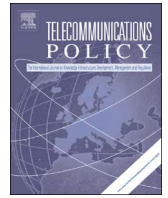




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## The evolution of the telecommunications policy agenda: Forty years of articles in *Telecommunications Policy*

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### ABSTRACT

This paper investigates the evolution of the telecommunications policy agenda by means of text mining forty years –from 1976 to 2016– of papers in the journal *Telecommunications Policy*. Text mining techniques help identify the key topics, the dominant combinations of concepts and the main areas of research within this multidisciplinary –technical, economic, social, policy–discipline. In addition they depict an evolution of the policy agenda more nuanced than the conventional public service, pre-competition and post-liberalisation stages typical of telecommunications. Also, in combination with bibliometric information, the results display the relationships between areas of research and methodologies, countries and authors' background, all together providing a deeper understanding of the past, present and future avenues for research in telecommunications policy.

### 1. Introduction

Unlike most academic journals, *Telecommunications Policy* has two salient features: (1) it was founded with a clear and definite aim that has not changed over the years, and (2) its title accurately reflects this aim. Lawrence H. Day, first *General Editor* of *Telecommunications Policy*, wrote on the first Editorial comment published on December 1976 (Day, 1976), that the journal *will present a continuing discussion on telecommunications futures and policy options [...] in a manner that is most useful to decision makers and policy analysts in government and industry*, whilst acknowledging that *a considerable amount of the material published in the journal is expected to come from academic and national and international policy-research organisations*.

The way in which the sought dialogue between academia and stakeholders has developed is twofold. First, decision makers from here and there have undoubtedly taken advantage of the progresses and ideas published in the journal. Unhappily, the extent and manner in which this has happened is impossible to elucidate in the framework of this paper. Conversely, policy agendas have oriented, or even constrained, research agendas and, consequently, the subjects covered in the articles published in the journal.

This on-going link between hot policy and regulatory issues on the one hand, and publications on the other, serves a specific purpose. When reached a certain level of maturity, every discipline looks back to analyse what has been its own evolution. Usually, this requires a considerable effort of gathering and organising facts and documents, often scattered among a wide array of sources. In the case of telecommunications policy –as a discipline–, the existence of the privileged outlet that is *Telecommunications Policy* –as

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a journal– brings a substantial simplification of this task. Without obviously denying that many interesting works can be found elsewhere, *Telecommunications Policy* has held –and holds– the lead position as the reference in the sector. What has happened in telecom-related markets has had a reflection on the pages of the journal; what has been discussed in the articles that have deserved publication has frequently arrived to the offices of regulatory authorities and decision makers.

With this in mind, this article intends to make a review of the evolution of the agenda of the telecommunications sector –this is, which are the most relevant items in this agenda and how they have evolved over time–, looking at it through the glasses of the articles published in *Telecommunications Policy*. For that, a number of techniques from multivariate (big) data analysis specifically aimed at text mining have been employed. The aim when making use of these methods is twofold: these are the most adequate tools to identify prominent items in a set of text documents such as journal papers, while, from the perspective of authors, their usage provides an illustration on the possibilities of textual analysis in the domain of ICT research, an increasingly popular methodology across many industries and research fields but seldom applied in the ICT domain. In addition to the text mining analysis, but always departing from it, bibliometric information has been added to explore the links between main dimensions of research –main topics in the policy agenda– and other variables such as methodological approach or geographical distribution.

The article is structured as follows: after this introduction, the next section briefly discusses the links between academic publications and policy-making to put in context the findings of this paper. Next, the section on methodology explains the collection of data, the pre-processing, the text mining techniques and the software employed. The ensuing section presents and discusses the results with a particular focus on cluster analysis. Last, the conclusions section closes the article.

## 2. The role of academic journals outside the academic world

The usefulness of scholarly journals is always measured in academic terms. Journal rankings and ratings serve as criteria for evaluating journals performance. Without denying the importance of those indicators, they do not reflect the wider impact that they may have. Scientific research has no sense by itself but understood as an effort to help society progress.

How to assess an impact that transcends academic journals' foremost *playing field* is a pending challenge – an extraordinarily daunting challenge, indeed. For those journals in the technological fields, their significance could be measured by tracing the transfer of knowledge derived from academic articles to marketable products. For instance, a ranking system that considers the number of citations in patents as a proxy for measuring the *technological value of journals* has been proposed (Liaw, Chan, Fan, & Chiang, 2014). For other kinds of journals, and particularly for policy journals, it is hardly to be expected that such a similar ranking would be available.

However, this does not mean that there is no reflection on how to best use –in real-world conditions– the knowledge enclosed in scholarly works with policy implications. Almost as old as *Telecommunications Policy* are two contributions that even today continue to underpin any further work. The “two-communities theory” (Caplan, 1979), which has largely dominated the ensuing debate, claims that the problem of under/non-utilization of research in the policy process lies on the fact that policy makers and academics form two separate and poorly connected communities that operate under different rules, speak different languages, and are motivated by different rewards systems. With a more positive approach, the “enlightenment function of social research” (Weiss, 1977) states that decision makers tend to use research indirectly, as “a source of ideas, information, and orientation to the world (...) although the process is not easily discernible, over time it may have profound effects on policy”.

Over the last 40 years, further contributions have fine-tuned but not replaced these theories. There is a number of sensible middle way approaches that have nuanced the more extreme positions. As a summary, it can be stated that there is not a simple dichotomy between use and non-use of research by decision makers; rather, the relationship occurs along a spectrum of interaction, with some public servants engaging more closely with academic research than others (Newman, Cherney, & Head, 2016).

In spite of all the endeavours towards gaining a deeper understanding of how this interaction takes place, the overall evidence is somehow discouraging: “apart from some biographical accounts and case studies, surprisingly little is known at a more general level about how policy-makers do actually engage with academic research and expertise” (Talbot & Talbot, 2015). The conclusion, therefore, is that, in the particular case of *Telecommunications Policy*, it has influenced, no doubt, telecommunications policy, though in ways that it is impossible to determine or measure.

But equally evident is that telecommunications policy has influenced *Telecommunications Policy*. This reverse link between policy activity and academic research has never been explored before. Although may not always be as appealing as the direct relationship is, it is instrumental in raising some other issues, the most outstanding of these being the analysis of the historical evolution of a particular field.

This is the case for this journal and this area of knowledge. The filing in 1974 by the United States Department of Justice of an antitrust lawsuit against AT&T can be considered the milestone that marks the start of the modern era of telecommunications policy. *Telecommunications Policy* witnessed the settlement of this long process, as well as any other landmark event that had happened since then. In its pages, current affairs at the time have been dissected, analysed, discussed and challenged; issues that were going to play a key role even in the long term have been foreseen before reaching the market; authors have drawn up proposals and offered recommendations. Academic or practitioner, anyone who had had anything to say has sent his/her work in the first place to *Telecommunications Policy*. To untangle the lines of the past of *Telecommunications Policy* is to understand the history and agenda of telecommunications policy.

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