



EQAF
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RESEARCH A NECESSITY PRICED AS A LUXURY

A Look at Economic Barriers in
Research and the RARS Solution

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INTRODUCTION

1.1 The Role of Research

- Drives economic growth, innovation, and well-being
- Fosters critical thinking, collaboration, and societal progress

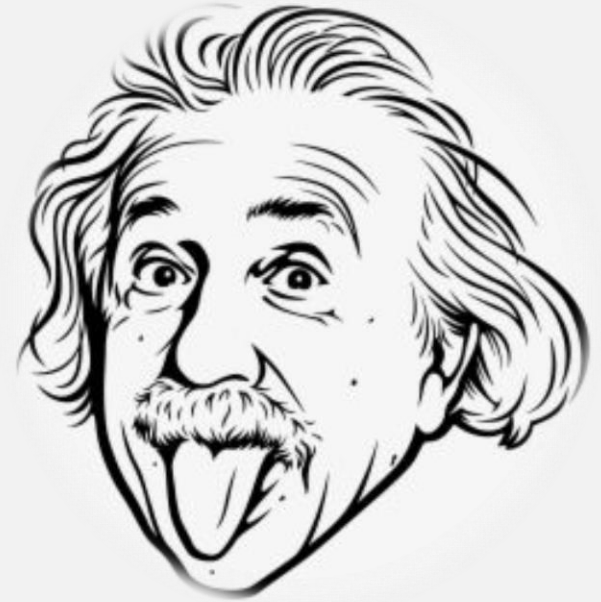
1.2 The Problem

- High research costs limit access to well-funded institutions only
- Barriers include: journal fees, equipment, data, and staffing
- Exclusion limits diversity, quality, and equality in research

1.3 Our Solution: RARS Platform

- A collaborative, cost-saving digital platform
- Shares resources, data, and tools through cloud and open-source tech
- Democratizes research access and supports an inclusive research ecosystem

**THE PRICE OF
RESEARCH: WHY CAN'T
WE ALL BE EINSTEIN?**



- Research costs present significant barriers across institutions
- Key costs affect students, researchers, and institutions alike
- These expenses threaten inclusivity and quality in research

2.1 Subscription Costs for Academic Journals

- Access to literature is essential but often unaffordable
- Major publishers charge high fees; example:
 - University of California spent \$10.5M/year on Elsevier (2018) Top-tier universities spend up to €5M annually on subscriptions
- Open access provides some relief but can still be costly:
 - Publication fees range \$2,000 - \$5,000 per article

2.2 Equipment and Infrastructure Costs

- Specialized equipment is critical but expensive:
 - High-Performance Computing (HPC) costs up to \$1M/year
 - Mid-range lab equipment (e.g., confocal microscope) costs \$200K–\$500K plus 5–10% in annual maintenance
- Smaller institutions struggle, often forced to use outdated technology, impacting research quality

2.3 Data Acquisition and Analysis Costs

- High-quality datasets are essential but costly:
 - Proprietary data costs: \$10K–\$100K
 - Data analysis tools: \$1,000–\$5,000 per user annually
- Smaller institutions often can't afford these essential resources

2.4 Human Resources and Research Personnel

- Qualified research personnel are crucial but costly:
 - Average research assistant salary: €30,000–€50,000
 - Specialized consultants for short projects: €5,000–€20,000
- Limited budgets lead to reliance on teaching rather than research roles, especially in smaller institutions

2.5 DUPLICATION AND INEFFICIENCIES

- Financial waste due to duplication of resources is high:
 - 23% of Europe's research expenditures are duplicative (EU Commission, 2018)
- Lack of resource-sharing platforms results in redundant costs and missed opportunities for collaboration

Who's Left Behind?

- Smaller institutions and underfunded researchers are at a disadvantage.
 - Limited access means limited potential for high-quality research.

RATIONALE FOR CHOOSING ECONOMETRIC MODELS IN RARS PLATFORM ANALYSIS

- Ordinary Least Squares (OLS): Establishes baseline understanding of cost impacts on RARS performance, providing a comparison point.
- Fixed Effects Model: Controls for unchanging user characteristics (e.g., institution size), ensuring unbiased cost impact results.
- Random Effects Model: Evaluates whether user- or institution-specific traits influence performance, supporting generalizations about variations.
- Robust OLS: Corrects for heteroscedasticity, ensuring reliable results across diverse user sizes and cost distributions.
- General Regression Analysis: Validates relationships between costs and performance across different modeling approaches, increasing confidence in findings.

KEY FINDINGS (COEFFICIENTS & SIGNIFICANCE)

- Subscription Costs ($\beta_1 = -0.002$, $p = 0.046$): **A €1 increase in subscription costs reduces research output by 0.002 units** (statistically significant).
- Equipment Costs ($\beta_2 = -0.003$, $p = 0.003$): A €1 increase in equipment costs reduces research output by 0.003 units (statistically significant).
- Data Acquisition Costs ($\beta_3 = -0.0015$, $p = 0.003$): **A €1 increase in data acquisition costs leads to a 0.0015 unit decrease in research output** (statistically significant).
- Human Resources Costs ($\beta_4 = 0.001$, $p = 0.505$): No significant impact on research output ($p > 0.05$).
- Duplication & Inefficiencies ($\beta_5 = -0.004$, $p < 0.001$): **Significant negative effect, with a 0.004 unit decrease in output per €1 increase in inefficiencies.**

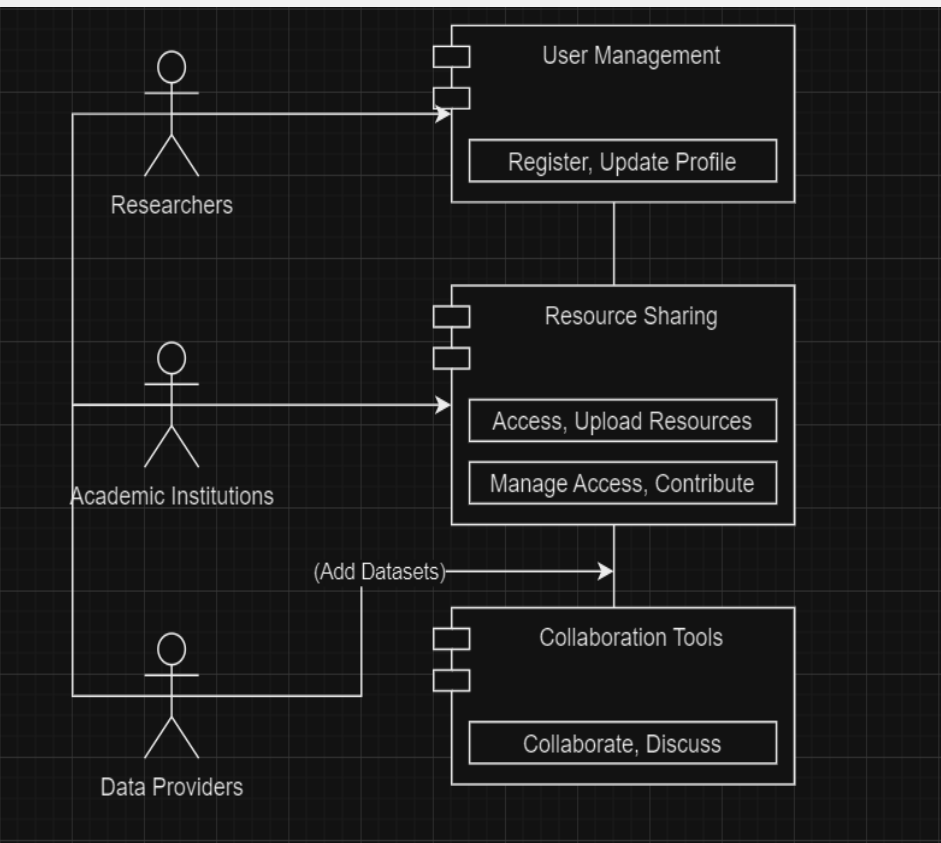
Model Fit & Diagnostics:

- **R-squared:** 0.65 (65% of variation explained)
- **F-statistic:** 25.3 ($p < 0.001$) → Model is significant
- **RMSE:** 0.75 (good prediction accuracy)
- **No multicollinearity or heteroscedasticity issues** ($VIF < 10$, $p > 0.05$)

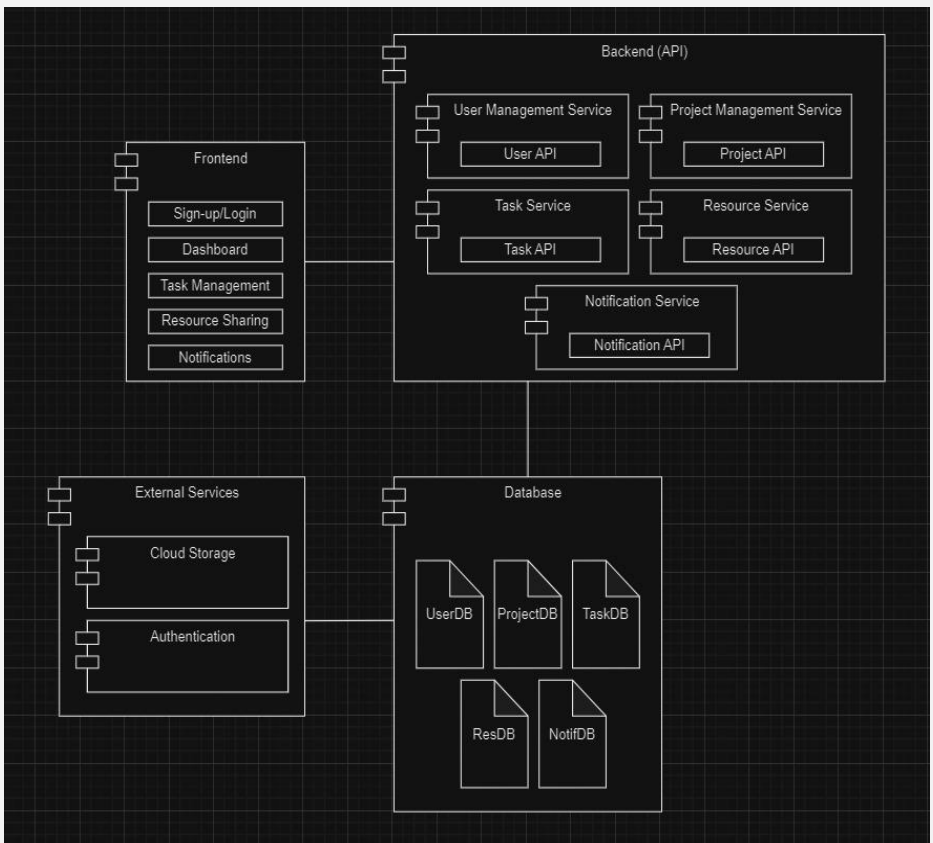
RARS SYSTEM: ENABLING COLLABORATIVE RESEARCH

- **Objective:** Break down financial and logistical barriers, providing researchers with easier access to essential tools and resources.
- **Key Participants:**
 - Researchers: Gain access to datasets and research tools.
 - Academic Institutions: Share and manage resources more effectively.
 - Funding Agencies & Data Providers: Support research by connecting with institutions and researchers.
- **Features:**
 - Collaboration & Resource Sharing: Facilitates broad access to research tools and datasets.
 - Advanced Search Function: Quickly find resources and collaborators by filtering keywords and criteria.

RARS Collaboration Workflow



RARS Platform Interaction Overview



CONCLUSION

- **Addressing Economic Barriers:**

Economic limitations on research access hinder innovation, particularly for under-resourced scholars and societies.

- **Global Challenges:**

High costs of journal subscriptions, specialized equipment, and data collection necessitate systemic change for equitable research resource distribution.

- **RARS as a Solution:**

- Promotes **inter-institutional collaboration** and **efficient resource sharing**.
- Facilitates **affordable access** to open-source tools and datasets, leveling the research playing field.
- Reduces **research overlap and waste** through streamlined sharing.

- **Empirical Support & Future Vision:**

- Case studies demonstrate RARS' potential to reshape research expectations and foster a collaborative, creative environment.

- **Call to Action:**

We invite the academic community to contribute to the development and improvement of the RARS platform to shape the future of research.

**JOIN US IN CHANGING THE FUTURE OF RESEARCH
COLLABORATION IS KEY – MORE MINDS, LESS MONEY**

- We invite academics to collaborate in RARS' development and offer their insights.
- Let's drive innovation without financial limitations.



<https://project-rars.web.app/auth/login>



https://www.youtube.com/watch?v=g2sjRRLckOY&ab_channel=UniversitetiiTetov%C3%ABs

