A Data Driven Approach to Research Enterprise Growth and Infrastructure Design

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2:30-3:15 PM

Presenter Introductions

Marisa Zuskar

Managing Director

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Director

Session Objectives

- Understand the drivers and impact of growing proposal, award, agreement and regulatory compliance volumes on research infrastructure:

    o   Strategy and Planning

    o   Administrative Teams and Talent

    o   Technology and Systems

- Discuss approaches to leverage both internal and external data to make effective business and planning decisions in response to growth goals.

- Explore how data can inform the justification or team size and roles, timing and implementation of a growth-focused infrastructure and workload and staff management approaches.

- Hear about some of the research analytics technologies and tools Huron is currently partnering with to deploy across institutions.

Agenda

1. Operational Analytics

2. Benchmarking Analytics

3. Productivity Metrics & Organizational Design

4. Technology & Tools at Huron

5. Questions

Building Blocks: Data Analytics

Research enterprise growth and infrastructure design – let's build it.
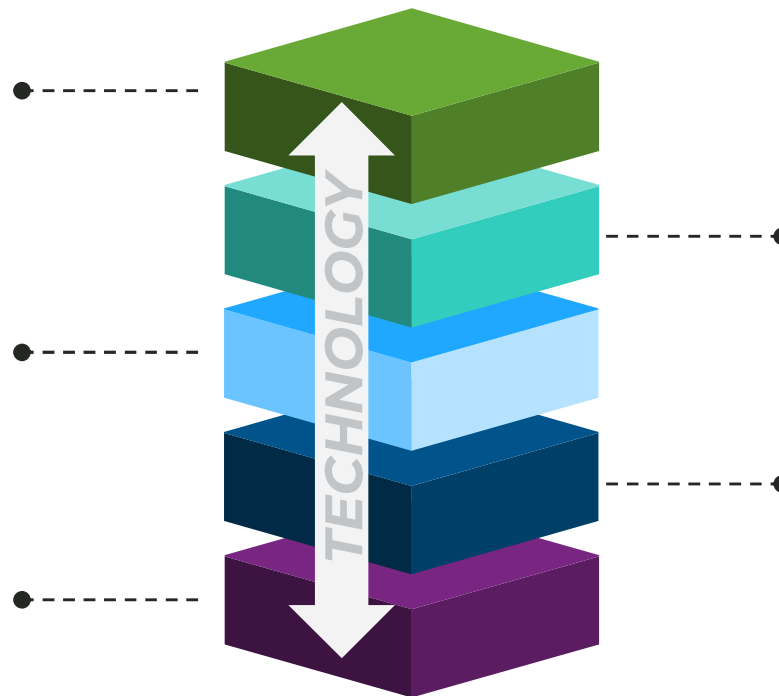
Benchmarking

- Comparing data (external and internal) for insights

Productivity Metrics

- Understanding resource allocation and throughput

Organizational Design

- People: organizational alignment, workload and roles and responsibilities

TECHNOLOGY

Compliance Metrics

- Managing regulatory risk
- Identifying and prioritizing non-compliance

Let's start here

Operational Metrics

- Understanding the scope of growth, volume and performance based on internal data

Operational Analytics

- Understanding the scope and strategy for growth, volume and performance based on internal data

Operational Research Metrics

Purpose

Universities can effectively use operational metrics to understand the current state of the research enterprise – in terms of productivity, performance and the associated operations. These metrics – when used to **measure, analyze, and act** – improve a University's overall impact in the **current and future states.**

Efficiency
- Cycle Times
- "First Pass Yield"
- Iterations
- Workload per Staff
- Transactional Aging

Effectiveness
- Research Volumes
- Regulatory Activity Volumes
- Win Rates
- Growth Trends
- Administrative Trends

Cost
- Personnel Levels
- Investment Requirements
- Financial Leakage

Risk
- Audit Outcomes
- Financial Risk
- Regulatory Risk
- Reputational Risk

TECHNOLOGY & ORG ALIGNMENT

Operational Research Metrics

Strategic Application

Operational metrics measure and quantify the efficiency, effectiveness, cost, and risk of institutional practices and processes. **Used strategically, research metrics can help research enterprises project, plan and make effective business decisions regarding resource needs, allocation methodology and scalability.**

Measure **Analyze** **Act**

Set goals

Gather data

Benchmark Interpret

Align
Decide
Implement
Enhance
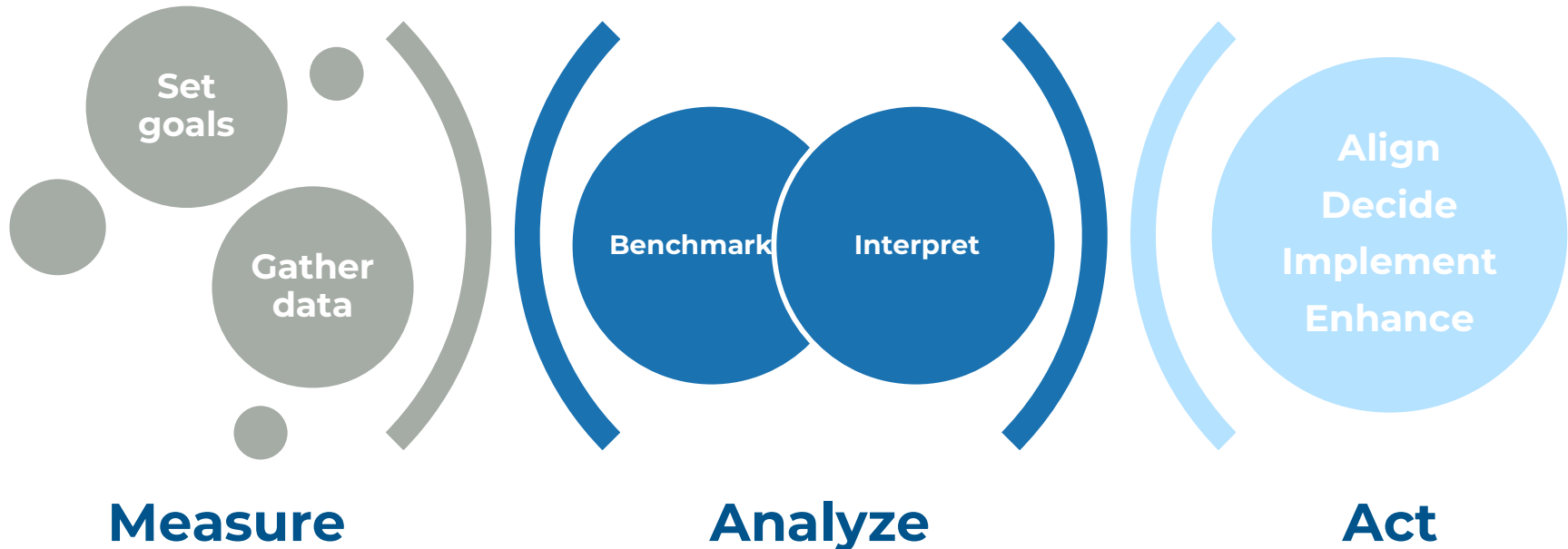
Understanding Growth Plans

Institutions continue to **rapidly grow in research activity.** With the ongoing advancement of science and technology, there is a corresponding surge in growth targets which also comes with heightened complexities in agreement types and the associated administrative management.

What's next?
Establish alignment on **research growth.**
- **Dollars**
- **Faculty**
- **Publications**

In current dollars, higher education research and development (R&D) grew at an average annual rate of 4.0% since FY 2012

However, in constant dollars, the average annual growth rate of R&D was 1.6%

View analysis →

Graphic from NSF HERD: https://ncses.nsf.gov/surveys/higher-education-research-development/2022
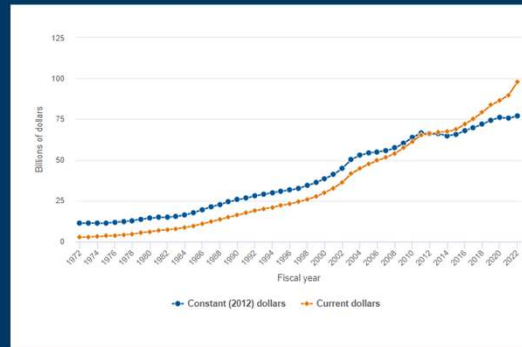
$97.8B

R&D spending by academic institutions in FY 2022 totaled $97.8 billion in current dollars, an increase of $8.0 billion from FY 2021

55%

Federally funded R&D at universities totaled almost $54 billion in FY 2022—55% of total academic R&D expenditures

Measure

Understanding Growth Dynamics

Strategic planning of administrative infrastructures to support research growth is critical. Consider an analysis of workload volume over time in comparison to FTE growth. With retention challenges in the workforce, there are often additional backlogs to account for that may create additional FTE needs.

"What is the 'magic $ metric' to consider an additional FTE?"

Research Expenditure & Post Award Growth

Centralized Departmental Post Award Support FTE & Total Research Expenditures

Legend: External + Internal Res Exp ($M) — Post-Award FTEs (Portfolio) — Target
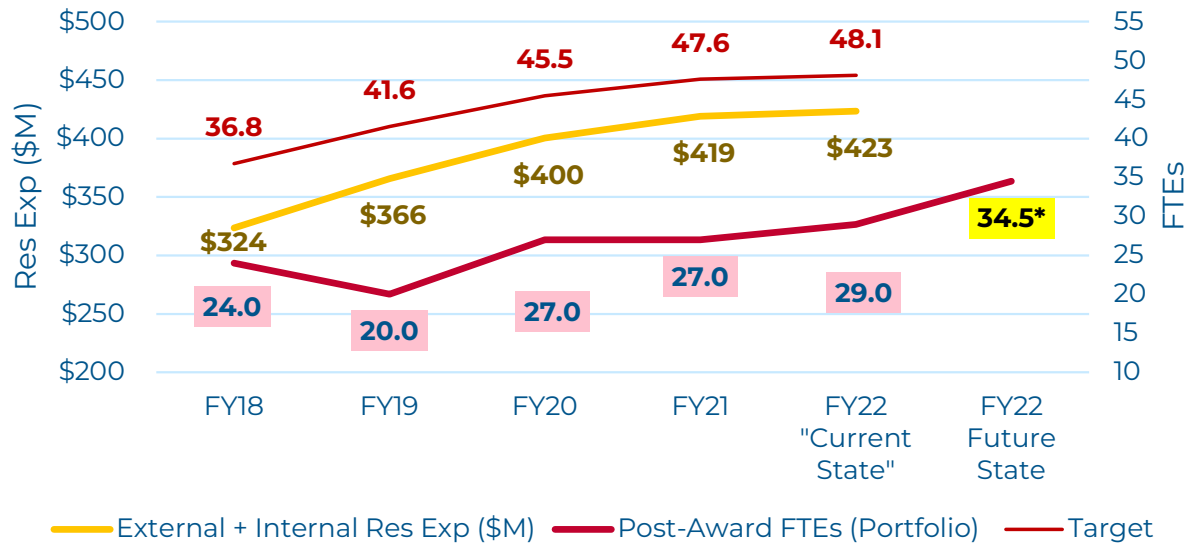
Additional FTE Analysis:
Pre Award
- Proposal Count
- Proposal $
Central Post Award Accounting
- Expenditures
Departmental Portfolio
- Proposal Count and $
- Expenditures

Huron Consulting Group Inc. and affiliates.

Understanding Growth Impact

Examples

Operational metrics for institutions to measure to understand goals, growth and the projected scope and size of the research enterprise:

| Sponsored Programs Admin	Regulatory Compliance	Research Support & Growth
• Transactional Cyle Times (award setup, subaward and contract execution, accounts receivables) • Financial Balances • Financial Aging • Workload allocation	• Human Subjects Volume and Risk • Animal Subjects Volume and Risk • Protocols Cycle Times • COI Disclosures (Process and Outcomes) • Regulatory Audit Findings / Fees	• Research Activity (Proposals and Awards) • Research Revenues • Funding Diversity • Major Programs • Faculty Engagement • Administrative FTE Ratios • IP Activity & Revenue

Support of Growth & Faculty Experience
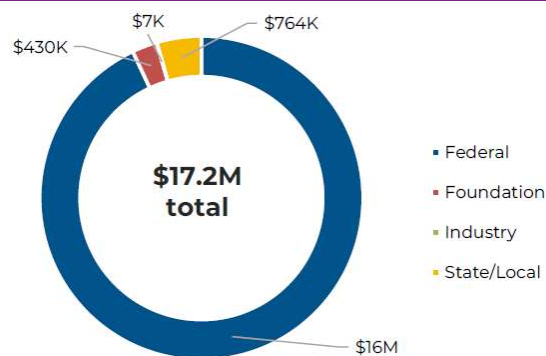
Understanding Growth Impact

Examples

Proposal & Award Volume
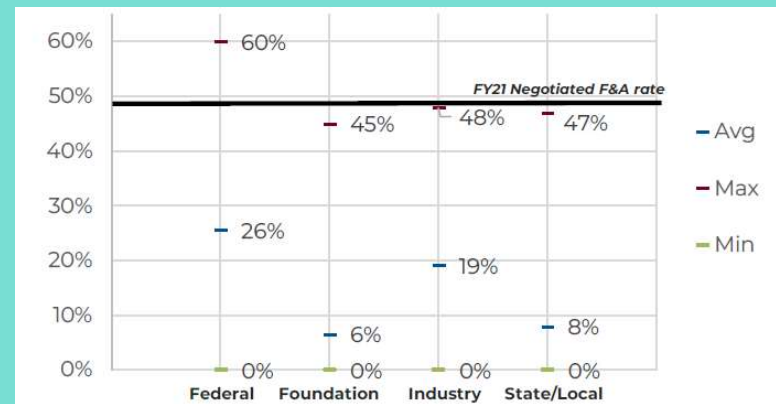
F&A Recovery

Unspent Balances

2

📍 **Benchmarking**

- Comparing data (external and internal) for insights

Research Operational Benchmarking

Research institutions can measure the performance of their pre-award and post-award functions across the grant lifecycle by comparing their operational metrics to other research enterprises.

Commonly Benchmarked Research Administration Areas:

Research Volume

Organizational Structure, Staffing and Experience

Training

Pre-Award Processes

Post Award Processes

Research Administration Technology

Research Operational Benchmarking

Total Research Expenditures: Growth Potential and Targets

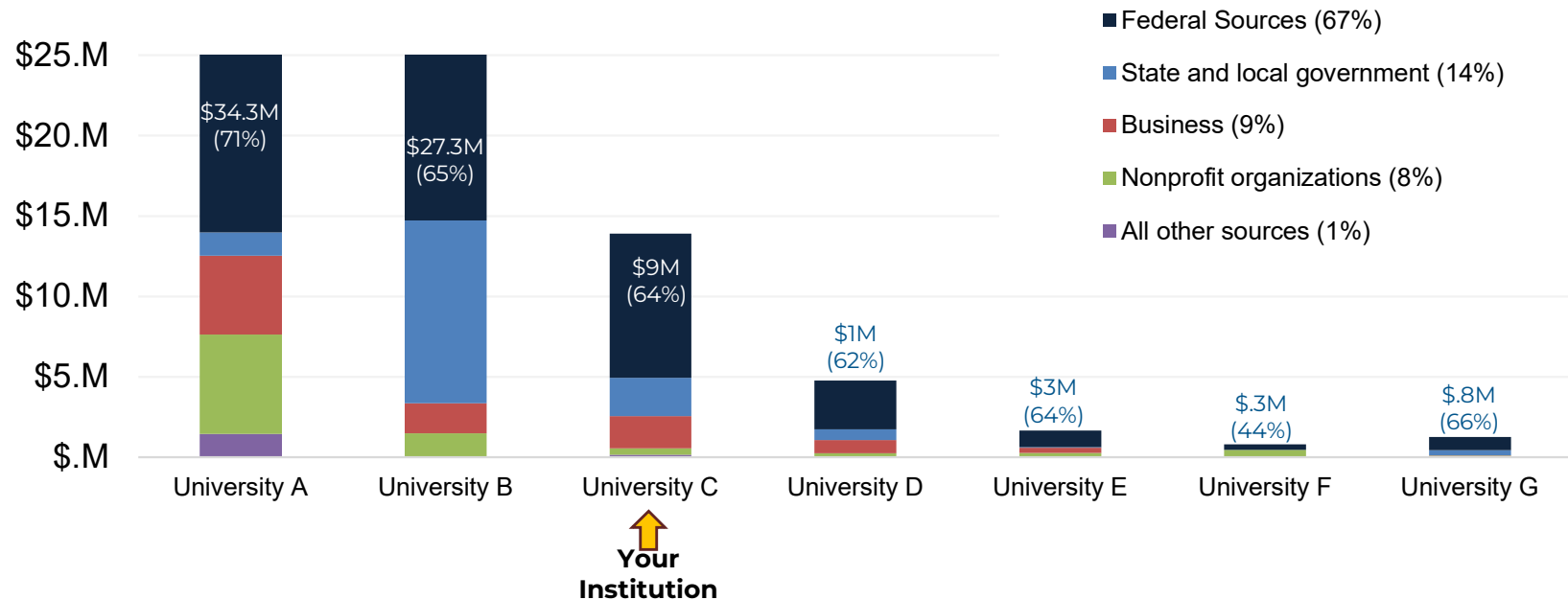| Total Research and Development Expenditures[1] (2018 – 2022)						
Institution	2018	2019	2020	2021	2022	5-Year Annual Growth
Institution A	$706.3M	$657.2M	$688.1M	$644.0M	$712.2M	0.2%
Institution B	$245.0M	$260.8M	$263.5M	$274.5M	$312.7M	6.3%
Institution C	$339.0M	$352.6M	$368.8M	$385.6M	$405.3M	4.6%
Institution D	$106.7M	$129.9M	$134.2M	$146.8M	$171.9M	12.7%
Institution E	$211.1M	$223.2M	$219.4M	$213.8M	$245.2M	3.8%
Institution F	$1.1B	$1.2B	$1.2B	$1.2B	$1.4B	4.6%
Institution G	$128.3M	$135.9M	$191.1M	$195.3M	$216.3M	14.0%

METRIC HIGHLIGHTS
- **5.5%** is the *median growth for peer institutions*

Source: NSF HERD Survey. Research expenditures includes research and development expenditures.

Research Operational Benchmarking

Research Expenditures by Sponsor Type: Potential for Diversity and Expedited Growth

Sponsored portfolio mix based on comparison of annual expenditures.

Legend:
- Federal Sources (67%)
- State and local government (14%)
- Business (9%)
- Nonprofit organizations (8%)
- All other sources (1%)

University A: $34.3M (71%)
University B: $27.3M (65%)
University C: $9M (64%) — **Your Institution**
University D: $1M (62%)
University E: $3M (64%)
University F: $.3M (44%)
University G: $.8M (66%)

Research Operational Benchmarking

Research Revenue as a % of Operating Expense: Institutional Capacity and Potential

UNIVERSITY	Externally Funded Research (FY19)	Operating Revenue (FY19)	External Research as a % of Operating Revenue
University A	$48.2M	$854M	6%
University B	$41.9M	$365M	11%
University C	$13.9M	$661M	**2%**
University D	$4.7M	$210M	2%
University E	$1.7M	$271M	1%
University F	$1.3M	$74M	2%
University G	$794K	$148M	1%

Your Institution →

Research Operational Benchmarking

Institutionally Funded R&D: Investment Demands and Operational Impacts

FY19 Institutional R&D Percentage

Mean = 43%

Your Institution — 63%

(HERD Survey Peers, axis A–S; x-axis 0% to 140%)
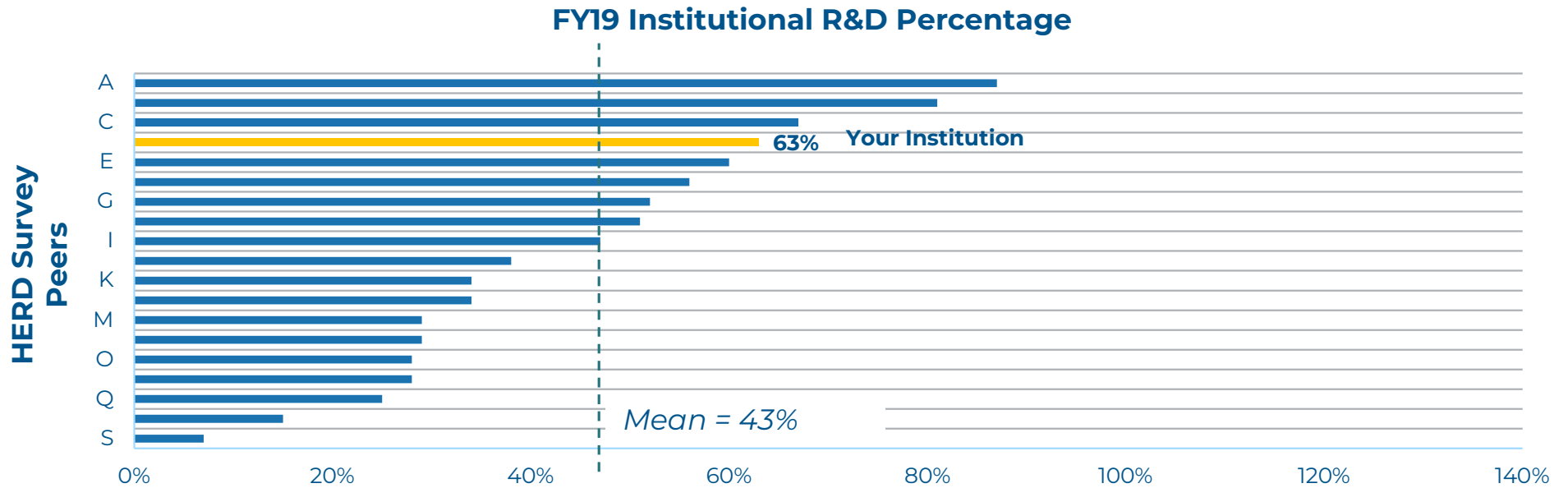
Research Organizational Design

An Activity before ACT: Asking the right questions - develop the right analytics - design the right organization.

Consider your institution's top research administration growth area or operational "pain point".

- How do you know this? What **data currently exists** to support this finding / fact?

- Have you set **specific targets or goals** related to this area?

- What **data-based information is needed** to better understand current state?

- What **data or metrics are needed to set goals and targets** in this area?

- What **data points do you need to capture** to answer these questions?

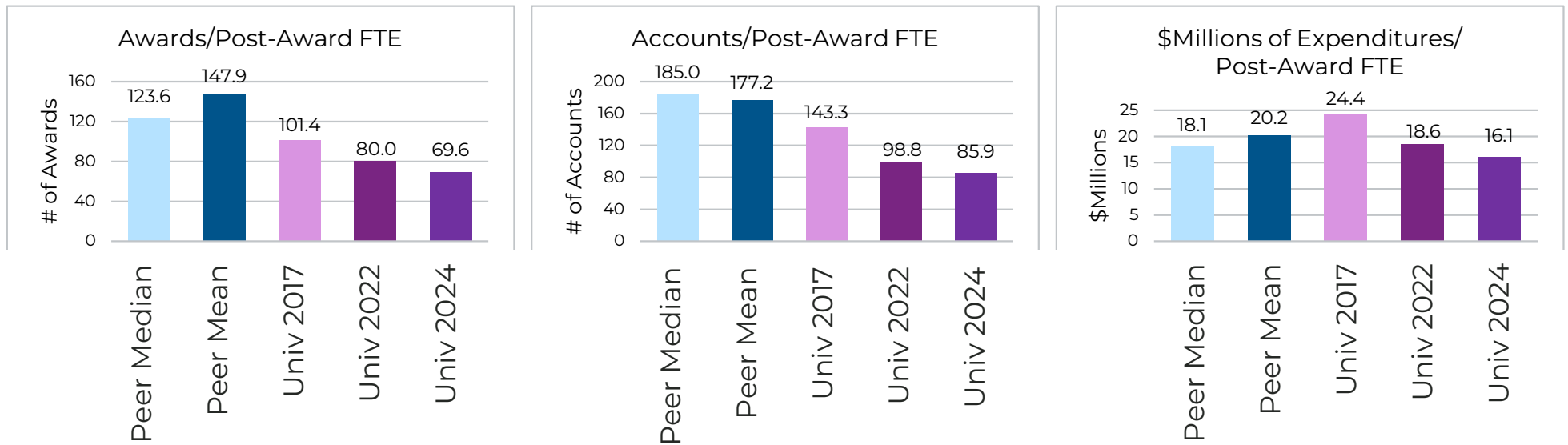- What data points or metrics do you measure to **verify change or impact**?

3

Productivity Metrics & Organizational Design

- Understanding resource allocation and throughput, and designing the organizational alignment, workload and roles and responsibilities necessary

Organizational Design & Productivity

One application of analytics to organizational design is straight-forward staffing benchmarking and comparisons.

Awards/Post-Award FTE

Category	# of Awards
Peer Median	123.6
Peer Mean	147.9
Univ 2017	101.4
Univ 2022	80.0
Univ 2024	69.6

Accounts/Post-Award FTE

Category	# of Accounts
Peer Median	185.0
Peer Mean	177.2
Univ 2017	143.3
Univ 2022	98.8
Univ 2024	85.9

$Millions of Expenditures/Post-Award FTE

Category	$Millions
Peer Median	18.1
Peer Mean	20.2
Univ 2017	24.4
Univ 2022	18.6
Univ 2024	16.1

Organizational Design & Productivity

Continued application of research analytics based on activity projections allows for workforce planning. Further this approach enables scaling based on technology enablement to moderate resource growth over time.

**Illustrative
RA Partners Over a 5 Year Period**

— Baseline (7% growth)   — Conservative

— Mid-Tier   — Optimized

(Line chart: RA PARTNER STAFFING vs Years, y-axis from 300 to 500, x-axis 0 to 5 years, starting at 322, with curves labeled "Realized efficiencies")
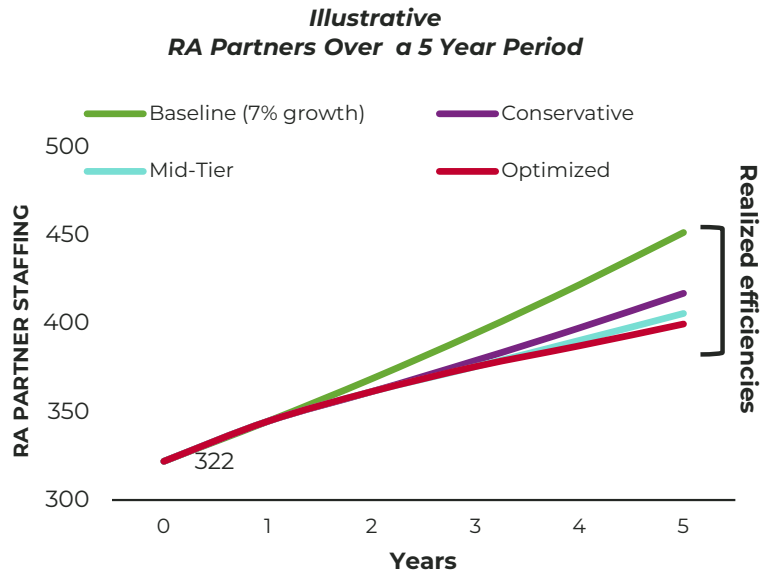
Capacity Realization Scenarios	Description
Conservative **Staffing Model** **Consolidate Jobs**	•*Reallocation of effort upon consolidation, resulting in reduced FTEs (via attrition / reduced hiring) over time*
Mid-Tier **Staffing Model** **Business Process Review + Central Redesign**	•Redesign business processes •Transform central admin into center of excellence to better support research administration infrastructure
Optimized **Staffing Model** **Cloud Implementation**	•New technology to support redesigned processes

Organizational Design & Productivity

A common challenge, across research institutions, is balancing varying workloads across a diverse team of experts.

Challenge

- Sponsored programs offices are tasked with understanding and managing expanding and increasingly complex award portfolios
- Many institutions assign staff workload by department or sponsor, but struggle with how to divide the sponsored project portfolio across staff members so the workload is balanced and equitable, while maintaining customer service.
- Staff turnover, extended absences, and varying expertise amongst staff complicate this ongoing workload management challenge.

Organizational Design & Productivity

Utilize operational metrics to strategically balance workloads across individuals and team members, based on expertise and tenure.

Solution

- Pre award and expenditure data can be utilized to apply complexity scores across the institutional sponsored projects portfolio.
- Institutions can improve their understanding of their sponsored programs administration workload and determine ways to redistribute their portfolio across staff to achieve equitable, constituency-based workload assignments.

Organizational Design & Productivity

Example Weighting Criteria may include but is not limited to:

Award Type	• Varies from basic contract/grant to complex contract/grant.
Sponsor Type	• Includes differentiation between industry and federal sponsors, as well as types of industry or federal sponsors (NIH vs. NSF).
Experience of Staff Member	• Determined by Leadership; can account for strength or experience-level of staff members.
Strength of Departmental Administrative Support	• Determined by Leadership; can account for strength or level of support that Department-level support staff provide.
Type of Invoice/Report	• Varies from standardized institutional templates to detailed/unique sponsor-required templates.
Cumulative Award Expenditures	• Based on the summing of award expenditures and determining thresholds for increasing complexity.

Portfolio Weighting Application

A recommended redistribution of assignments across a pre-defined staff (either the current team or incorporating additions / reductions) as well as a comparative analysis against the distribution in the current state.

Analysts	Original: Cumulative Weight	Original: # of Projects	Levels/FTE	Post-Analysis: Cumulative Weight	Post-Analysis: # of Projects
Analyst 1	483	119	1	**437**	118
Analyst 2	739	191	1	**438**	109
Analyst 3	532	151	1	**436**	117
Analyst 4	-	-	0.5	**219**	54
Analyst 5	-	-	0.5	**224**	63

Pre-Analysis Distribution

Post-Analysis Recommended Distribution

Balancing Workloads Across a Team
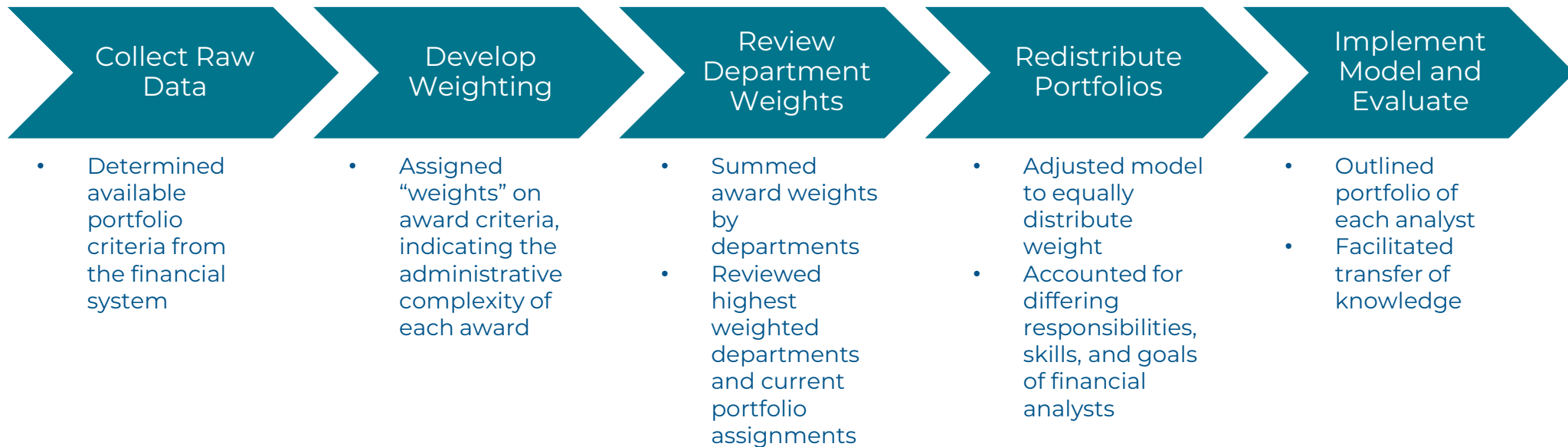
CASE STUDY: The Need

Rising R1 institution with ~$21M in research expenditures during the time of the Portfolio Weighting assessment and implementation.

Restructured Post-Award	Continued Research Growth
• In recent years, the Post-Award unit was developed from a combined Office of Sponsored Programs unit within the Office of the Vice Provost for Research (OVPR) and responsibilities were expanded for their financial analysts.	• The institution continues to execute on their strategic plan to prioritize research growth. At the end of 2020, awards were up 41% and expenditures grew 9%. • The Post-Award team grew from 1 to 4 financial analysts and plans to expand to 5.

Balancing Workloads Across a Team

CASE STUDY: Model Development

Rising R1 institution with ~$21M in research expenditures during the time of the Portfolio Weighting assessment and implementation.

Collect Raw Data	Develop Weighting	Review Department Weights	Redistribute Portfolios	Implement Model and Evaluate
• Determined available portfolio criteria from the financial system	• Assigned "weights" on award criteria, indicating the administrative complexity of each award	• Summed award weights by departments • Reviewed highest weighted departments and current portfolio assignments	• Adjusted model to equally distribute weight • Accounted for differing responsibilities, skills, and goals of financial analysts	• Outlined portfolio of each analyst • Facilitated transfer of knowledge

Balancing Workloads Across a Team

CASE STUDY: Weighting Development

Invoice and Contract Type

- Cost reimbursable were weighted higher than fixed due to the additional review. Non-Letter of Credits were weighted higher due to the frequency of their draws

Project End Date

- Certain end dates indicate if closeout procedures will require the financial analysts' efforts

Total Expenditures

- Higher total expenditures are weighted higher to account for the more detailed review of expenses

Balancing Workloads Across a Team

CASE STUDY: Redistribution Model

Several models were analyzed for potential redistribution. The final model below balanced workloads, new analysts, and a shift in cash management responsibilities.

- **Maintained highest weighted departments** with original analysts

- Manageable portfolio for **New Analyst**

- **Transition of cash management and A/R monitoring** from Analyst 3 to Analyst 2

- Continued part-time support for Vacant Analyst while hiring

- **Higher volume of federal awards** in Analyst 3

Analysts	Original			Update		
	Weight	# Projects	# of Dept	Weight	# Projects	# of Dept
Analyst 1	483	119	16	500	133	12
Analyst 2	496	126	10	256	70	5
Analyst 3	679	187	24	576	147	9
New Analyst	-	-	-	326	82	24
Vacant Analyst	96	29	1	96	29	1

Balancing Workloads Across a Team

CASE STUDY: Implement and Evaluate

Implementing the portfolios required clear outlines of each workload, training on new responsibilities, and a transfer of knowledge on awards.

June 2021
- Shared new portfolios with financial analysts to get feedback and buy-in

July 2021
- Implemented portfolio changes and communicated to OVPR partners (e.g. Pre-Award)
- Trained financial analysts on new awards or skills as needed

Next Steps
- Evaluate the impact of portfolio redistribution
- Monitor uneven growth in portfolios
- Determine portfolio of 5th financial analysts when onboarded
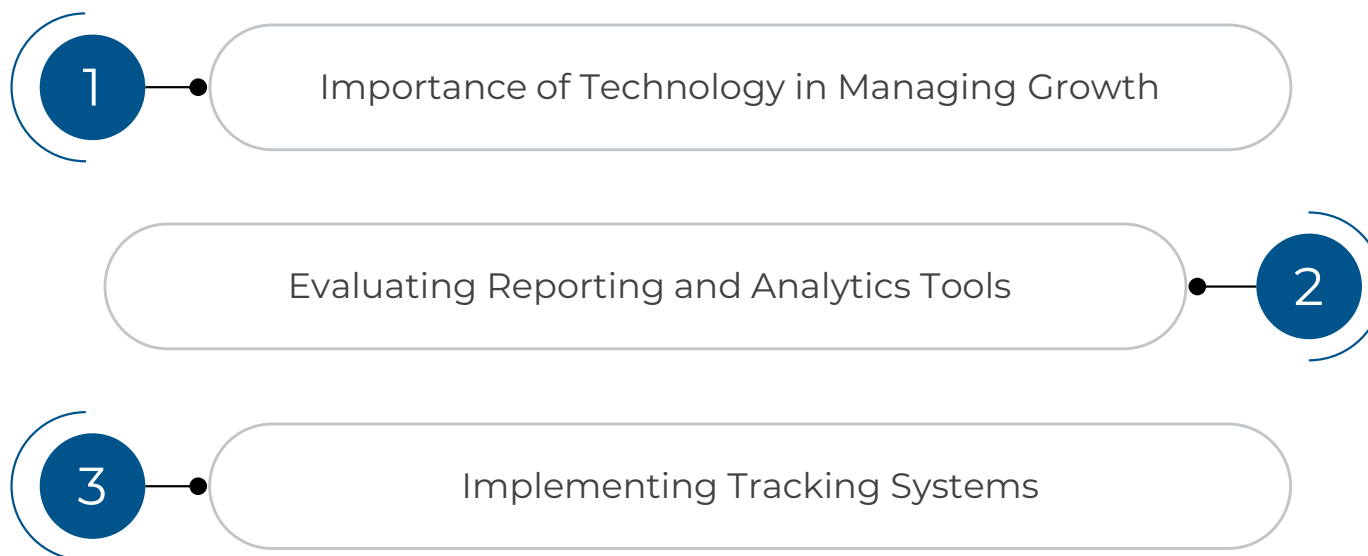
4

Technology & Tools

- Technology and Tools to capture, analyze and support the research enterprise through analytics

Technology and Tools

Data analytic technology systems allow for research enterprises to compile and analyze large amounts of data to gain insight into their research offices, understand pain points in their processes, and identify enhancements to their workflow to speed up mandatory processes.

Technology Considerations

1 Importance of Technology in Managing Growth

Evaluating Reporting and Analytics Tools **2**

3 Implementing Tracking Systems

Act

Technology and Tools

Example applications we are working on today....

Research Compliance Data Analytics

Methodology and reports focused on efficient monitoring and oversight of research risks

RADIUS

An open-access Benchmarking Survey and associated analytics for central sponsored programs administration

Higher Education Performance Analytics

University-wide dashboards and reporting to inform executive level oversight and planning for the University
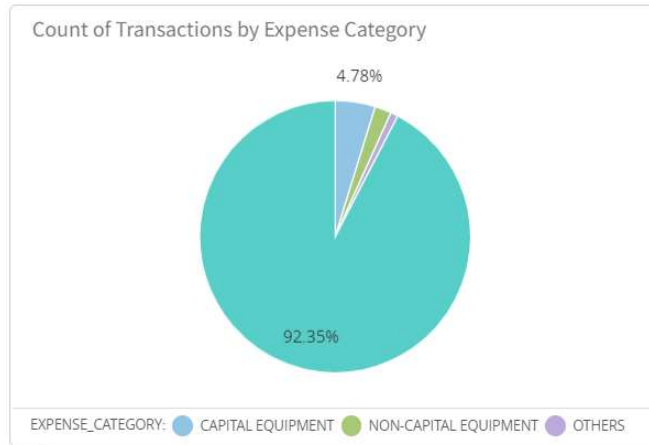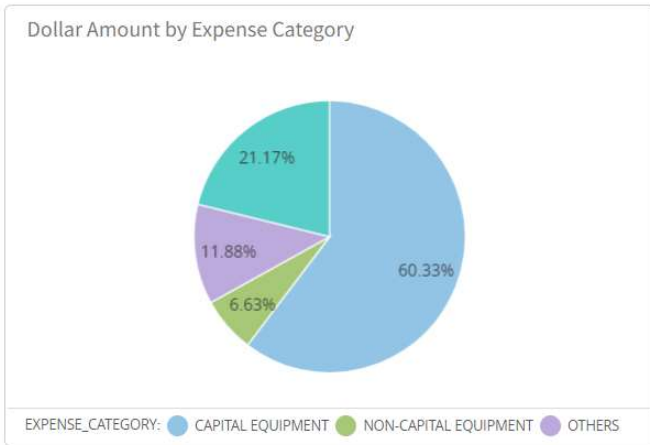
Huron Research Analytics

Extension of Huron Research Suite, including descriptive and diagnostic analytics for research admin

Technology and Tools

Research Compliance Data Analytics

Collection ▾ / Expenditures at the End of the NSF Grant ▾

Transactions processed in the last 90 days or after the end of the grant for high-risk expense categories.

Dollar Amount by Expense Category

21.17%
11.88%
6.63%
60.33%

EXPENSE_CATEGORY: ● CAPITAL EQUIPMENT ● NON-CAPITAL EQUIPMENT ● OTHERS

Count of Transactions by Expense Category

4.78%
92.35%

EXPENSE_CATEGORY: ● CAPITAL EQUIPMENT ● NON-CAPITAL EQUIPMENT ● OTHERS

Total Population:

Total NSF Awards with Expense Activity
618

Total Principal Investigators Impacted:
287

Total Audit Expenditures
$170,139,561

Total Number of GL Transactions:
112,031

Test Results:

Total NSF Awards with Expense Activity:
108

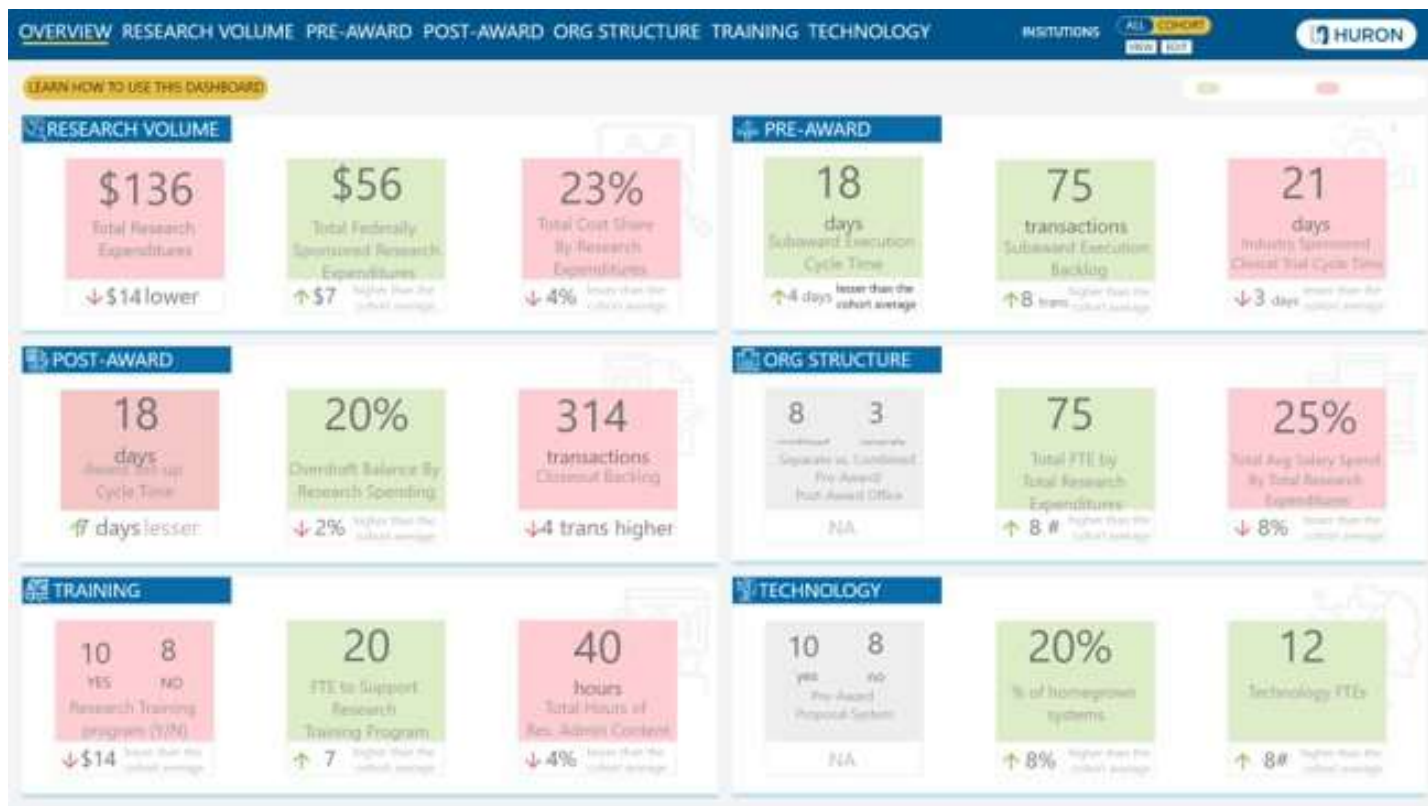Total Principal Investigators Impacted
92

Total Expenditures:
$1,055,354

Total Number of GL Transactions
1,464

Act

Technology and Tools

Huron's RADIUS Benchmarking Survey

Technology and Tools

Higher Education Performance Analytics

Suite of drilldown dashboards provide university leaders both broad and detailed analytics capabilities to improve decision making and support alignment of institutional resources, priorities, and mission.

The Huron Difference in the Analytics Market

Analytics cloud suite **designed to accelerate colleges and universities on the analytics journey**

Data reviewed and cleaned by **Huron consultants** that work with universities each day
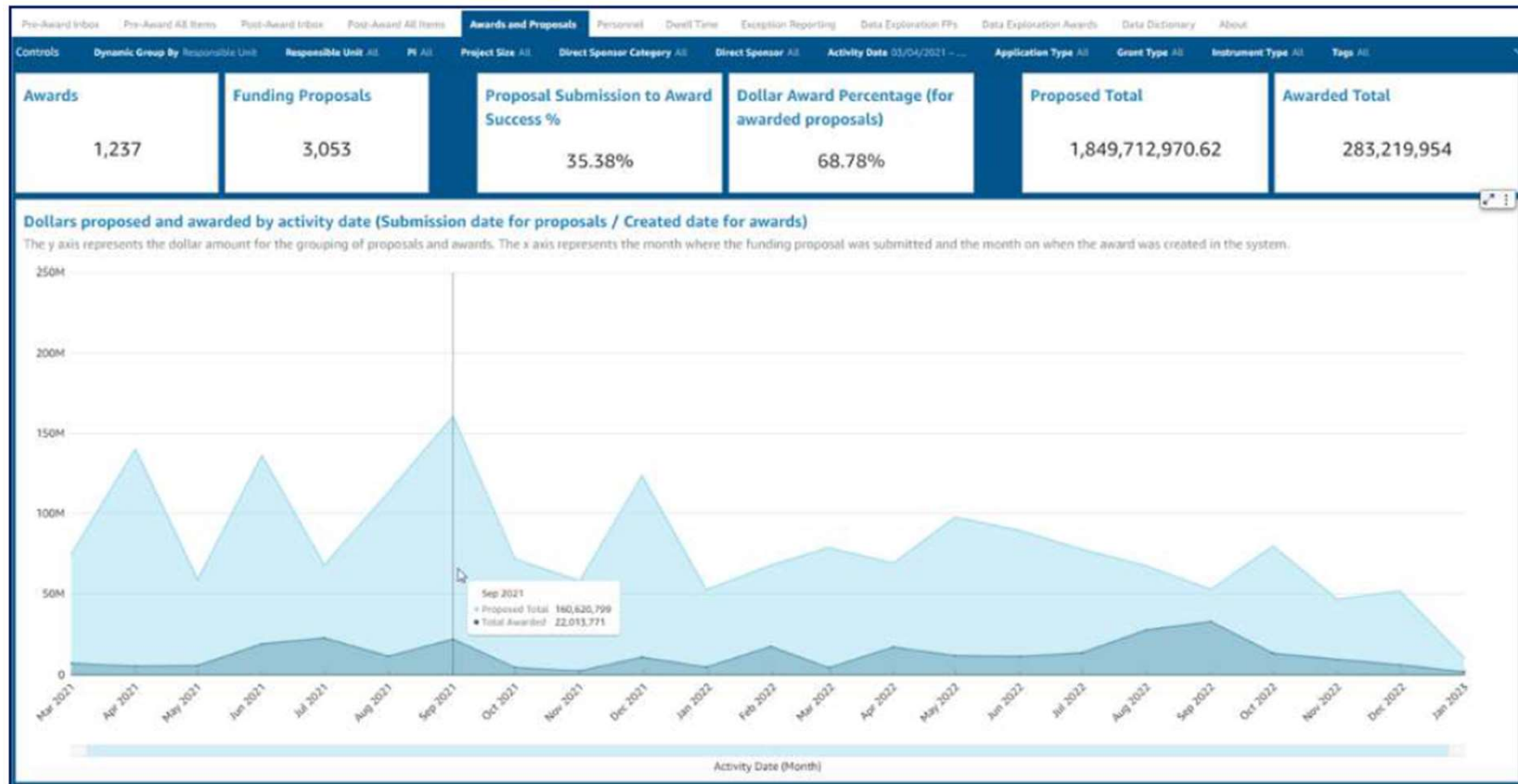
A process focused on partnership to **ensure buy-in** for the analytics from university stakeholders

Academic Portfolio Performance

Student Lifecycle Insights

Procurement and Spend Management

Financial Health

Talent Lifecycle Analytics

Space Analytics

Act

Technology and Tools

Huron Research Analytics (a component of the Huron Research Suite)

6

Conclusion & Questions

Roadmap

1 Where are you now?

2 What tools do you have to make informed decisions?

3 How will you prepare to design and operationalize?

4 What is the people and organizational design impact?

5 Are you prepared to scale?

6 What will you use to measure, monitor, and adjust?

Questions?

Thank you for your time today!

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