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BIBLIOMETRIC ANALYSIS OF THE REGULATORY COMPLIANCE FUNCTION WITHIN THE BANKING SECTOR

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1. INTRODUCTION

1.1 Summary

In today's global marketplace, banking organizations have greatly expanded the scope and complexity of their activities and face an ever changing and increasingly complex regulatory environment. Furthermore, due to the consumer credit crisis, several high profile compliance breakdowns, and increased emphasis on consumer protection, the federal and state regulatory agencies, investors, legislators, and the general public are focused on institutions' customer practices and regulatory compliance performance like never before. Moreover, a compliance failure can result in litigation, financial penalties, regulatory constraints, and reputational damage that can strategically affect an organization.

Regulatory compliance is an organization's adherence to laws, regulations, guidelines and specifications relevant to its business. This discipline has become more prominent in a variety of organizations and the trend has even led to the creation of corporate, chief and regulatory compliance officer positions to hire employees whose sole focus is to make sure the organization conforms to stringent, complex legal mandates.

In this context, the aim of the present work is to provide with key notions regarding Regulatory Compliance applied to the banking industry, and the key guidelines in order to design and implement a compliance structure and methodology in a financial entity.

A subsequent bibliometric analysis will be performed in order to obtain the main aggregated attributes of the existing literature related to banking regulatory compliance. This analysis will be based on the publications obtained from the bibliographic database Web of Science and will include the use of bibliometric tools such as BibExcel, designed to analyse bibliographic data, and Pajek, designed for visualization of large networks. The analysis will contain the most commonly used indicators to analyse the features of the set of documents studied, such as collaboration networks, keywords and co-wording, authorship and geolocation.

Finally, an in-depth analysis of the literature that populates the bibliometric analysis will be the basis to detail the different perspectives maintained by the authors publishing in this area.

This analysis aims to gather significant conclusions about the treatment adopted towards Regulatory Compliance depending on the geographical area, existing regulation and other social factors.

1.2 Purpose of the TFC and justification of the related subjects

The purpose of this work is to obtain a detailed overview of regulatory compliance and the most significant facts of this discipline applied to banking industry. This objective will be performed by a research of the related theoretical information and a further bibliometric study, which will show

the impact of this discipline in the bibliometric databases and will provide with an extensive knowledge on bibliometrics techniques. A final comparison between the theoretical concepts and status update found in specific bibliography and the conclusions from the articles found in the bibliometric study will allow to conclude on whether all relevant topics have been sufficiently covered by the bibliometric databases articles, and what are the foreseeable trends for the near future.

Below is included the detail of the subjects that are related to each chapter and a brief rationale of their input for the accomplishment of this work.

Chapter 2: Theoretical principles of Regulatory Compliance	
Related subjects	Business Law General and Analitic Accounting Strategic Management and Company Policy Financial Management Introduction to corporate sectors (services) Financial Systems and Markets Technology of financial companies, consultancies and processing agencies
Rationale	<p>This chapter describes the Regulatory Compliance function and an overview of the current situation of this discipline. Some of the regulation applicable to the banking industry was studied in Business Law. The banking activity was described and analized in the subjects Introduction to corporate sectors, Financial Systems and Markets, Technology of financial companies, consultancies and processing agencies and Financial Management.</p> <p>The contents of the subjects General and Analitic Accounting and Strategic Management and Company Policy have provided a background on management, decisión making and strategy in order to describe the mínimum requirements to design and implement a compliance methodology in a financial entity.</p>

Chapter 3: Methodology and sources for a bibliometric analysis	
Related subjects	Statistical methods applied to Economics Introduction to Statistics Information systems management
Rationale	This chapter describes the most commonly used indicators for bibliometric analysis as well as the source of the information and tools employed to process the data. The subjects Statistical methods applied to Economics, Introduction to Statistics and Information systems management provided a background on these contents.

Chapter 4: Bibliometric study for banking Regulatory Compliance	
Related subjects	General and Analitic Accounting Introduction to corporate sectors (services) Technology of financial companies, consultancies and processing agencies Statistical methods applied to Economics Introduction to Statistics Information systems management
Rationale	This chapter included the bibliometric study based on the methodology, sources and tools described in chapter 3. In addition to the subjects described before, the lessons learnt from General and Analitic Accounting have been useful to perform a qualitative analysis and accurate interpretation of the statistics obtained through the tools. Furthermore, the subjects Introduction to corporate sectors and Technology of financial companies, consultancies and processing agencies provide with key learning points of the banking activity, which were useful to link the regulatory compliance discipline with its application to banking industry.

Chapter 5: In-depth analysis of the literature related to Regulatory Compliance	
Related subjects	<p>General and Analitic Accounting</p> <p>Strategic Management and Company Policy</p> <p>Service companies management and organization</p> <p>English</p>
Rationale	<p>The subjects Strategic Management and Company Policy and Service companies management and organization de servicios include basic concepts on banking structure, activity and organisation, which were useful to understand the regulatory compliance function applied to the banking industry.</p> <p>With the concepts learnt in General and Analitic Accounting a background was provided regarding qualitative analysis and results interpretation which was used to obtain the key information required and aggregate qualitative results from the articles selected.</p> <p>Finally, the technical English contents in the language classes were useful in order to develop my English skills, which has been demonstrated in the use of English to write this piece of work.</p>

1.3 Objectives

The global objective of this work is to gain understanding about the regulatory compliance discipline applied to the banking industry by searching on specialized sources, articles and experts' opinions.

The bibliometric analysis of the articles related to this matter entails several objectives:

- a. To deepen in the knowledge of regulatory compliance and of the current environment of the discipline applied to the banking industry.
- b. To get knowledge about bibliometrics, a so far unknown tool to perform quantitative analysis of the research production related to a given matter,
- c. To get key information regarding the production activity of literature published in specialized bibliometric databases for banking regulatory compliance.
- d. To deepen my knowledge of banking Regulatory Compliance through the analysis of the articles included in the specialised bibliography.
- e. To assess, through a comparison between the literature available and the description of the current status of banking regulatory compliance, the degree of linkage between the current hot topics in regulatory compliance (regulatory updates and main challenges) and the conclusions of the articles published in bibliographic databases.

2. THEORETICAL PRINCIPLES OF REGULATORY COMPLIANCE

2.1 Introduction to Regulatory Compliance

All businesses have a certain set of regulations to which they must adhere. The regulatory map is constantly expanding and includes different kind of regulations (worldwide or continental, country-related, sectorial, etc) which occasionally overlap each other. Furthermore there are some recent areas such as the dynamism of the corporate relations and the development of digital solutions that cause the appearance of new relevant regulations, such as those ones related to data protection and e-commerce.

Compliance is a fairly straightforward concept of acting in accordance with established laws, regulations, protocols, standards and specifications. The critical issue is around the cost of noncompliance which can be civil, criminal, reputational, financial or market based. Corporate compliance typically includes compliance with external laws (enacted by legislative bodies) and regulations (created by regulatory bodies) and internal protocols such as policies and procedures (Tarantino, 2008).

Regulatory compliance affects to all kind of organisations, regardless their activity, size or location. However, the requirements are stronger for highly regulated sectors, such as industry, banking or health care. In this work, we will focus on the specifications, main challenges and new trends of banking regulatory compliance (refer to section 2.3).

Traditionally, the former compliance activities were performed by legal departments. The increase in the volume, complexity and variability of the compliance obligations impacting the organisations has multiplied in the last years. This entails that the use of structures to facilitate compliance and specialised human resources is currently not only a priority of the big corporations but also a need for most medium-sized companies (ASCOM, 2017). As a consequence, new organisational roles have been created, such as chief and regulatory compliance officer, whose focus is to make sure that organisations are adhered to laws, regulations, guidelines and specifications relevant to their business.

Compliance programmes

The set of systematic procedures implemented in an organisation to ensure that the regulatory requirements are met is defined as a compliance program. The compliance programme should be riskbased and subject to oversight by the head of compliance to ensure appropriate coverage across businesses and co-ordination among risk management functions (Basel Committee on Banking Supervision, 2005).

To qualify as “effective,” a company’s compliance program would not only have to establish standards and procedures to prevent and detect criminal conduct, but would have to actively promote a culture encouraging ethical conduct and compliance with the law.

The compliance programme should be adapted to the specific activity of the company. The specific areas for banking industry are mentioned in section 3.2. The minimum contents for a standard compliance programme are the following (Fraga, 2013):

- **Penal risk and control map:** This map should include a detailed list of activities that may be susceptible of committing penal risk, and the areas or processes in which they are located. The controls defined for each risk should be able to mitigate them totally or partly, with a residual risk lower than the inherent initial risk.
- **Compliance control organism:** the person or area in charge of supervising the functioning of the compliance model should be independent and sufficiently resourced. The structure of this organism should be accordant with the size of the organisation; this is, small companies may have a single Compliance Officer whereas bigger companies will have a complete structure of officers assigned by business areas and a Compliance Commission which serves as a communication channel between the compliance function and the management.
- **Whistleblowing channel:** This is an internal and anonym complaints channel which allows employees to inform of regulation breaches and is managed directly by the compliance control organism mentioned before.
- **Internal disciplinary system:** The disciplinary system should contain sanctions which are proportionate to the breaches committed. On the other side, it is recommended that there is also a system to reward the employees’ ethical behaviour and accomplishment of the compliance program through bonus or promotions.
- **Records management system:** All the actions promoted to guarantee compliance should be properly recorded and filed. The records management system should guarantee the authenticity of the records, their integrity, durability over time and reliability.

In order to guarantee the effectiveness of the compliance programmes the standardisation organism UNE will submit in 2017 the rule UNE 19601 for Penal Compliance Management Systems. The draft version of this rule includes the criteria to certify the compliance programmes and introduces the need of annual audits by an independent expert to verify the appropriateness of the compliance program to the regulatory requirements and the effectiveness of its deployment and compliance.

2.2 The penal responsibility and the origin of Regulatory Compliance

Modern compliance programs can be traced back to the beginning of the 20th century, when public safety agencies began to emerge. The Food and Drug Administration, for instance, was created in 1906.

The growth of the United States in the 1950s and 1960s prompted the development of modern management culture and organizational structures, being the public compliance control system predominant until the 1970s. After several events such as the Watergate scandal and foreign corruption investigations, the private industry increased its responsibility over the compliance of companies. In 1977 the Foreign Corrupt Practices Act was signed. Additionally, several enforcement agencies were created and promoted the hiring of companies to develop internal resources.

A change of the compliance culture was promoted after the criminal trial of Arthur Andersen, LLP as a consequence of the Enron scandal. The role of the former defendant in business (which would be comparable with the current compliance specialist), took higher importance and the focus of the organisations was moved from indicting, prosecuting and punishing corporations to increase sensitivity and reform corrupt corporate culture (Mackessy, 2010).

In the Anglo-Saxon territory, the banking industry has been strictly regulated since mid XX century. The increase of regulatory requirements and the need to guarantee their compliance promoted the specialisation of compliance areas which replaced increasingly the legal advisors who carried out this function formerly.

In Spain, the concept of compliance has been implemented quite lately with regards to the United Kingdom. The first companies implementing a compliance function were the branches of international companies, as a reflect of their compliance corporate structure. Other national companies with significant international activity also adopted the compliance plans and structure in an earlier stage (Sánchez López, 2015).

Nowadays, the compliance duties have been implemented to most large and medium-sized organisations, as the amount of regulation and standards to be met has increased significantly.

Compliance got its biggest impulse in Spain as a consequence of the amendment of the Penal Code in 2010 (*Organic Law 5/2010*), which introduced the corporate penal responsibility (beforehand, this liability was only economic and applicable to physical persons). The current regulation (*Organic Law 1/2015*) assigns penal responsibilities to the organisations or their managers for the regulation breaches, but also for the lack of control that should prevent compliance breaches to be incurred. Below are the most significant features of this new liability:

- The existence of a proper compliance programme may serve as an exemption or attenuation of the penal responsibility of the company. This program must include the minimum requirements detailed in section 2.1 of the present work.
- The compliance control function must be performed by an internal autonomous organism. As an exception, the small-sized companies may be supervised directly by the administration organism, following a principle of proportionality.
- The corporation will be exempted of penal liability when, before the crime commission, it would have adopted surveillance and control measures to prevent such type of crimes or mitigate the risk of breach.

The inclusion of this regulation has led to a significant improvement of the compliance control systems in the companies.

2.3 Regulatory Compliance at banking industry

Banking Compliance guidelines and organisms

The Basel Committee on Banking Supervision (BCBS), which is the primary global standard setter for the prudential regulation of banks and provides a forum for cooperation on banking supervisory matters, issued in April 2005 the document "Compliance and the Compliance Function in Banks" which is a high level paper including the main guidelines, responsibilities and principles to promote a proper compliance function within the banking sector. This document includes the following summarized guidelines:

- The specific **responsibilities of the bank's compliance area** are named below:
 - o To advise senior management on compliance laws, rules and standards
 - o To assist senior management in educating staff on compliance matters, act as a contact point for compliance queries from staff, and establish written guidance on the implementation of compliance standards.
 - o To identify, measure and make an assessment of compliance risk associated with the bank's business activities (e.g.: participate in new products approval, change of types of business or customer relationships). This assessment should be made through the use of indicators to measure compliance risk.
 - o To monitor, test and report recurrent compliance controls.
 - o To carry out statutory responsibilities, such as anti-money laundering officer, and perform liaison with the regulators.
 - o The responsibilities of the compliance function should be carried out under a compliance programme that sets out its planned activities, such as the implementation and review of

specific policies and procedures, compliance risk assessment, compliance testing, and educating staff on compliance matters.

- **Responsibilities for the board of directors** for compliance: The bank's board of directors is responsible for overseeing the management of the bank's compliance risk.
- **Responsibilities of senior management** for compliance: The bank's senior management is responsible for the effective management of the bank's compliance risk, establishing and communicating a compliance policy, for ensuring that it is observed, and for reporting to the board of directors on the management of the bank's compliance risk.

They are also responsible for establishing a permanent and effective compliance function within the bank as part of the bank's compliance policy.

- The bank's compliance function should be **independent**. This Independence involves four elements: to be a function with a formal status within the bank, to have a head of compliance with overall responsibility, to avoid potential conflicts of interest of the compliance staff between their responsibilities and any other responsibilities they may have, and to have access to the information and staff necessary to carry out their responsibilities.
- The compliance responsibilities may be carried out either by a compliance department or unit or by other functions in the bank (for example, legal department). If there is a division of responsibilities, the **allocation of duties** to each function should be specified.
- The scope and breadth of the activities of the compliance function should be subject to periodic **review by the internal audit** function.
- Banks should comply with applicable laws and regulations in **all jurisdictions** in which they conduct business, and the organisation and structure of the compliance function and its responsibilities should be consistent with local legal and regulatory requirements.
- Specific tasks of the compliance function may be **outsourced**, but they must remain subject to appropriate oversight by the head of compliance.

In Spain, the National Association of Compliance (ASCOM, for Asociación Española de Compliance) was created in 2014 with the aim of professionalizing the compliance function and serving as an interlocution channel with the institutions and regulators. This institution defends the professional interests of its associated members, who are people with more than two years experience, promotes the knowledge of compliance providing with patterns of activity to their professionals, sets the institutional relationship with regulators and institutions and maintains a specialised job pool.

Compliance Program for banking industry

With regards to the compliance programmes for banking entities, the following specific areas should be included, together with the generic areas specified on section 2.1 (ASCOM, 2017):

- Anti-Money Laundering and Terrorism Financing
- Bribery, Fraud and Corruption detection
- Defense of Competition
- Market Abuse
- Personal Data Protection and Information Privacy
- Conflicts of Interest Management
- Complaints and Claims Management
- Prevention System for Penal Risk
- Consumer Protection
- IT Compliance

Main challenges of banking compliance

The banking and regulatory industries show a constantly changing environment. Below are described some of the most significant hot topics which relate to both areas:

1. New trends in regulatory compliance

In the last years, the Compliance profession has been acquiring increasing significance within the corporate governance of companies. The establishment of programs and methodology has led to a more “professionalized” area, which comprises specialized staff. The trends for regulatory compliance in the upcoming months/years are the following:

- Increase of the relationship between compliance and corporate ethics: as more people get specialised in compliance, compliance organisations increase the volume and level of their training and the flows of information exchange are bigger each time. This entails that all the compliance structure gets stronger and professionals provide added value to their work including new aspects such as corporate ethics.
- Operationalisation of the compliance programs: the compliance programs may not be only a set of procedures and controls, but they also may be applied effectively to the relationship between Compliance and the other areas of the entities.
- Audit and monitoring: Compliance programmes may be permanently reviewed by an independent audit team, specially for their involvement of third parties.

- Improve Board participation: Overall, the Board members have not been properly skilled on compliance knowledge. As long as this function is becoming key in the organisations, the Board members will need to be adequately trained on the monitoring and surveillance of compliance programs and promote a “tone from the top” culture of compliance.

2. Roles of the regulatory compliance professionals

Work in advising organisations on regulatory compliance and ethics programs has expanded exponentially. Inhouse corporate lawyers are claiming the area of preventive law as their own. Meanwhile a new “compliance profession” is beginning to emerge, as evidenced by the employment of both lawyers and non-lawyers in inhouse corporate compliance departments and the growth of professional associations, conferences and training courses catering specifically for their needs (Parker, 2000).

One of the main differences between these two types of specialists is the perimeter of their analysis: the lawyers see the legal advisory as an autonomous advocacy whereas the compliance experts show a higher conceptualisation of their duties, adjusting the regulatory framework within the company and taking consideration of other professionals, regulators and stakeholders to play a transformative role within the organisation (Parker, 2000).

Due to the increasing demand of compliance officers who are able to set up the mechanisms to ensure that the organisations are compliant with the regulatory framework, the profile of the traditional lawyers is evolving towards a compliance officer role, not only experienced in law, but also in risk management and with communication skills to promote the compliance across all the organisation.

3. The cost of implementing a compliance system

As a recent discipline, the market shows a certain degree of distrust with the sale of compliance solutions to be implemented in their companies. The main reasons are explained below:

- There is a large number of providers of services offering compliance solutions. In many cases, the product offered consists of a set of standard framework, methodology and procedures, which may not be completely adapted to the organisation (these are informally called “pret-a-porter” solutions). The rationale under the acquisition of this type of solutions is that the existence of a compliance program sometimes precludes criminal prosecution of a corporation after its agent has broken the law, or can lead to a sentence downgrade. However, it is remarkable that the compliance program implementation must be “effective”, and therefore the lack of real prevention systems may still cause penal liabilities for the companies.

In order to be considered as “effective”, a compliance program must meet, among others the following requirements: be approved, implemented and supported by the highest levels of the corporation; address the problema areas exemplified by the wrongdoing at issue; be tailord to fit

the particular corporation's culture as well as the relevant industry; clearly communicate the corporation's intention to comply with the law and announce employee penalties for prohibited acts; and involve efforts to enforce the policy and discipline wrongdoers (Wellner, 2006).

- The costs of compliance solutions are deemed to be excessive for the medium and small sized companies. Furthermore, the standard set provided by third parties is often applicable to big organisations, and therefore not realistic for these type of companies. However, there is a need for medium and small-sized organisations to have a preventative compliance system in place in order to be able to sign commercial agreements with public sector

The main challenge nowadays is to be able to perform a size-based assessment and implement the necessary compliance measures in these companies, with a reasonable cost.

3. METHODOLOGY AND SOURCES FOR A BIBLIOMETRIC ANALYSIS

3.1 Definition of Bibliometric Analysis

The Bibliometric Analysis (or Bibliometrics) is the study of scientific production through mathematic and statistical methods (Pritchard, 1969). The input of this discipline are scientific publications, including books and other media of communication, obtained from bibliographic databases.

A set of attributes, called bibliometric information, is required from each publication to perform the bibliometric analysis. This information includes author, affiliation, citations from other publications, co-citations with other publications, reader usage and associated keywords (Norton, 2001).

Bibliometrics uses a set of indicators that allow to express in a quantitative manner the bibliographic features of the set of documents studied as well as the relationship between these features (Ardanuy, 2012). The types of indicators are described in the next section.

The bibliometric analysis is applied mainly to two fields: a) the planning of libraries and documental centres in order to solve space constraints, as bibliometrics provides with information of documents that fall into disuse or reduced use due to ageing, and therefore can be stored in external deposits or transformed into microformes; and b) to scientific policy tasks, where the analysis of citations are used to assess the scientific production of given investigators, groups or countries.

Bibliometrics has developed a large amount of techniques which allow measuring different attributes of the users, both from the scientific production perspective as well as the consumption of information they make. In general, its application has meant a big help to define the systems and information services more adequate for them (Sanz Casado et al., 1997).

The advantages of bibliometric methods for scientific evaluations are rather obvious (The Guidelines Project):

- The methods are straightforward, since based on simple counting. Many techniques have become especially simple in the digital age, because their application can be automated.
- On first sight they are objective and unbiased.

At the same time, there are some obvious drawbacks in these methods:

- As quantitative methods they may completely miss the point for a qualitative evaluation.
- They may be manipulated (e.g., unnecessary citations by your colleagues).
- The number of citations depends more on the number of people working in the same domain, rather than on the intrinsic quality or originality of the published results.
- Since the number of citations is a driving force for evaluating researchers in their career promotion, researchers will tend to cling to “trendy research” in fields where many other

researchers are active and where scientific funds can more easily be obtained. The result may be a trivialization of research subjects instead of an active search for original research ideas.

- In practice it has led to an Anglo-Saxon bias and a strengthening of the big players in the publication sector, to the disadvantage of small publishers, Southern countries and, e.g., Hispanic, Japanese, Chinese, Russian, Arabic and Francophone publications.

3.2 Bibliometric indicators

As stated in the previous section, the bibliometric analysis is performed through the use of bibliometric indicators. These indicators are numeric data calculated from the bibliographic attributes observed in the documents published in scientific and academic media

The indicators synthesize a bibliographic feature or a combination using a numeric value, which take more interest when compared with observations from other set of documents (other geographic areas, universities, discipline, databases etc) (Ardanuy, 2012):

Personal indicators

These indicators refer to authors' personal attributes such as age, gender, professional position, country or organisational affiliation. Other indicators based on this data are the insulation index or the percentage of references from a given publication that belong to the same country.

Production indicators

Production indicators are obtained from the count of scientific publications to measure the scientific activity. The scientific activity is measured based on the amount of publications by author, department or investigation group, institution, discipline or country during a given period of time.

These indicators allow establishing production rankings by authors and other aggregated comparisons. The productivity indicator is defined as the common logarithm of the number of publications. On the basis of the productivity data for the analysed authors it is possible to obtain indicators such as the average number of publications per author, average number of authors per publication or statistic indexes of dispersion (standard deviation).

Dispersion indicators

It is about determine which publications represent the core of the discipline. These publications are usually deemed to gather 50% of the citations.

Visibility or impact indicators

These indicators measure the influence of the authors and the articles published and are the most known magnitudes of bibliometrics given their direct effect on the investigators' professional careers. A considerable part of the promotion and assignation of resources systems for the

scientific and academic community in the most developed countries is based on the estimation of the investigator productivity and the influence of his work.

This estimation can be made from the analysis of citations or websites. It is reasonably assumed that a higher amount of citations or links corresponds to a greater influence of the author, and therefore his work is more valuable. Likewise a relative frequency of citations of a publication entails higher prestige for both its editors and its authors.

The most simple indicator is the total amount of received citations. Sometimes its logarithm is calculated – known as Platz index. Another commonly used indicator is the average of citations received by each contribution made by each author. The Impact Factor (IF), used for recurrent publications, is the division between the received citations and the articles published.

The impact factors are calculated yearly for the magazines that are included in the Journal Citation Reports (JCR) provided by Thomson Reuters. The JCR defines a publication IF as the ratio of the number of citations obtained in one year by a publication within the articles published the previous two years divided by the total amount of articles published in the same period.

Collaboration indicators

These indicators measure the relationship between the scientific producers that have come up with the joint publication of their results. It can be calculated the proportion of articles with two, three or more authors and identify those individuals or institutions that have worked more in partnership.

A more complex analysis studies the social network established between the authors publishing jointly. This analysis can be also made with other levels of aggregation such as institutions or countries. The social networks analysis allows the study of co-citation. This is the event by which two or more authors are cited jointly. In the case this occurs with a significant frequency, it is reasonable to conclude that they work in a same area of knowledge although they are not necessarily collaborating.

Obsolescence indicators

The current scientific development involves an accelerated aging of the scientific literature. In other words, there is a strong tendency in many disciplines by which scientific publications become obsolete quite rapidly. In some cases, in areas with a high level of production, the documents are substituted by others with more updated information. In other cases, the information is still valid, but there is a decreasing interest in such fields of knowledge. The obsolescence indicators measure the ageing of the publications.

3.3 Sources and tools for the bibliometric analysis

a. Sources for the bibliometric analysis

To perform a bibliometric analysis is required extensive bibliographic information, which is usually obtained from bibliographic databases.

These databases are made up of a set of attributes with bibliographic information (author, title of the article and of the publication or magazine, publication date, publisher, etc) which are stored and managed through computerized systems.

Many of these databases contain descriptors, keywords and abstracts, and some of them contain citation index. The only citation indexes available during a long time - Science Citation Index (SCI), Social Sciences Citation Index (SSCI) and Arts and Humanities Citation Index (A&HCI)– were developed by the Institute for Scientific Information (ISI), founded by Eugene Garfield in 1960. Nowadays, these indexes are integrated in the **Web of Science (WOS)**, provided by Thomson Reuters through the Web of Knowledge (WOK) platform (Ardanuy 2012).

WOS indexes around 9.300 of the most reputable investigation magazines and comprises the databases indicated below. The fact that a recurring publication is indexed in this database is considered globally as a significant quality criterion.

Table 1: Description of the Web of Science databases

WEB OF SCIENCE	
Database	Description
Science Citation Index Expanded (SCI-EXPANDED)	It covers more than 6,500 notable and significant journals, across 150 disciplines, from 1900 to the present. These are alternatively described as the world's leading journals of science and technology, because of a rigorous selection process
Social Sciences Citation Index (SSCI)	The SSCI citation database covers some 3,000 of the world's leading academic journals in the social sciences across more than 50 disciplines.
Arts & Humanities Citation Index (A&HCI)	This database abstracts and indexes for more than 1,700 arts and humanities journals, and covers disciplines that includes social and natural science journals.

Database	Description
Conference Proceedings Citation. Index- Science (CPCI-S)	Each year the worldwide community of scholars and the professional societies to which they belong organize tens of thousands of meetings at which the members present papers on their latest research. The conference proceedings issued at these gatherings are published as items in journals or as books. From this vast body of literature Thomson Reuters selects for coverage in its Conference Proceedings Citation Index only those publications which will be of greatest importance to the largest number of researchers and scientists worldwide.
Conference Proceedings Citation. Index- Social Science & Humanities (CPCI-SSH)	
Current Chemical Reactions (CCREXPANDED)	The database indexes over one million reactions, and the range of coverage is from 1986 to present day.
Index Chemicus (IC)	Bibliographic data related to chemical disciplines gathered since 1986.

Source: Compiled by the author

The articles listed in the Web of Science can be obtained either through their correspondent websites or through **Google Scholar**.

Google Scholar is a freely accessible web search engine that indexes the full text or metadata of scholarly literature across an array of publishing formats and disciplines. Google Scholar traces the Internet and converges two services into a single platform. Firstly it is a search engine for scientific publications, and secondly it is an index of citations that helps getting to know the impact of such publications (Torres-Salinas et al., 2009). We will use Google Scholar in this work only to download the contents of the scientific publications listed on Web of Science. Note that there is an actual dependency on Google Scholar subscriptions, as the type of access granted will depend on the type of subscription that every university or institution has agreed.

b. Tools for the bibliometric analysis

The tools we will use to develop our bibliometric analysis are described below:

Bibexcel

Bibexcel is designed to assist a user in analysing bibliographic data, or any data of a textual nature formatted in a similar manner. The idea is to generate data files that can be imported to Excel, or any program that takes tabbed data records, for further processing. This tool-box includes a number of tools, some of them visible in the window and others hide behind the menus.

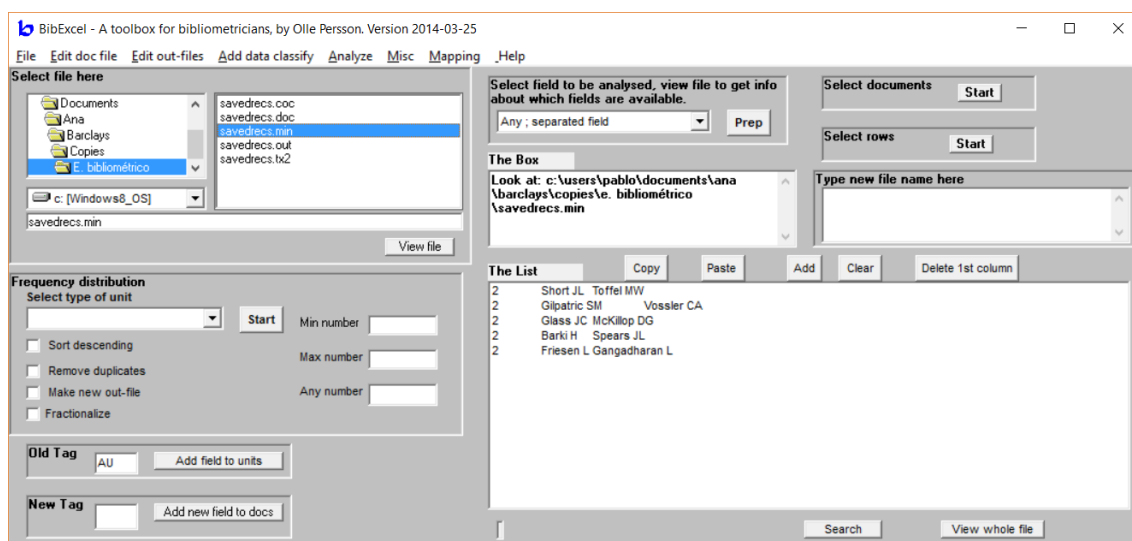
The link used to download Bibexcel is <http://homepage.univie.ac.at/juan.gorraiz/bibexcel/>

Figure 1: BibExcel logo



Source: BibExcel (2016)

Figure 2: BibExcel execution screenshot



Source: BibExcel (2016)

Pajek

Pajek is an open source Windows program for analysis and visualization of large networks having some thousands or even millions of vertices. In Slovenian language the google word pajek means spider. The main motivation for development of Pajek was the observation that there exist several sources of large networks that are already in machine-readable form. Pajek provides tools for analysis and visualization of networks such as collaboration networks, citation networks and diffusion networks.

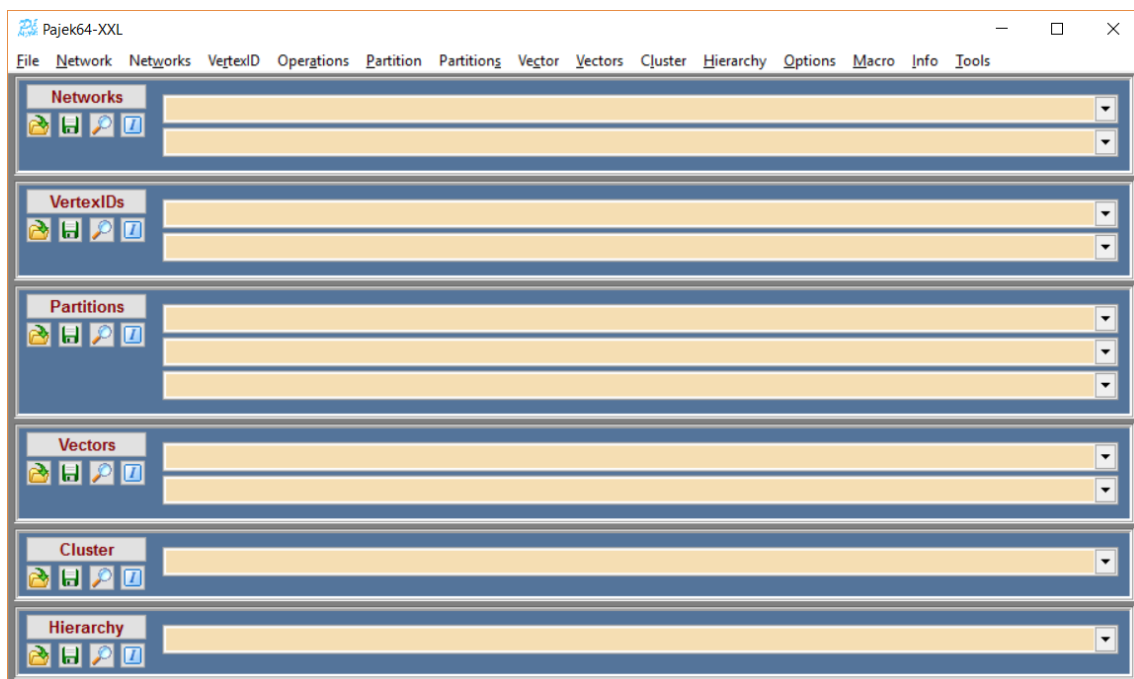
The link used to access Pajek is <http://mrvar.fdv.uni-lj.si/pajek/>

Figure 3: Pajek logo



Source: Pajek (2016)

Figure 4: Pajek interface screenshot



Source: Pajek (2016)

GPS Visualizer

GPS Visualizer is a free utility that creates customizable maps and profiles from **GPS** data (tracklogs & waypoints), addresses, or coordinates.

Figure 5: GPS Visualizer logo



Source: Google (2016)

4. BIBLIOMETRIC STUDY FOR BANKING REGULATORY COMPLIANCE

As stated in the Introduction chapter, the aim of this work is to perform a deep review of the literature and publications related to Banking Regulatory Compliance, in order to gather the most significant insights from those and perform an assessment based on the authors perspective of the current environment of this area within the banking sector.

This chapter includes the definition of search parameters in Web of Science (hereinafter WoS) to obtain an accurate list of related articles and the subsequent bibliometric study containing the main bibliometric indicators listed in the previous chapter.

4.1 Definition of the search parametres

The search in WoS was performed on 9th Desember 2016. Details of the search parameters in WoS are described below:

The initial search was made for the keywords “Regulatory Compliance” on the databases SCI-EXPANDED and SSCI, as our search is related to Social Sciences and these two databases cover the major spectrum of disciplines and publications.

A subsequent filter was applied to obtain the results related to the categories Business Finance, Economics, Business, Management. Finally, a third filter was applied on the type of document to gather information available in articles. The output of this search is a set of 87 articles which will be considered the input for our bibliometric study.

The table below summarizes the search steps and the number of results obtained through each filter.

Table 2: Search parametres in Web of Science

Step	Search parametres	Number of results
a	Advanced search for: TS=(“Regulatory Compliance”) Databases: <i>SCI-EXPANDED</i> and <i>SSCI</i>	1.017
b	Filter for Categories: <i>Business Finance, Economics, Business, Management</i>	93
c	Filter for Type of document: Articles	87

Source: Compiled by the author

4.2 Bibliometric analysis

The following indicators have been obtained and analysed for the population of 87 articles obtained:

1. Most productive authors and institutions they belong to
2. Annual distribution of articles
3. Geolocation
4. Collaboration networks
 - a. Co-author networks
 - b. Citation maps
 - c. Co-citation networks
 - d. Bibliographic coupling
5. Keywords and co-wording
6. Most productive editorials

The bibliometrics have been analysed through Bibexcel and, when appropriate, a graphical representation has been obtained from Pajek.

4.2.1 Most productive authors and institutions they belong to

The table below shows the authors with higher number of publications within our current population.

Table 3: Most productive authors and institutions they belong to

Author	Total articles	University
Friesen L	3	Univ. Of Queensland, Australia
Toffel MW	3	Harvard Univ, USA
Barki H	2	Depaul Univ, USA
Gangadharan L	2	Purdue Univ, USA
Gilpatric SM	2	Univ. Tennessee, USA
Glass JC	2	Queens Univ. Belfast, North Ireland
McKillop DG	2	Queens Univ. Belfast, North Ireland
Quinn B	2	Univ St Andrews, Scotland
Short JL	2	Harvard Univ, USA
Spears JL	2	Depaul Univ, USA
Stafford SL	2	Coll William & Mary, USA
Vossler CA	2	Univ. Tennessee, USA

Source: Compiled by the author via BibExcel

In this case, there are two authors who have participated in three articles, whereas ten authors have published two articles.

Lana Friesen, participating in three of the articles, is focused on the use of audit schemes to achieve regulatory compliance with an efficient use of resources and on measures to encourage truthfulness in compliance self-reporting. She is currently Associate Professor of the University of Queensland School of Economics, with experience in Experimental Economics, Microeconomic Policy and Managerial Economics. She has issued a large number of publications and completed papers and has been granted with several awards such as 2010 School of Economics Award for Excellence in Teaching *and 2010-2013 Australian Research Council Discovery Grant. She is currently Manager of the School of Economics Experimental Lab, Chair of School of Economics Ethics Subcommittee and Member of School of Economics Research Committee.

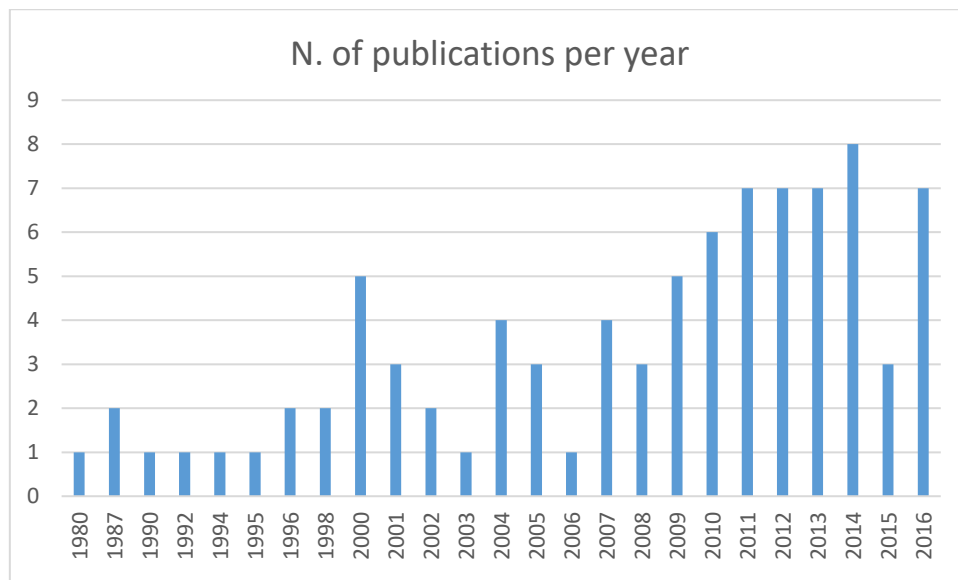
Michael W. Toffel is the Senator John Heinz Professor of Environmental Management, Faculty Chair of the HBS Business and Environment Initiative, and is course head of and teaches the Technology & Operations Management core MBA course. Mike Toffel's research examines companies' management of environmental affairs and occupational safety, identifying which types of management programs and regulations improve environmental and safety performance. His work is focused on the reliability of ratings and self-reporting to report the compliance activity to the regulators, and his investigations are focused in environmental activity, although the conclusions can be extrapolated to the banking industry.

With regards to the most productive educational centres, it may be noted that some of these centres (DePaul Univ, Harvard Univ, Queens Univ Belfast) correspond to authors who have co-published their articles jointly.

4.2.2 Annual distribution of articles

The figure below shows the number of publications per year:

Figure 6: Number of publications per year



Source: Compiled by the author

The number of articles published in relation to Regulatory Compliance was not significant until 2008 (less than 5 articles per year). This figure has been increasing since 2009, with a maximum of 14 articles issued in 2014. The reason for this rise may be the growing effect of the regulatory pressure specially in banking and the continuous establishment of a Compliance function in the companies in order to ensure that the regulatory requirements are met. Additionally, the financial crisis emerged in 2008 and the financial scandals have reinforced the need of implementing robust compliance frameworks.

The number of publications decreased in 2015 to 3 articles, whereas the figure raised again to 7 articles in 2016. As per the query done on 23 January 2017, one new article was published since 2016 year end.

4.2.3 Geolocation

This analysis returns the location of the authors included in our population of articles. WoS currently includes information consisting, at least, of city and country. This attribute is categorized in Bibexcel under the tag "RP".

To represent the geolocations obtained via BibExcel in a map, the tool GPS Visualizer, available through the internet (www.gpsvisualizer.com), is commonly used. The input required is the list of geolocations (country and city) from Bibexcel.

When tried to obtain the geolocation map in the site www.gpsvisualizer.com/geocoder, the website returned a message of unavailability. Therefore, we were unable to draw the geolocation through GPS Visualizer, due to tool constraints.

Given this unavailability, we obtained and sorted manually the list of locations from Bibexcel in order to know the main areas of publication within our sampled articles. The first 10 coincidences are shown in the table below:

Table 4: Locations with higher number of publications

Number of publications	Location
12	Washington, DC USA
5	Cambridge, MA USA
5	Knoxville, TN USA
5	Worcester, MA USA
4	Montreal, PQ Canada
4	Chicago, IL USA
3	Dearborn, MI USA
3	Athens, Greece
3	Reykjavik, Iceland
3	Ithaca, NY USA

Source: Compiled by the author

As observed in the table, seven of the locations are located in the USA and one in Canada, whereas other two are located in Europe (Greece and Iceland). We can conclude based on this information that most articles related to Banking Regulatory Compliance are issued in North America. This can be due to the following reasons:

- The impact of Regulatory Compliance and banking regulation in general (amount of regulation, harshness of penalties) is bigger in the United States than it is in Europe, and therefore the amount of information issued is larger.
- This theme entails a higher degree of interest in North America.

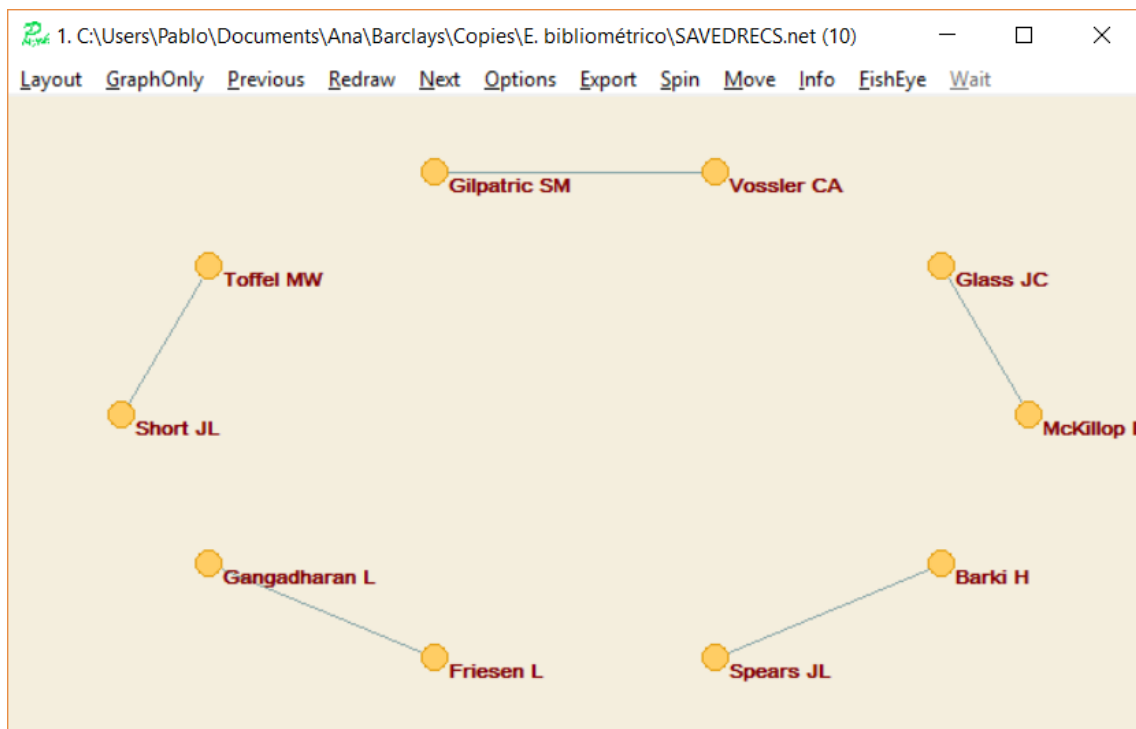
4.2.4 Collaboration networks

a. Co-author networks

With this analysis we are going to check the existence of recurring groups of authors issuing articles together. Bibexcel returns the results in pairs of authors. In order to identify actual collaboration networks, we will focus our search in authors publishing together at least twice.

The following representation in Pajek shows that there are 5 couples of authors who have published jointly twice.

Figure 7: Co-author networks for more than two joint publications



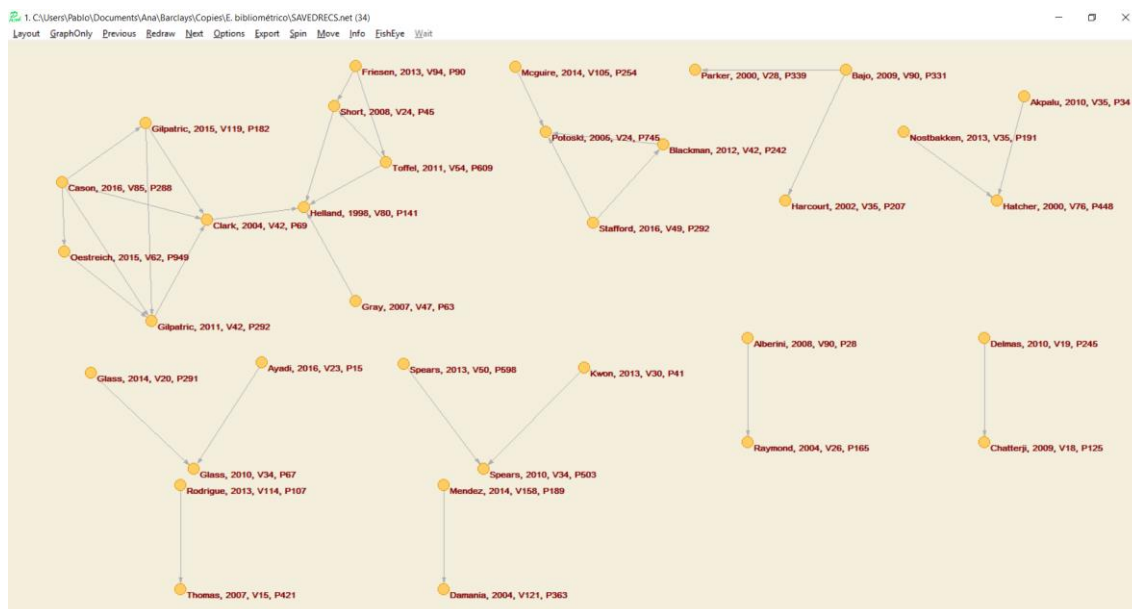
Source: Compiled by the author via Pajek

The results show that there are not co-author networks including more than two authors within our population of articles related to Regulatory Compliance. There are, on the other hand, five pairs of authors who have collaborated with the issuance of two articles in each case.

b. Citation maps

The citation maps show how the 87 articles included in our search from Web of Science cite each other. The citation map for our population is as follows:

Figure 8: Separate nodes of the citation map



Source: Compiled by the author via Pajek

As per the citation nodes drawn in the screenshot, there are three authors who have been cited by others in our compilation of articles.

Firstly, we have disregarded the result corresponding to Helland, E. as the theme of his article is related to environment regulation and therefore it is not considered within our scope.

Although the number of citations is not representative enough to consider that the other two cited authors (Clark, J. and Gilpatric, SM) are key pillars for the banking regulatory compliance literature, we can still note that their publishing activity is extensive and they are often part of specialist groups who participate in joint articles, as observed through the following indicators:

- Both authors have been cited three times each in this compilation of articles by more recent publications.
- Gilpatric, SM has issued co-authorised articles with other related authors (refer to section 1.a *Co-author networks*).
- As per the bibliographic coupling test included in this assessment (refer to section 1.d *Bibliographic coupling*), Gilpatric, SM and Clark, J. are part of groups of authors that have issued articles related to the use of competition to reinforce regulatory compliance and they have cited

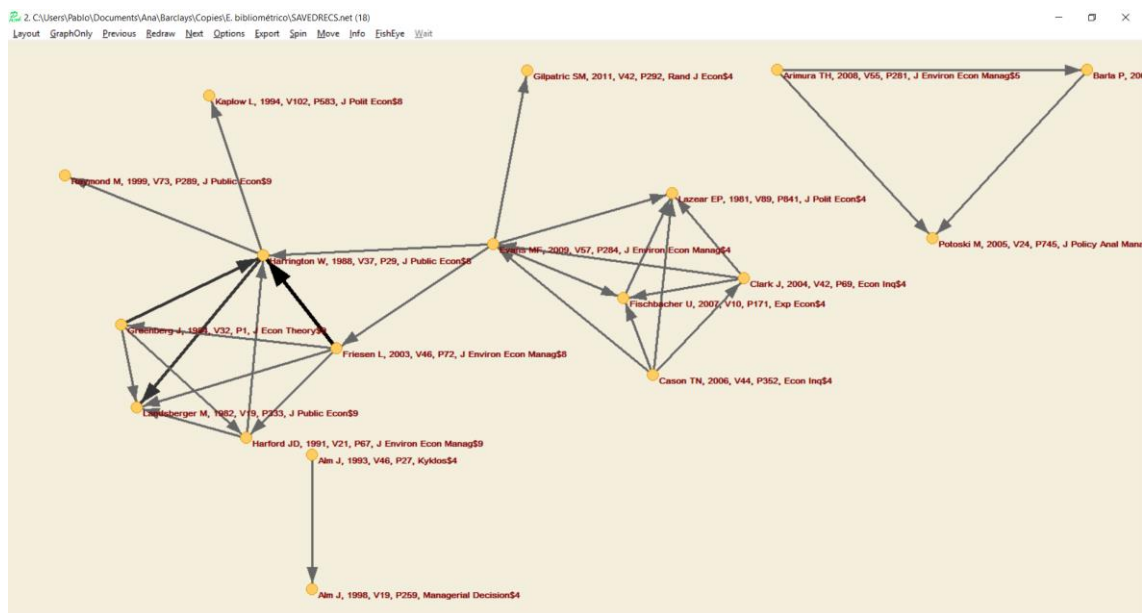
each other in their references.

c. Co-citation networks

The co-citation occurs when one author cites two authors in a publication, and this scheme has been repeated in several publications; this is, two authors have been recognized by several authors at the same time.

The map displayed in the figure below was obtained through the Kamada-Kawai algorithm (2D) by eliminating low frequencies (mínimum 3).

Figure 9: Co-citation networks for a minimum of three occurrences



Source: Compiled by the author via Pajek

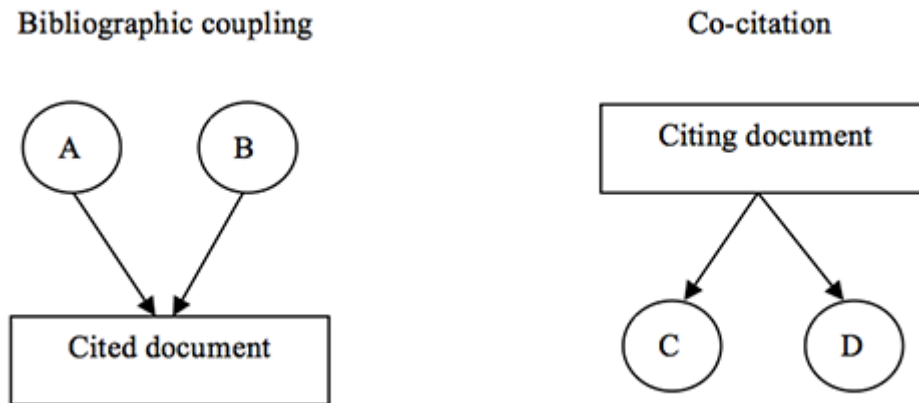
The co-citation map includes the documents represented by authors and year of publication. The map shows a single network containing two pairs of authors that have been co-cited significantly: Harrington, W. and Handsberger, M. and Lazear, EP and Fischbacher, U.

d. Bibliographic coupling

The bibliographic coupling defines the relationship when two authors cite other authors. This is therefore, the mirror-image of the co-citation. In bibliometrics, bibliographic coupling and co-citation are examples of ways to assess document similarities, as shown by the figure below. For bibliographic coupling, citing documents are the subject for analysis. The degree of bibliographic coupling for documents A and B is reflected in the number of documents that are cited by both A

and B. The focus of co-citation analysis is on the cited documents, by calculating the number of documents that cite both C and D.

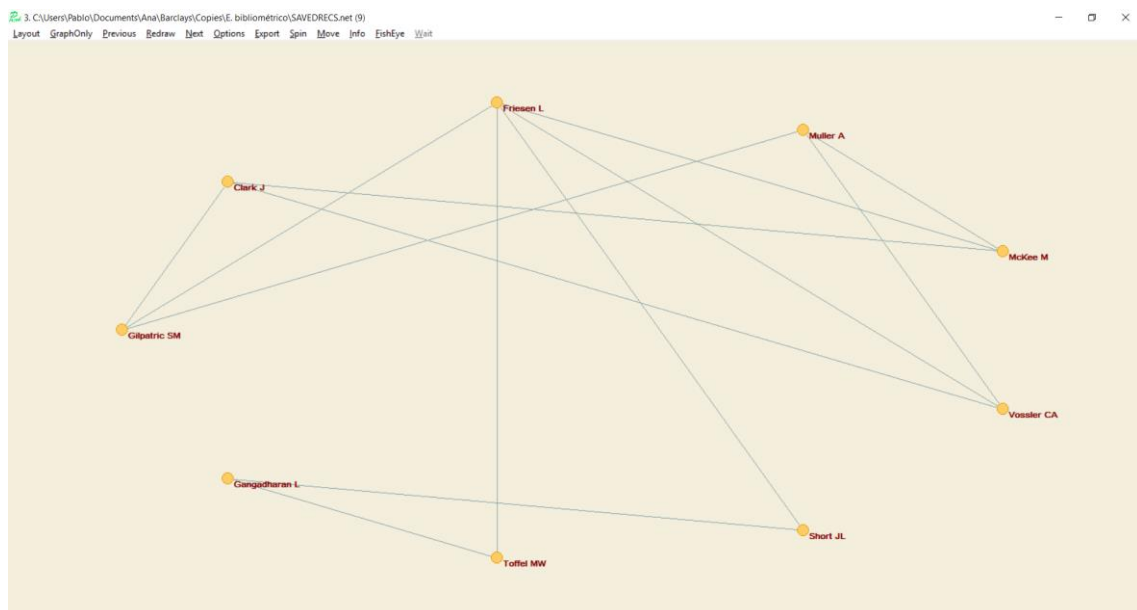
Figure 10: Bibliographic coupling vs Co-citation diagrams



Source: Information Research, an international electronic journal.

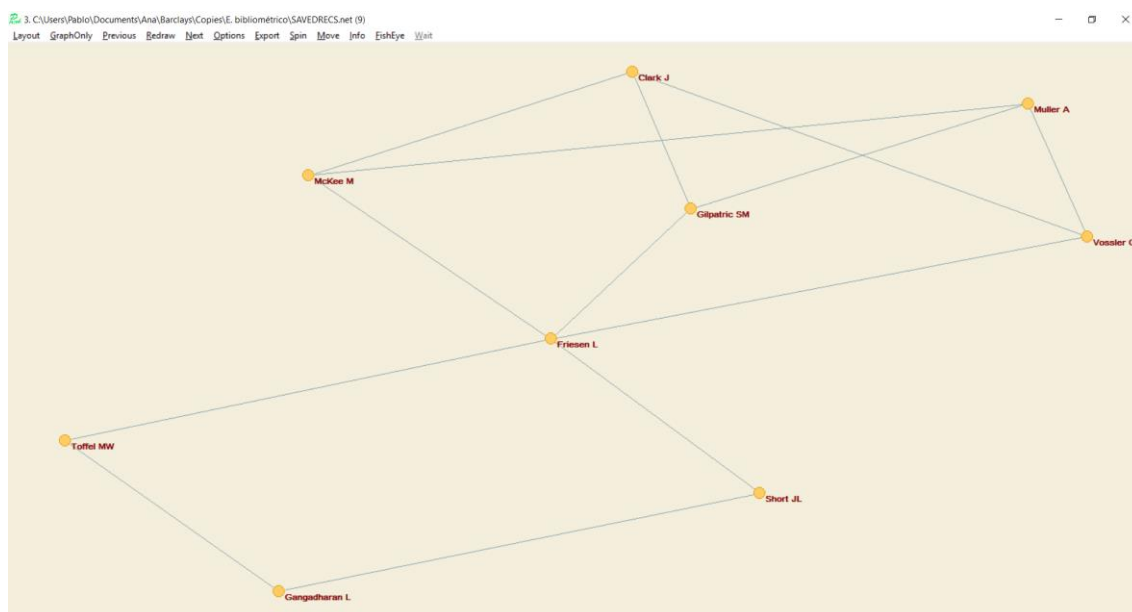
The search for bibliographic coupling in Bibexcel stated that the maximum number of joint citations obtained is 9. The two diagrams below show the two bibliographic coupling networks identified which include only the maximum number of citations observed in the bibliographic coupling file (9 iterations):

Figure 11: First bibliographic coupling network



Source: Compiled by the author via Pajek

Figure 12: Second bibliographic coupling network



Source: Compiled by the author via Pajek

Table 5: Groups of authors from the two bibliographic coupling networks analysed

Number of shared citations	Author 1	Author 2
9	Gilpatric SM	Clark J
9	Gilpatric SM	Friesen L
9	Gilpatric SM	Muller A
9	McKee M	Clark J
9	McKee M	Friesen L
9	McKee M	Muller A
9	Vossler CA	Clark J
9	Vossler CA	Friesen L
9	Vossler CA	Muller A
9	Friesen L	Short JL
9	Friesen L	Toffel MW
9	Gangadharan L	Short JL
9	Gangadharan L	Toffel MW

Source: Compiled by the author

The table returns different groups of associated authors. The first association is compound by the authors *Clark-Friesen-Muller* of article 65 “Using competition to stimulate regulatory compliance: A tournament-based dynamic targeting mechanism”. Gilpatric-McKee-Vossler are co-authors of article 37 “Regulatory enforcement with competitive endogenous audit mechanisms”. As both

articles relate to the use of competition to reinforce regulatory compliance, it seems reasonable that their authors cite each other in their references.

The second association is compound by the authors *Friesen-Gangadharan* (authors of articles 4 “Regulatory performance of audit tournaments and compliance observability” and 20 “Designing self-reporting regimes to encourage truth telling: An experimental study”) and *Short-Toffel* (authors of article 36 “Coming Clean and Cleaning Up: Does Voluntary Self-Reporting Indicate Effective Self-Policing?” and 51 “Coerced confessions: Self-policing in the shadow of the regulator”). Again, all these articles are related to the self-reporting and self-policing for regulatory compliance, and therefore the authors have cited each other in their references.

4.2.5 Keywords and co-wording

This section contains the search for the keywords that are most frequently mentioned in the abstracts of the documents related to banking regulatory compliance obtained in our query in Web of Science.

As per the information provided by Bibexcel, only 55 out of 87 articles included their keywords in their bibliographic metrics. The words that have been referred more than 4 times are the following:

Table 6: Keywords with highest frequencies

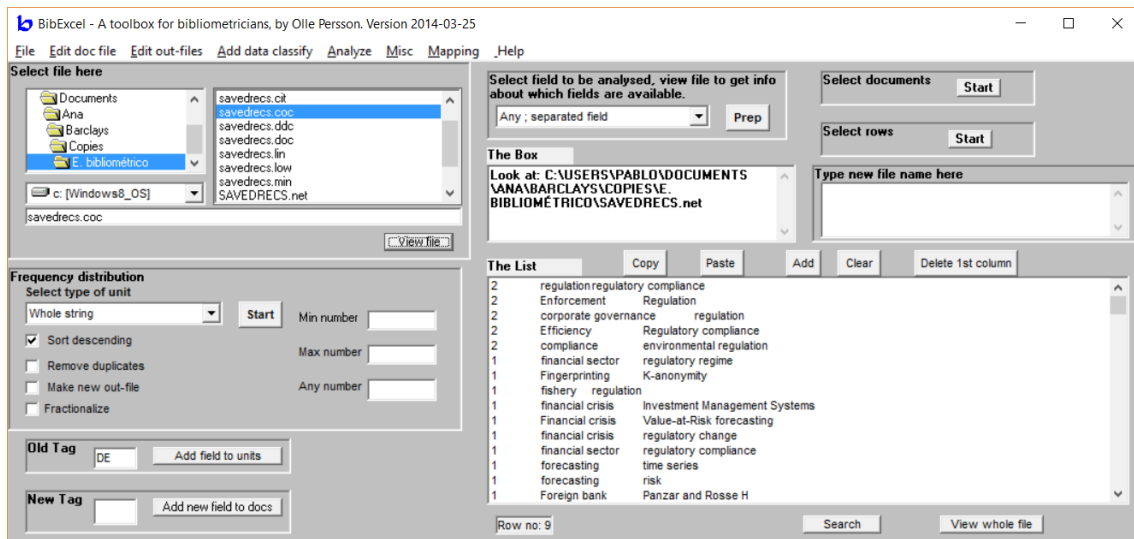
Frequency	Keyword
14	Regulatory compliance
8	Regulation
6	Environmental regulation
5	corporate governance
4	Compliance
4	Enforcement
4	corporate social responsibility

Source: Compiled by the author

All these keywords are closely related to the Banking Regulatory Compliance discipline, excepting the keyword “Environmental regulation”. The reason why this keyword is included with large frequency may be that Environmental is also a highly regulated area, with many activity concerning regulatory compliance.

The search below was done in order to perform a co-word analysis. The co-word analysis determines how the keywords are linked together in the same article. The search for co-word in Bibexcel returned the results from the screenshot below:

Figure 13: BibExcel results for co-word



Source: Compiled by the author via BibExcel

The results show that there are 574 couples of words co-mentioned once and only 5 couples of words that are mentioned together in more than one article. The table below includes these five couples of keywords:

Table 7: Co-word results for more than one iterations

Co-word frequency	Key word 1	Key word 2
2	Regulation	Regulatory compliance
2	Enforcement	Regulation
2	Corporate Governance	Regulation
2	Efficiency	Regulatory compliance
2	Compliance	Environmental Regulation

Source: Compiled by the author

4.2.6 Most productive editorials

This search is based on the 45 articles which are deemed to be related with Banking Regulatory Compliance (refer to the analysis in Section 5 of this work). The sample has been published by 19 different editorials. 27% of these publications correspond to Elsevier Science BV. Elsevier is a world-leading provider of information solutions that provides web-based, digital solutions — among them ScienceDirect, Scopus, Evolve, Knovel, Reaxys and ClinicalKey — and publish over 2,500 journals and more than 33,000 book titles. The table below includes the editorials with more publications within our population of articles.

Table 8: Editorials with more articles published for the 45 articles selected

Editorial	Total
ELSEVIER SCIENCE BV	12
INFORMS	4
KLUWER ACADEMIC PUBL	4
WILEY-BLACKWELL	4

Source: Compiled by the author

5. IN-DEPTH ANALYSIS OF THE LITERATURE RELATED TO REGULATORY COMPLIANCE

The objective of this chapter is to analyse in detail the articles related to Regulatory Compliance obtained in our initial search and gather information about the most common topics used and the conclusions obtained by the authors.

The aim of our search was to obtain articles related to banking regulatory compliance. The population of articles obtained in our initial search was 87 articles. A previous analysis of the abstract of all these articles was performed to disregard those that do not fully meet the attributes for our search.

Note that three additional articles meeting the attributes of our search were published in Web of Science on 11 April 2017. The addition of these articles do not impact significantly on the metrics obtained previously and therefore we have maintained the results for chapters 3 and 4 and have not included these articles within the population of chapter 5.

The first screening performed returned the following results:

Table 9: Classification of articles for their relation with Banking Regulatory Compliance

Topics	Number of articles
Topics related with Regulatory Compliance or Banking Regulatory Compliance	45
Topics related with specific activities different to banking (such as industry, environment, health and religion), with conclusions not applicable to other areas	42

Source: Compiled by the author

The 42 articles not fully related with Regulatory Compliance were disregarded and therefore the population for the metrics and the analysis performed in this section is based on the 45 remaining articles.

An in-depth analysis was performed over the literature extracted in the previous chapter, with the aim to obtain an understanding of the main topics related to banking regulatory compliance as per the articles found in our search in Web of Science. Firstly, we performed a classification of the 45 articles that conform the population into eight categories, being this categorization based on the information included in their abstract. The table below shows the categories and number of articles that have been included in each one of them.

Table 10: Categorization of the 45 articles selected into topics

Topic Id	Topic	Number of articles
1	The cost and cost-efficiency ratio of the regulatory compliance	10
2	Audit as a mechanism to reinforce regulatory compliance	5
3	The function of public institutions and governments to ensure regulatory compliance	5
4	Relationship between regulatory compliance and transparency	7
5	The impact of regulatory compliance on credit risk	4
6	Specifications of the compliance function	4
7	The impact of Risk Management & Corporate governance on regulatory compliance	7
8	Others	3
		45

Source: Compiled by the author

The articles related with the cost of implementing the regulatory compliance function entail 22% of the population, and those related with the relationship between compliance and transparency and the impact of risk management and corporate governance on regulatory compliance mean 16% each of the population. These are therefore the areas with highest interest for the authors.

Once categorized, we performed an in-depth lecture of the articles available. Note that we were not able to obtain the full article in 10 cases. In these cases, we used the information available in the abstract obtained in Web of Science to know the main aspects of the topics discussed.

The following aggregated information, related to the type of analysis performed, was obtained:

Table 11: Aggregated information of the type of analysis performed

	Qualitative	Both	Quantitative	Not determined	
Theoretical	7		1		8
Empiric	10	6	5		21
Both	2	5			7
Not determined				9	9
	18	11	6	10	46

Source: Compiled by the author

Table 12: Aggregated information of the methodology used for analysis

Methodology used	
Comparative analysis	7
Default model	1
Descriptive Study	9
Regression Model	18
Template analysis	1
Not determined	9
	45

Source: Compiled by the author

Most of the studies (86% out of 45 analysed articles) have an empiric component; this is, they are either pure empiric or join empiric and theoretical results to obtain conclusions. On the other hand, the studies related to the compliance discipline are qualitative in their majority (51% are only qualitative and 31% include qualitative and quantitative assessments).

With regards to the methodology employed for assessment, 51,4% of the analysis consist of predictive regression models. Regression analysis is one of the most widely used techniques for analyzing multi-factor data. Its usefulness result from the conceptually logical between a variable of interest (the response) and a set of related predictor variables. 22% of the population (9 articles) include a descriptive study whereas another 22% are based on a descriptive study. Finally, 7 articles (16% of the population) based their conclusions on comparative analysis.

A detail of the contents of the articles within each of these topics is included below:

Topic 1: The cost and cost-efficiency ratio of the regulatory compliance

Table 13: Articles included into Topic 1

Title	Publication Year
Does Basel compliance matter for bank performance?	2016
The effects of Regulatory Compliance for small banks around crisis-based regulation	2016
The Cost of Duplicative Regulation: Evidence From Risk Retention Groups	2012
Are foreign banks more profitable than domestic banks? Home- and host-country effects of banking market structure, governance, and supervisión	2011
Cross-Business Information Technology Integration and Acquirer Value Creation in Corporate Mergers and Acquisitions	2011
Irish credit unions: Investigating performance determinants and the opportunity cost of regulatory compliance	2010

Title	Publication Year
Integrated environmental and financial performance metrics for investment analysis and portfolio management	2007
Why do firms go dark?	2007
Evidence of non-big 6 market specialization and pricing power in a niche assurance service market	1998
Obeying the rules: Accounting for regulatory compliance costs in the United Kingdom	1996

Source: Compiled by the author

Ten articles have been categorised under this topic, being the two most recent articles published in 2016. The first article, co-written by four authors (Ben Naceur, Ayadi, Casu and Quinn) and published by Elsevier, aims to examine the relationship between the observance of international regulatory standards and the performance of the banking sector, and concludes that overall compliance with Basel Core Principles (BCP) has no association with bank efficiency. However, the results support the argument that although compliance has little effect on bank efficiency, increasing regulatory constraints may prevent banks from efficiently allocating resources. The second article was issued in 2016 by Ken Cyree and published by Wiley-Blackwell, and analyses the cost-efficiency ratio of the implementation of compliance programmes for small U.S. Banks based on the major crisis until 2014 in terms of profit, cost and productivity. The conclusions of the empiric study based on a panel regression show that the indicators analyzed for small banks (pretax ROA, loans per employee, change in number or employees, average pay and IT and fixed-assets costs) were consistent in performance with the increase or regulatory burden.

Four more articles were issued between 2010 and 2012. Leverty studied in his article “The cost of duplicative regulation: evidence from risk retention groups” the regulatory compliance costs associated to the standard insurers, which are regulated individually by the state they operate, versus the risk retention groups, which operate in multi-state and therefore are exposed to higher regulation, and are at the same time largely exempt from most aspects of duplicative regulation. The main rationale for companies qualification as RRG (Risk Retention Groups) is the absence of duplicative regulation in the countries where they operate. In terms of regulatory compliance costs, when operating in one state, standard insurers have lower estimated expected expense ratios than RRGs. As standard insurers write business in additional states their costs increase. In contrast, as RRGs write business in additional states their costs decrease. The difference in the expenses of the average standard insurer and the average RRG is an estimate of the cost of duplicative regulation. In terms of cost efficiency, the results state that RRGs are less efficient than standard insurers, and this difference is caused by allocation efficiency. This result may be caused either because RGG prioritize their cost advantage from lower regulatory compliance

costs or because standard insurers pay special attention to optimize inputs to achieve performance over regulatory costs. Finally, in terms of price of insurance, there is no negative impact for RGGs. In the case of standard companies, the low compliance costs associated to single entities impact positively on the price of insurance whereas the high compliance costs supported by multi-jurisdictional regulation leads to higher prices.

As per Chen and Liao ("Are foreign Banks more profitable than domestic banks?" published in 2011 by Elsevier), the foreign banks are more profitable than domestic Banks in the following cases: a) operating in a host country with a less competitive banking sector; b) the parent bank in the host country is highly profitable; c) the host country has low GDP rates, higher interest and inflation rates and; d) the host country has stronger regulation for Basel risk.

The study "Cross-Business Information Technology Integration and Acquirer Value Creation in Corporate Mergers and Acquisitions" analyses the advantages of having cross-business IT integration (CBITI) capabilities in mergers and acquisitions (M&A) processes. These capabilities allow a greater ability to comply with relevant law and regulations with a reduction of regulatory compliance costs, among other benefits, such as the reduction of IT costs and the minimization of potential disruptions to business operations.

The study "Irish credit unions: Investigating performance determinants and the opportunity cost of regulatory compliance" (written by Glass, McKillop and Rasaratnam and published by Elsevier in 2010) explains that credit unions are highly consolidated in Ireland, and they have strong regulatory and supervisory infrastructures. The regulator (IFRSA) requires credit unions to complete a quarterly prudential report containing calculation of key compliance ratios. The study investigates Irish credit union performance and regulatory compliance in a modelling context. The most significant conclusion of this study is that 68% of Irish credit unions do not face a specific extra opportunity cost of complying with bad debt guidelines.

Two of the articles categorised within this topic were published in 2007, year when the financial crisis was raised. In "Integrated environmental and financial performance metrics for investment analysis and portfolio management", a new measure is introduced combining external environmental costs with established measures of economic value added, and demonstrates how this measure can be incorporated into financial analysis. This new measure contributes in the analysis to increase understanding of portfolio-wide environmental risks, quantifies the environmental credentials objectively and helps to analyse investment mandates with an environmental component. Such external costs may include future regulatory compliance costs, among others.

On the other hand, the study "Why do firms go dark?" aims to know the main drivers for companies to deregister from the SEC ("to go dark") despite having a large number of outside shareholders. The conclusions are based on both theoretical and empirical tests and state that the compliance cost - as measured by audit fees - and the passage of the Sarbanes-Oxley Act are among the main driving forces behind a firm's decision to go dark. Firms with fewer growth opportunities,

greater insider ownership, lower institutional ownership, lower market momentum and higher leverage are also more likely to go dark.

Finally, there are two articles issued in 1998 and 1996. The first study, published in 1998, compares the CPA auditing firms of multi-employer pension plans considering the fees received, the market share and their belonging to Big 6 firms. Results of testing the relationship between auditor expertise (based on the number of plans audited) and audit fees indicate that audit fees are higher for pension plans who hire auditors with greater industry expertise, this is, firms with the largest market shares. Big 6 firms do not charge higher fees than other CPA firms in this market. These results indicate that the Big 6 do not obtain fee premiums over non-Big 6 firms for assurance services in the multi-employer pension plan market.

The second introduces the concept of "rational government" to describe the process by which the UK Government promotes a rationalization of the regulatory burden on a risk-based approach, to liberate businesses from onerous regulatory compliance costs. The Compliance Cost Assessment (CCA) technique developed by UK Government has certain restrictions and limitations to be widely used, as it is focused on the calculation rather than on the output, as limits the regulatory growth focusing on strictly economic reasons. However, the design and diffusion of this calculation is valid to promote the rationality in the deployment of regulatory burden in relation to the size and nature of the firms.

Topic 2: Audit as a mechanism to reinforce regulatory compliance

Table 14: Articles included into Topic 2

Title	Publication Year
Regulatory performance of audit tournaments and compliance observability	2016
Using competition to stimulate regulatory compliance: A tournament-based dynamic targeting mechanism	2015
Regulatory enforcement with competitive endogenous audit mechanisms	2011
Coerced confessions: Self-policing in the shadow of the regulator	2008
The good, the bad, and the regulator: An experimental test of two conditional audit schemes	2004

Source: Compiled by the author

Five articles were classified under this topic, being the more recent one published in 2016. Four of them were published in the USA and the oldest one was published in New Zealand. We can observe that three authors have participated in more than one article included in this list, as per the scheme below. This may entail that the themes included under this topic will be linked to each other.

Table 15: Scheme of authors participating in more than one article within Topic 2

Article	Author
Regulatory performance of audit tournaments and compliance observability	Cason TN
	Friesen L
	Gangadharan L
Using competition to stimulate regulatory compliance: A tournament-based dynamic targeting mechanism	Gilpatric SM
	Liu LR
	Vossler CA
Regulatory enforcement with competitive endogenous audit mechanisms	Gilpatric SM
	McKee M
	Vossler CA
Coerced confessions: Self-policing in the shadow of the regulator	Short JL
	Toffel MW
The good, the bad, and the regulator: An experimental test of two conditional audit schemes	Clark J
	Friesen L
	Muller A

Source: Compiled by the author

This set of articles include the use of audit as an element to reinforce the regulatory compliance. The study “Regulatory performance of audit tournaments and compliance observability” (2016) tests whether audit schemes (in this case, tournament mechanism) improve the performance of regulatory compliance in comparison with the traditional regulatory audit scheme, and whether increasing the visibility of actions can lead to improved compliance. In the Random Audit mechanism firms are randomly chosen for inspection. In the Tournament Audit mechanism the probability of inspection increases with the degree of estimated under-reporting. The empirical results show that there is an underreporting (output minus report) in the vast majority of reports. In the tournament treatment, the level of reporting is higher; however, the average output is lower than with a traditional random audit scheme. Social observability does not affect output or reporting significantly in either of the audit treatments.

On the same basis of audit schemes, the article “Using competition to stimulate regulatory compliance: A tournament-based dynamic targeting mechanism” develops the idea that, in a competition model between firms, the level of targeting for future audits affects the competency activity in regulatory enforcement leverage. The status of the firms with the regulator is also considered a variable of this model. The study is based on a theoretical model and a set of laboratory experiments for an activity including level of emissions, and aims to minimize the combined cost of taxes for disclosed emissions and penalties for undisclosed emissions; this is, of over/under-reporting, in order to avoid being targeted into groups of firms with higher probability

of further audits. Both theoretical and empirical studies conclude that the dynamic tournament mechanism achieves significant leverage over random audits.

Another theoretical development of two audit schemes is performed in the article “Regulatory enforcement with competitive endogenous audit mechanisms” to generate a compliance competition among agents. The analysis concludes that most agents are compliant under competition most of the time, although audit rates and expected penalties are low.

The article “Coerced confessions: Self-policing in the shadow of the regulator” defines the “Audit Policy”, consisting of a programme that encourages companies to self-report violations of laws in exchange for reduced sanctions. Both theoretical and empirical analysis conclude that, even though self-regulation and self-policing are deemed to enhance cooperation between the firms and the regulator, there should be a conservative idea that companies are apparently willing to self-report violations under the threat that they might be caught instead. Therefore, the success of “voluntary” self-policing depends on the continuous involvement of regulators with coercive powers.

Finally, the article “The good, the bad and the regulator is an experimental test of two conditional audit schemes” establishes a comparison between two audit schemes (past-compliance targeting and Optimal Targeting) against random auditing to assess the level of compliance and the level of inspections generated in each case. The results show that these two schemes require a lower frequency of inspections to achieve a desired rate of compliance, in comparison with random auditing. However, the compliance rate achieved by random auditing is higher than the obtained by using these schemes.

Topic 3: The function of public institutions and governments to ensure regulatory compliance

Table 16: Articles included into Topic 3

Title	Publication Year
Congressional Assertions of the Spending Power: Institutional Conflict and Regulatory Authority	2016
Can corruption foster regulatory compliance?	2014
Bribery in Indonesia: Some evidence from micro-level data	2004
The persistence of corruption and regulatory compliance failures: Theory and evidence	2004
Do employers comply with civil/human rights legislation? New evidence from New Zealand job application forms	2002

Source: Compiled by the author

This set of articles are linked by the topic of public institutions and regulators impacting on the compliance activity, specifically in relation to the management of corruption, bribery and institutional conflicts. The two more recent articles were published in the USA in 2016 in 2014, and the three remaining documents are dated before 2005.

The article “Congressional Assertions of the Spending Power” brings to light the use of spending power to create influence by majority of congressional coalitions towards institutional regulation and to circumvent judicial constraints by defining alternatives to regulate states and private actors in the USA. This process entails conditioning funds upon regulatory compliance measures at Congress, avoiding adverse opinion or conflict from institutions or opposing parties.

The article “Can corruption foster regulatory compliance?” challenges the assumption that the level of compliance decreases as corruption and bribery opportunities increase. The study aims to conclude on whether regulatory compliance is always less in the presence of corruption. The conclusions, based on a theoretical regression model and supported empirically by a survey performed over 4100 firms in 1999 that contained information about bribes paid to government officials, state that corruption is not only determined by the private firms subject to government regulations, but also by the availability of corrupt public officials, who choose their monitoring effort and their willingness to accept bribes depending on the level of regulatory compliance they observe. The starting point for this model is that, if public officials set their monitoring efforts independently, then it is possible for corruption to foster compliance as corrupt officials have an incentive (the bribe) to monitor more often, and this monitoring makes it harder for firms to ignore the regulations. The overall conclusion of this paper is not that corruption fosters regulation compliance always; but that it can, under certain circumstances and for specific types of regulations.

The article “Bribery in Indonesia: Some evidence from micro-level data” takes as hypothesis to investigate the extent and determinants of bribery in Indonesia in the more decentralised system of government introduced in 2001. Some conclusions are: firms’ profits are the key determinant of the bribes they pay: firms that are successful in negotiating more favourable bribe/dispensation packages with the bureaucracy will be more profitable, and therefore will live longer and grow larger. Governments could collect more tax revenue if they reduced other cost burdens on firms by reducing the number of taxes, cutting back on unnecessary regulatory interventions, and acting more vigorously to restrain corrupt behaviour on the part of the bureaucracy.

The analysis “The persistence of corruption and regulatory compliance failures: Theory and evidence”, published in 2004, intends to explain the main drivers for the persistence of corruption through the examination of polluting firms with emissions charged with a pollution tax. The theoretical model concludes that increased political instability is associated with a greater judicial inefficiency (a lower level of the rule of law), and that more inefficient judicial systems are found

to be positively correlated with corruption. Finally, the analysis concludes that corruption raises the degree of noncompliance.

Finally, the article “Do employers comply with civil/human rights legislation? New evidence from New Zealand job application forms” assesses the extent to which job application forms violate the New Zealand Human Rights Act. 88% of the job application forms contain at least one violation of the Act. The most common violations concern age, gender, nationality, and disability. The least common concern political opinion, ethical belief, religious belief, and sexual orientation.

Note that this article was issued in 2002, and therefore the premises may have changed at present. The conclusions obtained are not applicable overall to our study.

Topic 4: Relationship between regulatory compliance and transparency

Table 17: Articles included into Topic 4

Title	Publication Year
The "Peter Pan Syndrome" in Emerging Markets: The Productivity-Transparency Trade-off in IT Adoption	2015
Information asymmetry around operational risk announcements	2014
Designing self-reporting regimes to encourage truth telling: An experimental study	2013
Managing Data Quality Risk in Accounting Information Systems	2012
Pre-emptive Corruption, Hold-up and Repeated Interactions	2012
Coming Clean and Cleaning Up: Does Voluntary Self-Reporting Indicate Effective Self-Policing?	2011
The enforcement of pollution control laws: Inspections, violations, and self-reporting	1998

Source: Compiled by the author

Seven articles have been classified under this topic, as they link regulatory compliance with transparency, reporting and information provided to regulators. Six of these articles were published after 2010, and six of them were issued in the USA.

The article “The “Peter Pan Syndrome” in Emerging Markets” (2015) aims to answer empirically, focusing on retail textil Indian industry, whether operational transparency concerns impede IT adoption by businesses, to what extent IT adoption has a positive impact on productivity and to understand the differences in the level of IT adoption between smaller or larger firms. The results show that that IT adoption is significantly affected by transparency concerns. While corruption reduces IT adoption, enforcement and auditing increases IT adoption by providing all firms a level

playing field and reducing the negative impact of corruption. IT adoption increases store productivity on an average by about 50 to 70 percent. The effects of transparency on IT adoption and the impact of adoption on productivity are both greater for larger than for smaller firms. At the margin, higher corruption and lower enforcement raises the threshold of productivity required for IT adoption.

In the article “Information asymmetry around operational risk announcements”, the operational risk events by US financial firms during 1995-2009 were analysed in order to check the existence of information asymmetry (differential information between two types of traders: informed and non-informed) in the equity markets after the announcement of such incidences. The study checks that indeed the information provided by market makers is limited at the announcement of the risk events, in order to promote information risk and to accommodate an increase in trading volumes. This information asymmetry reverts after the announcement of the event settlement, and is specially significant for internal fraud and business practices related events.

The level of asymmetry is stronger in the case of weak governance structures (low ratio of independent directors in the board) and low levels of institutional ownership (low executive ownership ratio of company shares). However, the risk management function has poor impact on the quality of information. The interpretation of this, as per the study, is that the companies' risk management function is driven by regulatory compliance needs and performs a more formal and reporting function with no effective impact on the business activity. The challenge for regulation and corporate governance roles is then to establish effective disclosure practices and promote transparency in securities market.

The article “Designing self-reporting regimes to encourage truth telling: An experimental study”, published in 2013 in Australia, aims to study through an experimental design the firms self-reporting behaviour under different reporting regimes.

The results are presented separated into two variables: Individuals' honesty, which concludes that attitudes towards lying show a significant correlation with reporting behaviour; Reporting enforceability, showing that the proportion of individuals who report accidents is higher in the compulsory treatment as compared to the voluntary treatment. The findings suggest that careful design of self-reporting regimes is necessary to achieve satisfactory compliance outcomes.

In the work “Managing Data Quality Risk in Accounting Information Systems” (USA, 2012), a new methodology is presented to manage and decrease the risks associated with the accounting systems data quality. This is significant as the data quality of the accounting systems deeply impacts on internal business decision making and external regulatory compliance.

The paper “Pre-emptive Corruption, Hold-up and Repeated Interactions” analyses the effects of repeated interactions between a firm and an inspector who monitors regulatory compliance. The conclusions of the model, within the context of a repeated game are that: a) an increase in the probability of bribe detection is more effective at deterring collusion than an increase in the

penalties. This result may be particularly useful in situations where political constraints make it difficult to increase penalties and where limiting repeated interactions between bureaucrats and firms is not feasible because implementing a staff-rotation policy is too costly; b) the set up of penalties for bribery reduce both bribery and illegal activity among potential offenders but produces a net welfare gain for these offenders and therefore its effects are ambiguous; c) an increase of the inspector's reward for truthful reporting has also ambiguous effect as it discourages potential offenders from engaging in corruption but it may increase the fraction of criminals offering a preemptive bribe.

The oldest document within the set of articles published after 2010 is “Coming Clean and Cleaning Up: Does Voluntary Self-Reporting Indicate Effective Self-Policing?” (USA, 2011). This piece of work focuses on the voluntary compliance self-reporting programmes and concludes that the use of self-reporting by regulated firms is considered as an indicator of their willingness to police their own operations and their commitment to improve their regulatory compliance.

Finally, the study “The enforcement of pollution control laws: Inspections, violations, and self-reporting”, published in the USA in 1998, The study focuses on the role of targeting in environmental regulatory enforcement. In this model, the industry is divided in two groups: good firms and bad firms, and inspections are more frequent in the bad firms group. This study tests theoretically and empirically the role of targeting. The analysis, consisting of regression models for the violation, inspection and self-reporting scenarios, concludes that there is no evidence that inspections that do not detect violations increase the probability of future violations. This is consistent with the view that violations are difficult to correct and hence are not the best means for firms to signal their desire to cooperate with a regulator once a violation is detected. The cost of compliance appears critical to the decision to self-report a violation, with high- and low-cost plants far less likely to self-report a violation than plants with an intermediate cost. Finally, detecting a violation does make plants more likely to self-report a violation.

Topic 5: The impact of regulatory compliance on credit risk

Table 18: Articles included into Topic 5

Title	Publication Year
Does Regulatory Certification Affect the Information Content of Credit Ratings?	2016
Cyclical adjustment of point-in-time PD	2010
The value of non-financial information in SMEs enterprise risk management	2010
Default estimation for low-default portfolios	2009

Source: Compiled by the author

Four articles out of our sample link regulatory compliance with credit risk; all of them were published after 2009.

The study “Does Regulatory Certification Affect the Information Content of Credit Ratings?” published in 2016 in USA, aims to check whether the regulatory certification of credit rating agencies as NRSRO (Nationally Recognized Statistical Rating Organization) lowers the quality of the ratings they produce, taking into account the rating agency compensation structure (issuer-paid vs investor-paid agencies), which may cause conflicts of interest in the issuer-paid structure. A difference-in-differences approach (difference of pre-versus post NRSRO in difference of issuer-paid vs investor paid rating agency)

The analysis concludes that, in the case of an investor-paid credit rating agency, the information production is not affected by the NRSRO certifications, as the ratings policy persists after this designation. This may suggest that ratings policy is more dependant on each rating agency compensation, instead of dependant on their designation as NRSRO.

The article “Cyclical adjustment of point-in-time PD” introduces an approach to calculate capital requirements for banks which do not have sufficient information profundity to use a “long-run” calculation. This methodology, which includes predictions of future realizations of the time-series based on information from past occurrences, was accepted as compliant by the FSA, although some concerns were presented. The two most significant concerns referred to the conditional acceptance of this methodology only for firms that do not own complete data to model the long-run average PD, and the need to include a “once in 25 years stress test” in the firms’ stress testing. Other concerns refer to the impossibility to identify how much of the portfolio degradation is due to cyclical fluctuation and to the use of industry data and proxies.

The article “The value of non-financial information in SMEs enterprise risk management”, published in 2010 in USA, makes a comparative analysis and confirms the main idea that SMEs require models and procedures that are specifically focused on the SME segment. This information, when available, is likely to significantly improve the prediction accuracy of the model by up to 13%. Using nonfinancial variables as predictors of company failure significantly improves the prediction model’s accuracy. However, it is believed that this result is even more important for SMEs considering the lack of financial information available for so many of them.

Finally, the article “Default estimation for low-default portfolios”, issued in 2009 in USA by Nicholas M. Kiefer, includes a probability (Bayesian) approach to estimate default probability for low--default portfolios with little historical data information. The variables included in this approach are default likelihood and expert information. This approach presents handicaps with regards to robustness – the estimation may lack of validators and justification for the methods used – and with regards to supervisión – given the high grade of subjectivity of the estimation-. Supervisors are willing to accept subjective decisions as long as they are well grounded. The author concludes

that, as long as the subjective information becomes more formal (probabilistically described), supervisors will have to deal with this type of inputs with more frequency.

Topic 6: Specifications of the compliance function

Table 19: Articles included into Topic 6

Title	Publication Year
On the joint use of licensing and liability	2009
Punishment in a regulatory setting: Experimental evidence from the VCM	2003
Business crime: What to do when the law pursues you	2000
The ethics of advising on regulatory compliance: Autonomy or interdependence?	2000

Source: Compiled by the author

These four articles, all published before 2010, talk about specific features of the compliance function. The most recent article was published in Sweeden in 2009 (“On the joint use of licensing and liability”) and describes the relationship between licensing and strict liability. Licensing is a requirement for firms to hold a license to construct and operate a facility and is typically issued by a local regulatory agency. A variable in the license grant is the existence of compliance defense in case of a harm. This study analyses the joint use combinations of regulation and liability (in contrast to pure liability) and their implications to maximize social welfare. If a compliance defense is not allowed then a social welfare maximizing regulatory agency should consider litigation cost when making its licensing decision. This entails that a joint use of regulation and liability decreases social welfare compared to pure liability. In case of existing compliance defense, the activity level will depend on the cost rule (in exchange for the firm for being relieved of liability, it will comply with a smaller activity level than the level chosen under pure liability).

The article “Punishment in a regulatory setting” tests different scenarios of punishment probability and severity to analyze its effectiveness towards regulatory compliance. The publication “Business crime: What to do when the law pursues you” is a descriptive study that faces different challenges of regulatory compliance for business crime: a.- Outsourcing Compliance: To some extent, governments have now passed part of their policing functions to the commpanies, which have in place robust internal monitoring and reporting systems. Additionally, the debate on whether company's lawyers should keep an overriding loyalty to the client even though this means make non-compliance more difficult to detect or they should report illegal conducts to regulator is nowadays more focused on self-disclosing breaches and creating a close relationship with counsel; b- Some misunderstandings may rise with regards to the concept of managers versus the company itself. For routine business matters, this distinction has no practical involvement but the difference turns bigger when allegations of criminal conduct are made: c- The Board and Senior Management: The implementation of SOX set up the standards for Corporate

Governance. Current boards of directors, specially the new empowered independent directors, are taking a more aggressive role in Compliance, by launching internal investigations and turning the results to the Government; and d- Whistleblowing: The protection for whistleblowers has increased significantly in the last years, and retaliation can be a crime.

Finally, the article “The ethics of advising on regulatory compliance: Autonomy or interdependence”, issued in Australia in 2000, assesses whether the incorporation of an ethical role in the compliance practice enhances the outputs of the activity and concludes that the traditional ethics of professional autonomy is an inadequate conceptualisation for compliance advisors for two main reasons:

- It is an unrealistic conception of their daily work, as compliance professionals are dependent on their corporate clients. Compliance advisors are better served by an ethical ideal that recognises their intimate inter-relationship with their employers. The conception of compliance specialists counsels them to be committed to understanding and identifying with business goals in order to transform business with social and ethical concerns. This requires compliance advisors to be committed to a professional integrity within internal structures that protect Independence, and nurtured by participation in an external network of compliance professionals, regulators and community groups.
- The ethics of autonomy for compliance roles are not effective in institutionalising ethical and legal responsibility in organisations.

Topic 7: The impact of risk management & corporate governance on regulatory compliance

Table 20: Articles included into Topic 7

Title	Publication Year
The role of Investment Management Systems in regulatory compliance: a Post-Financial Crisis study of displacement mechanisms	2014
Corporate governance, growth opportunities, and the choices of cross-listings: The case of Chinese ADRs	2013
Formal and informal quota enforcement	2013
Theorizing the concept and role of assurance in information systems security	2013
The Determinants of Regulatory Compliance: An Analysis of Insider Trading Disclosures in Italy	2009
Corporate social responsibility and sustainability challenges for a bancassurance Company	2005
Evidence of regulatory noncompliance with SEC disclosure rules on auditor changes	1996

Source: Compiled by the author

Seven of the articles cover these topics, and four of them were published in 2013 and 2014. As per the most recent article, published in UK in 2014, the regulatory requirements are emphasizing the implementation of Investment Management Systems (IMS) in order to retire manual processes for conducting trading and therefore decrease the risk associated to this trading. The study seeks to confirm whether the automatization of processes through IMS displaces old compliance practices and institutionalize new ones. The following mechanisms were identified to categorize the social forces observed after the implementation of Investment Management Systems: Monitoring, as the system acts to ensure compliance by both constraining non-compliant and enabling compliant transactions; Segregation of duties, meeting the regulatory requirements of appropriate segregation of "doer" and "checker"; Automation, which ensures a more reliable result for trading and compliance; Consolidation, based on the creation of an aggregated core system removing disparate systems; Standardization, with the overall introduction of firm best practices and Sharing and Learning to refine new compliance practices. The final conclusions show that the IMS play a key role in complying with regulatory obligations that can be met by applying quantitative restrictions to trade. However, nowadays there are non-quantitative factors that cannot be modelled through IMS, such as appropriate compliance behaviour. The expectation that the implementation of IMS will enable this behaviour is limited by counter mechanisms currently in place: use of manual processes, individuals resistant to full automation of trades and the lack of immediate readiness of the systems to regulatory changes.

The article "Corporate governance, growth opportunities, and the choices of cross-listings: The case of Chinese ADRs", issued in Australia in 2013, takes as hypothesis that the listing choices of American Depositary Receipts (ADRs) for Chinese firms are influenced by their growth opportunities and internal governance. One advantage for a foreign firm to cross-list in the U.S. is that doing so offers a more stringent legal and regulatory environment in which investors have access to higher-quality information disclosure and governance standards.

The study is based on the observation of five variables (Board size, percentage of independent directors, CEO duality, Insider ownership and ownership concentration) for a set of Chinese ADRs listed companies. The conclusions suggest that firms with lower growth opportunities tend to choose listing levels that require less regulation (Level 1), even though the capital-raising is more restricted. Companies with higher growth opportunities prefer cross-listing levels that entail full regulatory compliance but permit public offering (Level 3).

The article "Formal and informal quota enforcement" (Canada, 2013) studies the implications of policy change on compliance level, quota prices, and the norm of compliance. The conclusions are that the regulatory changes, such as tougher enforcement, make individuals more compliant, the norm of compliance is gradually strengthened, which in turn induces more compliant behavior.

In the text “Theorizing the concept and role of assurance in information systems security”, assurance is examined as an input for regulatory compliance. The Security Risk Management systems must be mature enough to assume the assurance provided as a compliance evidence.

The paper “The Determinants of Regulatory Compliance: An Analysis of Insider Trading Disclosures in Italy” investigates the determinants of regulatory compliance in corporate organizations. The main conclusions are that the firms with a high degree of separation of ownership from control are most likely to comply with regulation, and board governance does not increase the propensity of firms to comply. Corporate ethos is also a key influence for the compliance predictability in companies.

Before the financial crisis, the article “Corporate social responsibility and sustainability challenges for a bancassurance Company” was published in 2005 in Italy, which gathered the ideas expressed in the third Montepaschi Vita Forum and focused on the role of the “paradigms of value” in the bancassurance business. The values of a Company are defined and guaranteed by the Corporate Governance and Corporate Social Responsibility functions. As per the conclusions extracted from this forum, these two functions are evolving from a “philanthropic” role to a strategic role within the companies to gain the trust of clients and other stakeholders. A cultural change is involved, transforming a “regulatory compliance” approach into a more proactive “regulatory compliance plus” approach.

Finally, the paper “Evidence of regulatory noncompliance with SEC disclosure rules on auditor changes” suggests that breaches of compliance detected in the late filing of Form 8-K (which notifies a change of auditor) may be caused by the SEC expertise of the auditor (as Big 6 firms do not normally incur in this breach). The study concludes that the time to file the Form 8-K and the frequency of late filings increase significantly when non-Big 6 auditors are involved, and late filers are more likely to be smaller and financially distressed, and less likely to issue securities following the auditor change. Therefore, the breaches for late filing the Form 8-K is affected by factors other than competency between auditors.

This article was issued in 1996, and the circumstances explained (Form 8-K to notify change of auditor filing time) may not be applicable nowadays.

Topic 8: Others

Table 21: Articles included into Topic 8

Title	Publication Year
Health-Care Security Strategies for Data Protection and Regulatory Compliance	2013
User participation in information systems security risk management	2010

Title	Publication Year
The management implications of women's employment disadvantage in a female-dominated profession: A study of NHS nursing	2000

Source: Compiled by the author

The article “Health-Care Security Strategies for Data Protection and Regulatory Compliance”, published in China in 2013, aims to establish a relationship between the operational maturity of hospitals and the impact of the IT security resources on breaches occurred and level of compliance through a regression model based on a hospital survey on patient data safety.

The model demonstrates that regulatory compliance significantly decreases breach occurrences only for operationally immature hospitals, and breach occurrences hurt perceived compliance only for operationally mature hospitals. The result further indicates that immature hospitals are motivated by meeting compliance mandates rather than actually protecting information. By contrast, operationally mature hospitals seem to be more motivated by actually protecting their patient data rather than fulfilling minimal regulatory requirements. The security resources impact positively in a mature organisation for compliance outcomes, but these outcomes are diminished in immature firms. Both types of hospitals show a significant impact of security resources on breach occurrence.

The study “User participation in information systems security risk management” states that Although the IS security literature has often cited users as the weak link in IS security due to user errors and negligence, the present study provides evidence that supports an opposing view. That is, business users were found to add value to IS security risk management when they participated in the prioritization, analysis, design, implementation, testing, and monitoring of user-related security controls within business processes. User participation raises organizational awareness of security risks and controls within business processes, which in turn contributes to more effective security control development and performance. The need for regulatory compliance may encourage user participation in SRM within targeted business processes. Security managers can harness regulatory compliance as an opportunity to engage users, raise organizational awareness of security, and better align security measures with business objectives.

Finally, the article issued in 2000 in England analyses the management implications of womens employment disadvantage in a female-dominated profession. The study states the need to monitor employment equity beyond regulatory compliance and the need to implement effective employment strategy.

6. CONCLUSIONS

As stated in the Introduction, the aim of this work is to gain knowledge of the regulatory compliance discipline applied to the banking industry and of the bibliometrics principles in order to perform an analysis over the existing literature related to banking compliance.

a. **Regulatory Compliance principles and current environment applied to banking industry**

Regulatory compliance is the set of procedures implemented by the organisations and companies to detect, manage and mitigate the risks associated with potential non-compliance of relevant internal and external laws, policies and regulations. Compliance affects to all type of organisations regardless their activity or size. However, the requirements are stronger for highly regulated sectors and big companies.

The former compliance activities were traditionally performed by legal specialists. However, the discipline of regulatory compliance has acquired significant importance in the last years as a consequence of two factors: the exponential growth of the regulatory obligations and the inclusion of corporate penal responsibility for the companies without a proper compliance system.

The current regulation defines a set of conditions to guarantee that the companies are properly managed in terms of regulatory compliance: there must be a compliance program in place which includes minimum requirements, the control of compliance function must be performed by an internal autonomous organism and the companies must have adopted control measures to prevent financial crime or mitigate the risk of breach in advance to the crime comission. In this case, the corporations may be exempted of penal liability.

The structure of Compliance within the company may be either centralized, in which Compliance design and controls the activity for the whole organisation, or decentralized, through the integration of compliance controls in the different areas of the company with the overall supervision of compliance specialists. Compliance services may also be outsourced to a specialist services provider. In SMEs companies, the compliance officer role may correspond to a management position. Note that, in all cases, these activities must remain subject to appropriate oversight by the head of compliance.

This work has focused in the regulatory compliance discipline for the banking industry. In Europe, the main global setter for the prudential regulation of banks is the Basel Committee on Banking Supervision (BCBS). The main guidelines, responsibilities and principles to promote the compliance function within banks are included in the document "Compliance and the Compliance Function in Banks", and includes responsibilities assigned to the bank, the board of directors and the senior management.

The bank's compliance function should be independent, reviewed periodically by internal audit, applied in all jurisdictions in which the bank conducts business. The compliance duties may be

properly identified and allocated, even though they have been decentralized to other areas in the organisation or have been outsourced.

The main duties of bank management in terms of compliance are to promote a “top of the tone” culture of compliance across the organisation, oversee and take accountability of the effective management of the risks linked to compliance within the business activity.

A standard compliance area (or outsourced services if applicable) should identify and assess the risks of the organisation related with compliance and create, monitor, test and report recurrent compliance controls that mitigate or reduce the inherent compliance risk of the bank’s activities. This area should also perform specific statutory roles and liaise with regulators.

Compliance areas define and use the compliance programmes in order to carry out their planned activities. A standard compliance programme must include a risk and control map for penal risks, a defined compliance control organism, a whistleblowing channel, an internal disciplinary system and a records management system. Furthermore, the banking entities must include the following regulated 3.areas into their compliance programmes: Anti-Money Laundering and Terrorism Financing, Bribery, Fraud and Corruption detection, Defense of Competition, Market Abuse, Personal Data Protection, Conflicts of Interest management, Complaints and Claims management, Prevention System for Penal Risk, Consumer Protection and IT Compliance.

Both banking and regulatory industries show a constantly changing environment. The following areas have been identified as the hot topics that affect these industries. In this section, we will analyse whether these topics have been also considered in the specific literature published in the bibliographic databases analysed.

- The first topical subject is the existence of new trends that are transforming the management of the regulatory compliance discipline. Some of these trends are the inclusion and increasing use of corporate ethics as an added value of the compliance professionals and the operationalisation of the compliance programmes, which may be applied effectively across the organisations. Other recent trends are the increasing participation of the Board members in the compliance decisions, developing a “tone from the top” message, and the permanent review of the compliance programmes by an independent audit team, specially regarding to the involvement of third parties.
- Concerning the role and background that the compliance professionals should fulfill, traditionally the compliance duties have been performed by lawyers and legal advisors and this discipline has been considered isolated from the rest of the organisation. This profile is currently evolving to a compliance officer role who is not only experienced in law but also in risk management, and who owns communication skills to promote the compliance knowledge across the company.
- Finally, it is worth mentioning that the market shows a certain degree of distrust with the sale of compliance solutions and their implementation in companies by third parties. The main reason

is that the acquisition of standard systems may not be always useful for the companies unless a effective implementation is done. The rationale under the acquisition of this type of solutions is the regulatory exemption of penal liability for companies that have implemented a compliance system within their organisations. However, it is remarkable that implementing a compliance system does not mean being compliant with the regulation, and therefore the lack of real prevention systems may still cause penal liabilities for the companies. The main challenge nowadays is to be able to perform a size-based assessment and implement the necessary compliance measures in the companies, with a reasonable cost.

b. Bibliometric study for banking regulatory compliance

Once the main theoretical concepts of regulatory compliance and bibliometrics have been described, we have performed a bibliometric analysis over the articles related that have been searched in the bibliographic database Web of Science (WoS). The bibliometric analysis has been performed with Bibexcel tool and large networks have been visualized with Pajek.

The source of the study consisted of 87 articles, which were obtained through a set of filters in order to accurate at maximum the objective of our search (articles related to Banking Regulatory Compliance). The following outcomes were extracted from the bibliometric analysis:

- There are no authors who have written a significant number of articles to be considered of reference widely. However two authors (Lana Friesen and Michael Toffel) have participated in three articles whereas ten authors have published two articles. The majority of educational institutions where the authors belong to are located in the USA.
- The articles published related to Regulatory Compliance were not significant in number until 2008. After the start of the financial crisis and the emergence of financial scandals, the number of articles has been increasing since 2009 with a maximum of 14 articles issued in 2014. The reason for this rise may be the growing effect of the regulatory pressure specially in banking and the continuous establishment of a Compliance function in the companies in order to ensure that the regulatory requirements are met.
- The only co-author network found in our population consisted of five pairs of authors issuing two articles in each case. There were not any co-author networks including more than two authors.
- Two authors have been cited more frequently by other authors in the articles analysed: Clark, J. and Gilpatric, SM. Although the number of citations is not very high, we consider that these are representative authors of this discipline due to their specialist publishing activity and collaborating with other authors in the publication of articles related to the use of competition to reinforce regulatory compliance. They also cited each other in their references.

- The search for co-citation networks returned a single network containing two pairs of authors that have been cited significantly: Harrington, W. and Handsberger, M. and Lazear, EP and Fischbacher, U.

- In this work also were analysed the bibliographic coupling cases with the maximum number of citations (9 interactions) observed. Two groups were identified, being one of them compound by the authors Clark-Friesen-Muller, who cite in their articles the group formed by the authors Gilpatric-McKee-Vossler. The theme of their articles relate to the use of competition to reinforce regulatory compliance.

The second group is compound by the authors Friesen-Gangadharan and Short-Toffel, who have cited each other in their references for nine times, and all their articles relate to the self-reporting and self-policing for regulatory compliance.

- The most used keywords found within our population of articles were “Regulatory Compliance”, “Regulation”, “Corporate Governance”, “Compliance”, “Enforcement” and “Corporate Social Responsibility”. These words are also the most frequently used in pairs, as shown in the co-word analysis.

- 27% of the 45 articles which were classified as related with Banking Regulatory Compliance were published by the editorial Elsevier Science BV, which is a world-leading provider of information solutions and scientific contents.

- With regards to the geolocation where the 45 articles related to Banking Regulatory Compliance were issued, 68% of the articles were published either in USA (24 articles), Australia (4 articles) and UK (4 articles), as per the table below:

Table 22: Most frequent countries publishing articles related to Banking Regulatory Compliance

Country	No. Articles
USA	24
AUSTRALIA	4
UK	4

Source: Compiled by the author

The USA focus more that 50% of the publications. This is caused on one hand by the early emergence of the first financial scandols in this century (Enron case of reputational risk in 2001, Worldcom and Tyco in 2002, AIG in 2005) and, on the other hand, by the large number of existing financial regulatory authorities, such as SEC (Securities & Exchange Commission), Fed (Federal System Reserve), FinCEN (Financial Crimes Enforcement Network) or FINRA (Financial Industry Regulatory Authority). The high exposure to regulatory bodies, as well as the existence of precedents of regulatory breaches and their fines may have increased the interest in the USA for this discipline.

On the same basis, the exposure to financial regulation is also high for Australia, which is regulated by the APRA (Australian Prudential Regulation Authority) and ASIC (Australia Securities and Investment Commission). The main regulators for financial industry in UK are the BoE (Bank of England), FCA (Financial Conduct Activity) and PRA (Prudential Regulation Activity).

The publishing activity in Europe is very limited (18% of the total number of articles) and there is not any article issued from Spain. This is contrary to my initial expectations, as Europe owns extensive financial regulation with local country authorities and European Supervisory Authorities (encompassed by the European System of Financial Supervision, ESFS). Furthermore, the regulatory and compliance preventative activity has been intense in the last years, as seen in section 2 of this work.

Three out of the eight articles published in Europe are related with the cost efficiency of the implementation of regulatory compliance. One of them discusses about the combination of external environmental costs with economic measures of values; another article makes an assessment of the Irish credit unions and the third one was published in 1996 and defined a technique to avoid some regulatory compliance costs.

Other three articles refer to the impact of risk management and corporate governance on regulatory compliance. An article published in UK emphasizes the implementation of Investment Management Systems to automate processes and decrease the volumen of manual errors. An article published in Italy concludes that the more separated the ownership and the control of a company are, the more compliant they will be with regulation.

The two remaining articles refer to the relation between regulatory compliance and credit risk and to the employment equity between men and women beyond regulatory compliance rules.

c. Analysis of the literature related to Regulatory Compliance

Finally, an in-depth analysis of the contents was performed over the articles from the population to know what are the main topics treated related to banking regulatory compliance and the main findings obtained. An initial classification showed that 42 out of the 87 articles were not closely related with Regulatory Compliance or they were applied to other areas such as industry, health and environment), and therefore these 42 articles were rejected for the in-depth analysis.

With regards to the analysis techniques used, most of the studies (82%) have an empiric component; this is, they are either pure empiric or they join empiric and theoretical results to obtain conclusions. On the other hand, the studies related to the compliance discipline are qualitative in their majority (51% are only qualitative and 31% include qualitative and quantitative assessments).

The articles analysed were clasified into seven different topics, as per their main theme. During this categorisation we realized that the topics found were very closely linked with the most

frequently used keywords that were obtained in the co-word analysis performed during this work. Based on the information included in these articles, we can obtain the conclusions hereafter:

- Cost is a significant driver for the implementation and maintenance of any type of regulatory compliance programme. Several studies try to optimise these type of costs by defining integration capabilities in M&A processes to ensure a better compliance with the law with a reduction of compliance costs, qualifying as RRG (Risk Retention Group) to operate in multiple states, creating cost assessment techniques or new integrated performance metrics which include not only economic inputs, but also information related to the production of the company. In some cases, companies had to deregister with the Securities and Exchange Commission as a consequence of the high cost of regulatory compliance.
- The articles in which audit is considered as a mechanism to reinforce regulatory compliance tested the use of competition and audit schemes, such as audit tournament system, induced competition of compliance agents or self-policing standards. In two cases, the level of compliance obtained through these schemes was higher than with the traditional random schemes (for use of induced competition of compliance agents and self-policing standards). However, two other studies concluded that the level of compliance achieved was not necessarily increased with respect to the standard systems (audit tournament system and use of audit schemes instead of random audits). The studies made over self-reporting and self-policing trends show that the willingness to report violations is reinforced under the coercive power of the regulator.
- The governments and public institutions define the local and global regulation for both public and private companies. As such, the compliance of their regulations may be subjected to corruption and bribery in a variety of ways. The articles analysed in this set include studies about corruption from lobbies of companies with high spending power to circumvent regulation through the management of funds, and also bribery to public officials. This last article contradicts the existing literatura by concluding that, under certain circumstances and for specific types of regulations, corruption may foster regulatory compliance.

Governments seek to reduce corruption through different measures, however the level of corruption is highly determined by the country risk. In politically unstable regimes, the institutions necessary to monitor and enforce compliance are weak. In such countries, corruption therefore is more pervasive, and the compliance with regulations is low.

- Banking transparency is crucial to obtain trustworthiness from clients and other stakeholders. The literature analysed describes some means to gain transparency, such as IT investments, establishment of compulsory reporting regimes or strong governance structures, and also names the main challenges that the companies face to achieve this transparency: corruption, weak governance structures, repeated interactions between bribing firms and compliance inspectors and lack of willingness to perform self-reporting of compliance incidents.

- Credit risk and regulatory compliance are directly linked in both ways through the following facts: a) use of non-financial inputs, such as regulatory compliance information to improve the default prediction of SMEs credit risk models; b) the compliance function includes regulation for Basel II credit risk models, and the outputs of these models (such as Probability of Default information) concerns areas such as regulatory compliance; and c) the use of Bayesian approach to estimate default probability for portfolios with little historical data information, including subjective information such as expert information, has an increasing tendency and the probability description of subjective variables will make them easier to model in the future.
- With regards to the specifications of the regulatory compliance function included in the articles sampled, the current discussions focus on the independency or interdependence of the compliance professionals, as well as what is the best profile to carry on regulatory compliance programmes implementation. Other areas of interest are the challenges of outsourcing the Compliance function (professional practices firms provide with internal monitoring and reporting systems, but it should be clear that the relationship maintained with the client should include self-disclosure and breaches and not tend to avoid reporting illegal conducts to regulator), and establishing a differentiation between the concept of managers versus the company itself, which results specially important in case of allegations of criminal conduct.
- One of the key arrangements of Corporate Governance is to promote a culture of risk and control within the banking entities. The risk management function, in accordance with the Board, is responsible for defining and approving the entities' risk appetite, which is defined as the level of risk that the company is prepared to accept whilst performing its business strategy.

The literature included under this topic concludes that small firms with lower growth opportunities tend to choose structures that need less regulatory requirements, whereas companies with higher growth expectations prefer compliance levels that entail full regulatory compliance but permit public offering.

- Finally, it may be noted the strategic role for organizations played by business users, who add value to Information Systems Security risk management through their involvement in the definition, implementation and monitoring of used-related security controls within business processes.

The regulatory compliance requirements demand the implementation of automated Investment Management Systems, not only to avoid at maximum manual trading error and ensure the compliance of quantitative requirements, but also to promote a compliance behaviour along the time. Finally, the Corporate Governance and Corporate Social Responsibility are evolving to strategic roles to gain the trust of clients and stakeholders, approaching regulatory compliance to a proactive enforcement.

d. Assessment of the results of the bibliometric analysis and the contents of the articles

A key part of the conclusions is the comparison between the outcomes obtained in the bibliometric analysis and the expected findings, as per the description of the current environment of the banking compliance.

This section examines the degree of linkage between the current hot topics in the regulatory compliance discipline (regulatory updates and main challenges) and the conclusions of the articles published in bibliographic databases.

In the first place, we have analysed to what extent **the compulsory areas introduced in the current regulation** have been pursued in the population of articles selected.

Table 23: Inclusion of the current hot topics in the regulatory compliance literature

Topics included in the current regulation	No. Articles	Observations
Penal Risk associated to compliance	0	
Definition and implementation of compliance programs	1	One article issued in 2000 in Australia covers this topic and raises questions on which professional role is better to fulfill this duty.
Internal audit function	5	These articles show opposed perspectives on whether the use of innovative audit schemes are more effective than traditional randomly schemes to reinforce regulatory compliance.

Source: Compiled by the author

The second analysis relates to the inclusion in the articles of the **challenges and main trends of the regulatory compliance applied to the banking industry** that have been mentioned in section 2.3. The results are summarized in the table below.

Table 24: Inclusion of the challenges and main trends of compliance applied to the banking industry

Challenges and main trends of banking regulatory compliance	No. Articles	Observations
Corporate ethics	1	The article "The ethics of advising on regulatory compliance: Autonomy or interdependence?" is key because it is linked with several of the topics considered as new trends in compliance in the last years. Specifically related to ethics, it questions what professional role is more ethical to fulfill the compliance function. The current trend is moving from lawyer specialists, who consider the legal advisory activity on an isolated basis, to compliance practitioners, whose analysis take consideration of the whole business activity. The article considers that ethics is more integrated in this modern approach which cares for the benefits of the whole company, and which also identifies with ethical communities of other professionals, such as regulators and stakeholders.
Operationalisation of compliance programs	1	The article "The ethics of advising on regulatory compliance: Autonomy or interdependence?" defines through the operationalisation of the compliance programmes their effective application to other areas of the organisation.
Roles and background of compliance professionals	1	The article "The ethics of advising on regulatory compliance: Autonomy or interdependence?" establishes comparisons between the two current perspectives for this function.

Participation of the Board	2	<p>The article “The determinants of Regulatory Compliance: An Analysis of Insider Trading disclosures in Italy”, published in 2009, exposed that a board governance – such as a chief executive and chairman duality- does not increase the propensity of firms to comply with regulation and, on the other hand, the companies with highly separated functions between the ownership and the control are more likely to be compliant.</p> <p>The article “Information asymmetry around operational risk announcements” states that the level of Independence of the Board influences, among other factors in the level of information asymmetry produced after operational risk announcements.</p>
Cost of implementing a compliance system	10	<p>The articles include studies for the cost optimization by defining integration capabilities in M&A processes to ensure a better compliance with the law with a reduction of compliance costs, qualifying as RRG (Risk Retention Group) to operate in multiple states, creating cost assessment techniques or new integrated performance metrics which include not only economic inputs, but also information related to the production of the company.</p>

To sum up, most of the topics mentioned as challenges and new trends of the regulatory compliance discipline were covered to some extent by the articles found in Web of Science. However there are some areas that have not been sufficiently considered, such as the introduction of penal risk for regulatory compliance breaches and their impact in the organisations, and the definition and implementation of real, effective and adapted compliance programmes into the businesses.

The article “The ethics of advising on regulatory compliance: Autonomy or interdependence?”, written by Parker C. and published by Journal of Business Ethics in 2000 in Australia, is key as it covers most of the topics that are on trend nowadays.

The geographic distribution of the literature shows little interest for this discipline in Europe, and specifically in Spain, in comparison with the USA, despite existing a strong regulation over this function and the banking industry in general.

Finally, the following predictions are based on the current status of the banking regulatory compliance and the observed articles and reflect my expectations on how this discipline will look like in the near future:

- Top Management to assume an ethical leadership and promote the ethical culture across the organisation; not only based on their entrepreneurial commitment, but also to prevent unknown negligences they could be under control in the past.
- Increase of the standardisation of the compliance function across the companies, thanks to the descriptive regulation, the annual reviews over the compliance programmes and the

subsequent improvement, customization and assumption of the compliance programmes by the organisations.

As a global conclusion, I consider that the targets defined at the beginning of this work have been fully met, as an overview of the key notions of banking regulatory compliance were provided, including a thorough study of the current status of this discipline in Spain. The performance of a bibliometric study has shown new resources, techniques and investigation methods to get to know the available literature over a defined theme and the in-depth analysis of this literatura has contributed to the interpretation and categorization of the results obtained and to the extraction of aggregated conclusions and predictions related with the perspectives of banking regulatory compliance in the near future.

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APPENDICES

Appendix 1: List of the 87 articles sampled for the bibliometric analysis

Doc Id.	Title	Publication year	Authors
1	The effects of regulatory compliance for small banks around crisis-based regulation	2016	Cyree KB
2	Informal sector, regulatory compliance, and leakage	2016	Baksi S Bose P
3	Does Regulatory Certification Affect the Information Content of Credit Ratings?	2016	Bruno V Cornaggia J
4	Regulatory performance of audit tournaments and compliance observability	2016	Cason TN Friesen L Gangadharan L
5	Environmental management systems and compliance at small and lightly regulated facilities: evidence from the New Hampshire hazardous waste program	2016	Stafford SL
6	Congressional Assertions of the Spending Power: Institutional Conflict and Regulatory Authority	2016	Yaver M
7	Does Basel compliance matter for bank performance?	2016	Ayadi R Ben Naceur S Casu B Quinn B
8	Firms' Emissions and Self-Reporting Under Competitive Audit Mechanisms	2015	Oestreich AM
9	Using competition to stimulate regulatory compliance: A tournament-based dynamic targeting mechanism	2015	Gilpatric SM Liu LR Vossler CA
10	The "Peter Pan Syndrome" in Emerging Markets: The Productivity-Transparency Trade-off in IT Adoption	2015	Sudhir K Talukdar D
11	Assessing the Impact of Sarbanes-Oxley Act on the Logistics Industry: An Exploratory Study	2014	Chandra A Srinivasan M
12	Information asymmetry around operational risk announcements	2014	Barakat A Chernobai A Wahrenburg M
13	The effect of ISO 14001 on environmental regulatory compliance in China	2014	McGuire W
14	Realized volatility models and alternative Value-at-Risk prediction strategies	2014	Louzis DP Refenes AP Xanthopoulos-Sisinis S
15	An algorithm for collusion-resistant anonymization and fingerprinting of sensitive microdata	2014	Echizen I Kieseberg P Mulazzani M Schrittwieser S Weippl E
16	Cooperative bank efficiency in Japan: a parametric distance function analysis	2014	Glass JC McKillop DG Quinn B Wilson JOS
17	The role of Investment Management Systems in regulatory compliance: a Post-Financial Crisis study of displacement mechanisms	2014	Currie W Gozman D
18	Can corruption foster regulatory compliance?	2014	Mendez F
19	Theorizing the concept and role of assurance in information systems security	2013	Barki H Barton RR Spears JL

Doc Id.	Title	Publication year	Authors
20	Designing self-reporting regimes to encourage truth telling: An experimental study	2013	Friesen L Gangadharan L
21	Corporate governance, growth opportunities, and the choices of cross-listings: The case of Chinese ADRs	2013	Lin CT Pan LH Yang PC
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