# The Nature and the Structure of Scientific and Innovative Collaboration Networks

**Authors :** Afshin Moazami, Andrea Schiffauerova

**Abstract :** The objective of this work is to investigate the development and the role of collaboration networks in the creation of knowledge and innovations in the US and Canada, with a special focus on Quebec. In order to create scientific networks, the data on journal articles were extracted from SCOPUS, and the networks were built based on the co-authorship of the journal papers. For innovation networks, the USPTO database was used, and the networks were built on the patent co-inventorship. Various indicators characterizing the evolution of the network structure and the positions of the researchers and inventors in the networks were calculated. The comparison between the United States, Canada, and Quebec was then carried out. The preliminary results show that the nature of scientific collaboration networks differs from the one seen in innovation networks. Scientists work in bigger teams and are mostly interconnected within one giant network component, whereas the innovation network is much more clustered and fragmented, the inventors work more repetitively with the same partners, often in smaller isolated groups. In both Canada and the US, an increasing tendency towards collaboration was observed, and it was found that networks are getting bigger and more centralized with time. Moreover, a declining share of knowledge transfers per scientist was detected, suggesting an increasing specialization of science. The US collaboration networks tend to be more centralized than the Canadian ones. Quebec shares a lot of features with the Canadian network, but some differences were observed, for example, Quebec inventors rely more on the knowledge transmission through intermediaries.

**Keywords :** Canada, collaboration, innovation network, scientific network, Quebec, United States