

# Networks of Canadian Business Elites: Historical Corporate Interlock Networks circa 1912

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## Abstract

This paper provides details about a historical dataset of Canadian corporations and business elites who served on corporate boards circa 1912. The source of this corporate interlock data is the *Directory of Directors in Canada, 1912*, a public domain volume listing Canadian public companies in Canada. Because these data are thought to be of interest not only to network researchers, but also to business historians and management scholars, an attempt has been made to make the data as easy to use as possible. Supplementary information has also been added to the network files provided. All of the individuals and companies in the dataset have been geolocated. The proper 1911 Census Division a company was located in has also been added so that the networks can be combined with other publicly available data from the period. Two sets of graph files are provided in CSV format with other formats provided on the author's website. The first file contains corporations as the nodes with directors as edges. The second file has the individual directors as nodes and edges connecting them are corporate boards individuals both sat on.

## Keywords

Corporate interlock network, Canadian business elites, business history.

The dataset presented in this paper offers a unique view into the relationships of business elites in Canada in the early part of the last century. Canadian business was marked by the existence of powerful families that occupied the boards of many corporations. Also present, but less common, were more widely held firms with more entrepreneurial owners. At that time, Canadians considered themselves very much a part of the British Empire. The major financial and business centers at the time were Montreal and Toronto. Although, the mid-western city of Winnipeg was a rapidly growing regional center as well.

This dataset allows for the identification of major corporations and the ties that exist between them through corporate directors. The coverage in the data presented here is the complete volume of the *Directory of Directors in Canada* published in Canada by W.R. Houston (1912). The entire volume is now public

domain and available for download (at <https://archive.org/details/directorydirector00housuoft>). Houston had close ties to the Toronto Stock Exchange that only grew over time. For example, his offices were originally located nearby the exchange, but eventually they were relocated to the Exchange itself (Murphy, 1984).

In the sections that follow, I will outline the details of the graph and associated data that were collected. The data that this paper describes are available as two different network projections. The first is a graph describing the relationships between firms as nodes, with directors as edges relating these organizations. The other file describes the network of individuals that served on the boards of the firms. In this file, the nodes represent people and the edges are the boards that they have common membership on. Both are projections of the same data for ease of use by those less familiar with network visualization and analysis software.

## The format and contents of the corporate graph file

The format of the files provided with this paper is comma separated value (CSV) format. This is a plain text format that is usable in spreadsheets and most network visualization and analysis programs. The data files are also available on the author’s website (<http://jgmackay.com>) in other file formats, including graph exchange format (GEXF), which is an open graph format supported by many popular network analysis software packages. This standard was developed by the Gephi consortium and supported by Gephi network visualization software, which is freely available (Bastian et al., 2009). The GEXF file format has been designed to be open and work with a variety of software packages.

### Information about attributes

Table 1 lists the attributes of nodes and edges that exist in the graph files and includes a brief explanation of the attribute.

### Weights

The edges in the graphs are weighted to represent whether nodes are joined by one or more edges. For example, in the graph, where the companies are the nodes, two companies may have a tie between them with a weight greater than one if there

are multiple directors that sit on both corporate boards.

### Spatial information

In addition to the names of the companies in the DoD, some additional information has been added. First, the address of each company has been parsed from the DoD and broken down into more useful components. In this graph, each firm has a city and province attribute for its location. I have used this information to geolocate each firm so there are additional fields for latitude and longitude.

Using a mapping layout that accepts latitude and longitude pairs, a user can easily visualize the locations of corporations or directors on a map of one’s choosing. (I suggest Gephi as a network visualization tool.) Most companies and individuals are located in Canada. However, the data show directors located in the UK and Europe and some companies located in South America.

Finally, I have also linked the geographical location of companies to the 1911 Canadian Census data files. The field `uid_cd_11` contains the unique identification number for the Census Division numbers in the 1911 Census files. Map files composed of the appropriate GIS shapefiles should be available from Library Archives Canada or from the Canadian government’s Open Data Initiative website.

It should be noted that corporations listed in the files are, for the most part, public firms. The DoD also

**Table 1. Attributes in graph files.**

Node attribute field	Meaning	Field present in
City	City where the firm is located	Company, Person
Company	Name of the company	Company, Person
Cprov	The 2 letter province code used in the 1911 Canadian Census	Company
Initials	Person’s initials	Person
LastName	Family last name	Person
Latitude	Location information	Company, Person
Longitude	Location information	Company, Person
Prov	Province where the firm is located	Company, Person
uid_cd_11	Unique regional identifier field in the 1911 Canadian Census	Company

contains some information about regional chambers of commerce and other organizations.

## The format and contents of the person graph file

The graph file containing corporate executives and directors from the DoD has the firms as edges and the nodes as people. This file contains location data (longitude and latitude pairs) for both individuals and the firms they worked for. Additionally, there is information about the province and city each individual was located in. Perhaps of most interest for historians of the period are the fields with the full names of individuals. This allows researchers to construct sociograms of the elites of Canadian business of the day. Additional historical background and information about regional elites based on this data is also available (MacKay, 2016).

## Limitations

The key limitations of the data presented here have already been alluded to; it is unknown whether the DoD is representative of all of the public companies in Canada at the time, or whether it was biased toward companies listed on the Toronto Stock Exchange. At the time, Montreal was the home of the major stock exchange, although Toronto was also considered a major center. It seems reasonable to assume that W.R. Houston would not overlook major firms listed in Montreal. However, he may not have been aware of a number of companies that were listed in Winnipeg. The preface to the DoD makes it clear that there were a number of non-responses to Houston's survey of directors of public companies in Canada. However, these limitations are perhaps forgivable given that there does not exist a canonical list of Canadian public companies from this period. Although imperfect, the DoD provides one of the most complete listings of directors and firms from that period (for discussion of these points, see MacKay, 2016).

The data used to create the graph files were extracted using optical character recognition (OCR) software from electronic versions of the DoD and then manually corrected by the author and assistants. Ultimately assigning a tie between nodes in the graphs relies upon the names being listed consistently throughout the DoD. It is also assumed that the OCR and text cleaning process found and corrected any mis-spellings so that the common ties could be correctly created. Every attempt has been made to clean and translate the data appropriately.

## Conclusion

This paper has presented an overview of two projections of graphs based on information extracted from the DoD. The graph files have been created, so that they are easily usable by non-specialists. Additional information has also been added, which makes integrating these networks with Canadian national census data from 1911 possible or plotting locations of directors or companies using longitude and latitude pairs. It is hoped that this information will be of use to both business historians and network scholars.

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