

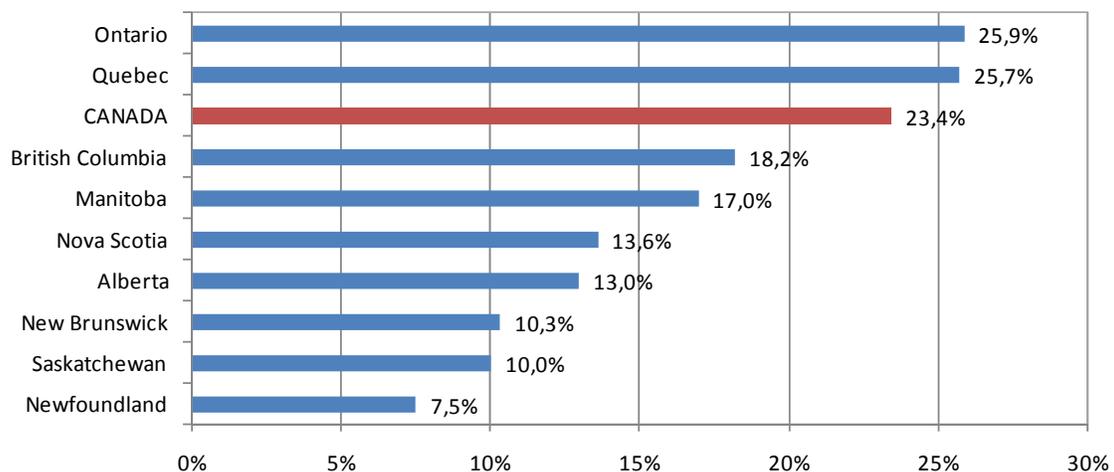
RESEARCH IN CANADA 2007: A COLLABORATIVE AFFAIR¹

This research note deals with collaborative practices in Canadian scientific publications. At the provincial level, we analyze three types of collaborations: intra-provincial (between two or more institutions from the same province), interprovincial and international. In addition, Canada's international collaboration practices since 1980 are presented according to three aspects: global international collaboration, carried out with all countries, international collaboration with other G7 member countries, and collaboration with non-G7 countries².

Intra-provincial Collaboration

What could be more natural than to seek collaborators from among one's closest neighbors, especially when the organization to which the researcher is attached is relatively small? Yet that requires that the province includes other research organizations working in the same field. This is illustrated in Figure 1.

Figure 1
Share of Canadian Papers Written in Intra-provincial
Collaboration by provinces (2007).



Source: Observatoire des sciences et des technologies, SCI Expanded database

¹ The data presented here are from the Canadian Bibliometric Database (CBD™) constructed by the Observatoire des sciences et des technologies (OST) based on the Web of Science from Thomson Reuters®, which contains the Science Citation Index-Expanded, the Social Sciences Citation Index and the Arts and Humanities Citation Index. Copyright: Thomson Reuters. The CBD™ is a registered trademark of the Observatoire des sciences et des technologies.

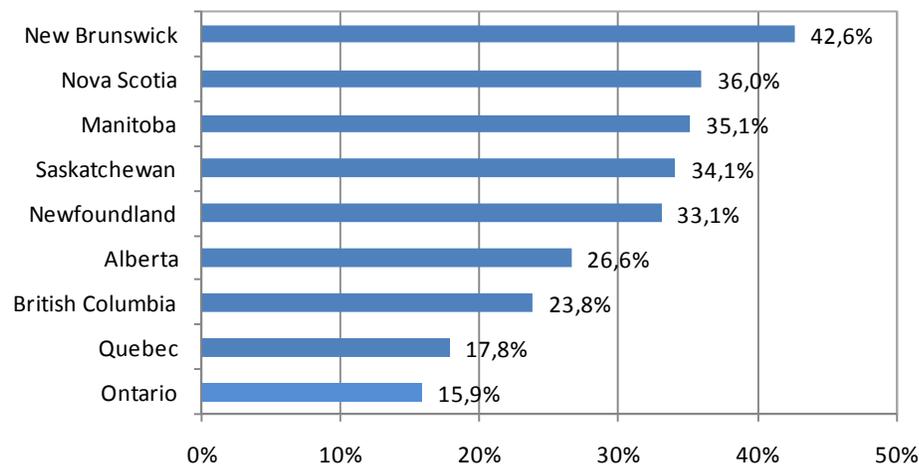
² G7 member countries are the United States, Great Britain, Japan, France, Canada, Italy and Germany.

At first glance, it is evident that this classification follows almost exactly that of the population of each of the provinces³. However, note the inversion between Manitoba and Alberta and the fact that Quebec's intra-provincial collaboration share is almost equal to that of Ontario, which is probably an effect of the province's French character. Ontario's high rate of intra-provincial collaboration can be explained by the fact that numerous of the country's largest university, hospital and government research institutions are in that province; researchers therefore often do not have to look very far to find collaborators and/or the equipment and installations necessary to their work.

Interprovincial Collaboration

When the collaborator is not close at hand, researchers can still knock on the neighboring door (province), whereas if the province has several research organizations, interprovincial collaboration becomes less necessary. Figure 2 partly illustrates this phenomenon.

Figure 2
Share of Canadian Papers Written in Interprovincial
Collaboration by Provinces (2007).



Source: Observatoire des sciences et des technologies, SCI Expanded database

It is striking to find the Maritime Provinces among those that collaborate most with another province, followed by the central and the western provinces. This high rate of collaboration in the Maritimes arises in part from the fact that there are few research institutions in this region; these therefore sometimes have networks, either of campuses or of hospital institutions in the case of the universities, extending over several neighboring provinces, which favor interprovincial collaborations. We can also presume the existence of networks corresponding to

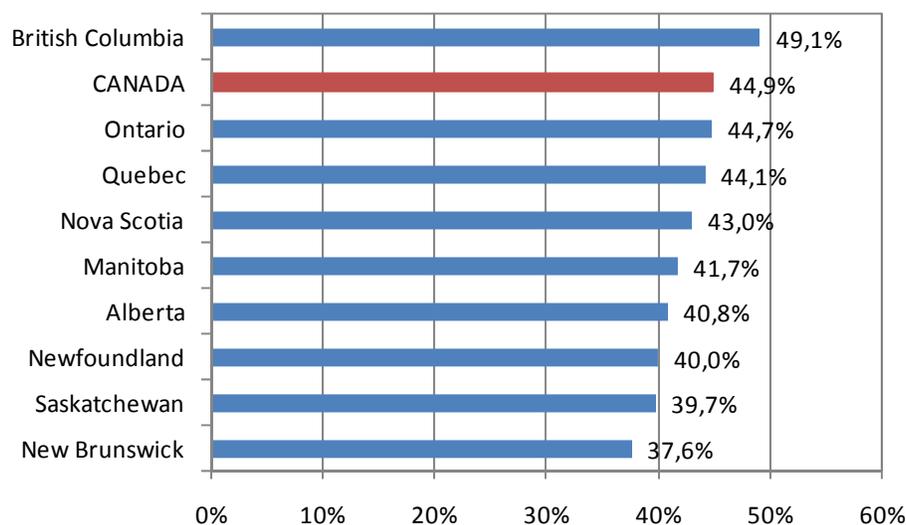
³ The province of Prince Edward Island is not taken into account in this study due to the too-low number of publications for the period under consideration.

the major Canadian regions. Finally, Ontario and Quebec, which in 2007 accounted for almost two-thirds of all Canadian publications, collaborate much less with the other provinces.

International Collaborations of the Canadian Provinces

International collaboration in scientific research is widespread in each of the provinces, as illustrated in Figure 3.

Figure 3
Share of Canadian Papers written in International
Collaboration by provinces (2007).



Source: Observatoire des sciences et des technologies, SCI Expanded database

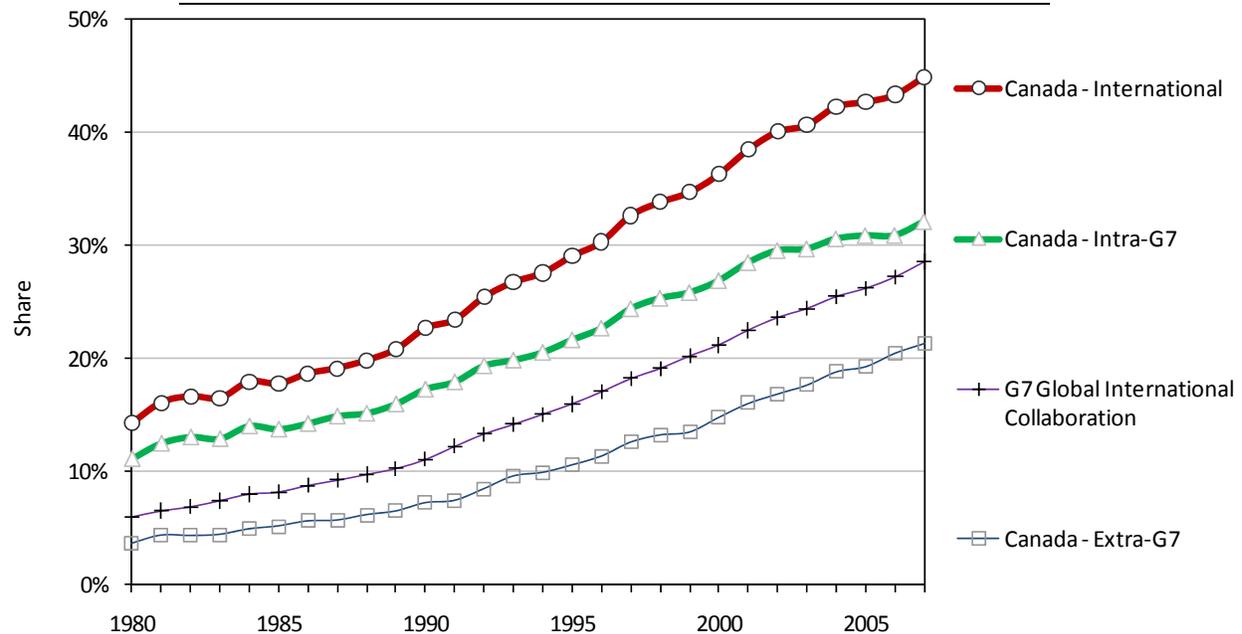
Basically, the gaps observed are much smaller than previously, the lowest rate being 37.6%, and if it were not for British Columbia, they would extend over less than 8 percentage points. Basically, the Canadian average⁴ is pulled upward by the high rate of collaboration, almost 50%, measured for British Columbia. One may think that the proximity of this province to the multitude of Asian countries would make it an excellent candidate for a high rate of international collaboration. In addition, the immigration that frequently results from this proximity can lead to international collaboration networks.

⁴ This is a true average: number of articles with author(s) from another country/total number of articles.

Canada's International Collaboration

Growth in the share of articles written in international collaboration has been constant for more than 25 years in Canada, as illustrated in Figure 4.

Figure 4
Share of Canadian Papers Written in International Collaboration, World Total, Intra-G7 and Extra-G7 (1980-2007).



Source: Observatoire des sciences et des technologies, SCI Expanded database

The share of Canadian researchers' scientific papers involving collaboration with at least one researcher from another country was 14.3% in 1980, 22.7% in 1990 and 36.3% in 2000, while it reached 44.9% in 2007, or almost one of every two papers. This time, it is much more the vitality and the excellence of Canadian research that demonstrates this type of collaboration.

In addition, the gap between Canada's international collaboration rate and the average for G7 countries increased from 8 to 16 percentage points over the entire period. The United States, which is the largest contributor to the total number of publications of the G7 countries⁵, has a lower propensity to collaborate internationally. This is quite evidently a statistical relationship: the larger a country's scientific production, the less these publications are likely to be produced with partners from other countries. Furthermore, there is a relatively high negative correlation between the scientific production of countries and their rate of international collaboration.

⁵ The U.S. represents almost 50% of G7 publications.

In addition, Figure 4 shows that Canadian researchers' principal collaborators come from the most developed countries, in particular those of the G7: over the entire period, these collaborations represent almost three-quarters of all of Canada's international collaborations.

These results illustrate the development of research in collaboration in Canada since 1980. International collaborations rose during this period from 15% to almost 50%, added to which are numerous interprovincial and intra-provincial collaborations. The regular growth shown in the figures demonstrates that it is not accidental and that research activities represent less and less the work of a single isolated researcher, but have rather become global enterprises, for which there are no longer any borders.

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