Patterns of Internationalization and Criteria for Research Assessment in the Social Sciences and Humanities

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Abstract

This paper investigates the developments during the last decades in the use of languages, publication types, and publication channels, in the social sciences and humanities (SSH). The purpose of the study is to develop an understanding of the processes of internationalization and to apply this understanding in a critical examination of an often used criterion in research evaluations in the SSH: Coverage in Scopus or Web of Science is seen in itself as an expression of research quality and of internationalization. This extrinsic 'coverage criterion' is beyond the control of academia and without support in analysis of how research quality and relevance is achieved through scholarly publishing in the SSH. It needs to be replaced by intrinsic criteria based on the SSH's own concepts of field-specific research excellence and societal relevance. The study will demonstrate this by using data from scholarly publishing in the SSH that go beyond the coverage in the commercial data sources by giving a more comprehensive representation of the SSH.

Conference Topic

Science policy and research assessment

Introduction

The presence of publications in Scopus or Web of Science (WoS) has increasingly become a criterion in evaluations of research in the social sciences and humanities (SSH). Some countries have even installed protocols for research evaluation or performance-based funding models where publications that are indexed by the commercial databases are treated separately in indicators of "internationalization" and "research quality". In other countries, there is a general belief that research quality can be promoted in the SSH by expecting more publications in the limited number of international journals that have been selected for indexing. Consequently, for several years already, Elsevier and Thomson Reuters have experienced a pressure from researchers in the SSH to have more journals indexed. Both providers have responded by increasing the coverage of journals and book series, and, recently, even of books in the SSH. However, the coverage of the scholarly publication output in the SSH is still limited (Sivertsen, 2014). The shortage is mainly due to the more heterogeneous scholarly publication patterns in the SSH where publishing in international journals is supplemented by book publishing and the use of journals in the native languages (Hicks, 2004; Archambault et al, 2006; Engels, Ossenblok & Spruyt, 2012; Sivertsen & Larsen, 2012; Sivertsen, 2014).

Just as with the abuse of Journal Impact Factors in research assessment in science, technology and medicine (STM), the 'coverage criterion' in the SSH represents an artefact which is external to and beyond the control of the scholarly norms and standards that it is sought to represent. It creates unnecessary tensions between fields in the SSH with different degrees of coverage in the databases. It also creates debates about what will happen to the use of books and native languages in the SSH. In these debates, the general development towards publishing in journals covered by Scopus or Web of Science is often perceived as "inevitable" and driven by new evaluation regimes, not by internal scholarly standards. In this study, I will develop an understanding of the processes of internationalization in the SSH which is

independent of the 'coverage criterion' and instead related to concepts of field-specific research excellence and societal relevance in the SSH.

Methods

For the purpose of this study, data are needed that give a complete representation of scholarly publishing it the SSH, also of publications in books, series and journals not covered by Scopus or Web of Science. In 2005, Norway was the first country to establish a national information system with complete quality-assured bibliographic data covering all peer-reviewed scholarly publishing in the total higher education sector (Schneider, 2009; Sivertsen, 2010). This national system, which is now called CRISTIN (Current Research Information System in Norway) and has been expanded beyond the higher education sector, provides the main source of data for this study.

The methodology of the bibliographic data collection in the Norwegian CRISTIN database (www.cristin.no) has been published earlier (Sivertsen, 2010; Sivertsen & Larsen, 2012; Sivertsen, 2014). Scientific and scholarly publications of all fields are covered completely according to an agreed definition. Among other criteria, the definition demands originality and scholarly format in the publication and peer-review in its publication channels. All publication channels (journals, series, book publishers) and publication types (see below) are standardized in the database.

Humanities is defined in our study as the disciplines included in this major area in the OECD Field Classification.[1] The *Social Sciences* are defined in the same way with the exception of Psychology, which we have not included in this study. Note that Law and Educational Research are classified as social sciences by OECD.

Two supplementing data sets (A, B) will be used, each of them for a more specific purpose:

A. For the analysis of publication patterns in the SSH down to the level of individual researchers, we use data from the above-mentioned CRISTIN system which cover the four years 2010-2013. The unit of analysis is publications per researcher within a variable of three publication types (articles in journals or series with ISSN; articles in books; books) and a dichotomous variable of languages (Norwegian (the native language); International languages). The data include 1,895 unique researchers in the humanities with 7,145 unique publications, and 3,229 unique researchers in the social sciences with 11,817 unique publications.
B. For the analysis of the development of publication patterns in the SSH over time, we use data that are defined and collected in the same way as in data set A, but aggregated at the level of disciplines. The data cover the years 2005-2011. The unit of analysis is publication per discipline (and major area) with the same variables of publication types and languages as in data set A. Data set B includes 14,558 unique publications in the humanities and 19,450 unique publications in the social sciences.

Results, Part I: Characteristics of the Publication Patterns in the SSH

As seen in *Table 1*, publications in journals and series represent a little more than half of the publications in the humanities and two thirds of the publications in the social sciences, indicating that book publishing is important as well, especially in the form of articles in books (edited volumes). There are, however, just as wide differences *within* each of the two major areas: Only 45 per cent of the publications in History are in journals, compared to 61 per cent in Linguistics. In Sociology, only 46 per cent of the publications are in journals, compared to 75 per cent in Economics.

[1] OECD: REVISED FIELD OF SCIENCE AND TECHNOLOGY (FOS) CLASSIFICATION IN THE FRASCATI MANUAL, version 26-Feb-2007, DSTI/EAS/STP/NESTI (2006)19/FINAL.

Table 1. Number and percentage publications per publication type. Based on data set A.

	Humanities N	*Humanities %*	*Soc Sci N*	*Soc Sci %*
Books	328	4.6 %	273	2.3 %
Articles in books	2,861	40.0 %	3,640	30.8 %
Articles in journals or series	3,956	55.4 %	7,904	66.9 %
Total	7,145	100.0 %	11,817	100.0 %

The scholarly publication types in the SSH are often discussed as if they represent alternatives to each other: Is the use of one of the publication types increasing at the cost of the others? Are monographs becoming obsolete in the SSH? Before we study the trends, we shall observe an indication that the publication types are supplementing each other rather than competing with each other. As seen in Table 2, the numbers and percentages of *the researchers* that actually use a certain publication type are significantly higher than in Table 1, indicating that more than one publication type is often present in the publishing profile of an individual researcher. As an example, although less than a third of the publications in the social sciences are articles in books, more than half of the researchers are using this publication type.

Table 2. Number and percentage of the researchers using a publication type within four years. Based on data set A.

	Humanities N	*Humanities %*	*Soc Sci N*	*Soc Sci %*
Books	297	15.7 %	273	8.5 %
Articles in books	1,187	62.6 %	1,676	51.9 %
Articles in journals or series	1,537	81.1 %	2,775	85.9 %
Total (unique researchers)	1,895		3,229	

Table 3 demonstrates to what degree the publishing profiles of individual researchers include more than one publication type. Even in the social sciences, where journal articles represent two thirds of the output, almost half of the researchers who publish these articles also use other publication types.

Table 3. Number and percentage of the researchers using a publication type that also uses another publication type within four years. The percentages are related to the numbers (N) in Table 2. Based on data set A.

	Humanities N	*Humanities %*	*Soc Sci N*	*Soc Sci %*
Books	265	89.2 %	250	91.6 %
Articles in books	891	75.1 %	1,275	76.1 %
Articles in journals or series	930	60.5 %	1,291	46.5 %

So far, we can conclude that book publishing and journal publishing seem to supplement each other rather than represent alternatives in the SSH. We will return to a possible explanation for this in the discussion at the end.

We now turn to another dimension in the publication patterns of the SSH – the language dimension. In non-English speaking countries, the use of the native language in scholarly

publications is an indication that the publication is mainly oriented at a national or regional audience of readers in which not only peers, but also students, policy makers, professionals, media and a wider public may be reached as well. Since scholarly publications in the native languages are relatively frequent in the SSH, publishing in an international language is, on the other hand, not the normal situation, as in the sciences, but a clear expression of an ambition to reach an international audience of experts in the field.

We proceed as with the publication types and start with an overview of the use of language in publications in Table 4. In both the humanities and the social sciences, the majority of scholarly publications are in the international languages. However, publications in the native language are much more frequent than in the sciences, indicating that such publications have a specific role in the SSH.

Table 4. Number and percentage publications per language type. Based on data set A.

	Humanities N	*Humanities %*	*Soc Sci N*	*Soc Sci %*
International language	4,368	61.1 %	8,666	71.7 %
Norwegian language	2,777	38.9 %	3,418	28.3 %
Total	7,145	100.0 %	11,817	100.0 %

Again, the question may be raised: Are the native and international languages supplementing each other, or are they competing as alternatives? By going down to the level of individual researchers, we can observe in Table 5 that high proportions of the researchers combine both types of languages in their publication practice. While a majority of researchers publish in the international languages, there is *no minority of researchers* publishing in the native language only. Researchers in the SSH are *normally bilingual* in their publication practice (if their native language is not English).

Table 5. Number and percentage of the researchers using international and native languages in their scholarly publications within four years. Based on data set A.

	Humanities N	*Humanities %*	*Soc Sci N*	*Soc Sci %*
International language	1,482	78.2 %	2,687	83.2 %
Norwegian language	1,228	64.8 %	1,725	53.4 %
Total (unique researchers)	1,895		3,229	

A more general conclusion from the results so far, is that although the *majority of publications* in the SSH are published in journals and in international languages, *the majority of researchers* are publishing in books and in the native language as well. Is this picture changing?

Results, Part II: Developments in the Publication Patterns in the SSH

To study the developments, we use data set B, by which it is possible to cover a longer period of time. The general picture is that the publication patterns in the SSH are quite stable, both with regard to publication types (Figure 1) and the use of international versus native languages (Figure 2). In relative shares, the uses of international languages and of journals are increasing, but not by a high rate. In absolute numbers, there is no in reduction book publishing or the use of the native language, since in data set B, which we are using here, there was an increase in the total number of publications by more than 50 per cent between 2005 and 2011.

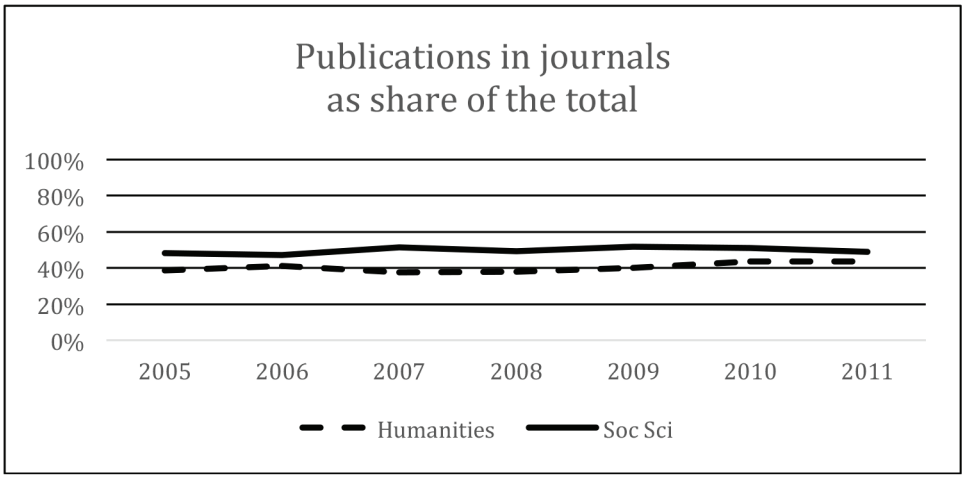

Figure 1. Scholarly publications in journals as a percentage of the total, which also includes articles in books and books. Based on data set B.

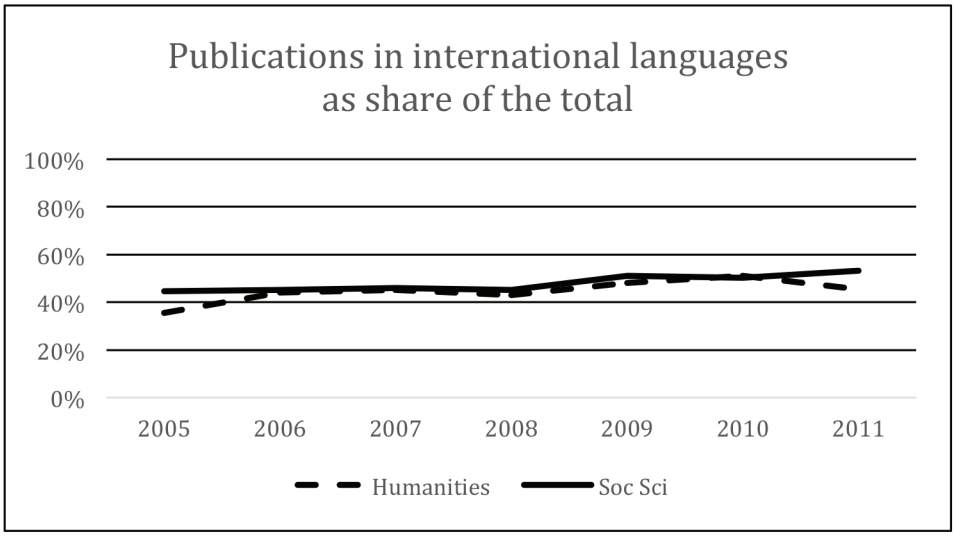

Figure 2. Scholarly publications in international languages as a percentage of the total, which also includes publications in the native language. Based on data set B.

Discussion and Conclusions

The normal publication practice in the SSH, in which both types of languages, and books as well as journals, are used for scholarly publishing by the majority of researchers, seems to prevail during a period of internationalization. The stability of the publication patterns, as well as their differences *within* the SSH (Sivertsen & Larsen, 2012; Ossenblok, Engels & Sivertsen, 2012), indicate that the choice of language and publication type is not just a question of new trends versus old traditions. Publication patterns are more deeply rooted in scholarly norms, methods and practices. The monograph, the edited book and the journal article represent different methodologies that may all need to be used at different times. The choice of language depends on the international scholarly relevance of the research versus the societal relevance for the culture and society being studied. One and the same research project may well contribute with different parts to both dimensions. The SSH would lose their *raison d'être* and societal impact by disconnecting from the surrounding culture and society and mainly communicating in international journals that are only read by peers abroad. At the same time, publishing in those specialized journals on the international level is necessary in

order to be confronted with and inspired by the scholarly standards, critical discussions and new developments among other experts in the field.

In the context of criteria for research evaluation in the SSH, there is a need to accept that none of the alternatives in the two dimensions of the scholarly publication patterns that have been described here – language and publication type - can be regarded as more valuable alternatives. All of them contribute – with different roles and connected to different methodologies, audiences and feedbacks – to research excellence and societal relevance of the SSH. The coverage in Scopus or the Web of Science of the scholarly publishing pattern in the SSH is far from complete (Sivertsen, 2014). Hence, *coverage in a commercial indexing service* should not be used as a criterion for research quality or an indicator of internationalization in the SSH.

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Looking for a Better Shape: Societal Demand and Scientific Research Supply on Obesity

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Abstract
As science policy shifts towards an increasing emphasis in societal problems or grand challenges, new scientometric tools are required to inform decision-makers. However, while traditional bibliometrics could focus on the knowledge production side (the science supply), grand challenges also demand to investigate the articulation of societal needs. In this paper, we present an exploratory investigation of the grand challenge of obesity -an emerging health problem with enormous social costs. We illustrate a potential approach, showing: (a) how scientific publication can be used to describe existing science supply by using topic modelling based on publication abstracts; (b) how question records in the French parliaments can be used as an instance of social demand; and (c) how the comparison between the two may show (mis)alignments between societal concerns and scientific outputs.

Conference Topic
Science policy and research assessment

Introduction
Tackling complex global problems or grand challenges – such as climate change, food security, poverty reduction, risk of global pandemics – requires not only to increase R&D expenditure, but also the exploration and eventually the coordination of a variety of stakeholders with different areas of expertise and pursuing diverse research avenues. Typically these challenges benefit from the understanding of the physical and biological phenomena underlying a challenge (e.g. the virus and its genes), but also demand an understanding of the environmental and social contexts in which they occur, and the policy networks and instruments available in those contexts (Ely, Van Zwanenberg & Stirling, 2014).
Science policy funding schemes for societal problems or grand challenges seek to align science supply with social problems or needs. Although science is conducted in conditions of incomplete knowledge, it is well documented that certain particular research options are much

better aligned to certain outcomes (Sarewitz, 1996, pp. 31–49). It is, for example, very unlikely that astrophysics be useful for improving health care in malaria. Historically, several lines of inquiry in science policy have explored the alignment between research options and social outcomes, namely related to priority-setting and evaluation of research, but also to broader considerations related to the "supply" and "demand" of policy-relevant science. For this reason, a suitable interpretation of the alignment issue should be based on our understanding of the current state of the science (the *supply*) and what is required to achieve social goals (the *demand*) (Sarewitz & Pielke, 2007). The "demand" side must therefore consider not only the plurality of outcomes, but also various ways of articulating specific science or technology -driven pathways for achieving them. This in turn can refer to a process of public deliberation whereby different outcome preferences or divergent underlying values are made explicit by stakeholders. Similarly, the "supply" side is not just about how much "high-risk, high-return" research should be undertaken, but also about what type of outcomes are more or less *likely* to result from a given line of research. In this article, one the one hand, we apply the concept of *research landscape* (Wallace & Rafols, 2014) in order to map the scientific research on obesity.

On the other hand, we symmetrically map one of the interpretations (representations) of social needs (demand) on obesity. The supply-demand schema can be represented as in Figure 1. Here societal demand and scientific supply are not related directly in one single way. Instead they can relate via a variety of interpretation/representations of the "obesity" social needs. These representations shape science policy and affect actions that may reconcile supply and demand.

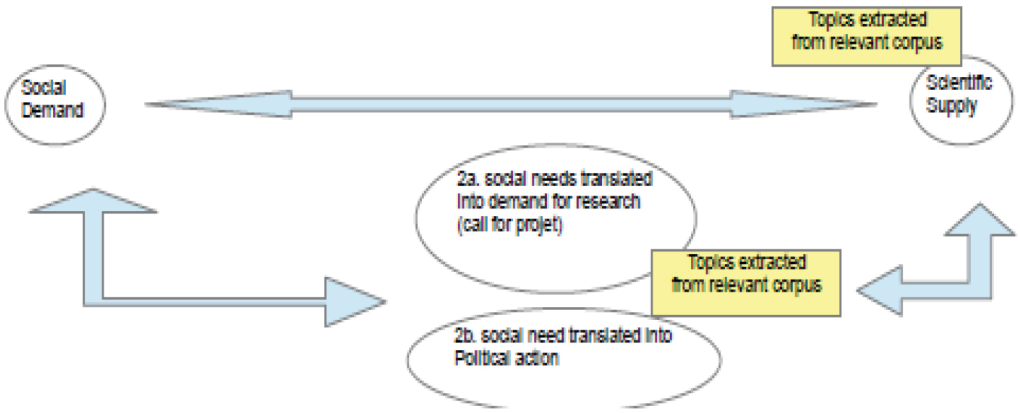

Figure 1. Social demand – scientific supply and political discourse as an example of intermediary representation.

In this paper we investigate the alignment (or lack thereof) between science supply and social demand by mapping, first, the scientific supply via the research landscape of obesity as defined by topic modelling of publication abstracts, and, second, social demand according to political discourse in the French parliaments. These maps of both supply and demand are specific and partial representations used in this preliminary and exploratory study -- other, complementary representations would be possible. For example, supply could be represented by a topic modelling of grants abstracts (as Talley et al., 2011 did for the US National Institutes of Health). And demand could be mapped using newspaper articles, among many other sources.

Data and Methods

Data

In order to define the relevant corpus for obesity, we follow a two-step method. First, we retrieve all publications with indexed MeSH term matching the search *obes** in MEDLINE/PubMed during the 2002-2013 period. This search was performed on October 16, 2014 and it returned 87,315 records.

Then, we launched *medlineR*, a routine based on the R language that allows the user to match data from Medline/PubMed with records indexed in the ISI Web of Science (WoS) database (Rotolo & Leydesdorff, 2015). The routine identified 71,055 WoS records (WoS core collections), with 'article' or 'review' as document types.

Second, we used Leiden's classification system to identify clusters of publications related to obesity. The classification system is constructed at the level of individual publications and clustering is based on direct citations (Waltman & van Eck, 2012) for the period 2000-2013. Obesity publications appear in 4,718 micro-clusters (in which at least one publication is tagged obesity), out of 32,466 micro-clusters for the whole WoS corpus. All the publications from clusters with at least 25% of publications tagged as 'obesity' were considered to be relevant for the study. This threshold of 25% is arbitrary and exploratory. Further explorations will use a lower threshold to test the robustness of this choice. The obesity corpus thus obtained contains 54,424 publications.

Topic modelling

Topic modelling provides a suite of algorithms to discover hidden thematic structure in large collections of texts. A topic model takes a collection of texts as input and it discovers a set of topics (recurring themes that are discussed in the collection) and the degree to which each document exhibits those topics.

Latent Dirichlet Allocation (LDA) is the simplest topic model. The intuition behind LDA is that documents exhibit multiple topics. LDA is a statistical model of document collections that tries to capture this intuition. It is most easily described by its generative process, the assumed random process. A topic is defined as a distribution over a pre-defined vocabulary. Moreover, it is assumed that the topics are specified before data have been generated (technically, the model assumes that the topics are generated first, before the documents). Now for each document in the collection, we generate the words in a two-stage process:

1. Randomly choose a distribution over topics.
2. For each word in the document
   (a) Randomly choose a topic from the distribution over topics in step #1.
   (b) Randomly choose a word from the corresponding distribution over the vocabulary.

This statistical model reflects the idea that each document contains multiple topics. Each document exhibits the topics with different proportion (step #1); each word in each document is drawn from one of the topics (step#2b), where the selected topic is chosen from the per-document distribution over topics (step #2a).

The goal of topic modelling is to automatically identify the topics from a collection of documents. The documents themselves are observed, while the topic structure (the topics, per-document topic distributions and the per-document per-word topic assignments) is a hidden structure.

Results on Science Supply

For this study, we fitted a 100-topic model to the 54,424 publications of the obesity corpus. We perform LDA with the R package “topicmodels” and visualize the output using LDAvis.

Figure 2 shows a map of these 100 topics. Topics are located close to one another if they are similar in terms of distributions of the words belonging to the selected dictionary. The measure of topic similarity is the matrix of Jensen-Shannon divergences between topics, considered as distributions over words, into two-dimensional coordinates and is represented in a 2d space through multi-dimensional scaling (i.e., principal coordinates analysis).
In addition, a clustering technique is used to cluster topics into research areas. We applied k-means clustering to the topics as a function of their two-dimensional locations in the global topic view with k=10. Labels are assigned to clusters. These labels are obtained by extracting the most relevant terms for each cluster of topics, where the term distribution of a cluster of topics is defined as the weighted average of the term distributions of the individual topics in the cluster.

Figure 2. Map of topics of publications on obesity (2003-2013).

Results on the Societal Demand

The same approach has been used to map the social demand. In order to define one possible interpretation, we refer to the questions that the members of the French Parliament (i.e. Assemblée Nationale or Senate) can ask to the government. Deputies and senators publicly question the members of the Government in different ways. The question can be asked during a Parliament session to the government or be written and a Parliament session is not necessary and addressed to one of the ministers. We retrieved this information and built up two datasets.

First, we selected all the questions asked by the Senators where the word *obes** was reported in the public database - with records from 1985 on - which is now available. We got 242 questions from 1992 - year of the first occurrence of 'obesity' in these questions - to 2014. Second, we collected oral and written questions asked by members of the Assemblée Nationale in the last three legislatures, getting: 422 questions (2002-2007), 870 (2007-2012) and 380 (2012 – 2014). The output of the 10-topic model is shown below for the Senate questions.

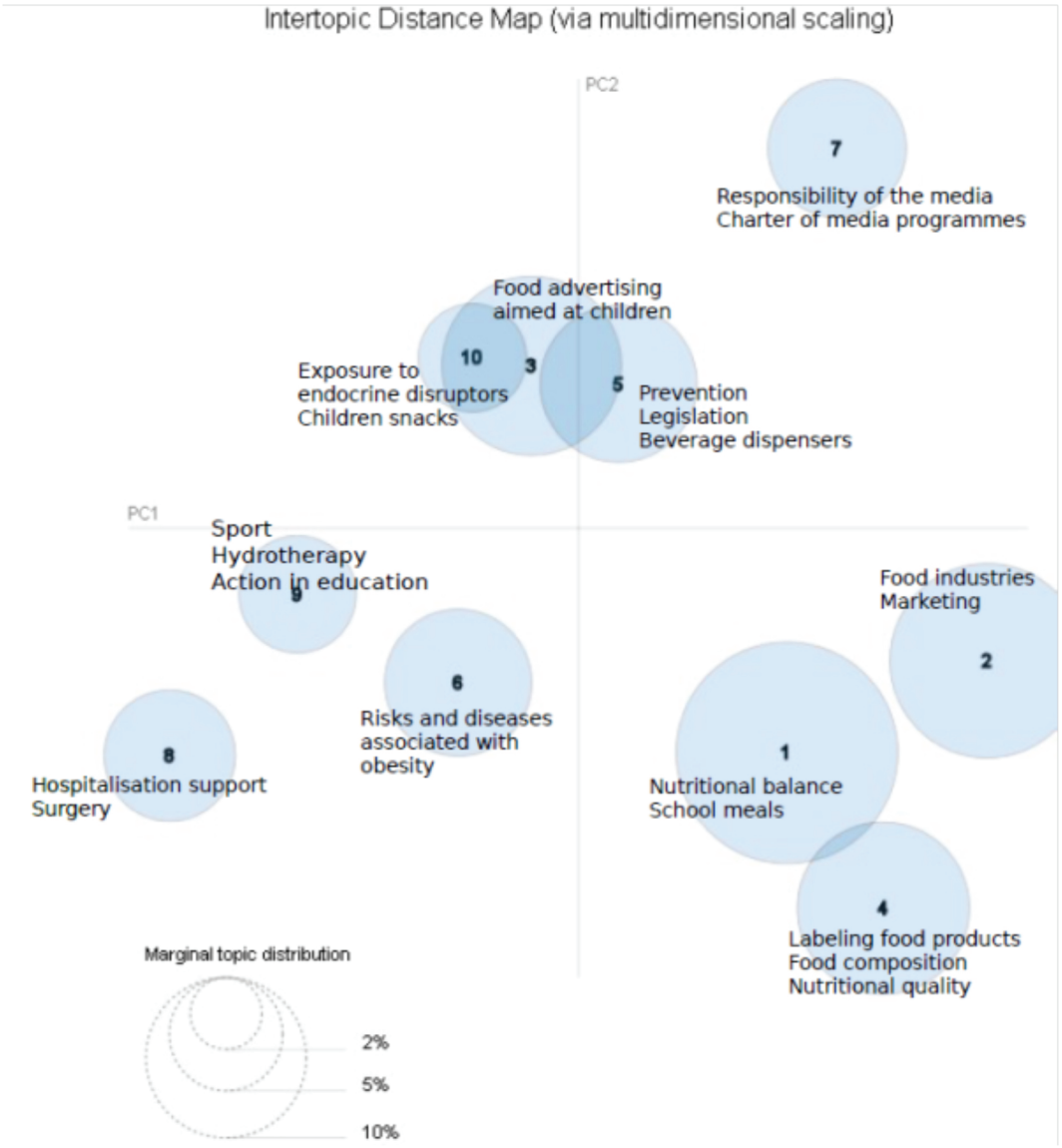

Figure 3. Map of topics for questions in the French Senate (1992-2014).

Discussion

In the centre of the Figure 2, we have a cluster of topics concerning *Physical activity, psychology and quality of life*, then turning around clockwise we find *Food consumption and diet* and then two clusters concerning mainly topics linked to biology research and further four clusters related to medical and surgery issues. The clusters of topics identified in the research landscape are mainly concerning medical and biological issues and only two clusters seem to deal with social and behavioural determinants of obesity, respectively *Obesity & ethnicity* and *Food consumption and diet*. The political discourse (Figure 3) seems to be organised around topics different from the research landscape. Among *the ten topics defined*

three main groups are reasonably identified. The first one, on the top part of the graph (i.e., topics number 3, 5, 7 and 10), is concerned mainly with children nutrition and the role of media as in advertising. A second group of topics, on the bottom right of the graph (i.e., topics number 1, 2 and 4), deals with food industry, marketing, and labelling issues. Finally, a third group, at the bottom left (i.e., topics number 6, 8 and 9) is concerned by medical and surgery issues. Only three out of ten topics of political discourse seem to find a counterpart in the research landscape. A preliminary analysis therefore suggests that, while research is concerned about the biophysical mechanisms that lead to obesity, many of the political questions are about the social mechanisms that favour obesity, such as advertisement, beverages, marketing, etc. This may suggest insufficient research regarding the social origin of obesity.

Acknowledgments

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