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## Focus:

# HISTORICAL ANALYSIS OF FRANCE'S FOREIGN TRADE - THE TOFLIT 18 PROJECT

Analysis of the historical roots of development is an important track of the DIAL team's work programme. Researchers collecting survey data on the subject brave archive dust more than field dust (in particular the Sahelian field). Some even brave dust on both locations at once, but they are not the subject of this focus. The subject presented here is France's international trade on the eve of Europe's industrialisation.

The project is headed by Guillaume Daudin. It is funded by the French National Research Agency (2014-2017). It is called TOFLIT18 (for Transformation Of the French economy through the Lens of International Trade in the eighteenth century). The project's brief is to improve knowledge of the period that laid the economic foundations for France and the rest of Europe to step into the modern industrial era. Guillaume Daudin is supported by a team of DIAL and non-DIAL economists, historians and IT engineers including Loïc Charles, professor at the French National Institute for Demographic Studies (INED), who launched the collection of statistical data with Daudin in 2009; Béatrice Dedinger, historian on Germany and trade; Pierre Gervais, Professor at the University of Paris 3 and historian of market capitalism; and Paul Girard, a data scientist.

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#### UNDERSTANDING THE ROLE OF TRADE IN FRENCH ECONOMIC CHANGE

The project addresses the question of France's economic development through the lens of its international trade. As in today's developing countries, international trade was historically an important source of income for states and was therefore the subject of particular administrative interest (L. Charles & Daudin 2011; Loïc Charles & Daudin 2015). France consequently has relatively comprehensive, detailed trade statistics dating back to 1716, which have never been systematically trawled (see the Figure 1 example).

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#### Figure 1: Example of a statistical register

General Register of Trade - 1757 – Rouen Municipal Library. TOFLIT18

This research programme's interpretive work has two particular focuses: a study of French specialisation trends to understand French economic change regionally and nationally – one of the aims being to conduct international comparisons – and an analysis of the effects of the different trade policies on the French economy. Early studies have already been conducted to develop the use of data, especially in the form of a number of master theses defended or in progress. A wide range of subject matters are covered: trade in medicines, trade in cereals, the effect of treaties and wars, and so on.

The project also intends to publish the most comprehensive database possible on French international trade from 1716 to 1828. The compilation of data in digital picture format has been a long process, but it is an interesting and rewarding detective work. The archives held by the French tax farms (which played the role of customs) were destroyed by the revolutionary fury. Fortunately, the administrators at the time often left their positions with

part of their records, which ended up dispersed among different French and foreign collections of archives: the famous historian Posthumus, for example, compiled a collection from merchants selling old papers in Amsterdam in the 1930s.

The transcription of registers (generally handwritten) in the form of tables is much less rewarding work. A large team transcribed over 400,000 trade flows. Mistakes made by copyists at the time, geographic and historical variations in spelling, and human error by the transcribers made for a base that initially contained over 45,000 different goods and over 700 trade partners. The team therefore had to correct spellings and consolidate equivalent names (such as "herring" and "herring sea fish") to harmonise the entries and bring the number of goods and partners down to 16,000 and 165 respectively. The team is now classifying the 16,000 goods in some 20 categories based on the UN's SITC classification (Standard International Trade Classification). This is no mean task since a great deal of 18<sup>th</sup> century merchandise is hard to fit into these modern classifications. In fact, no classification can claim to be definitive so it is important to give everyone the possibility to alter the classifications, cross-check them, and so on. This is the purpose of the most original aspect of the construction of this database: the "datascape".

#### **DEVELOPING AN INTERACTIVE, OPEN DATABASE: THE DATASCAPE**

The notion of a datascape should interest all researchers who handle data. It concerns both a concept and a method (Latour et al. 2012). The aim is to build a "flexible" database. The datascape is built in such a way as to be able to store and use a set of heterogeneous data, such as names of goods and geographic entities, and a wide range of classification strategies. Whereas most databases can only be used by researchers for the purpose for which they were created, the way in which a datascape is coded means that its data can be used intuitively to answer a variety of research questions.

Technically speaking, the method consists of building a data transformation chain (Latour 1993) from all sorts of sources – handwritten, visual and printed – to obtain an overall visualisation of the data (Leclercq & Girard, 2013). The said sources – statistics on trade flows to and from France in the case of TOFLIT18 – are transcribed and stored in a dedicated space. A script aggregates everything into a graphic database while a classifications management system tests flexible aggregation models. The datascape ultimately returns different interactive visualisations of the data, which researchers can use to develop exploratory analyses of the information (Tukey 1977) and then select and export a data sample for a more in-depth analysis using the software and methods of their choice. Data modelling (e.g. feeding the base of goods classifications) and data exploration (through data visualisation) are two sequential actions that need to be repeated many times to build a virtuous cycle that opens up the archives and encourages quality checks on the coding work (Figure 2).



Figure 2: The datascape "cycle"

Source: The Experiments in Art and Technology Datascape, Christophe Leclercq & Paul Girard, 2013

#### Figure 3: UK trade in RICardo



Total UK trade from 1796 to 1938, in value (pound sterling). Imports/Exports. RICardo

In practical terms, building the datascape was made possible by collaboration with Médialab de Sciences Po, already the architect of one datascape under the RICardo project to build a world trade database for the period from 1800 to 1938. The RICardo datascape is already online and publically accessible (http://ricardo.medialab.sciences-po.fr).



#### Figure 4: A display of RICardo metadata

Breakdown of the availability of sources by year, country and source type. RICardo

RICardo can be used to explore the metadata in the base (Figure 4), which offers an overview of the data available per year and per country, but also to build all kinds of graphs by chosen indicators (country, partners, time period, imports/exports, etc.) ranging from a simple representation of a country's international trade right through to the display of bilateral statistics and mirror flows between different partners (Figure 5).





Comparison of total French and UK trade, in value (pound sterling) from 1796 to 1938. RICardo

### Figure 6: Growth in trade, in value (livre tournois, franc equivalent), between France and England; 1750-1821





These visualisations are also available in the TOFLIT project's datascape (see Figure 6). However, whereas RICardo focuses "simply" on 19<sup>th</sup> century bilateral trade, TOFLIT18 includes the dimensions of products and places in France. Network visualisations can be created to identify the relations between partner countries and French regions.

Figure 7 presents the flows of French imports from the country's trade partners by point of goods entry ("Direction"). It shows the importance of such ports as Rouen, Marseille, La Rochelle and Bordeaux as large trade hubs in the network, receiving flows of imports from many trade partners. For example, Bordeaux plays this role as the link between the Baltic Sea and the North Sea (North and Holland) on one side and with the French colonies on the other.

Some partners are also defined as "hubs", since they export to many French ports. This is the case with Holland, for example. Conversely, peripheral zones can also be observed in the network. These are either specialised French regions import from just a few countries or small trade partners that only export in the French direction.



Figure 7: TOFLIT datascape geographic network

Network view of import flows between direction ( $\bullet$ ) and country ( $\bullet$ ); 1716-1821. TOFLIT18.

Figure 8 presents another application of the network analysis by displaying the interrelations between goods. A lexicographical analysis of the trade descriptions of the goods traded identifies the link between them. Frequently traded goods hence form "hubs" in the network. For example, the term "Iron" in Figure 9 stands out as an important element as the term covers many different commodities: sheet iron, pig iron, miscellaneous iron, etc. This is also the case with the word "Copper" as many goods are made from this metal. Yet these two "hubs" are themselves interconnected as "Wrought Iron" and "Wrought Copper" products both contain the term "Wrought", which makes the connection between the two. Hence a network view can be produced from this lexicographical analysis. This is extremely interesting, as this view can also be produced by French region to find, for example, that the port of Bordeaux exports a relatively smaller range of goods than the port of Marseille (see Figure 10).



**Figure 8:** Network of the trade descriptions of goods imported by Bordeaux

Lexicographical network view of merchandise. Each colour represents a community of goods determined by a Datascape algorithm. TOFLIT18.

In this way, the TOFLIT18 team is setting up a powerful tool to understand changes in the French economy. The datascape is set to be made available free of charge to encourage future research on the data collected. The website also has the capacity to export output in CSV spreadsheet form for personal analyses. It is scheduled to be put online next year, but the project team can be contacted today for further information or to access the datascape for a particular research project (guillaume.daudin@dauphine.fr). Meanwhile, regular news on how progressing available TOFLIT18 website: the project is is on the https://toflit18.hypotheses.org/.



Figure 9: Specific network view of the TOFLIT18 datascape

"Iron" and "Copper" lexicographical network view. TOFLIT18

Figure 10: Comparison of Bordeaux's exports (left) with Marseille's exports (right)



Lexicographical network view of "Wood" and its associated terms. TOFLIT18

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