Launching the Lighthouse Database

- in search of taxonomy and structure to comfort academia and Swedish shipping industry

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Abstract

The study of a certain industry, such as mining, computer electronics or shipping, can be conducted in many ways. By way of field studies, case studies, surveys or analysis of quantitative data, knowledge of different aspects of the selected industry can be gained. This paper is about the construction of a database for research purposes of a particular industry, namely the Swedish shipping industry. Depending on the purposes of the intended research, the content of the database should be carefully considered. Further, the data collection process must be considered in a manner that fulfils not only basic research demands on validity and reliability , but also secures future demand of data for other studies and purposes, perhaps other than initially intended.

This paper is structured as follows. At first, a description about the problem of counting the number ship of the Swedish fleet is given that is taken as a starting point by the research team to illustrate the prerequisites and background for the Lighthouse database building process. A proposal is made on what to consider when structuring the Lighthouse database, as six different modules are suggested that would enhance a high degree of flexibility when computing reports or conducting academic research. An outline is made on how to realize a database to show how public information could be integrated and to what extent new information sets have to be produced to enable a rich analysis. This paper is of explorative nature and proposes a tentative structure and discusses how this database should be build to be mot only valuable for Swedish shipping companies but also for academia to renew academic research within the Swedish shipping industry.

Introduction

“How large is the Swedish trading fleet” a simple question like this headed an article that was published in the Swedish Shipping News (Nilsson, 2005). It showed a variety of numbers from 306 ships according to a German Institute of Shipping Economics and Logistics (ISL) to 434 ships according to Swedish Institute for Transport and Communications Analysis (SIKA) or even 568 ships according to Sjöfartens Analys Insitut (SAI).

One explanation is that the shipping industry is highly internationalised, which sometimes makes it difficult to reflect plainly on a national context. Ownership is another issue that can lead to different numbers regarding the size of the Swedish fleet. Although ships are large tangibles they are rather prominent in harbours. However, when it comes to counting them problems may arise in the question of ownership and nationality. Ownership of ships has become rather complex due to financial models that make it interesting for investors from all over the world to invest in ships. In consequence, one ship may be owned by a large number of owners, whereas just one shipping company might actually operate this ship. Where does current statistics reflect this issue? Nationality might cause further problems to statistics. Swedish shipping companies might operate many more ships than to be found in the Swedish ship register. If a ship operates under the Swedish flag it will find itself in the statistics, but what if a Swedish shipping company has registered some of its ships under different nationalities e.g. Cyprus? Not to forget statistical problems regarding the load capacity of ships. Different ship types do have different ways of counting the volume of cargo to be carried, which is mainly depending on the transport of cargo in itself. A container ship is measured in Twenty-Foot Equivalent units (TEU). How can this be compared to a

Roll-on Ro-off (RoRo) ship, which measures its capacity in meters. A more general measure that often is utilised for describing the size of a ship by Brutto Register Ton (brt) or Dead Weight Ton (dwt), but does this really reflect the actual transport capacity?

As simple as the question “How large is the Swedish trading fleet ?” looks like in the beginning it is much more complicated in reality when it comes to statistical validity. In consequence, one has currently to cope with the fact that different institutes count differently. The German ISL counts only ships with more than 1000 brt, which led in 2005 to 146 ships of the Swedish fleet with a capacity of 1,43 million dwt. In comparison, SIKA counts ships with more than 100 brt operated by Swedish shipping companies, which led in 2005 to 434 ships with a capacity of 3,6 million dwt. In contrast, SAI counts not only ships with more than 300 brt, regardless of nationality flag, but even ships that a controlled through charter contracts by Swedish shipping companies. This way of counting leads to 568 ships with a total capacity of 10,83 million dwt.

This shows just one of the many problems that researchers have to cope with for statistical analysis. Moreover the problem of validity in statistics has not even touched upon. In the current state of colleting statistical material for computing tables another problem might be the fact that some national data on shipping is made public with almost a two years delay to publication date, which is mainly due to the fact it has to be waited for the reported numbers in the national company registration (PRV). Therefore many items that could be considered as being basic facts are often retrieved from secondary material. This causes the problem that data on shipping has to be collected from a multitude of sources e.g. the Swedish National Centre of Statistics (SCB). A new

database could consider collecting data themselves and not from secondary material in order to increase validity and timelineness.

Most recently, researcher at Lighthouse[1] produced a set of statistics with five variables for the Swedish Shipowner's Association. These statistics tables can be seen as a pre-study for the proposed Lighthouse database. The research to establish these tables showed that it is vital to be very careful in the retrieval of each number to assure highest data quality to ascertain statistical validity.

To engage in an endeavour of building a Lighthouse database not only the structure and taxonomy of statistical items has to be considered but also that the database remains open to a multitude of studies and analysis. It is of great interest that the Lighthouse database could serve the purpose of Swedish shipping companies as well as for researchers that are studying the shipping industry from academic traditions. Hopefully, such a database enables both parties to gain knowledge and development and trends in Swedish shipping. Furthermore, the Lighthouse database should permit possibilities to conduct national cluster studies that could be compared with international clusters in the global shipping industry. A more recent national cluster study by Plamberg, Johansson and Karlsson (2006) from the Jönköping International Business School confirms the problems of retrieving statistical material from a multitude of different secondary

[1] Lighthouse is a center of competence in the maritime sector. The base for the center is formed by cooperation between the Swedish Shipowners' Association, School of Business, Economics and Law at Göteborg University and Chalmers University of Technology. The mission of Lighthouse is to communicate new competence in areas that is of future interest to the Swedish shipping industry. Those areas will be defined through a dialogue starting from the competence and development of today. The School of Business, Economics and Law will make contributions foremost in the field of World trade and International Shipping, Logistics and Cargo handling, Financial Reports and Analyses and Maritime Law.

sources. Many reports are continuously produced but they have in common that they are not integrated with each other. This causes difficulties for researchers to validate the quality of the statistical data, which the integrated view of the proposed Lighthouse database would be able to handle. Furthermore proposes the Lighthouse database a module based structure where economic data can be linked to flow data. One target of the Lighthouse database is to provide the possibility to be able to link all resources to ships and company to facilitate a multitude of studies e.g. financial flexibility within Swedish shipping industry.

This article examines Swedish shipping's current position concerning a variety of institutes that are producing their reports unconnected from each other leading into varying numbers. One question posed is how should a Swedish shipping database be structured to be useful for Shipping companies and academia? What kind of taxonomy would be appropriate for the Lighthouse database?

How the Lighthouse database could be structured

Constructing a database upon different data modules has clear advantages related to the data collecting and data processing. If the database is structured according to modules the database can be easily extended with additional data modules. Furthermore, it may be desirable to eliminate modules due to issue of data collection, validity, reliability, etc. The module structure puts great restrictions on the logics of the database since it must be possible to connect each module with any other module. The method for this is to define a connecting and common data keys. It is desirable to have data keys that are static in nature and that can be related to a wide set of data variables and actors in the

industry. Based on the nature of the shipping industry possible data keys can be ships, seamen, corporate identification number. The problem of using seamen as data key is the mobility. Since chartering, co-ownership and frequency of ownership changes is high corporate identification number would be a time consuming and inefficient data key. Ships, is a suitable data key since the population is small enough to enable the database providers to keep updated with any changes in population. Furthermore, is a physical resource that is registered in many databases and by many different stakeholders which makes data related to ships easier to validate. Ships also leaves formal traces at ports, shipping related agencies, canal fees, insurance companies, shipping lines, etc. These characteristics make "ships" a suitable data key for connecting different data modules.

Industry data module

In order to achieve an elementary understanding of the industry and its resources it is essential to map and store key ratios. By elementary data we refer to ratios that on an aggregated level describe the nature and status of the shipping industry. This elementary data is often provided by lobbying agencies, government agencies and statistical organizations. This type of data is structured into three categories: ships, human resource and industry turnover. From a production perspective, ships in combination with human resources constitute the input to the production of shipping services and industry turnover the aggregated industry output.

Ship module:

Most ship-intense nations in the world have a national based register for ships. In Sweden it is managed by The Swedish Maritime Administration and contains

information of all ships operated under Swedish flag. This database is the best possible platform related to the moving resources in the industry, i.e. the transport resource. It contains information related to all ships that are above 12 meters in length and 4 meter wide. The Swedish/EU ownership of the ship is required to be at least 50% in order to be able to register the ship. The ship is not allowed to be register in any other nation's ship registry. The database contains comprehensive information concerning ownership, technical data etc of each ship registered.

Besides the ship registry, data concerning newbuilding of ship provides an understanding of the future supply of ships and it gives an indication of shipowners' expectations of the future.

Human resource module:

Another key component that is necessary to enable input/output analysis of the industry is data concerning the input of human resources in the industry. This type of data is also necessary in order to enable analysis of government policy changes related to the framework of employment in the industry. Since the industry is truly international and foreign employees are common in the industry the change over time in distribution of nationality in the industry is interesting.

The Swedish Maritime Administration maintains the national registry of seamen. In this registry all activities related to seamen's employment are registered. Combined with the personal data such as nationality, gender, age, etc. valuable analyses related to the human resources in the industry can be made.

Industry turnover module:

This type of data is often provided by the national statistics bureau and/or the

organization that handles and supplies information concerning the national economy. This type of data gives a fundamental understanding of the import and export activity in the industry on an aggregated level. The data provides an indication of the financial status of the industry. Combined with data of goods flows it is possible to analyze the connections between goods flow changes on the global, national and regional trade with the development in export and import.

Flow module

The shipping industry consists of a complex pattern of movement of goods and resources. Since the industry is closely linked with global, national and regional trade patterns it is important to understand the demand and its most fundamental underlying element, i.e. goods flows. Contemplating on the transportation system as whole the sole demand for movement is goods flows. However there are different modes of transport available to realize movement, hence, competition between transport modes.

In order to gain an understanding of an industry such as shipping, knowledge concerning resources is essential, especially in a resource intense industry such as shipping. The level of investments in resources requires a comprehensive knowledge of future demands, i.e. goods flows. From a practitioner's perspective, such information would be valuable in order to construct and test different forecasting methods, strategies and management systems. Scientifically it is valuable to have information about goods flows since it enables analyses of goods flow patter and comparative analyses with the movement and deployment of resources within the shipping industry. Since resources constitute the supply and goods flows the demand in the traffic market, it is valuable to have a platform of data for both supply and demand to enable valid analyses of the dynamics in the industry.

For data related to the national structure of goods flows, the Swedish Institute for Transport and Communications Analysis (SIKA) produces an analysis of goods flows based on more than 12000 workplaces (SIKA 2006). Much of the data on goods flows at the European level are managed by Eurostat. Eurostat compiles and constructs data provided by the national statics bureau of each member country. Providers of global data are foremost institutions such as: national statistics bureaus, International Chamber of Shipping, International Maritime Organisation, Lloyd's Register Fairplay.

Goods flows have obvious geographical dimensions and are closely linked with infrastructure. To incorporate the flow module in geographical information system (GIS) enables data to be connected with geographical aspects and analyses. GIS has the ability to combine complex transportation systems with special attention to infrastructural prerequisites and goods flows. It also offers opportunities for visual representation through the use of maps and animations (Barnett and Okoruwa 1993; Bergqvist and Tornberg 2005; Andersson, et.al. 2005). The method, however, requires substantial system and modeling development since it has to be tailored to the structure and nature of the database and associated analyses. Since the method would function as a separate entity with the database as input it is always possible to extend the context of the database with GIS features at a later stage.

On the use of financial information

Financial information would primarily be gathered from the companies' financial statements found in their annual reports. The sources for annual reports are several. First, the information could be gathered from the companies themselves, in the form of quarterly reports or semi-annual reports. The disadvantage of this is that the information

needs to be processed manually into the database. Secondary sources are among others, SCB (Statistiska Centralbyrån, Official Statistics of Sweden) or MM Partner, a Swedish company which gather and process annual reports from Swedish companies. Financial information from both these sources is available "electronically", which is helpful for processing in the database.

Information from the balance sheet would include assets, current and long-term, and their financing in the form of debt and equity. The income statement contains information about sales and different types of costs, and report the companies profit (or loss). Information can also be disclosed about the different sources of income, what segments has the largest turnover and so on. The cash flow statement shows the various company activities – operating, investing and financing – and their use of cash. In practice, the whole of the companies annual reports would be gathered and processed into the database.

The potential use of the financial information mentioned above for academic research is a motivation for constructing the database in its own right, but the usefulness for the industry itself is equally important. Profitability, return on investments/assets, margins, et cetera is just some examples of financial measures derived from the companies' financial statements. These measures could be used for identifying trends and developments over the years in the shipping industry, as well as benchmarking between companies within the shipping industry.

The number of academic studies that could be performed based on the mentioned information is literally almost endless. In the stream of accounting research, most capital market based accounting research (CMBAR), could easily be applied to the field of Swedish shipping.

More details on the types of studies that could be performed. Is it really interesting?

The financial information combined with other kinds of collected information on the shipping industry (as mentioned above) enables researchers to do many different types of studies. Studies on efficiency in the shipping industry is made possible when combining financial data with information about the companies production, flows etc.

How to realize a database?

Once starting the endeavor to build a Lighthouse database that would be suitable as well to the needs of Swedish shipping companies as to academic research purposes a number of practical issues of realizing such a database have to be considered.

One issue to discuss is how to deal with the database, the information gathered and different fields of interests. One party might be interested in the number of ships, weight, number of containers et cetera, and another party might be more interested in the legal entities (i.e. the companies) that control the ships, and their profitability, debt-to-equity ratio and so on. To make both of these different types of entries into the database possible is a task that has to be solved.

Closely related is the issue of defining limitations to what type and size of ships and what type and size of companies that is included in the database. There are Swedish shipping companies that do not own a single ship, and there are ships that are partially owned by companies and partly by individuals or other, foreign companies. There must be careful considerations as to what kind of delimiters that has to be set for inclusion of both ships and companies in the database. For example, one criterion for inclusion is that the company is a Swedish registered company. On the other hand it is not a

necessary criteria that the ships are registered in Sweden for the controlling company to be included, since the value creation that stems from the ships is shown in the Swedish companies income statement.

Final round-up or how do we go from here practically

The starting point of initiating the discussion on establishing a database on Swedish shipping should not be mistaken to replace the existing institutes that are already well established and producing reports that are much appreciated.

The intention of the Lighthouse database is more about finding a new approach that could fill the spaces that the current reports do not provide information on. This could make a considerable contribution to the existing reports as well as to fuel academic research in Swedish shipping industry.

Although the Lighthouse database is thought of national Swedish character, it would certainly like to take the opportunity to investigate the possibility to cooperate with international institutes to enhance options to participate in international studies regarding shipping industry.

However, once starting the Lighthouse database it has to be regarded not as a short-term event but as a long-lasting service. Since continuity is the underlying means of the proposed database it has to be reflected on terms of availability and dissemination.

The more open the database would be to be utilized by all interested parties regarding statistical information on Swedish shipping it has to be considered that publications of the statistics should allow timeliness. It is mandatory that listed companies have to issue financial information on a quarterly basis, which later on has to result into their annual reports. The Lighthouse database could try to follow such pattern and provide information on a number of uncommented reports that should add to an annual report

presenting the raw data of the database. However, it could be thought of issuing an additional annual report that should contain a commented version of the raw material, where trends and changes are reflected and discussed.

The proposed database can result into numerous studies and reports on the Swedish shipping industry that could be a helpful service to both academia and shipping companies to enhance understanding on governmental policy decisions as well as on the development of the Swedish shipping industry.

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