

The Classification, Challenge and Potential of Business Models by Using Open Data

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ABSTRACT

Public data collected or possessed by administrative agencies and subsequently released as Open Data is expected to bring about positive economic effects. The purpose of our research is to estimate economic effects provided by the utilization of Open Data in business industries. To prepare a statistical analysis survey for business industries we would classify Open Data business model case studies. In this paper we have classified existing Open Data business cases into business models to facilitate statistical analysis regarding effectiveness and growth potential. This approach allows us to extract the challenges and possibilities of each Open Data business model within certain parameters.

CCS Concepts

• **Proper nouns:** People, technologies and companies → Organizations → Open Knowledge Society

Keywords

Open Data; Economic Effect; Open Innovation; Public Data; Business Model

1. INTRODUCTION

Public data collected or possessed by administrative agencies and subsequently released as Open Data is expected to bring about positive economic effects. From this perspective the purpose of using Open Data can be understood as being motivated by the potential for improving administrative services and the most of the expected economic effects of Open Data adoption presume cost reductions in the public sector. At the same time, it is also important to consider the economic effects created in commercial industries

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that use Open Data originating from the public sector. To estimate the economic effects of using Open Data quantitatively Noda et al. (2016) have analyzed the economic process and influence of Open Data as illustrated in **Figure 1**. Noda et al. (2017) subsequently conducted a survey of local governments in Japan to explore the economic effects delivered by the utilization of Open Data in the public sector and this research output is included on the left side of **Figure 1**. From the data collected it would appear that the work cost of municipal employees engaged in operations involving Open Data are 3 times or greater than the work cost saved by Open Data in the short term. However, the research further indicates that the cost will be balanced out in 3 years or more by broader economic effects. The estimation of economic effects by the utilization of Open Data quantitatively in the public sector can therefore only be fully appreciated with the inclusion of the related economic effects provided by the utilization of Open Data in adjacent business industries. These are illustrated on the right side of **Figure 1**.

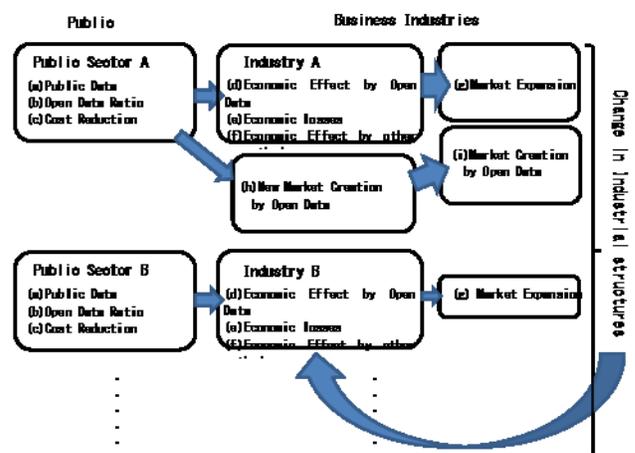


Figure 1. Economic effects by the utilization of Open Data

2. Business Models of Open Data

2.1 Estimations of Open Data Business

The European Commission Vickery research project (2011) is a well known exploration of the economic effects of Open Data,

which estimated a value of approximately 200 billion Euro annually or 1.7% of GDP across the EU 27 countries. Omidyar Network (2014) later announced that Open Data will strongly support the G20's economic growth and concluded that the contribution of Open Data contribute as much as 55% of the goal of 2% growth of G20's GDP. In order for these numbers to be realized the cost reduction of using Open Data in the public sector alone is not sufficient. The creation and development of business models using this Open Data must also be factored in. To accomplish this it follows that the same type of questionnaire used to estimate economic effects by the utilization of Open Data for the public sector must also be applied to adjacent business industries. There are not as many case studies for statistical analysis of this latter item but there are some related to Open Data as is shown in "The Open Data 500". Gurin (2014) also presents a strategy for success or applicable business models in the coming era of Open Data.

It follows that to prepare a statistical analysis survey for business industries we would classify these Open Data business model case studies using the above approaches. The key difference is that while previous studies primarily list success stories regarding business models we instead explore the problems and possibilities of each Open Data business model.

2.2 Classification of Open Data Business Models

There are several types of Open Data business model, (1) organize data possessed by the public sector and support the release of Open Data, (2) manage Open Data on behalf of the public sector and create places to provide their data, (3) support businesses to make Open Data more accessible through visualizations and applications for accessing data sets, (4) build a catalog of Open Data by collecting and organizing a large amount of data, (5) develop value-added services by analyzing Open Data to increase the accuracy of existing business, (6) create new services by using Open Data to create "Big Data" predictive models, and (7) obtain know-how by the development of services around Open Data and apply this knowledge (business methods) in other markets. Below we list specific examples of each Open Data business model.

(1) Open Data Support Business

Spikes Cavell, an English consulting business, offers services related to the cleaning and classification of public sector data before it is opened. In Japan a company called *Styles Corporation* provides a similar service called '*OpenDataStack*'.

(2) Open Data Management Business

Socrata offers services of budget visualization and analysis. In Japan, *Hitachi Systems* develops *Open Data Portal Software* based on CKAN.

(3) Open Data Visualizing Business

Mapbox provides an Online Map Service utilizing Open Data from the public sector and *Geofabrik* builds maps from geographic data in the same way.

(4) Open Data Catalog Business

MIRS provides evaluation information by collecting Open Data related to real estate from the public sector. *Calil* provides one stop

searches related to the lending data of 6,000 public libraries in Japan.

(5) Open Data Analysis Business

Zaim provides an online household account book called '*My Benefit*'. This provides information about the benefits, allowances and deductions that users can apply from their household account records.

(6) Open Data Forecast Business

BIVALE automatically sets an energy saving schedule for air conditioners based on weather forecast data. *PredPol* predicts the possibility of crime. *Aglinote* support agricultural business. These businesses forecast the future by analyzing not only Open Data and but also various other Big Data sources.

(7) Open Data Marketing Business

Chibarepo from Chiba City in Japan is an example of a citizen participation form of business. Chiba City publishes information on road breakage, graffiti, illegal dumping, etc. on its website. Chiba citizens can add data using smartphones and post it on the site with comments. This approach is based on the concept of sharing information bi-directionally to allow the city office to work in a more efficient transparent way. The goal is to drive cost reduction and for the city office (and the business that supplies the system for the city) to obtain activity records of citizens of Chiba City. This allows for the development of predictive models regarding future activity. The concept is to apply the know-how to multiple areas in the future.

3. Problems and Possibilities of Open Data Business Models

3.1 Problems of Open Data Business Models

When public sector data is proprietary then adjacent business industries must acquire data independently. Issues as small as disparate file formats storing data reduces interoperability and reuse, and the basic act of collecting data requires considerable cost. Conversely, when at least some public sector data is freely available, business models that generate profit by organizing data such as case (1) - Open Data Support Businesses - benefit from a considerably reduced cost of data acquisition. This provides an incentive for the public sector to open further data in areas where third-party analysis can be of benefit. Since there are many jobs contracted from the public sector by this business model, it provides an opportunity for stable profit for a certain period. However, this type of business model has no fundamental difference from traditional contracted IT business models, and Open Data itself does not create business values per se. It simply reduces the cost of collecting data for analysis.

The business models listed in situations (2) to (6) create value by processing and analyzing Open Data. In these business models human resources with appropriate technical skills and management know-how are necessary to analyze large amounts of data to create such value and there is a commensurate requirement for financial resources to sustain this activity. Therefore, the conditions for monetization around these business models is the technical ability to analyze data, the management ability to refine the applied profit model, and the financial strength to support the chosen approach.

3.2 Market Possibilities of Open Data

Business Models

The present and possible market of each business model is plotted in **Figure 2**. The vertical axis shows business potential and the horizontal axis shows problem solving (= publicness).

The market of model (1), raising revenues by Open Data itself, will sustain itself but will gradually decrease in value according to the progress of Open Data conversion in the public sector.

In the market of model (2), even after creating solutions for providing data, business industries involved can continue to generate revenue by undertaking maintenance and management of such services.

Most of the market of model (3) involve trial services or - when paid - have a tier that can be used free of charge. It is necessary to increase the quality of the provided services and convert free service users to paid users to see sustainable growth.

In the market of model (4), business industries can generate revenue if they sell large quantities of data catalogs. In situations where the services can be used for free such as *Calil* advertisement revenue is the main source of profits. This approach has a relatively low barrier to entry but may prove difficult to increase profits.

The business models offered by approaches (5) and (6) depend on developing valuable service provision based on data analysis and on creating competitive advantages for others. Technical abilities, management abilities and fiscal strength are the key requirements for success. Model (5) targets existing businesses and model (6) targets new services. In both scenarios it is possible to build competitive advantages for startup industries and to drive new services. On the two models, model (6) appears to offer the greatest potential to become a driving force for the advancement of Open Data businesses in the future.

In the model (7), profitability is obtained indirectly, with the businesses involved making use of data and know-how obtained by various Open Data in other business areas or services. If this approach can be linked to increasing profits as a result, it is considered to be a viable high potential business model regarding future use of Open Data

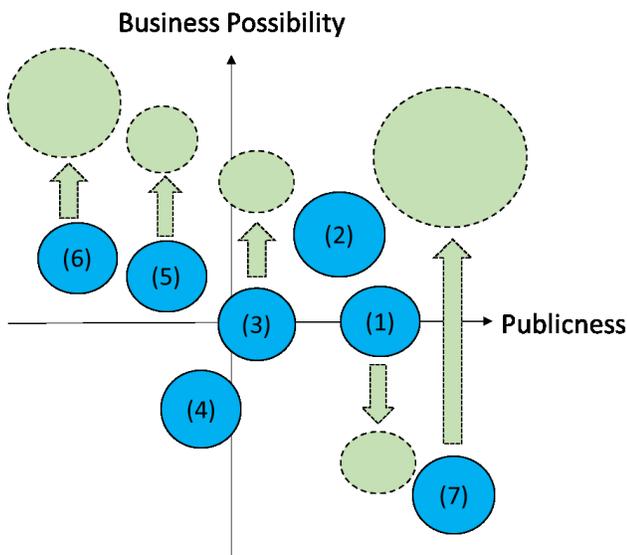


Figure 2. Market Possibilities of Open Data Business Models

4. The Outlook of Further Research

In this paper we have classified existing Open Data business cases into business models to facilitate statistical analysis regarding effectiveness and growth potential. This approach allows us to extract the challenges and possibilities of each Open Data business model within certain parameters. In doing so it becomes possible to estimate differences in economic effects caused by the use of each business model when using Open Data. From this we can gain some understanding of the current and potential profitability of various Open Data business models. Further research can be conducted using this approach to develop more detailed quantitative estimates of the economic effects created by the utilization of Open Data in the public sector and adjacent business industries.

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