



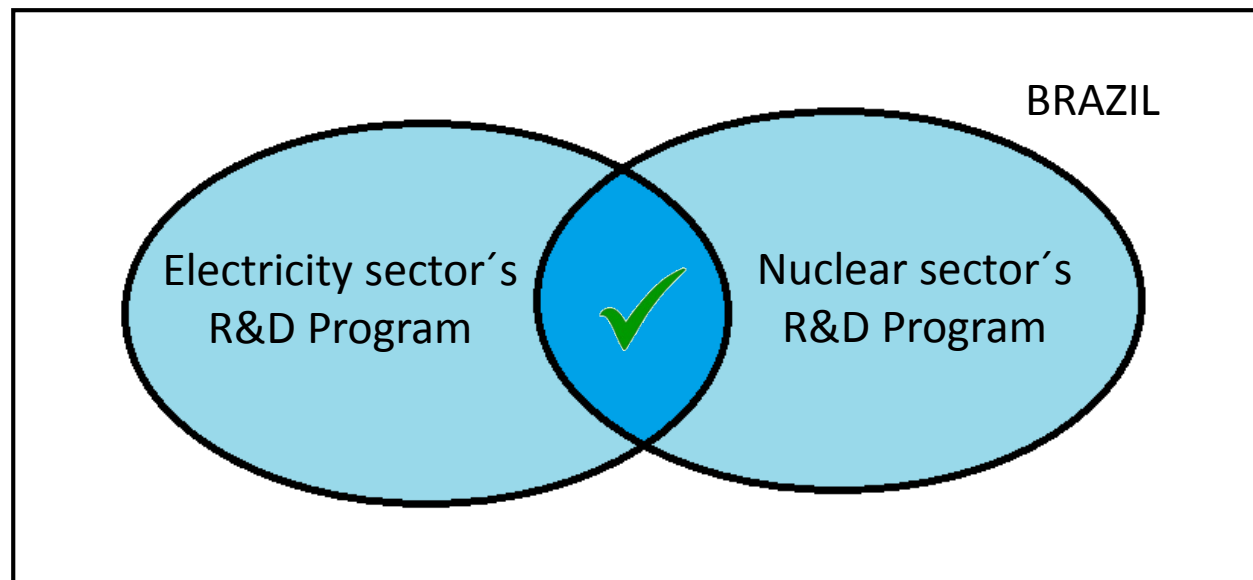
THE NATIONAL ENERGY R&D PROGRAM AND THE CONTRIBUTION OF THE NUCLEAR SECTOR IN INNOVATION MANAGEMENT: A BIBLIOMETRIC STUDY

INTRODUCTION

- **Research and development (R&D)** activities have been an increasingly present theme in **public policy issues in Brazil** as a possibility to improve them to increase the competitiveness of Brazilian industry
- Electricity sector → **Law 9.991/2000 ANEEL**, which requires utilities to invest in these activities by allocating 1% of their net operating revenues (ROL) in investments in research and development (R&D) projects
- Eletrobrás Eletronuclear is a company of **great representation in the electric sector** as it is responsible for 30% of the consumed electricity of the State of Rio de Janeiro (percentage that will increase to 50% with the conclusion of the Angra 3 Nuclear Power Plant) besides being the largest producer of nuclear energy in Latin America, to which it contributes 46% of the energy generated in this region (ELETRONUCLEAR, 2017)
- Since 2008, Eletronuclear **has been exempted by Aneel** from investing the resources it regulates in R&D, as it is AUTHORIZED and not a public service provider, as quoted in Technical Note 403/2009 in the letter addressed to Aneel.

INTRODUCTION

- In 17 years of enactment of the Law, **several academic works** have been developed to analyze **the R&D Program of the electric sector**.
- The contribution of this work is to provide **an overview** of what has already been researched about the R&D projects of the Brazilian electric sector, **also considering the works involving nuclear energy**, in order to verify the contribution of the nuclear electric sector in this set.

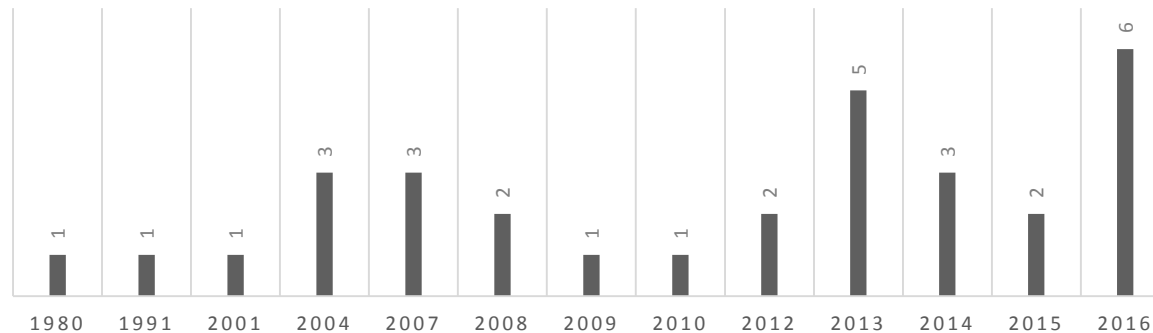


DISCUSSION OF RESULTS

- The Fifteen Year Study of ANEEL's R&D Program - A Bibliometric Study (2016, p. 155) **used 3 bases for bibliometric** research of the Brazilian electricity sector (not considering the nuclear area) - Thomson Reuters, EBSCO and Emerald - and found only 4 articles. The author made the decision to search Google Scholar (Scholar) which provides not only articles published in journals, but also books, theses and dissertations and congress articles
- **Approximately 43% of the works were found through the English expressions, but none of these works come from the English language bases.** Therefore, even if there are results in Portuguese on known platforms, it is valid to do the searches in the same terms in English
- As the 33 papers, **with only 8 referring to the nuclear area**
- **Their abstracts were evaluated** for certification of consistency of the theme, those classifieds were transported to Microsoft's Excel software, generating two main tables: **Analytical Chart & Bibliometric Data**

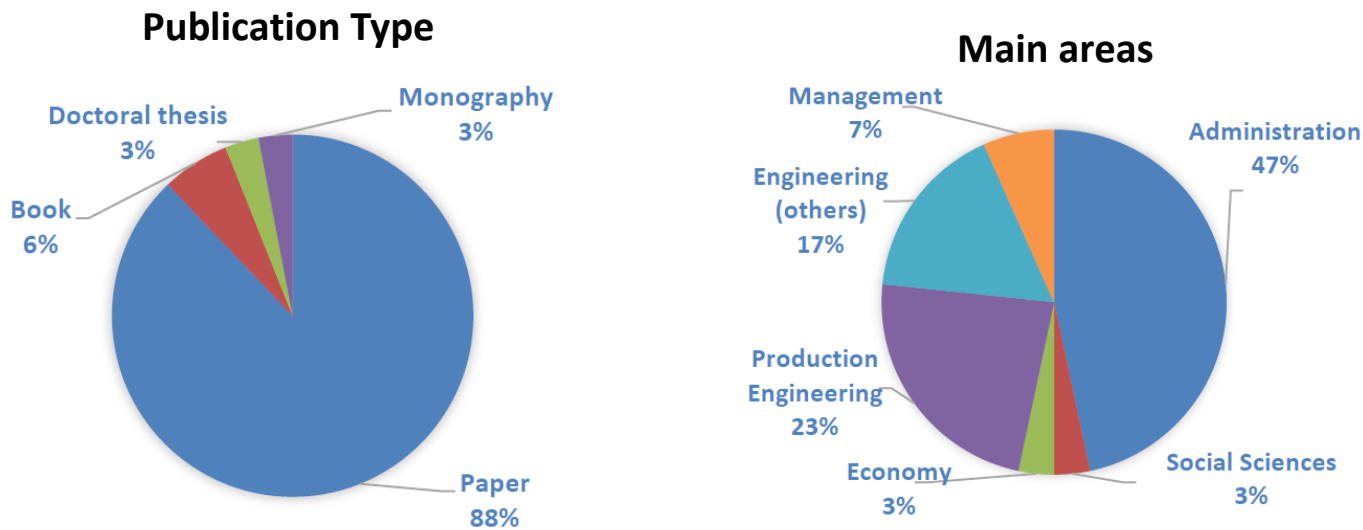
DISCUSSION OF RESULTS

Temporal Evolution



- **There was no immediate influence** on the publications after the enactment of Law 9.991/2000
- **The first relevant peak happened in 2013**, being surpassed in 2016, which may demonstrate a current and recent relevance of the studied theme

DISCUSSION OF RESULTS



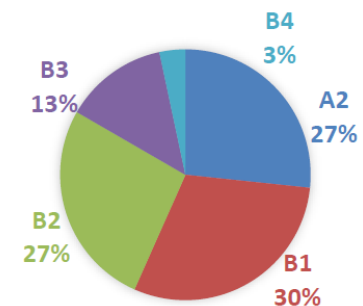
- The Figure **Publication Type** shows that most of the papers found were **articles**. It is important to highlight that no Thesis / Dissertation platform was used. **Main areas** shows that the works are predominant in the **Engineering** areas as well as predominant in the **Administration** area

DISCUSSION OF RESULTS

Key Sources of Information

Name	Number of Publications	Qualis
Journal of Technology Management & Innovation	5	A2
Revista Gestão & Produção	5	B1
RAC	3	A2
Revista de Administração e Inovação	2	B1
Revista Ibero-Americana de Estratégia - RIAE	2	B2
Desafio On line	1	B3
Produção	1	B1
Revista ADM.MADE	1	B2
Revista Brasileira de Estratégia	1	B2
Revista Contemporânea de Economia e Gestão	1	B2
Revista de Administração da UFSM	1	B2
Revista do Mestrado em Administração UNP	1	B3
Revista Economia e Gestão	1	B2
Revista Eletronica de Administração	1	B3
Revista Gestão & Conexões	1	B4
Revista Gestão & Tecnologia	1	B3
Revista Pensamento contemporâneo em Administração	1	B2
Revista Perspectivas em Ciência da Informação	1	B1

- Regarding the sources of publication, it can be seen from Table 1 that **Journal of Technology Management & Innovation** and **Revista de Gestão e Produção** concentrate the largest number of publications, whose qualities of intellectual production (presented through the notes in the column “Qualis”) are quite relevant



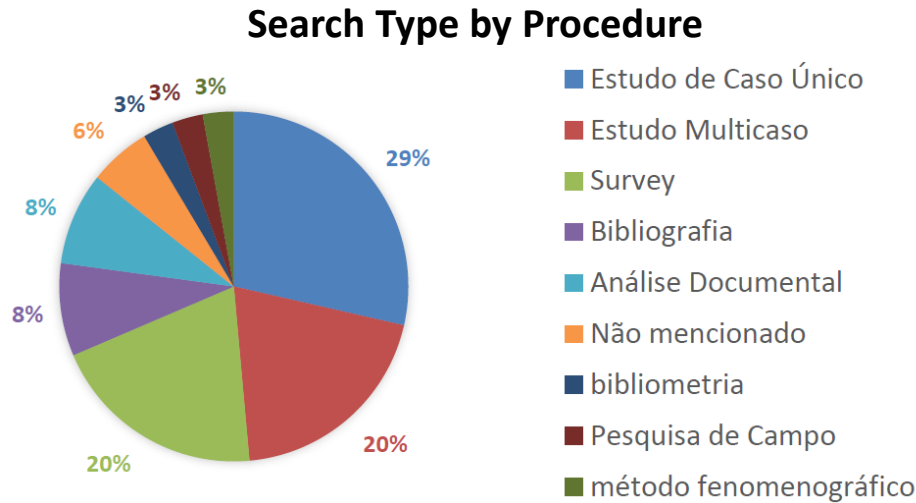
DISCUSSION OF RESULTS

Key Authors

Author	Number of Publications	From
Alexandre de Carvalho Castro	4	CEFET
Cristina Gomes de Souza	4	CEFET
Josiel Gonçalves dos Santos	4	CEFET
Mario Salerno	4	USP
Roberto Marx	4	USP
Guilherme Amaral	4	USP
Aldo Cosentino	3	UFSC
Rafael Zimmermann Homma	3	UFSC
Luiz Afonso Pereira Athayde Filho	3	UFSC
Maria Terezinha Angeloni	3	UFSC
Marta Araújo Tavares Ferreira	3	UFMG
Fabricao Ziviani	3	UFMG
Deborah Moraes Zoauin	2	FGV
Edison de Oliveira Martins Filho	2	FGV
José Luiz Pereira Brittes	2	UNICAMP
Mariana Savedra Pfitzner	2	UNICAMP
Sergio Luiz Monteiro Salles-Filho	2	UNICAMP

- The **Key Authors** presents the main authors of the theme. Authors who had only 1 publication were not included. It can be seen from the institution's column that **there are 6 teams basically working more deeply on the topic**
- Relevance of the participation of **UFRJ** and **PUC RJ**

DISCUSSION OF RESULTS



- It is noteworthy the **application of the Survey** technique in the works found, in addition to the case studies that were already expected since the theme is directly related to the cases of Brazilian companies
- This research, being a procedure that has been widely used by scholars of this area and of great representation, **as it can be equated to the dissemination of methodologies such as case study**, so well-known and applied in the business environment

DISCUSSION OF RESULTS

The most cited authors

Title	Number of references	Authors
Arquiteturas Organizacionais para a Área de P&D em Empresas do Setor Elétrico Brasileiro	7	Jaelton Avelar Fernandino Janete Lara de Oliveira
Gestão estratégica da energia nucleoeleétrica no Brasil: recursos e competências críticos para seu sucesso	6	T. Diana L. v. A. Macedo-Soares Luiz Augusto P. A. Figueira
Barreiras e obstáculos à inovação no setor elétrico brasileiro: desafios e oportunidades	2	Fabricio Ziviani Marta Araújo Tavares Ferreira
Transferência do conhecimento tecnológico gerado em projetos de P&D no setor elétrico brasileiro: o caso Eletronorte	2	Maria Zuleila Carmona R. Campos Marta Araújo Tavares Ferreira Sandro Márcio da Silva
R&D and Innovation Management in the Brazilian Electricity Sector: The Regulatory Constraint	1	Ruy de Quadros Carvalho Glicia Vieira dos Santos Manoel Clementino de B. Neto

- There is **still little** citation activity in the selected articles. It can also be seen that the most cited authors are not necessarily the authors with the largest number of publications
- **The first article** seeks to identify the organizational architecture models that are being adopted by companies from the Brazilian electricity sector to manage the R&D program. **The second** has the objective to propose an analytic framework with the fundamental resources and competencies for managing effectively the exploration of nuclear-electric energy in Brazil

CONCLUSIONS

- The results not only supported researchers interested in ANEEL's R&D policy, but also provided an overview of the field of innovation research in the Brazilian electricity sector, including the nuclear sector, to foster innovative policy in the Brazilian electricity sector as a whole.
- Of the 286 articles found, 33 were selected after detailed individual analysis, with only 8 referring to the nuclear area. This result highlights the general **gap that exists in the market about the areas of Innovation and R&D Management** in the national electricity sector as a whole, that is, including the nuclear sector
- Regarding the temporal evolution, in relation to the publication of the works, it was found that 2016 presents the peak of publications, confirming not only how relevant the topic is, **but how recent it is**
- We can conclude that although there are still few publications, there is a great concern of the authors to publish them in good quality and well-regarded magazines. This fact adds to the **relevance and timeliness of the theme, its consistency and importance for national economic development**