Quantitative research assessment and its unintended consequences

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Chapter 1.
General introduction

The experience of Lithuania, a small nation which regained its independence and has since begun navigating its integration into the global research landscape, resonates with countless other countries, large and small, that face similar challenges. This dissertation delves into the multi-faceted dynamics of quantitative research assessment, examining its historical evolution, policy implications, and impact on behaviour of individual researchers, institutions, and patterns of national outputs. By focusing on Lithuania, this thesis offers in-depth insights into the challenges and opportunities that national research systems face in a globalised world, shedding light on ongoing debates on responsible research assessment practices.

To provide the necessary background for this PhD research, this chapter is structured as follows. Section 1.1 begins by tracing the rise of quantitative research assessment practices, drawing on relevant literature. Section 1.2 reviews external evaluations of the Lithuanian science system and the narrative of "lagging behind." Section 1.3 then presents an overview of the quantitative research assessment system in Lithuania, focusing on its structure as developed over the past quarter-century. Finally, Section 1.4 explains the scope of this thesis and the research questions it aims to address.

1.1. The rise of quantitative research assessment

The introduction of the Frascati-based indicators (OECD 1963) marked a turning point in how research and development (R&D) was perceived in the early 1960s. This shift underscored the growing recognition of the role of R&D in driving economic growth and the need for standardisation, sparking interest in the economics of research, development, and innovation. Since the early 1970s, OECD countries have begun to adopt national science policies and funding systems (Lepori et al. 2007). The OECD, acting as a catalyst, developed a standard model for science policymaking and actively encouraged its adoption among member countries through various channels like transnational arenas, committees of national practitioners, and country reviews (Henriques and Larédo 2013). Somewhat later, the European Union embarked on the creation of the collaborative European Research Area, which similarly fostered the spread and uptake of research policies among member states (European Commission 2000).

The imperative for research internationalisation gained momentum after international organisations began to integrate national research communities into the global landscape (Wagner et al. 2001; Wagner and Leydesdorff 2005). The OECD issued methodological manuals for the measurement of scientific and technological activities, facilitating comparisons against a common international standard (OECD 1994). This drive was bolstered by bibliometric research, which highlighted the growing importance of international collaboration, particularly with the EU emerging as a key scientific partner for both advanced and developing countries (Glänzel, Schubert, and Czerwon 1999). Since then, more international collaboration has tended to mean higher publishing rates and better performance in terms of bibliometric indicators. Countries not collaborating internationally may be losing more than ever before in terms of resources and prestige (Kwiek 2015). With many countries

reporting their science and technology indicators, bibliometrics became the norm in science policymaking (Leydesdorff 2005; Okubo 1997).

The late 1990s marked a pivotal moment in research assessment, as countries such as the UK and Australia pioneered performance-based funding (PBF) systems (Anderson, Johnson, and Milligan 1996; Butler 2003b; Donovan and Butler 2007; Elton 1988; Franceschet and Costantini 2011; Jiménez-Contreras, De Moya Anegón, and López-Cózar 2003; OECD 2010). These systems, designed to tie research funding to performance outcomes, have evolved over time with varying objectives and implementation methods (Jongbloed et al. 2023). Some PBF systems operate *ex-ante* (before research), others *ex-post* (after), and evaluation methods range from *metrics-based* to *peer review* (Geuna and Martin 2003; Zacharewicz et al. 2019). While debate persists over the optimal approach (De Rijcke et al. 2016; Sivertsen 2017; Traag and Waltman 2019), many countries combine both, reflecting the complexity of research assessment (De Boer et al. 2015; Kulczycki, Korzeń, and Korytkowski 2017; Nelhans 2022). These PBF systems were designed to boost research productivity, enhance accountability and introduce market-driven approaches into academia (Hicks 2012b; Jonkers and Zacharewicz 2016). They rapidly spread globally and ushered in an era of quantitative research assessment.

At the turn of the millennium, the Web of Science (WoS) dominated as the principal source of the bibliometric data used to benchmark national research performance, track international collaboration, and evaluate institutions (Bozeman and Corley 2004; European Commission 2001; Glänzel 2001; Pohl 2021; Wagner et al. 2001). The launch of Scopus by Elsevier in 2004 introduced competition into the bibliometric landscape. As these citation indices gained prominence, the global science system transformed into a "citation economy," where academic success became increasingly tied to publication in indexed journals (Mills 2024). Alongside these citation indices, various journal ranking lists have also become deeply embedded in the academic environment, influencing decision-making at both institutional and individual levels (Allen and Heath 2013; Frey and Rost 2010; Rafols et al. 2012). However, the effectiveness of these ranking lists in truly advancing scientific progress remains a point of contention (Serenko and Bontis 2024).

The increased pressure to publish in peer-reviewed journals led to a transformation of the academic publishing landscape. The surging demand for papers prompted established publishers to launch new peer-reviewed journals and adapt their commercial strategies. This resulted in consolidation within the academic publishing industry, leading to an oligopoly of major publishers (Larivière et al. 2015). As the demand for publishing peer-reviewed outputs outstripped the available supply of reputable journals, publishers, institutions, and even researchers launched new journals. However, this rapid expansion fuelled concerns about the quality of newly launched journals and the papers they published, giving rise to the concept of "predatory publishing" (Beall 2017; Grudniewicz et al. 2019; Kendall 2021). Dissatisfaction with the publishing industry extended beyond newcomers to established players, leading to boycotts, such as the "Cost of Knowledge" campaign targeting Elsevier (Heyman, Moors, and Storms 2016).

While the broader policy context and nuanced interpretation of bibliometric data often remained under-discussed (Gläser 2024; Kehm and Teichler 2007; Robinson-Garcia and Ràfols 2020), researchers worldwide faced mounting pressure to publish in international, high-impact, English-language journals (Van Dalen and Henkens 2012). Though research internationalisation offered potential benefits such as increased collaboration and knowledge exchange, it also led to challenges for researchers and universities. The emphasis on Western-centric publication practices marginalised local perspectives and languages, incentivising researchers to conform to dominant academic paradigms (Hicks 1999, 2012a; Stöckelová 2012). Caught between these competing pressures, universities and researchers struggled to adapt their publication strategies (Hamann 2019; Hansen et al. 2019; Stoker 2006). Similarly, policymakers' ambitions to drive research internationalisation by incentivising publication in high-tier journals often clashed with the realities of local research environments, leading to significant obstacles and sometimes outright failure of such policies.

The widespread adoption of PBF has led to extensive research on its profound and often unintended consequences (Dahler-Larsen 2014; Franco-Santos and Otley 2018; de Zwart 2015). Studies have shown that PBF has impacted research systems at both national (Butler 2003b, 2003a; Elton 2000; Gläser et al. 2002; Taylor 2001) and institutional levels (Aagaard 2015; Dix et al. 2020; Hughes and Bennett 2013; Leišytė, Enders, and De Boer 2008; Mouritzen and Opstrup 2020). These systems have significantly affected individual researchers, often fostering a "publish or perish" culture (Miller, Taylor, and Bedeian 2011; Rowlands and Wright 2021) or a "publication game" (Butler and Spoelstra 2020).

Due to the proliferation of quantitative metrics and the unintended consequences they have posed, we are witnessing growing calls for responsible research assessment from academia and international organisations. First came academic calls such as the San Francisco Declaration on Research Assessment (DORA 2012), the Leiden Manifesto for research metrics (Hicks et al. 2015), the Vienna Principles on the Future of Scholarly Communication (Kraker et al. 2016), the Helsinki Initiative on Multilingualism in Scholarly Communication (Federation of Finnish Learned Societies et al. 2019), and the Hong Kong Principles for Assessing Researchers (Moher et al. 2020). In addition to these academic community initiatives, UNESCO adopted recommendations for open science (UNESCO 2021) and the European Commission launched and supported the Coalition for Advancing Research Assessment (CoARA) (CoARA 2022). The latter is particularly noteworthy as a policy-driven call for more inclusive and more qualitative approaches to research assessment, moving beyond now-traditional metrics such as journal impact factors.

Overall, research assessment reform has been in the air for years. Yet to effectively reform entrenched quantitative research assessment practices, it is crucial to understand how they were developed. The analysis of this development might contain lessons about the opportunities and difficulties in undoing or reforming quantitative assessment today. This requires an in-depth examination of the factors that influenced policy decisions, the key actors involved in policymaking processes, and their influence in policy implementation. Given the complex landscape of research assessment, country-level case studies can offer valuable

insights for current debates on research assessment reform, emphasising the importance of considering diverse interests, power dynamics, and potential unintended consequences in policymaking.

As internationalisation and PBF become increasingly prevalent, it is crucial to examine their impact on research systems across diverse contexts. Lithuania, with its ambitious pursuit of scientific internationalisation and its reliance on quantitative assessment, serves as a valuable case study for understanding the complex interplay between these trends. By analysing the Lithuanian experience, this thesis aims to contribute to broader debates on research assessment reform and the pursuit of responsible and effective research evaluation practices. This is particularly valuable for Lithuania and almost thirty other "low research and innovation (R&I) performing" countries striving to enhance their research performance within the European Research Area (Hardeman, Van Roy, and Vertesy 2013). Many of these countries remain relatively under-investigated in the global research literature on policymaking in the public science system and bibliometric analysis, whereas countries such as Poland and the Czech Republic have received significantly more attention (Good et al. 2015; Kulczycki 2018; Kulczycki et al. 2017; Stöckelová 2012). Ultimately, understanding the dynamics of quantitative research assessment in such contexts can offer valuable insights for policymakers and stakeholders seeking to develop effective and sustainable research policies amidst calls for reform.

The following sections critically review the existing literature on the Lithuanian science system to provide context for this PhD research and identify main areas for further investigation.

1.2. External evaluations and the narrative of "lagging behind"

This subsection provides an overview of international advisory reports commissioned by Lithuania, examining how external perspectives have shaped the development of its research and innovation landscape. These reports, prepared by organisations such as the EU, OECD, and World Bank, were developed in close collaboration between foreign experts and Lithuanian authorities. The recommendations provided in these reports proved instrumental for Lithuanian policymakers in transforming the science system and joining these prestigious international organisations. Spanning several decades, these assessments offer valuable insights into the perceived strengths and weaknesses of Lithuanian research and innovation, often highlighting a recurring theme: the narrative of "lagging behind."

1.2.1 Early assessments and the emergence of a narrative (1996–2006)

In the years after Lithuanian independence was restored, a series of international assessments played a crucial role in shaping the country's research and innovation landscape. In 1996, the Norwegian Research Council was invited to conduct the first assessment of the Lithuanian research system, particularly in international cooperation, doctoral training, and research collaboration (Research Council of Norway 1996). This expert evaluation aimed to provide

recommendations supporting the future development of Lithuanian research. As Lithuania sought to join international organisations, further assessments were conducted by the EU Commission (1999), OECD (2002), and The World Bank (2003). The experts consistently found that funding for research activities in higher education institutions was inadequate, resulting in unsatisfactory research and development outputs. The experts also noted a scarcity of Lithuanian publications in international databases such as the Web of Science, which were used to benchmark national research performance at that time. These early assessments were crucial. They highlighted key challenges, prompting further investigation into the state of Lithuanian research and laying the groundwork for the narrative of Lithuania needing to catch up. However, this was only the beginning of a longer process of evaluation and reform.

Building on these initial assessments, the European Commission launched a new initiative in 2007. This was the CREST Open Method of Coordination (OMC) Policy Mix exercise, designed to help EU member states improve their national innovation systems. It involved mutual learning and sharing of best practices, culminating in a comprehensive analysis of the Lithuanian innovation system (Edler et al. 2007). The resulting report was clear: Lithuania urgently needed reform. It called for swift action to address several challenges, including limitations in administrative capacity, policy intelligence, and coordination. Greater stakeholder engagement was also deemed crucial. The report offered a range of recommendations to overcome these obstacles. These included strengthening the "innovation model," linking incentives to research performance, and investing in capacity building and specialised funding agencies. It also stressed the importance of fostering dialogue with industry, consolidating institutional roles, and modernising governance within the public science system. Echoing earlier assessments, the report highlighted how Lithuania was falling short in its gross expenditure on research and development (R&D) compared to the EU average.

Despite efforts to improve, concerns about Lithuania's research and innovation performance persisted. International assessments continued to highlight underperformance. These evaluations consistently pointed to low research productivity and limited international collaboration as key areas requiring attention. For example, the EU Key Figures 2007 report (European Commission 2007) showed that Lithuanian researchers were less productive than the EU average. This was measured by considering scientific publications in Web of Science journals relative to public R&D expenditure. Furthermore, data indicated that Lithuania contributed only 0.09% to the world's share of scientific publications in 2004. This ranked it seventh from the bottom among EU member states.

The World Bank responded to these concerns with a 2009 review of Lithuania's science and technology (STI) policies (Thorn and Mogensen 2009). This was built upon the national and international assessments mentioned above and specifically the Norwegian Research Council (1996), the EU Commission (1999), the OECD (2002), and the World Bank (2003). It also referenced Lithuanian indicators presented in the EU Key Figures 2007 report. This review offered updated guidance for developing STI policies in Lithuania. It focused on four key areas: oversight and governance, the science base, R&D linkages, and industry innovative

capacity. Notably, the report emphasised the need for increased competition for research funding, reflecting a growing trend in Lithuania to measure research performance based on publications in international journals, particularly those indexed in Web of Science databases.

Building on these early assessments, the European Commission and other bodies continued to monitor Lithuania's progress. A key period of intensified scrutiny emerged with the introduction of two new mechanisms: the ERAWATCH Country Reports (2008–2013) and the later Research and Innovation Observatory (RIO) Country Reports (2014–2017). These reports, which involved collaboration with local experts, offered a more detailed and nuanced picture of the Lithuanian research and innovation system.

1.2.2. Intensified scrutiny: ERAWATCH reports (2007–2013)

The European Commission launched a series of in-depth evaluations known as ERAWATCH Country Reports produced for EU Member States and Countries Associated to the Seventh Framework Programme for Research of the European Union (FP7). The ERAWATCH Annual Country Reports aimed to characterise and assess the performance of national research systems and related policies in a structured manner that was comparable across countries. This section focuses specifically on the Lithuanian ERAWATCH reports and their relevance to this PhD research.

The 2008 report (Kriaucioniene 2009) stressed the need for structural reforms in higher education and research to boost R&D capacity and align with European standards. Despite acknowledging progress in increasing scientific publications, it stated that Lithuania "still remains among the EU outsiders." This theme of needing to "catch up" to EU counterparts echoed throughout subsequent ERAWATCH reports.

The 2011 report (Paliokaitė and Caturianas 2013) highlighted weaknesses in knowledge production and international collaboration. It noted that the low number of foreign PhD researchers in Lithuania indicated limited international competitiveness. Furthermore, it pointed to the absence of Lithuanian universities in the top 500 of the World University Rankings as evidence of this limited competitiveness.

The 2012 report (Paliokaitė 2014a) reiterated Lithuania's "lagging behind" in knowledge production, citing quantitative indicators. It revealed that while the number of publications had increased slightly, the proportion of highly cited publications remained less than half the EU average. Moreover, it highlighted the low rate of international co-publications, indicating a relatively isolated science base.

The 2013 report (Paliokaitė 2014b) further emphasised this lag. It presented a table of Main Innovation Union indicators whereby Lithuania scored low in most R&D performance categories, except for human resources, finance and support, and firm investment. Alarmingly, it concluded that based on innovation output indicators, "it is unlikely that Lithuania will bridge the innovation gap in the short or medium term."

Overall, the ERAWATCH reports painted a concerning picture: they showed Lithuania trailing its EU counterparts in key areas of research and innovation. This recurring narrative

underscored the need for continued and targeted efforts to strengthen Lithuanian position within the European Research Area. While the ERAWATCH reports highlighted broad performance issues, the subsequent RIO reports delved deeper into the challenges of implementing reforms.

1.2.3. Policy implementation and the RIO reports (2014–2017)

In addition to the ERAWATCH reports, the European Commission's Joint Research Centre (JRC) produced a series of Research and Innovation Observatory (RIO) Country Reports for the same EU member states. The RIO Country Reports were published annually and offered an analysis of the R&I system of the respective country, including relevant policies and funding, with a particular focus on topics critical for EU policies. The RIO reports also identified the main challenges of the respective national research and innovation system and assessed the national policy responses.

Building on the ERAWATCH reports, the RIO 2014 report for Lithuania (Paliokaitė 2015) highlighted the fragmented nature of the Lithuanian research and innovation system, calling for better policy coordination, increased private sector involvement, and greater commercialisation of public R&D. This report also noted that the establishment of the Research and Higher Education Monitoring and Analysis Centre (MOSTA) in 2007 was a direct response to earlier recommendations from international experts.

Subsequent RIO reports continued to emphasise the need for reforms. The RIO 2015 report (Paliokaitė, Krūminas, and Stamenov 2016) emphasised the challenge of building capacity for the private research and innovation sector, acknowledging skills mismatches, and further improving the commercialisation of public research. Interestingly, it also pointed out a potential unintended consequence of the national quantitative research assessment system, explaining disadvantages of counting funding points. While high-quality publications earned more points, the sheer number of low-quality publications outweighed the benefits of fewer high-quality ones, potentially incentivising quantity over quality of research. This report also mentioned the creation of lists of journals with high self-citation levels that were excluded from consideration for state funding allocation (this policy instrument is examined further in Chapter 3 as "the suspended journal lists").

Despite some progress noted in previous reports, the 2016 RIO report (Paliokaitė and Gonzalez Verdesoto 2017) identified four main challenges facing Lithuania: policy coordination, human resources, private investment, and commercialisation. While recognizing R&I policy developments and discussing the economic context, it highlighted concerning indicators, such as the low and decreasing rate of public-private co-publications (only 1.7 per million population in 2014, comparing to 33.9 EU average).

Despite these challenges, the report acknowledged Lithuania's proactive efforts to improve. It highlighted the shift of MOSTA, the Research and Higher Education Monitoring and Analysis Centre, toward accountability to the Government instead of the Ministry of Education and Science, signalling a greater emphasis on research and innovation at the highest levels of government. Furthermore, MOSTA's own report on the unattractiveness of working conditions

and career prospects for researchers (MOSTA 2016) indicated a commitment to improving the research environment.

The 2016 RIO report also highlighted the government's efforts to increase R&D funding for non-state higher education and research institutions through a quantitative performance-based system. Importantly, this report acknowledged significant policy developments in Lithuania. Within a year, the President of the Republic of Lithuania proposed the Science and Innovation Policy Guidelines, which were subsequently approved by Parliament. These guidelines were developed by consulting fifty stakeholders across academia, business, NGOs, and other sectors, demonstrating a commitment to both collaborative policymaking and a proactive approach to addressing the challenges identified in international assessments. The Parliament mandated that the Government prepare an implementation plan for these guidelines by the end of 2016, further underscoring this commitment and aiming to translate policy recommendations into concrete actions.

Continuing this trend of critical evaluation, the RIO 2017 report (Paliokaitė, Petraitė, and Gonzalez Verdesoto 2018) began its summary with a statement highlighting how Lithuania was falling short in developing innovative and entrepreneurial talent. Overall, however, it focused on skills shortages, R&D commercialisation, policy coordination, and the growth of innovative companies, including a discussion of the Smart Specialization Strategy.

The RIO reports were instrumental in informing authorities and promoting evidence-based approaches to research and innovation. By consistently emphasising the need for continued reforms and strategic interventions to address persistent challenges—such as research fragmentation, lack of private sector investment, and difficulties in commercialising research results—they underscored the gap between Lithuanian R&I performance and EU averages. This recurring narrative served as a constant reminder of the ongoing efforts needed to enhance Lithuania's position in the global research landscape.

1.2.4. Broader European assessments and the "low R&I performing" label

Beyond these in-depth analyses, broader assessments of European innovation performance also highlighted areas where Lithuania needed to improve. In addition to the ERAWATCH and RIO reports, the 2017 European Innovation Scoreboard provided a composite indicator of research and innovation performance across the EU, placing Lithuania at the bottom of the European rankings (Vertesy 2017). In fact, the Scoreboard identified fifteen 'less advanced' EU member countries, including Lithuania, a group that has since expanded to almost thirty 'widening countries' including EU-associated nations and the Outermost Regions. These countries are now targeted to receive additional EU grants to bolster their research and innovation capacities (European Commission 2024).

Similarly, OECD reviews in 2016 and 2017 stated that "the performance of the Lithuanian higher education system with respect to research and innovation is significantly below international standards" (OECD 2016, 2017). Interestingly, these reviews, based on stakeholder interviews and a background report commissioned by the Lithuanian authorities,

specifically noted the absence of Lithuanian universities in the CWTS Leiden Ranking 2015 of university scientific performance and limited appearance in other university rankings.

Notably, Lithuanian experts from the association "Knowledge Economy Forum" prepared a background report for these OECD assessments, entitled "Initial Assessment of Lithuanian Innovation Policy." Thus, the OECD reports were a collaborative process, involving both Lithuanian policymakers and international experts, highlighting the commitment to improving Lithuania's standing in the global research landscape. However, the persistent identification of areas needing improvement underscored the ongoing challenges in achieving this goal.

1.2.5. The legacy of external evaluations

These international advisory reports, while valuable in guiding Lithuanian authorities in developing research and innovation policies, consistently revealed a narrative of Lithuania underperforming compared to its EU counterparts.

The recurring identification of challenges—such as insufficient funding, low research productivity, and limited international collaboration—helped Lithuanian policymakers lobby for changes in the public science system. These international reports, spanning several decades with their recurring narrative of underperformance, have undeniably shaped Lithuania's research and innovation policy landscape, spurring policy changes across various domains. To understand how these recommendations have been implemented nationally, the next section explores state-level reports that have guided the development of the Lithuanian science system. Examining how these reports presented and addressed the "underperforming" narrative for local audiences offers insights into the evolution of national research assessment.

1.3. External validation and internal tensions in policymaking

This section examines the role of state-level reports in responding to international assessments of Lithuania's research and innovation performance. In the early years of Lithuania's independence, state-commissioned reports played a crucial role in aligning national research priorities with European standards. A prime example is the White Paper on Lithuanian Science and Technology, prepared in 2001 (*Lithuanian Science and Technology*, 2001) in close collaboration with academia during the Lithuanian bid for EU membership. This white paper advocated for stronger state responsibility in internationalisation efforts and led to concrete policy outcomes.

Building on these early efforts, the establishment of the Research and Higher Education Monitoring and Analysis Centre (MOSTA) in 2007 marked another significant shift in Lithuanian science policymaking. This move further solidified the influence of international assessments on shaping the national research landscape.

1.3.1. Navigating the science system and policymaking obstacles

The establishment of MOSTA marked a new era for Lithuanian science policy. MOSTA played a crucial role in shaping the national science system by producing and commissioning

numerous reports that analysed the higher education system and provided evidence-based recommendations. One of the first such reports focused on the internationalisation of Lithuanian science (Leichteris and Stumbrytė 2008). It reviewed the international assessment reports discussed in Subsection 1.2.1 and offered twelve recommendations, including developing a clear vision for science in Lithuania, establishing a long-term R&D strategy, and involving international experts.

A study commissioned by MOSTA in the same year (Augustinaitis, Rudzkienė, et al. 2008) investigated inter-institutional coordination in Lithuanian science policy. This study highlighted the need to align European research priorities with actual research conducted at the institutional level. A subsequent MOSTA summary (Augustinaitis, Bumelis, et al. 2008) likened the policymaking process to navigating between global trends (a "coordination funnel") and powerful stakeholder groups disrupting the intended course ("pirate ships"). This "hierarchical anarchy," the authors imputed this "hierarchical anarchy" to a lack of leadership and excessive stakeholder influence leading to a fragmented decision-making process.

These challenges in coordinating and implementing research policy were further highlighted in a 2009 meta-analysis of international assessment reports (MOSTA 2009a). The analysis revealed a persistent disconnect between the aspirations of these assessments and the realities of domestic policy implementation. Despite the emphasis on goals such as internationalisation and increased research productivity, concrete strategies and actions within the Lithuanian context were lacking. This further highlighted the need for more effective communication and a deeper understanding of the complexities within the Lithuanian science system when implementing recommendations from foreign experts.

A separate 2009 report (MOSTA 2009b) examined the critical role of policymakers in the Lithuanian higher education system. It emphasised the need for systematic policy development and implementation and highlighted the urgent need to strengthen governance capacity for lasting reforms. This study acknowledged that the 2009 Law on Higher Education and Research, while seemingly a victory for policymaking, was achieved more through individual efforts, political manoeuvring, and favourable circumstances than through robust, systematic governance. This report also revealed a growing dissatisfaction with quantitative research assessments and proposed piloting qualitative peer review approaches, a recommendation eventually adopted for all disciplines.

While MOSTA played a central role in analysing the Lithuanian science system and driving reforms, challenges persisted in coordinating policy efforts and translating recommendations into action, raising concerns about the effectiveness of policy implementation.

1.3.2. Concerns about policy implementation and the search for solutions

Despite numerous projects investigating the Lithuanian science system, concerns persist about their influence on policy implementation. The "Scholarly Lithuania 2030" project, a major undertaking in 2011, appears to have had minimal impact on the national progress strategy "Lithuania 2030" (State Progress Council 2011). This limited influence is concerning given the project's ambitious goals and extensive stakeholder involvement. Furthermore, only a

summary is publicly available (MOSTA 2011), raising concerns about transparency in policymaking.

A 2014 report by the European Science Foundation (ESF 2014) further emphasised the importance of the national progress strategy "Lithuania 2030": if "strategy is to be developed further than coordinated effort between ministries, the RCL [Research Council of Lithuania] as well as other agencies could pave the way for a more refined research and education agenda for the future." The ESF experts "formed the impression that the Ministry does not see the RCL as a key strategic player in national plans for research and development." These inconsistencies pointed to potential tensions and communication challenges within the Lithuanian science policymaking landscape.

In 2014, the Technopolis Group was commissioned to propose a new research assessment process (Arnold and Angelis 2014). They recommended a one-time, internationally-conducted Research Assessment Exercise to evaluate research-performing organisations and identify areas for improvement. Echoing earlier reports, they highlighted the imbalance in R&D funding and low internationalisation, proposing a UK-style peer-review process using international experts. A pilot peer-review assessment in 2015 (MOSTA 2015) confirmed concerns about the Lithuanian research system, including fragmented resources, insufficient funding, low research productivity, and weak internationalisation. Based on these findings, a new system incorporating quantitative metrics and qualitative foreign peer review was implemented.

Since 2018, the research funding system has included both quantitative and qualitative assessments. The Comparative Expert Assessment (CEA), conducted every five years, evaluates research units based on quality, impact, and development potential, informing the allocation of 60% of basic R&D funding (MOSTA 2018). Despite these developments, challenges persisted (MOSTA 2019), prompting calls for system redesign even as positive trends, such as increased citation indicators and international collaboration, were also reported.

1.3.3. Transforming state agencies

Following the successful implementation of the Comparative Expert Assessment and its integration into the national performance-based funding system, MOSTA underwent a significant transformation. In 2019, it was reorganised into the Government Strategic Analysis Centre (STRATA), placed directly under government authority. This shift signalled a potential emphasis on strategic analysis and evidence-based policymaking. However, STRATA primarily focused on completing MOSTA's existing projects and ceased publishing reports previously utilised by academics.

In 2022, STRATA was tasked with revising the responsibilities of key research funding institutions, including the Research Council of Lithuania (RCL) and the Agency for Science, Innovation and Technology (MITA) (Viliūnas et al. 2022). A project to establish a Competence Centre for Evidence-Based Governance included an assessment of the RCL's implementation

of recommendations made by the European Science Foundation (ESF 2014) on research structures and performance.

This 2022 assessment, however, appears to have been influenced by pre-existing tensions between the RCL and the Ministry, stemming from disagreements on science policy and the RCL's accountability to Parliament rather than the Government. By commissioning this assessment based on foreign expert recommendations, the government may have strategically used external validation to support its agenda and centralise control over research funding. This raises questions about the genuine commitment to evidence-based policymaking and the potential for using foreign expertise to further domestic political goals.

Following this assessment, the government merged MITA with the Research Council, placing it under government authority. These transformations suggest a shift towards centralising control and potentially limiting the independence of research funding. While the Research Council now houses the Research and Higher Education Policy Analysis Unit, it is unclear whether this fully replaces MOSTA's functions. These developments illustrate how reports commissioned from foreign organisations can be used strategically to influence policymaking in the Lithuanian science system.

The instances overviewed in this section underscore the potential disconnect between evidence and policy action, even when external expertise is involved, and raise concerns about the long-term sustainability and self-determination of Lithuanian science policy. To gain a more comprehensive understanding of the Lithuanian science system and its response to external pressures, it is crucial to consider perspectives beyond those found in state-level reports. The following section will explore independent, non-state-agency research on higher education policies and other relevant issues in Lithuania.

1.4. Review of literature on Lithuanian research system trends

This section delves into existing studies of Lithuanian research trends, drawing from both domestic and international perspectives. It first examines critical analyses of the impact of quantitative metrics on the Lithuanian research landscape, followed by an exploration of bibliometric studies that position Lithuania within the global research context.

1.4.1. Critical voices analysing the consequences of quantitative metrics

Lithuania, with its population of 2.8 million, faces the challenge of limited human resources in research: a mere 6.8 thousand researchers hold a PhD within its entire higher education sector.[1] Furthermore, the predominance of Lithuanian-language publications hinders accessibility for international audiences, limiting global engagement with Lithuanian research. Moreover, there are no dedicated research units specifically focused on critically and systematically analysing the national science system itself. Despite these challenges, Lithuanian researchers from a variety of disciplines have made valuable, albeit occasional,

[1] Researchers in the higher education sector with scientific degree or an academic title (2023) in the Indicators Database of the Official Statistics Portal in Lithuania. https://osp.stat.gov.lt/statistiniu-rodikliu-analize#/

contributions to understanding specific aspects of their national science system. This subsection presents a topical overview of the research relevant to the development of the public science system.

In the realm of higher education reform, Želvys (2003) provided a comprehensive overview, highlighting the initial decentralisation efforts in the early 1990s and the subsequent shift towards greater state control, particularly through the introduction of performance-based funding. This centralisation, however, encountered resistance from the academic community, underlining the tension between institutional autonomy and accountability. Building upon Želvys's observations on academic resistance, Leišytė & Kiznienė (2006) examined the complex interplay between state regulation and academic self-governance in Lithuania. Their findings suggest that while new legislation aimed to reinforce university autonomy, the influence of new public management ideas was limited compared to other countries. Leišytė et al. (2015) extended this line of inquiry by exploring the implementation of Bologna Process action lines, revealing varying interpretations and challenges in adapting to international standards within Lithuanian higher education institutions. Meanwhile, Urbanovič & Wilkins (2013) focused on the role of internationalisation as a quality improvement strategy in small countries such as Lithuania. They noted that while the government had set clear internationalisation goals, it lacked a concrete national implementation strategy to guide institutions in achieving these objectives.

While these studies focused on institutional and policy changes, other Lithuanian researchers examined the impact of research assessment reforms on academia and specific disciplines. Lithuanian researchers outside research evaluation disciplines offered critical perspectives on the research assessment reforms and their incentives and consequences. Sociologist Zenonas Norkus (2001) connected ongoing debates on reforming Lithuanian science with the broader "crisis of big science" recognised by those in his field. A decade later, philosopher Aldis Gedutis (2012) provided insights into the dynamics within Lithuanian academic journals, focusing on editorial boards, authors, and institutional affiliations; he drew upon the concepts of "academic gangs" and "tribes" to explain observed patterns and changes. Furthermore, mathematician Rimas Norvaiša (2011) explored instances of Journal Impact Factor manipulation within the Lithuanian scientific community, arguing that certain administrative practices can undermine science self-governance and academic ethics. Another mathematician, Saulius Maskeliūnas (2011), reviewed the requirements for peer-reviewed journals in the national performance-based funding system and its influence on Lithuanian journal publishing trends.

Philosophers Kirtiklis and Gedutis (2020) offered a systematic analysis of research evaluation in Lithuania, drawing on theoretical frameworks and empirical evidence to examine its impact, particularly on the humanities and social sciences. Their book explored the arguments for the value of the humanities in both global and local contexts, providing valuable insights into the challenges faced by humanities scholars in the Lithuanian science system. This work is particularly crucial given the dominance of research assessment criteria derived from the natural and technical sciences, which have already negatively affected the humanities and social sciences. The authors also highlighted the "trench mentality" prevalent in Lithuanian

academia, which hinders productive discussions about the goals and value of these fields. Unfortunately, this book is in Lithuanian and only available in print, making it difficult to access for an international audience. In a related journal article, (Gedutis and Kirtiklis 2023), guided by the fear and feeling of injustice, reconstructed different types of the notions of quality which are crucial for a deeper understanding of the outcomes of qualitative research assessment and peer review practices.

Beyond these qualitative critiques, some researchers employed bibliometric methods to analyse trends in Lithuanian scientific publications. Developers of multi-criteria methods, Zavadskas et al. (2011) traced the evolution of scientific publications in the Baltic States over the first two decades of independence. In 2015, Dagienė, then an academic publisher, and Sandström, her Swedish co-author, examined the impact of national policy on scholarly communication and citation patterns, finding that while policy changes led to increased pressure on national journals, these journals also demonstrated adaptability and resilience (Dagienė and Sandström 2015). Maskeliūnas et al. (2015) further analysed the frequent changes in evaluation criteria, highlighting the Ministry of Science and Education's ongoing efforts to balance the fair distribution of funding with the encouragement of high-level research.

It appears these studies were conducted on an ad hoc basis, with few available in English. Reacting to policy decisions rather than proactively examining the system, many of these studies flagged problems within academia that are outcomes of policymaking. Though offering diverse perspectives, these papers, originating from researchers outside science and technology studies, lacked a cohesive framework. The fragmented approach observed from this research indicates the absence of dedicated research units specifically tasked with conducting systematic, independent analysis for comprehensive understanding of the science system as a whole.

1.4.2. Lithuania in the foreign research landscape

Complementing foreign expert assessments, bibliometric studies offer data-driven insights into Lithuania's scientific journey, emphasising both progress and persistent challenges. Lithuania was recognised as part of a core group of countries with international co-authorship relations in 2000 (Wagner and Leydesdorff 2003). But broader analyses of research openness and citation impact (Wagner et al. 2018) have continued to underscore Lithuania's challenges in achieving high levels of research impact and international collaboration.

Early on, Allik (2003) highlighted the financial constraints facing the Baltic states, noting low R&D expenditure as a potential roadblock to a knowledge-driven society. A decade later, Ukrainski et al. (2014) observed a concerning decline in full-time equivalent researchers in Lithuania in 2009, analysing scientific cooperation patterns of small European countries. However, they also indicated steady growth in Lithuania's share of co-publications with top 100 European institutions, suggesting progress in international collaboration.

Yet, even amidst these limitations, Teodorescu and Andrei (2013) found certain Lithuanian journals achieving relatively high Impact Factors, though potentially aided by within-group

citations. This duality of promise and constraint continued to emerge. Grančay et al. (2017) focused on Business & Economics publications, highlighting the phenomenon of "local articles" published in journals within Central and Eastern European countries, including Lithuania. This study raised concerns about the quality of some of these journals and the potential influence of personal connections on publication decisions. Going further, Lauk and Allik (2018) offered a more critical perspective, suggesting that Lithuania had prioritised developing a "cottage industry" of national journals instead of competing for publication in leading international outlets.

Lithuania has also been featured in broader bibliometric studies, including analyses of social sciences and humanities in Eastern Europe (Pajić 2014), as well as benchmarking European post-Socialist countries (Zgrabljić Rotar, Jokić, and Mateljan 2018) and post-Soviet countries (Chankseliani, Lovakov, and Pislyakov 2021). The latter highlighted Lithuania's impressive growth in scientific publications between 1993 and 2019, with a 1,522% increase since independence, surpassing both Estonia (842%) and Latvia (336%). However, the research also pointed to a lag in international collaboration. In 2019, 74% of Estonian and 73% of Latvian articles had foreign co-authors, compared to only 57% of Lithuanian ones. While this study provided valuable insights, it did not track these trends on a year-by-year basis, leaving room for further research into the nuances of Lithuanian research development.

Additionally, Lithuania was included in studies examining dissertation publishing (Goedeken and Hérubel 2018) and internationalisation at the country level, where Eastern European countries generally have marginal shares of foreign academic staff (Lepori, Seeber, and Bonaccorsi 2015). Some analyses also touched upon Lithuania's research assessment policies. Sivertsen (2017) mentioned the use of bibliometrics in informing research evaluation panels in Lithuania, while Kulczycki (2018) noted similarities in criteria for evaluating books in the social sciences and humanities between Lithuania and other countries.

While bibliometric analyses offer valuable insights into the outputs and impacts of the Lithuanian science system, a deeper understanding requires examining the national research assessment system that shapes these trends. The following section provides an overview of the Lithuanian quantitative research assessment system and its evolution.

1.5. Lithuanian quantitative research assessment

As outlined in the previous sections, the rise of quantitative research assessment was a global phenomenon. This trend was particularly pronounced in Lithuania due to its pursuit of rapid internationalisation following the restoration of state independence.

1.5.1. The rise of metrics and its consequences

Following its separation from the Soviet Union, Lithuania embarked on a path of scientific internationalisation, seeking to integrate its research system into the global knowledge market. This ambition led to the development of a quantitative research assessment system designed to incentivise internationally recognised publications and boost research performance. This system, encompassing regulations for degrees, qualifications, and funding, reflects the

historical context of Lithuania's transition and its aspiration to achieve rapid progress in the international research arena.

Three decades after regaining its independence, the Lithuanian scientific landscape is overly focused on metrics. There is a growing sense of cynicism within the scientific community about their own academic system. Academics say the system does not promote individuals based on groundbreaking discoveries or life-changing inventions. Instead, they say, promotion goes to those who publish in journals with the highest impact factors or climb the questionable rankings or belong to some influential academic groups.

The quantity of publications and the prestige of the journals they appear in have become the primary measures of success, overshadowing the actual content and societal relevance of research. Universities celebrate publications in "high-impact" journals or with "prestigious" publishers, while the public is left in the dark about the true meaning and importance of these "valuable" studies made by "significant" academics.

This overemphasis on metrics has even permeated the national science awards, where those with numerous publications in high-impact journals are often favoured, leading to a growing consensus within Lithuanian academia that it is time to get rid of this flawed system. Meanwhile, the younger generation asks how we became so addicted to these numbers and metrics even as it struggles to imagine alternatives. However, in order to envision such alternatives, it is indeed important to understand how this quantitative research assessment system evolved, how it operates, and how it influences researchers and their institutions.

This emphasis on quantitative assessment is deeply rooted in Lithuania's post-independence pursuit of scientific internationalisation. Regaining independence brought dramatic changes to everyday life, including the need to rebuild governmental institutions and adapt to a new economic reality (Bikales 1997). This context created pressure for rapid results, leading policymakers to adopt a quantitative research assessment system focused on rapid progress in the international research arena. Thus, policymakers developed a quantitative research assessment system, gradually refined over time, which incentivises publications in internationally recognised journals and books from prestigious publishers.

To better understand how this emphasis on quantitative assessment has shaped the Lithuanian research landscape, the next subsection examines the key pillars of this system.

1.5.2. Key pillars of the quantitative research assessment system

Figure 1 illustrates this metrics-based system that impacts the behaviour and priorities of Lithuanian researchers. The figure summarises the main strands of this system: regulations on awards of scientific degrees and academic ranks, minimum qualifications for researchers' and lecturers' employment, and a performance-based funding system for state funding allocation to institutions.

Initially, policymakers in Lithuania introduced an *All-in-One Regulation for Scientific Degrees and Academic Titles* (1992–1998). This comprehensive national legal act established a framework of rules governing the awarding procedures and candidate requirements for both

scientific degrees (PhD and Habilitated Doctor, a higher doctorate) and academic titles (Professor and Associate Professor). Universities and research institutes were mandated to incorporate these rules into their institutional policies. Early versions of the regulation, such as the 1993 wording, stressed the importance of publishing in international journals for Habilitated Doctor candidates but did not specify a minimum number of publications required. However, by 1996, quantitative requirements were introduced. For example, PhD candidates needed at least two papers in journals listed in the List of Lithuanian Journals. Habilitated Doctor candidates required 15 papers in nationally and internationally recognised journals, or at least 8 papers if accompanied by a monograph. Candidates for the title of Professor had to be habilitated doctors with additional publications in recognised journals or a monograph or textbook since their habilitation.

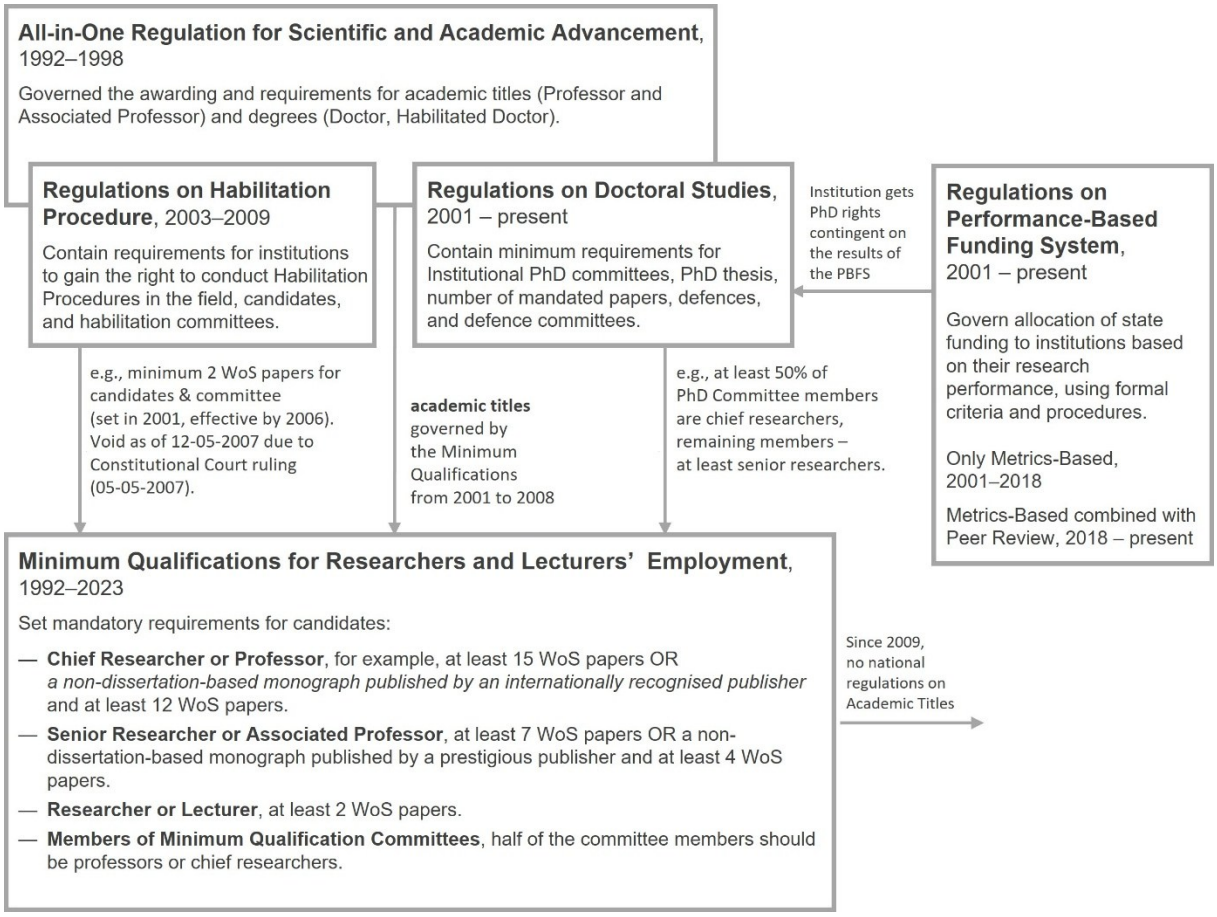

Figure 1. Key pillars and quantitative requirements in Lithuanian research assessment (1992–present).

Subsequently, the scientific degrees were governed by separate legal acts: the *Regulation on Habilitation Procedure* (2003–2009) and the *Regulation on Doctoral Studies* (2001–present). The requirements for attaining academic titles (Professor and Associate Professor) in 2001–2008 were intertwined with the *Minimum Qualifications for Researchers' and Lecturers' Employment* (1992–2023). However, the previously mentioned 2009 revision of the *Law on Science and Studies* delegated the authority to set specific qualification requirements, including publication numbers, to individual institutions. While the law mandated that these

institutional standards must be at least as rigorous as the national minimum qualifications, it allowed for greater autonomy and flexibility. This resulted in a landscape where many institutions opted to implement even more stringent criteria for academic advancement than those stipulated at the national level.

The former *Regulations on Habilitation Procedure* (2003–2009) established a prestigious academic qualification in Lithuania, recognising researchers who had made substantial contributions beyond their doctoral work. This qualification signified mastery of research methodology, the ability to articulate complex ideas, and a commitment to advancing their field. It served as a gateway to top academic positions such as professor or chief researcher. From its inception, the regulation outlined specific requirements for institutions, candidates, and committees involved in the habilitation process. Institutions seeking authorisation to conduct habilitation needed a minimum of five researchers (with at least three in the relevant field) holding professor or chief researcher positions and fulfilling the Minimum Qualifications for a 3- or 5-year term. Habilitated Doctor candidates were required to have published at least 15 peer-reviewed papers after completing their PhD, including a minimum of two indexed in Web of Science (WoS) journals. However, these strict mandatory requirements for a minimum of two WoS papers for both candidates and committee members, implemented in 2001 and in effect by 2006, were later nullified on May 12, 2007, due to a Constitutional Court ruling. The implications of this ruling will be further elaborated upon in this thesis.

1.5.3. Long-lasting regulations and requirements

Similar to the Habilitated Procedures regulations, *Regulations on Doctoral Studies* (2001–present) also outline specific requirements for institutions, candidates, and committees involved in PhD studies and defences.

Institutions gain state-funded PhD study rights and the number of PhD students they can admit based on their performance-based funding system results and the availability of qualified researchers. For example, to qualify, institutions must have at least 11 and no more than 15 researchers (including foreign fellows), with at least half holding professor or senior researcher positions in the relevant doctoral study disciplines. The qualifications of these researchers should align with those set in the *Minimum Qualifications for Researchers' and Lecturers' Employment*.

Defence committees are also subject to regulations, such as ensuring that their members have no co-authored papers with PhD candidates and that more than 50% have no co-authored papers with the supervisors within the past five years. These requirements, like those for PhD candidates, have evolved over the years. Since the introduction of the regulations in 2001, candidates have consistently been required to have at least two peer-reviewed papers for their defence.

However, the specific journal requirements have changed over time. Initially, all disciplines required one paper in a WoS journal and one from the List of Lithuanian Journals (2001). This shifted to two papers in either WoS journals or the List of Lithuanian Journals in 2002, then

to simply two peer-reviewed papers in 2003 (this is linked to the Constitutional Court case explored in this thesis).

Stricter requirements emerged in 2017, mandating at least two peer-reviewed papers (one international) for social sciences and humanities, and WoS journals with impact factors for the sciences. By 2020, social sciences and humanities PhD candidates needed two papers with at least one in WoS or Scopus. Other disciplines required two WoS papers in journals having an impact factor. Thus, while the overall requirement for two papers has remained stable, the specific journal criteria have become progressively more demanding.

Minimum Qualifications for Researchers' and Lecturers' Employment (1992–2022) established the criteria for holding academic positions at state universities and research institutions, ranging from chief researcher to junior researcher, and from professor to lecturer. It also outlined requirements for members of qualification committees, which mirrored those in previous regulations, such as mandating that at least half of the committee members be professors or chief researchers.

As with academic advancement, the minimum number of required papers for senior positions remained largely consistent since 2001. For example, chief researcher or professor positions required at least 15 peer-reviewed journal papers, or a non-dissertation-based monograph published by an internationally recognised publisher along with at least 12 papers in similar journals (Research Council of Lithuania 2022). Candidates for senior researcher or associate professor positions needed at least seven papers, or a non-dissertation-based monograph from a prestigious publisher plus at least four additional papers. Those seeking researcher or lecturer positions needed a minimum of two papers, while junior researchers had no specific requirements for their journal papers.

As previously explained, the criteria for acceptable journals evolved over time, shifting from the List of Lithuanian Journals and the National List of Databases to WoS journals with journal impact factors, mirroring the trend observed for PhD candidates.

While institutions were required to set their own qualification requirements in line with these national standards, they could not be lower than the minimum requirements specified in the regulations. The 2007 revision of the regulation removed the exact requirements for 3- or 5-year terms, granting institutions greater autonomy in setting these criteria, while strongly recommending alignment with the output and position requirements detailed in the regulation.

1.5.4. The Performance-Based Funding System (PBFS)

The *Regulations on the Performance-Based Funding System* (PBFS), in effect since 2001, emphasise a shift from state-level requirements to individuals to institutional research assessment. They represent the final pillar of Lithuania's quantitative research assessment framework, as illustrated in Figure 1. These regulations govern the allocation of state funding to universities and research institutions, linking financial support directly to their research performance based on established criteria and procedures.

While the first metrics-based research assessments, considering publications in ISI (now Web of Science) journals, were conducted between 1996 and 2002 (Daujotis et al. 2002), the official methodology for the metrics-based PBFS was launched in 2001. This marked the beginning of an era of quantification in Lithuanian research assessment, with institutions annually reporting their outputs (monographs, journal papers, patents, and research projects) to secure state funding. From 2006 onwards, *monographs published by prestigious international publishers* and papers in *WoS journals* garnered significantly more funding points than those from other sources.

To further emphasise the value placed on international recognition and research quality, policymakers added a new indicator in 2017— top-10% citation-ranked papers by WoS category—which also earned funding points for institutions. Nevertheless, in 2014, Lithuania piloted a peer-review-based PBFS, inviting international panels to evaluate institutions (Arnold and Angelis 2014).

After this pilot, the 2018 PBFS, which incorporated peer review, was used to allocate 60% of the basic state funding for R&D. However, the annual metrics-based PBFS remains in place, accounting for the remaining 40% of state funding allocated annually (Research Council of Lithuania 2022). Notably, the outputs deemed most valuable in the PBFS (monographs from prestigious publishers and high-impact WoS journal articles) also feature prominently in the minimum qualification requirements for academic advancement, creating a strong incentive for researchers to prioritise these publication outlets.

1.5.5. The role of national lists

From 1993 to 2009, two exclusive lists, the List of National Journals and the National List of Databases, were introduced and developed within the research assessment system. Only papers in journals from those lists were eligible for purposes of employment, promotion, scientific degrees, or membership on influential committees. The use of these lists as instruments in research assessments and promotions was discontinued because of burdens and obstacles policymakers met developing these lists.

Taking a broader view, the research assessment system in Lithuania, as visualised in Figure 1, has evolved into a multifaceted structure emphasising quantitative metrics: particularly those tied to publications in internationally recognised journals and books from prestigious publishers. This quantitative approach reflects the drive of policymakers to enhance the standing of Lithuanian research and its integration into the global scientific community. However, whether these efforts have translated into tangible success and international recognition remains an open question, as the negative narrative of Lithuania "lagging behind" is still being used in foreign and state-level reports.

As internationalisation of science and performance-based funding systems have become pervasive around the globe, their impact on research and academia has been profound. Focusing on Lithuania as a case study, this thesis examines the intricate relationship between quantitative research assessment, aimed at boosting national outputs and improving indicators of internationalisation, and the unintended consequences of such assessment. While

Lithuanian policymakers have actively pursued research internationalisation and implemented quantitative research assessment instruments, there have been no independent studies comprehensively investigating the outcomes of these policies and regulations.

1.6. Research objectives, approach, and research questions

1.6.1. Research objectives

This PhD thesis pursues three objectives. First, it aims to understand the evolving paths of research assessment in transitioning science systems. Lithuania serves as an empirical case study here, representing former Soviet countries transforming their science systems to integrate into the global research landscape. Furthering the understanding of research assessment development, this PhD thesis studies the influence of quantitative research assessment metrics on publishing behaviour within such transitioning systems. Second, this research aims to contribute to the development of more effective and responsible research assessment frameworks, particularly for smaller countries navigating the challenges of research internationalisation. Third, this research aims to contribute to the development of policymaking theories and understanding of policy dynamics within public science systems, with implications for smaller countries seeking to internationalise their research.

1.6.2. Research approach

This PhD thesis provides an in-depth case study of the development and implementation of quantitative research assessment policies. It *utilises a multi-level perspective*, examining research assessment at the national, institutional, and individual levels and considering the interactions and power dynamics among various stakeholders. Furthermore, the research *employs longitudinal analysis*, tracing the evolution of the research assessment policies over three decades and examining their changes and adaptations in response to unintended consequences and actions taken by institutions and individuals. Finally, this PhD research *adopts a mixed-methods approach*, combining qualitative insights from interviews, policy documents, and grey literature with quantitative bibliometric analysis of journal papers and scholarly books.

1.6.3. Research questions

This PhD research is guided by five research questions presented in this section. Each question, addressed in a separate chapter of this thesis, reflects the multifaceted nature of the quantitative research assessment system developed in Lithuania over three decades. This system has incentivised papers in high-impact Web of Science journals and books published by foreign, internationally recognised publishers, leading to a complex interplay of intended and unintended consequences for researchers, institutions, and the Lithuanian research landscape as a whole. The research questions below delve into this system and its outcomes, exploring its development, implementation, and impact.

RQ1: How have multi-actor dynamics within and outside the Lithuanian science system influenced the development and implementation of national research assessment policies?

Lithuania, seeking internationalisation and integration of national research into the global scientific community, set ambitious goals to achieve tangible results rapidly. This ambition led policymakers to employ quantitative research assessment, prioritising papers in international journals indexed in the Web of Science (WoS) databases. This journey involved a transition period where policymakers compiled national journal lists to guide research output from primarily domestic publications towards internationally recognised journals. However, this emphasis on WoS publications and the transition process itself were influenced by a complex interplay of actors within and outside the Lithuanian science system.

By analysing policy documents, bibliometric data, grey literature, and interviews with policymakers, researchers, and other stakeholders, Chapter 2 investigates the interplay among various actors, including science policymakers, research assessment experts, publication data providers, and academic researchers. It examines how these actors have interacted to shape the trajectory of research assessment in Lithuania, particularly the focus on WoS publications as a key indicator of research quality and internationalisation. Exploring the challenges and unintended consequences that have arisen in policymaking processes, Chapter 2 demonstrates the proliferation of institutional journals and the influence of commercial databases on policymaking decisions.

Crucially, Chapter 2 examines how the imposition of disproportionate and stringent requirements for WoS publications on social sciences and humanities (SSH) disciplines by influential scientific elites from the natural sciences led to strained interdisciplinary relationships and diminished respect between Lithuanian academics in different disciplines. This conflict, stemming from differing disciplinary norms and expectations, fuelled concerted efforts by SSH scholars to safeguard their unique research traditions. These efforts ultimately culminated in a Constitutional Court case that highlighted the need for a more balanced and inclusive approach to research assessment.

RQ2: How have the strategies of policymakers, institutions, and researchers shaped the development of the Lithuanian Performance-Based Funding System?

The Lithuanian Performance-Based Funding System (PBFS), like those in many countries, aims to enhance the effectiveness of national research. Similar to the PBFSs in Poland (Korytkowski and Kulczycki 2019; Kulczycki et al. 2017) and the Czech Republic (Good et al., 2015; Stöckelová 2012), the Lithuanian PBFS initially involved a set of eligible outputs (journal papers and books) with assigned funding points. Expert panels were tasked with ensuring fair judgement in assessing whether submitted outputs fit the descriptions and metrics of eligible outputs. However, this state funding allocation system has undergone significant changes since its introduction in 2001.

Chapter 3 delves into the development of the Lithuanian PBFS, examining how interactions among policymakers, institutions, and researchers have shaped its evolution and impacted research evaluation practices. It analyses national PBFS policies, bibliometric data, grey

literature, and interviews with various stakeholders to identify the multi-level dynamics within the Lithuanian PBFS.

Chapter 3 also traces changes in the PBFS regulations, analysing how policymakers have navigated the tension between international aspirations and domestic realities while responding to unintended consequences and publicly expressed pressures. These pressures have come not only from actors within the Lithuanian science system but also from professional organisations of Lithuanian researchers working abroad or those who obtained their PhDs at foreign universities. Active researchers, driven by a desire to contribute to the advancement of Lithuanian science, played a significant role in advocating for reforms and shaping the public science system.

This chapter also illustrates how universities and researchers have adapted their strategies to maximise their performance, thereby contributing to the development of PBFS regulations. This analysis examines the interplay among state institutions, higher education authorities, scientific elites, and individual researchers, highlighting their diverse interests and influences on the public science system.

Furthermore, Chapter 3 explores the challenges and unintended consequences that have arisen, such as the proliferation of institutional journals, the influence of commercial databases, and the strategic responses of universities and researchers. It also examines how policymakers have addressed these challenges through policy adjustments and the introduction of new instruments, such as the journal suspension policy. Through this analysis, Chapter 3 aims to provide a deep understanding of the complexities and dynamics inherent in quantitative research assessment systems.

RQ3: How do European countries evaluate books submitted as research outputs, and how consistent are these evaluation practices across different countries?

Chapter 4 investigates the diverse approaches to scholarly book evaluation in Europe, focusing on monographs in the social sciences and humanities. These approaches vary significantly, from expert panels assessing individual books to rankings of book publishers. Through a comparative analysis of assessment practices in the UK, Norway, Denmark, Finland, Spain, Poland, and Lithuania, this chapter highlights the challenges inherent in these different systems.

Lithuania, where publisher prestige plays a significant role in national research assessment, serves as the source for empirical data. Here, national research assessment policies still incentivise publishing with internationally recognised publishers. To illustrate the inconsistencies in this approach, Chapter 4 examines the fluctuating rankings of book publishers in Lithuania between 2004 and 2016, where the same publishers were variously categorised as prestigious (for both SSH and the sciences) and ordinary (for SSH only) or marginal (not-prestigious for the sciences only). Furthermore, a comparison with the rankings of these publishers in the Norwegian Register, which employs a similar system of book evaluation, raises questions about the effectiveness and consequences of relying on publisher prestige as a primary book evaluation metric.

Finally, this chapter identifies the specific criteria and procedures used to determine book publishers' standing in different research assessment systems and discusses the implications of these variations for research evaluation and funding allocation. Exploring book evaluation practices across countries, this chapter aims to contribute to a deeper understanding of the outcomes associated with assessing books by their publishers.

RQ4. How can the ISBN Manual and the Global Register of Publishers (GRP) be utilised to identify the actual publishers of books and their roles in book production?

It is important for the development of effective research assessment policies to identify the actual publishers of scholarly books submitted as research outputs and recognise the publishing practices at work. However, the evolving landscape of academic publishing, with its complex web of imprints, mergers, and acquisitions, presents significant challenges in this regard.

To further understand the implications of focusing on publisher prestige in research assessment, and to assess whether such policies produce their intended consequences, Chapter 5 examines the books submitted as research outputs in the Lithuanian quantitative research assessment system and the UK's Research Excellence Framework (REF) in 2014 and 2021. This analysis offers a comparative perspective between the UK and Lithuania, using the book ISBN metadata available in the GRP. Specifically, Chapter 5 uncovers the definitions and guidelines provided in the ISBN Manual regarding book publishers and their roles. It also analyses the GRP data to identify the actual publishers of books submitted for institutional research assessment in Lithuania and the United Kingdom from 2008 to 2020.

Chapter 5 presents a systematic examination of the ISBN Manual and the GRP, evaluating their suitability in determining key book attributes such as genre, publisher, country of publication, and publisher category (e.g., academic, university, non-publisher, self-publisher). This analysis demonstrates the complexities and challenges encountered in identifying book publishers because of multiple imprints, mergers, and acquisitions. It also explores the potential of the GRP as a valuable, yet underutilised, data source for bibliometric analyses.

RQ5. To what extent does WorldCat metadata reflect the effectiveness of Lithuanian research assessment policies in enhancing the visibility of nationally authored books?

The WorldCat catalogue is a primary source of book metadata in bibliometric research. The presence and quality of metadata for Lithuanian books in this source can indicate the effectiveness of national research assessment policies. These policies incentivise publishing with prestigious international publishers to maximise the visibility and impact of national research. Chapter 6 investigates the extent to which this strategy translates to book discoverability and presence in this international library catalogue.

To gain a broader perspective on research visibility, Chapter 6 examines metadata of books from both Lithuania and the UK, drawing on the same book ISBNs as in Chapter 5. These books were submitted as research outputs in Lithuania's research assessment system and the UK's REF2014 and REF2021. As shown in Chapter 5, academic publishers produced two-

thirds of the books submitted to the UK's REF, while they issued only a quarter of Lithuanian books, with universities themselves producing half.

Chapter 6 investigates the representation of these books in WorldCat. It examines the availability and completeness of metadata elements (e.g. authors, titles, language, publication year) essential for library cataloguing and reveals the status of Lithuanian books within this major source of research data. By identifying the primary contributors to metadata availability, this research informs strategies to maximise the visibility of national books. It also highlights potential challenges involving metadata providers (beyond publishers) and opportunities for improving the representation of books authored by Lithuanian researchers in WorldCat, increasing the visibility of national research.

1.6.4. Thesis outline

This chapter provided the essential context for understanding the evolution of the quantitative research assessment system in Lithuania and the nuances of its development. It has also outlined the research approach and research questions that guide this thesis. Chapters 2 to 6 delve deeper into the five research questions, providing a comprehensive analysis of the Lithuanian case and its implications for research assessment policies both domestically and internationally. Chapter 7 summarises the main findings of this PhD thesis. Based on these general findings, the dissertation concludes with policy recommendations and directions for future research.