

Conditions for innovation in KIBS: evidence from Small KIBS firms in Ontario

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1. Context of the research and methodology

The key aim of the research project was to analyse the conditions for innovation in KIBS with a focus on the use of ICTs in knowledge production and diffusion, and the internal and external knowledge search strategies pursued by KIBS to innovate. The data used in the quantitative analysis originate from a firm-level survey. The core questions in the questionnaire were inspired from Statistics Canada's Survey of Innovation and Business Strategy (Statistics Canada), the Community Innovative Survey, and the third edition of the Oslo Manual of the Organisation for Economic Cooperation and Development (OECD). The survey was carried out between September 19, 2015 and May 4, 2016 through computer-assisted telephone interviews. The primary data source for the survey population was the Dun & Bradstreet's Ontario directory (2015). An initial sample of 2,000 KIBS establishments was randomly drawn from the entire population of firms available (5,060 establishments). The sampling was restricted to Computer Services (NAICS 5415), Legal Services (NAICS 5411) and Management Services (NAICS 5416). Firms with fewer than 5 and over 200 employees were not included in the sample. In this respect, we deviated from Industry Canada's categorization of SMEs in service-based business given the fact that they define a small business as one that has fewer than 100 employees (if the firm is producing a goods-producing business) or fewer than 50 employees (if the firm is a service-based business). Ultimately, we obtained valid responses from 392, representing a sample rate of 19.6%. Given the small sample size and the profile of the constituent firms, the generalizability of our results is limited. The goal of this study is not to produce an overall profile of innovation in service firms, but rather to better understand how some KIBS firms innovate, and to identify the activities most likely to influence different forms of innovation.

2. Question 1. *What was my key research question and what is my major finding from the research?*

The research project on the determinants of innovation in KIBS was articulated around the following questions:

- What is the role that ICTs play in supporting the innovation process of KIBS firms?
- What kinds of internal and knowledge sourcing strategies impact on innovation?
- To what extent KIBS innovation varies across regions?

The first result relates to the question how the use of ICTs positively impacts on innovation. The literature new information and communication technology (ICT) acts as a catalyst for innovation,

which in fact frequently results from the introduction of new technologies or the adaptation of existing technologies in a firm. KIBS can furthermore act as infrastructure to support the development of new services within a firm, ultimately leading to more efficient innovation processes. The results of the research show that the use of ICTs shows no univocal influence on innovation in KIBS. Rather, we note that only the use of cloud computing shows a significant effect, but that effect is divergent for both forms of innovation, supporting our general intuition that the two forms of innovation present different characteristics. This hypothesis is therefore not entirely upheld and our results partially corroborate some studies that find no association between the use of different information technologies and innovation. However, these results should be interpreted cautiously. These results do not necessarily mean that the use of ICTs in general has no impact on company activities. Our results could also be explained by a number of other factors. For instance, some of these technologies are used by a considerable proportion of firms and therefore do not represent a direct source of competitive advantage. As well, it is possible that the application of these technologies is most useful to optimize existing processes rather than to create new forms of technological and non-technological innovation. The effect of cloud computing nevertheless shows that some technologies can be associated with more innovative companies, but that their benefits may apply only to certain activities. The specific contribution of cloud computing (and of ICT in general) should be deepened, as well as the correlation direction, that is, if innovative KIBS have a greater tendency to adopt this technology or if it contributes a posteriori to innovation activities, and vice versa for non-technological innovation.

The second result relates to the question of the extent to which the use of ICTs provide support to to developing and maintaining collaborations with external partners. The results show that, on the whole, the propensity to introduce a service that is new-to-the market in comparison to new-to-the firm is predominantly explained by a greater intensity of interactions with external partners and the use of video-conferencing as a tool to increase efficiency in communication and knowledge exchange. We have shown that KIBS that have introduced new-to-market innovations are strongly engaged in collaboration with their clients and their principal subcontractor. This empirical result is fairly intuitive: it validates the view that KIBS do not merely accompany their clients' innovation processes and occasionally adopt technologies developed elsewhere, but are innovators and carriers of change on behalf of – and in cooperation with – their clients. F2F interactions with both partners were not significantly related, however, suggesting that the transfer of more tacit types of knowledge is not more important here. With respect to the use of ICTs, some technologies are still not as widely adopted as we would think. Because most technologies considered in this paper are not significantly more related to some types of innovators than others, video-conferencing appears to be strongly positive across all types of collaborations. Therefore, the study suggests that ICTs may play a role in the development of new products in service firms, because they support external knowledge processes that will have an impact on innovation. However, only the use of video-conferencing technology is associated with innovation. The result appears to support some studies that demonstrate the lack of association between the use of different information technologies and innovation.

The third result relates to the question of the extent to which different types of innovation require distinct kinds of knowledge search strategies. We show a positive direct relationship between innovation type and openness, be it in terms of external sourcing and external partnering strategies. The study reveals that marketing innovation entails significantly higher external knowledge sourcing than any other types of innovation, while product innovation entails higher

external partnering than any other types of innovation. KIBS that conduct marketing innovation seem to seek external knowledge from more sources and at higher intensity, perhaps reflecting their recognition that it is information that has higher strategic value for developing significant changes in product placement, product promotion or pricing. On the other hand, KIBS which develop product innovation seem to more likely opt for high degrees of external partnering, perhaps suggesting that significant improvements in technical specifications, components and materials requires formal partnerships with other clients and organisations. Such result suggest that product innovation is driven by collaborative efforts to find or develop new ways to create value with service beneficiaries (e.g. customer, supplier, other KIBS, etc) through the integration of resources and know-how exchanges and service exchange and delivery. Finally, the intensity of use of ICTs was not related to any form of OI strategies.

The four results relates to the extent innovation differ according to the location of KIBS firms, in relation to urban areas and major cities. The results show that KIBS, irrespective of their location, share many similarities in the way they innovate. Most of KIBS use multiple types of ICTs and the firms rely significantly more on internal R&D than on external R&D. Most of them rely on multiple external sources of information and are integrated in innovation partnerships, that clients are the most important partner. Most of these partnerships are developed with local and regional collaborators. The innovative performance of KIBS measured as the new service introduce into the market, do not differ according to the types of regions, namely metropolitan, small urban regions and peripheral regions. With respect to some differences, we found that firms in large urban regions tend to focus more on internal resources for innovation, whereas KIBS in small peripheral regions stand out as relying more on external forms of partnerships. This highlighted the fact that KIBS in urban areas effectively show a higher level of internal resources for innovation, while KIBS in remote areas compensate the relative lack of resources by opting for other strategies based on partnerships and openness.

Question 2. *What do my research finding mean for our understanding of Canada's digital opportunity?*

The constant changes in the reach and use of ICTs in recent years have had an impact on the efficiency of interaction processes and innovation-related activities. First, ICTs contribute to internal efficiency through better information sharing and communication and greater employee involvement across the hierarchical structure. They connect people and resources more quickly and efficiently. ICTs thus make it possible to adopt new production methods, improve logistics and simplify back-office processes, all of which in turn support innovation processes within the firm. Second, ICTs supports the management of the firm's external networks, allowing them to share, exchange, and communicate with external agents, connecting them more tightly with other firms or universities, consultants, or research institutes. The use of ICTs can in some cases substitute face-to-face interactions and consequently reduce the resources that have to be dedicated to direct interactions with both local and geographically distant partners. However, that the possibility of substituting all forms of interactions with ICT-enabled processes is limited because of the difficulties associated with maintaining distant partnerships. Nevertheless, technologies for external use make it possible to strengthen and increase the frequency and efficiency of communication processes with external partners, contributing to open innovation strategies. Therefore, a greater use of ICTs allows the firm to both improve the efficiency of its

internal processes along with providing support to developing and maintaining its relationships with external partners.

However, the results of this study provide mixed results and it remains unclear how KIBS use different technologies with respect to internal processes and innovation, as other determinants have proven to have more predominant roles. However, this research has clearly shown the role of KIBS as innovators themselves by introducing new technologically driven services. Indeed, a large majority of firms that were surveyed reported having introduced both non-technological and technological innovations in the recent past. Hence, through the development of advanced solutions, KIBS importantly contribute to the digital shift of the Canadian economy not singularly in their own sector, but also for a large range of other sectors that acquire these solutions to improve their internal processes. The results of this research therefore suggest a large and important role for specialized services in the development of Canadian industries.

4. Question 3. *What are the key policy implications that flow from my findings?*

Policies should not neglect the KIBS sector and rather recognize the role of KIBS as key knowledge generators and providers in the economy. Two key points will be highlighted here. The primary step in encouraging the development of KIBS, and hence knowledge diffusion, is to raise awareness of their role and contribution at the policy and firm levels. This is especially relevant for smaller firms that seek to improve their processes, but lack their internal skills and expertise to do so. A clearer understanding of the long-term benefits of acquiring external specialized services could lead to net efficiency and profitability gains. This directly relates to the second point: firms often lack the financial resources to acquire these services. Two forms of intervention are possible in this respect. First, a supply-driven approach focuses on supporting the provider through funding, tax incentives, or consultancy. Increasing the supply of specialized services could be beneficial for consumers by lowering their prices. Secondly, a demand-driven approach would rather consist of providing financial support to firms acquiring knowledge-intensive services for various applications, including commercialization, expansion and profitability. Indeed, these types of policy interventions are not mutually exclusive and could, overall, further the development of the digital economy in Canada by encouraging the creation and diffusion of specialized knowledge within and across ecosystems, representing commercial opportunities for KIBS themselves as well as for a wide range of other economic sectors.

The second policy implication for this research concerns innovation in KIBS. This research emphasizes that innovation covers a number of activities. The results show the extent to which innovation and services are processes that require a wide range of activities, resources, and new organizational practices. It is common for innovation policies to consider an industry as a homogeneous entity, but the findings here demonstrate that there is a variety of ways KIBS innovate and no particular strategy precludes innovation. This heterogeneity calls for flexible incentives that take into account the multidimensional nature of innovation and avoid orienting the national innovation strategy towards a narrow understanding of innovation. They must also keep in mind that some of innovation activities may have different and sometimes counterintuitive effects on the implementation of successful innovation strategies in general, and on specific forms of innovation.

The third broad policy implication for this research concerns regional economic development. It has been highlighted that although the architecture of KIBS' innovation activities varies across regions, the propensity to introduce new services to the market is similar for metropolitan and peripheral regions. KIBS are key structural elements for the development of strong ecosystems both in, and outside metropolitan areas. However, policies regarding regional economic development tend to bear an urban bias, which, for various reasons, should be remedied. In front of growing inter-regional economic and social inequalities, policy makers have to find solutions to sustain the development of peripheral regions. Recognizing that it should be a comprehensive task, policies should consider the important role of knowledge-intensive services for employment and broader industrial development.