Developing and Supporting Analytics Initiatives

Insights and Benchmarks for BI in Higher Education
IT Forum

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Introduction and Purpose of this Report

This Business Intelligence (BI) Report provides insights and statistics on BI initiatives of colleges and universities across the United States and Canada. Members can use these data to benchmark their BI strategy, plan, and operations against those of other organizations.

For IT Forum members, please reach out to your EAB Dedicated Advisor to learn more about and access the IT Forum’s additional publications focusing on data governance, business intelligence, and analytics. We value your feedback, and we would be happy to discuss the report and results with you, should you seek additional details.

A Guide to the Report

Overview of Survey Respondents

page 4

Executive Summary

page 5

We have organized the results of the report into the following categories:

- **BI Maturity and Culture**
  - Explains our BI maturity index, which reflects data integration, attitudes about analytics, and the relationship between data and decisions.
  - pages 7-11

- **Leadership, Organization**
  - Describes the role of a single leader for BI efforts, where BI is likely to reside, and the roles of various campus partners and champions.
  - pages 13-19

- **Focus and Goal**
  - Shows the main goals and planned uses of analytics on campus, and whether institutions have a plan to measure success or ROI of BI efforts.
  - pages 21-25

- **Technical Architecture**
  - Provides additional information about the technologies and architectures on which BI efforts have been built.
  - pages 27-31

- **Staffing**
  - Includes details about the skill sets necessary for analytics on campus, and how institutions plan to grow staff in specific areas.
  - pages 33-37
Overview of Survey Respondents

Who Participated in the IT Forum’s BI Survey?

Classification of Participant Institutions

- Research Universities (very high research activity): 19
- Master’s Colleges and Universities (larger programs): 9
- Research Universities (high research activity): 7
- Doctoral/Research Universities: 4
- Medical Doctoral: 3
- Other Masters, Baccalaureate, and Medical Colleges: 5

Higher Education Institutions: 47
States and Provinces Represented: 29
Enrolled Students in Fall 2014: 1,000,000+
Executive Summary

Business intelligence and analytics initiatives have the potential to serve decision makers and leaders across the institution, but many institutions struggle to launch BI programs that are sustainable and affordable. The IT Forum has collected benchmarks on BI to help the IT function allocate resources and set goals that will make BI a long-term success on campus.

Top Lessons from the Research

**BI Struggles without Data Governance**
*Invest in tactics to standardize definitions, align processes, and centralize data access to build a sustainable BI initiative.*

- Data governance contributes to transparency, confidence, consistency, and security; without these critical pieces, BI projects can stall and even fail outright (pages 9-11)
- Collaboration with IR on BI is correlated with better data governance, higher BI maturity, and more ROI measurement (page 18)

**Consider Hiring a Dedicated BI Leader**
*Full-time BI leaders help build an initiative that is more mature, better-governed, and has stronger buy-in across campus.*

- BI leaders tend to support more collaborative efforts—which leads to more mature efforts with better ROI metrics (page 16)
- Dedicated leaders for BI are most common in initiatives with initial investment of at least $500,000, but are associated with maturity and cabinet buy-in across institution types (page 17)

**Match BI Goals to Campus-Wide Missions**
*Codify BI goals in a single, written plan and define ROI metrics for BI upfront to engage users early and demonstrate progress.*

- Fewer than half of institutions define the goals of BI in written form, creating the risk that turnover or organizational changes could obviate gains (page 15)
- More mature institutions use the institution’s strategic plan and vision to set goals for BI, and define ROI metrics to be measured at regular intervals (page 25)

**Staff Investments Outweigh Technology**
*Investments in people make up over half of BI budgets—and most plan to train existing staff rather than outsource.*

- Despite perceptions of BI as a technology project, a majority of budget dollars are dedicated to cultivating internal staff for data preparation and analysis (pages 34-45)
- Set staffing plans based on the goals and progress of BI; early success in visualization and simple dashboards can build the foundation for more complex investments
A Roadmap to BI in Higher Education

Contents

A BI Maturity Index for Higher Education
  Four Inputs Score Institutional Buy-In for BI (page 8)

Enterprise-Wide Data Governance Supports BI
  Data Governance Maturity Tied Closely to BI Maturity (page 9)

BI Initiatives Develop Maturity Over Time
  Invest in Written Plan, ROI Measures, and Leadership to Catch Up (page 10)

Not Seeing Eye-to-Eye
  Cabinet Leaders Don’t Always Understand Institutional Benefits of BI (page 11)
A BI Maturity Index for Higher Education

Four Inputs Score Institutional Buy-In for Business Intelligence

The IT Forum created a BI Maturity Index that comprises weighted inputs based on responses to the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our data remains in departmental silos</td>
<td>-5</td>
<td>-2</td>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Institutionally, data is viewed as a shared asset</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>-2</td>
<td>-5</td>
</tr>
<tr>
<td>Decisions made at high levels are validated with data from central sources</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>-2</td>
<td>-5</td>
</tr>
<tr>
<td>We align BI initiatives with institutional priorities</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>-2</td>
<td>-5</td>
</tr>
</tbody>
</table>

**Our data remains in departmental silos.**

- Strongly Disagree: 1
- Disagree: 12
- Neutral: 6
- Agree: 18
- Strongly Agree: 10

Average Score: -1.21

**Institutionally, data is viewed as a shared asset.**

- Strongly Disagree: 3
- Disagree: 13
- Neutral: 11
- Agree: 19
- Strongly Agree: 1

Average Score: +0.04

**Decisions made at high levels are validated with data from central sources.**

- Strongly Disagree: 3
- Disagree: 11
- Neutral: 16
- Agree: 16
- Strongly Agree: 1

Average Score: 0.00

**We align BI initiatives with institutional priorities.**

- Strongly Disagree: 1
- Disagree: 7
- Neutral: 12
- Agree: 23
- Strongly Agree: 4

Average Score: +1.00
Enterprise-Wide Data Governance Supports BI

Data Governance Maturity Tied Closely to BI Maturity

Defining the Components of Data Governance

- Consistently defined performance metrics stored in a central data dictionary
- Data entry quality rules and checks tied to alerts and incentives
- Tiered access to sensitive information set to individual roles and data needs
- Key data fields clean, accurate, consistent for timely, usable reports
- Sustainable roles and committee process to maintain data efforts over the long term

Data Governance at My Institution Contributes to:

- 43% Transparency into Decisions and Process
- 49% Confidence in Data and Analytics
- 57% Consistent Data Definitions and Usage
- 64% Security and Compliance for Access

Along this spectrum, which best describes the maturity of your data governance?

Regression shows a positive correlation between data governance maturity and rising BI maturity

The Data Governance Maturity Spectrum, Defined:

- **Fragmented**: Zero or few processes govern the input, collection, definitions, usage, and access of data
- **Focused**: Within a narrow terrain (e.g., reporting), policies, definitions and processes exist to maintain data quality and consistency
- **Enterprise**: Common policies and standards are in effect, with centrally-managed KPIs directing policy and plan development
BI Initiatives Develop Maturity Over Time

Invest in Written Plan, ROI Measures, and Leadership to Catch Up

When did you start your Business Intelligence (BI) initiative?

n=47

Regression shows positive correlation between age of initiative and BI maturity

What Older Initiatives Have Learned

Codify BI Goals and Methods in a Written Plan

Agree on How to Measure ROI for BI Investment

Hire a Dedicated Leader to Control and Organize BI

Percentage of Institutions with Written BI Plan

Percentage of Institutions that Have Set ROI Metrics

Percentage of Institutions that Have BI Leader

53% 41% 82% 48% 65% 34%

Started at Least Three Years Ago Started within Last Three Years

Started at Least Three Years Ago Started within Last Three Years

Started at Least Three Years Ago Started within Last Three Years
Not Seeing Eye-to-Eye

Cabinet Leaders Don’t Always Understand Institutional Benefits of BI

Too Many Cabinets Still View BI As IT Initiative

If senior leadership views BI and analytics as a purely technical IT exercise, the project will struggle to gain buy-in and long-term success. Nearly half of IT and BI leaders surveyed in this report argue that the cabinet views BI as a technical, IT project outside of their purview.

Few Leaders See BI Serving Only Academic Uses

Among the 47 IT and BI leaders surveyed for this report, only two reported that the institution’s cabinet saw BI as an academic initiative only. While virtually all institutions include academic aspects in their BI plan and investments (e.g., student success, faculty productivity), the data show that few cabinet leaders separate academic goals from enterprise-wide goals.

Administrative Benefits of BI Clear to Many

BI and analytics have clear applications to areas like procurement, where increased data quality and efficiency can have immediate positive financial outcomes. However, institutions in which the cabinet sees BI as an administrative project also have a lower average maturity than institutions where the cabinet sees BI as an IT, academic, or enterprise initiative.

Enterprise Viewpoint Provides Strongest Foundation for BI Success

A president’s cabinet that sees the full institutional potential of a BI initiative will be poised to engage the greatest number of functional areas in analysis and have the best chance of creating a sustainable and successful project. These institutions report a higher level of BI maturity and data governance than those with cabinets that see BI as a siloed project within one unit.
A Roadmap to BI in Higher Education

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Less Than Half of Surveyed Institutions Write a BI Strategy Plan (page 15)

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Full-Time Leaders A Feature of Mature, Well-Resourced Initiatives (page 16)

Prevalence of BI Leaders Rises with Initial Investment
But Not All Institutions with Large Initial Funding Hire Dedicated Leader (page 17)

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Provost Most Common Cabinet Ally for BI
Provost Support Associated with Governance Maturity, Enterprise View on BI (page 19)
Big Data without the Big Funding

Most BI Initiatives Start with Less Than $500,000 Investment

A majority of BI initiatives in higher education start with less than $500,000 investment in staff salary and capital. Larger research institutions are more likely to spend more than $1,000,000 on BI as an initial investment, but smaller investments in analytics are within reach for institutions across the spectrum.

Initial Funding Investment for BI

<table>
<thead>
<tr>
<th>Funding Category</th>
<th>Number of Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $100,000</td>
<td>13</td>
</tr>
<tr>
<td>$100,000 - $500,000</td>
<td>15</td>
</tr>
<tr>
<td>$500,001 - $1,000,000</td>
<td>6</td>
</tr>
<tr>
<td>More than $1,000,000</td>
<td>13</td>
</tr>
</tbody>
</table>

Average Planned Allocation to Funding Categories

- Staff salary, 52%
- Operating, 21%
- Capital, 27%

Staffing Leads Technology

- Despite the common perception that ‘BI’ equates to technology tools, staff investments heavily outweigh capital costs for BI initiatives at surveyed institutions.
- Seven initiatives plan to move forward with no new investments in technology compared to seven institutions that will dedicate at least 80 percent of all BI funding to staff costs.
- While several institutions plan to invest all funding in either staffing or capital costs, variance for operating costs is quite low; 70 percent of institutions have planned operating costs between five and 30 percent of total investment.
Leadership and Organization

Investing in BI, But Not Always with a Plan

CIOs and their teams use BI strategy plans to organize resource allocation, agree to goals and methods for analytics projects, and help campus constituents understand the complex goals and necessary costs of a BI initiative. However, less than half of surveyed institutions codify their BI strategy into a written plan, creating the risk that efforts will become siloed within IT or IR, lack buy-in for data governance and data sharing, and will lose the interest and attention of leadership and campus constituents.

**Components of An Effective BI Strategy Plan**

**Status Quo Problems**
- Why current decision-making processes must change
- Specific, tangible problems caused by status quo

**Leader and Sponsors**
- Senior leaders and cabinet members that will play a role guiding and supporting BI

**Institutional Goals**
- Campus-wide goals that will benefit from increased accuracy, speed, and consistency of data

**Funding**
- Dollars devoted to new technology and staff, and source of funds from central and distributed sources

**Specific Targets**
- Enterprise values (e.g., student success) and department missions (e.g., procurement) that will be included in new analytics

**Metrics for Success**
- Specific, metrics-based goals that will demonstrate the value and applicability of analytics across campus

**Wide Access to Plan**
- Accessible on campus website
- Face-to-face engagement with departments

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**Does your organization have a written BI strategy plan?**

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>55%</td>
</tr>
<tr>
<td>Yes, it is part of the IT Strategic plan</td>
<td>28%</td>
</tr>
<tr>
<td>Yes, it is a standalone plan (focused on data/analytics/BI)</td>
<td>13%</td>
</tr>
<tr>
<td>Yes, it is part of the Enterprise Strategic plan</td>
<td>4%</td>
</tr>
</tbody>
</table>

**Initiatives without A Written Plan Lacking Direction**

- Scale and use of funding
- Agreement on goals
- Data governance
- Campus buy-in

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Dedicated BI Leaders Prove Beneficial

Full-Time Leaders A Feature of Mature, Well-Resourced Initiatives

Is there a dedicated full-time leader for your business intelligence and data analytics initiative?  

n = 47

- Yes, 60%
- No, 40%

Benefits of a Full-Time BI Leader

• BI initiatives supported by a dedicated leader tend to have more
  - **BI Maturity**: The average maturity diagnostic score for institutions without a full-time leader is -2.89, and rises to 1.89 for institutions that dedicate a staff member to BI.
  - **Data Governance**: 70 percent of institutions with enterprise data governance and 73 percent of institutions with focused data governance also have a full-time staff member dedicated to BI. However, more than half of institutions identifying their data governance as fragmented do not have a dedicated BI leader.
  - **Planning**: Only 32 percent of institutions that did not hire a dedicated BI leader have a written BI plan, compared to 54 percent of institutions with a full-time BI leader that also create a written BI plan.
  - **Funding**: Initiatives with at least $500,000 in upfront investment are more than twice as likely to have a dedicated, full-time leader as those with less than $100,000 initial investment.
Prevalence of BI Leaders Rises with Initial Investment

But Not All Institutions with Large Initial Funding Hire Dedicated Leader

Although more than half of institutions surveyed currently employ a full-time leader for BI, several initiatives are entirely composed of new investments in technology. However, 85 percent of projects that began with at least $1,000,000 still maintain a dedicated BI leader, compared to 33 percent of initiatives which started below $100,000.

High Initial Funding for BI Initiative Carries into Present Leadership

<table>
<thead>
<tr>
<th>Initial Funding Level for BI Initiative</th>
<th>Percentage that Currently Employ Dedicated BI Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $100,000</td>
<td>30%</td>
</tr>
<tr>
<td>$100,000-$500,000</td>
<td>60%</td>
</tr>
<tr>
<td>$500,001-$1,000,000</td>
<td>67%</td>
</tr>
<tr>
<td>More than $1,000,000</td>
<td>85%</td>
</tr>
</tbody>
</table>

Even High Initial Funding Doesn’t Guarantee Dedicated Staffing for BI Initiatives

15% Of the 13 institutions that started their BI initiative with at least $1,000,000 in spending, 11 currently employ a full-time staff person to BI- but 2 still do not have a dedicated leader.
IT Taking the Lead On BI Efforts

Collaborating with IR on BI Drives Maturity and ROI Measurement

Where does the Business Intelligence initiative reside organizationally?

\( n = 45 \)

Institutions where IT and IR have different reporting lines (37)

- Within IT but collaborates with IR: 15
- Entirely within central IT: 13
- In a separate BI team: 5
- Within IR but collaborates with IT: 2
- Not Yet Placed: 2

Institutions where IT and IR have identical reporting lines (8)

- Within IT but collaborates with IR: 7
- Within IR but collaborates with IT: 1

How BI Benefits from Collaboration between IT and IR

- When BI is shared between IT, IR, and other units rather than being housed in a single unit, institutions show the following characteristics:
  - **More BI Maturity**: Shared BI initiatives have a higher self-assessed BI maturity than those owned entirely by IT or in a separate BI team
  - **More Attention to ROI**: Collaborative BI initiatives are more likely to measure ROI than those housed in a single location
  - **Supported by Single Leader**: Dedicated, full-time leaders are more likely to support collaborative rather than siloed efforts
Leadership and Organization

Provost Most Common Cabinet Ally for BI

Majority of Initiatives Find Non-IT Sponsor in President’s Cabinet...

51% of BI initiatives with non-IT cabinet sponsor

... And the Provost Takes A Leading Role in Most Institutions*

<table>
<thead>
<tr>
<th>Role</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provost</td>
<td>18</td>
</tr>
<tr>
<td>CBO or CFO</td>
<td>10</td>
</tr>
<tr>
<td>President</td>
<td>5</td>
</tr>
<tr>
<td>Enrollment or Admissions</td>
<td>5</td>
</tr>
<tr>
<td>Advancement</td>
<td>4</td>
</tr>
<tr>
<td>Student Affairs</td>
<td>3</td>
</tr>
</tbody>
</table>

* Multiple responses allowed

How the Provost Supports BI Initiatives

More Institutional Buy-In for Analytics

Cabinets that View BI as Enterprise Initiative

35% BI without Provost

50% BI with Provost

Stronger Data Governance Across Campus

Data Governance Maturity and Provost Involvement

- BI without Provost
- BI with Provost

Fragmented

Focused

Enterprise
A Roadmap to BI in Higher Education

Contents

Why is Higher Education Investing in BI?  
Drive for Student Success at the Core of Analytics Initiatives (page 22)

Students Front and Center  
Enrollment, Student Success Lead Investments in Analytics (page 23)

Funding Considered Largest Challenge to BI Success  
But Cultural Change and Data Governance Close Behind (page 24)

Few Institutions Have Plan to Measure Success  
Less Than Half of Initiatives Include Plan to Measure ROI (page 25)
Focus and Goals

Why Is Higher Education Investing in BI?

Drive for Student Success at the Core of Analytics Initiatives

What enterprise values were targeted for return on the BI investment?

n = 47

17% Teaching Productivity

19% Research Development

64% Student Success

Seeing the Diverse Benefits of Better BI

• In addition to the values listed above, institutions are investing in BI to take advantage of benefits to
  - More Effective State Reporting: Increased demands by state legislatures and regulators for financial and performance data
  - Faster Internal Reporting: Rapid access to key metrics for decision makers across the institution
  - More Efficient Finance and Administration: Centralized, shared viewpoint on purchasing and resource allocation decisions
  - More Transparency: Campus visibility into the metrics and considerations that drive change at the institution
  - Reduced Programmer Workload: Less need for individualized, one-off requests to access data when single warehouse serves most data needs
**Focus and Goals**

**Students Front and Center**

Enrollment, Student Success Lead Investments in Analytics

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**Which of the following functional areas do you actively manage or plan to include in your BI efforts?**

*n = 47*

<table>
<thead>
<tr>
<th>Functional Area</th>
<th>Active</th>
<th>Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment Management</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>Student Success</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Human Resources</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>General Operations</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Research</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Learning Analytics</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Advancement</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Faculty Productivity</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Faculty Performance</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Procurement</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

*While Learning Analytics requires more complex data integration and analyses, active and planned users include institutions across the funding spectrum.*
Focus and Goals

## Funding Considered Largest Challenge to BI Success

But Cultural Change and Data Governance Close Behind

*What are the top challenges for implementing your envisioned BI environment?*

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding</td>
<td>19</td>
</tr>
<tr>
<td>Transformation to a data-driven campus culture</td>
<td>13</td>
</tr>
<tr>
<td>Data governance</td>
<td>13</td>
</tr>
<tr>
<td>Executive interest/commitment</td>
<td>10</td>
</tr>
<tr>
<td>Staff capability or skill sets</td>
<td>10</td>
</tr>
<tr>
<td>Too many other, more urgent projects</td>
<td>9</td>
</tr>
<tr>
<td>Organization and coordination of existing resources</td>
<td>8</td>
</tr>
<tr>
<td>Identification of the right tools and approaches</td>
<td>4</td>
</tr>
</tbody>
</table>

See page 37 for benchmarks on the skillsets currently used and in demand for BI initiatives.

See EAB’s 2015 Study “A Common Currency” For Best Practices on Data Governance, Culture Change, and Executive Engagement

- The IT Forum has explored the most pressing issues CIOs face around data governance and transformation to a data-driven culture, and created a host of resources for members to support data-driven decisions on campus.
- Please visit [www.eab.com](http://www.eab.com) or ask your dedicated advisor to gain access our best practices and develop your successful, sustainable BI initiative.
### Focus and Goals

**Most Institutions Lack Plan to Measure Success**

Fewer Than Half of Initiatives Include Plan to Measure ROI

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**Fewer Than Half of BI Initiatives Have ROI Measurement Plan...**

...And Even Fewer Set BI Goals Based on KPI Improvement*

<table>
<thead>
<tr>
<th>Metric</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI improvement (e.g., graduation rate)</td>
<td>20</td>
</tr>
<tr>
<td>Soft returns (e.g., improved relationships)</td>
<td>9</td>
</tr>
<tr>
<td>Cost avoidance</td>
<td>9</td>
</tr>
<tr>
<td>Revenue Contribution</td>
<td>1</td>
</tr>
</tbody>
</table>

* Multiple responses allowed

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**Suggested ROI Metrics for Top BI Areas**

<table>
<thead>
<tr>
<th>Area</th>
<th>Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enrollment</strong></td>
<td>• # applications&lt;br&gt;• % yield&lt;br&gt;• Class academic score&lt;br&gt;• % of contacted recruits that apply</td>
</tr>
<tr>
<td><strong>Student Success</strong></td>
<td>• % DFW in bottleneck courses&lt;br&gt;• Students switching majors&lt;br&gt;• Graduation and transfer rates</td>
</tr>
<tr>
<td><strong>Human Resources</strong></td>
<td>• Average time to onboard and provision new employees&lt;br&gt;• Time to fill vacant position</td>
</tr>
<tr>
<td><strong>Research</strong></td>
<td>• # publications, prizes, grants by department and faculty member&lt;br&gt;• # research compliance errors</td>
</tr>
<tr>
<td><strong>Learning Analytics</strong></td>
<td>• Module completion and pace rates by discipline and course&lt;br&gt;• Faculty adoption rates</td>
</tr>
<tr>
<td><strong>Advancement</strong></td>
<td>• Percentage of MGO visits yielding gifts&lt;br&gt;• Efficiency of call center hours, staff&lt;br&gt;• % alumni donating</td>
</tr>
<tr>
<td><strong>Academic Faculty</strong></td>
<td>• Cost per student credit hour by discipline&lt;br&gt;• % of faculty teaching full course load</td>
</tr>
<tr>
<td><strong>Procurement</strong></td>
<td>• Average cost and time to process invoice&lt;br&gt;• Spend fragmentation by unit, time of year, and purchase type</td>
</tr>
</tbody>
</table>
A Roadmap to BI in Higher Education

Contents

Internal, Operational Reporting at the Core of Current BI
   Few Institutions Exceed Daily Rate for Data Extractions (page 28)

If You Build It, Will They Come?
   Most Creating ODS and Warehouse to Prepare for Future Requests (page 29)

BI by Central IT, for Central IT
   Primary, Central Data Feeds BI, With Many Reliant on Central IT for Access (page 30)

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   Predictive Modeling, Visualization Tools in High Demand (page 31)
Internal Reporting at the Core of Current BI

Few Institutions Exceed Daily Rate for Data Extractions

Which of the following best describes the types of analytics you currently produce from your BI environment? (select all that apply)  
\[ n = 47 \]

- Automated internal reporting 65%
- Manual internal reporting 50%
- Automated internal and external reporting, KPIs available, descriptive (retrospective) analytic support 39%
- Predictive analytics (e.g., forecasting retention, DFW, transfer rates) 7%
- Prescriptive analytics (e.g., advising information, major selection, program optimization) 7%

Which of the following best describes the data warehouse’s capability to access updated data?  
\[ n = 47 \]

- Real time, 2%
- Daily extractions, 76%
- Weekly extractions, 7%
- Extractions multiple times a day, 13%
- Real time, 2%
If You Build It, Will They Come?
Most Creating ODS and Warehouse to Prepare for Future Requests

Does your architecture include an Operational Data Store?
\[ n = 47 \]

- Yes, 64%
- Planned, 11%
- No, 25%

How do you assemble the data?
\[ n = 47 \]

- Extract data to pre-populate the warehouse in advance of specific requests, 76%
- Extract data only as needed for a specific project, 22%
- Left in place (no schema), 2%
- Four out of five institutions use a dimensional (Kimball) model to organize data
### BI by Central IT, for Central IT
Primary, Central Data Feeds BI, With Many Reliant on Central IT for Access

#### Which of the following best describes your current BI architecture?*

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central infrastructure implemented, including data from one or more transaction systems</td>
<td>65%</td>
</tr>
<tr>
<td>Central infrastructure with self-service tools (e.g., dashboards and drill-downs)</td>
<td>54%</td>
</tr>
<tr>
<td>Multiple data marts or reporting subsystems only (no central core)</td>
<td>22%</td>
</tr>
<tr>
<td>Optimized architecture with datamarts, operational data stores with real time feeds</td>
<td>13%</td>
</tr>
</tbody>
</table>

*Multiple responses allowed

#### Which of the following best describes your current data sources and data access?*

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise data warehouse (EDW) fed by ETL process from a few primary data sources</td>
<td>66%</td>
</tr>
<tr>
<td>Reporting tools or limited data warehouse modules as part of the major transaction systems</td>
<td>32%</td>
</tr>
<tr>
<td>EDW feed by ETL from other internal data sources (e.g., ticket sales)</td>
<td>23%</td>
</tr>
<tr>
<td>EDW feed by ETL from primary and secondary sources (e.g., state workforce information)</td>
<td>17%</td>
</tr>
</tbody>
</table>

#### Which of the following best describes the way in which users interact with the data?*

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dashboard drilldowns available to select users</td>
<td>48%</td>
</tr>
<tr>
<td>Data manipulations require manual staff support</td>
<td>46%</td>
</tr>
<tr>
<td>Static dashboard displays</td>
<td>39%</td>
</tr>
<tr>
<td>Users may freely manipulate all data to produce reports</td>
<td>30%</td>
</tr>
<tr>
<td>Dashboard drilldowns available to all users</td>
<td>17%</td>
</tr>
</tbody>
</table>
**ETL In Place for Most BI Initiatives**

Predictive Modeling, Visualization in High Demand

---

**What is the inventory of current and planned BI tools?**

<table>
<thead>
<tr>
<th>Category</th>
<th>Implemented and Purchased</th>
<th>Planned</th>
<th>Do Not Plan to Use</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extract, Transform and Load</td>
<td>72%</td>
<td>17%</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>Visualization Tools</td>
<td>51%</td>
<td>30%</td>
<td>9%</td>
<td>11%</td>
</tr>
<tr>
<td>Access Control and Auditing</td>
<td>43%</td>
<td>21%</td>
<td>15%</td>
<td>21%</td>
</tr>
<tr>
<td>Advanced Analytics / Statistical Visualization</td>
<td>26%</td>
<td>43%</td>
<td>19%</td>
<td>13%</td>
</tr>
<tr>
<td>Person Matching/Merge</td>
<td>19%</td>
<td>15%</td>
<td>40%</td>
<td>26%</td>
</tr>
<tr>
<td>Vocabulary and Semantic Management</td>
<td>17%</td>
<td>21%</td>
<td>34%</td>
<td>28%</td>
</tr>
<tr>
<td>Master Data Management</td>
<td>17%</td>
<td>38%</td>
<td>26%</td>
<td>19%</td>
</tr>
<tr>
<td>Prescriptive Modeling</td>
<td>15%</td>
<td>36%</td>
<td>30%</td>
<td>19%</td>
</tr>
<tr>
<td>Predictive Modeling</td>
<td>15%</td>
<td>49%</td>
<td>19%</td>
<td>17%</td>
</tr>
<tr>
<td>Natural Language Processing</td>
<td>4%</td>
<td>15%</td>
<td>53%</td>
<td>28%</td>
</tr>
</tbody>
</table>

---

**Tools Used by BI Teams in Predictive Modeling and Visualization**

- **Predictive Modeling**: IBM Cognos, SAP Business Objects, MicroStrategy, R, SPSS, SAS BI
- **Data Visualization**: SAS Visual Analytics, Tableau, Oracle Business Intelligence Enterprise Edition (OBIEE), Business Objects, Jaspersoft, Pentaho Data Analysis Tool
A Roadmap to BI in Higher Education

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One Fourth of Institutions Plan >20% Growth in FTE in Next Three Years (page 34)

BI Teams Combine Internal, External Staff
Existing Employees Largest Source of Analytics Staffing (page 35)

Majority of All Analytics Functions ‘Insourced’
Outsourcing Most Common for Data Warehouse Construction (page 36)

Data Modeling, Visualization Skills in Demand
Only One in Four Employ or Plan to Employ Map Reduce Programmers (page 37)
Planning to Grow Employed BI Staff

One Fourth of Institutions Plan >20% Growth in FTE in Next Three Years

How will the makeup of your BI staff change in the next three years?

n = 45

Employed FTEs

<table>
<thead>
<tr>
<th>Change Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease by 20% or More</td>
<td>4%</td>
</tr>
<tr>
<td>Decrease by 1-20%</td>
<td>57%</td>
</tr>
<tr>
<td>No Change</td>
<td>11%</td>
</tr>
<tr>
<td>Increase by 1-20%</td>
<td>28%</td>
</tr>
<tr>
<td>Increase by 20% or More</td>
<td>5%</td>
</tr>
</tbody>
</table>

Temporary Contract Labor

<table>
<thead>
<tr>
<th>Change Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease by 20% or More</td>
<td>5%</td>
</tr>
<tr>
<td>Decrease by 1-20%</td>
<td>52%</td>
</tr>
<tr>
<td>No Change</td>
<td>5%</td>
</tr>
<tr>
<td>Increase by 1-20%</td>
<td>26%</td>
</tr>
<tr>
<td>Increase by 20% or More</td>
<td>12%</td>
</tr>
</tbody>
</table>

Purchased/Outsourced Staffing Services

<table>
<thead>
<tr>
<th>Change Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease by 20% or More</td>
<td>2%</td>
</tr>
<tr>
<td>Decrease by 1-20%</td>
<td>19%</td>
</tr>
<tr>
<td>No Change</td>
<td>65%</td>
</tr>
<tr>
<td>Increase by 1-20%</td>
<td>14%</td>
</tr>
<tr>
<td>Increase by 20% or More</td>
<td>14%</td>
</tr>
</tbody>
</table>
BI Teams Combine Internal, External Staff

Existing Employees Largest Source of Analytics Staffing

Which of the following best describes your approach to BI staffing? (select all that apply)

- 18% Outsourcing to IT consultants
- 20% Outsourcing to education consultants
- 29% Leveraging other experts in the institution
- 86% Training existing staff

In an ideal situation, how would you operate your BI environment?

- 57% Combine outsourcing and in-house operations
- 28% Operate all BI function in-house
- 9% Purchase transaction systems with embedded analytics
- 4% Work with a vendor to aggregate my data with others’ for benchmarking
Majority of All Analytics Functions ‘Insourced’

Do you outsource core BI tasks or analytics functions?

n = 47

- **All BI infrastructure and analysis**: 96%
- **Executive dashboards**: 91%
- **ETL and EDW construction**: 91%
- **Prescriptive analytics (e.g., assessing the impact of potential actions)**: 60% (No outsourcing), 5% (Yes), 33% (Yes - We plan to outsource this task)
- **Predictive analytics (e.g., forecasting or simulation)**: 58% (No outsourcing), 9% (Yes), 31% (Yes - We plan to outsource this task)

- No outsourcing plan - We keep this task in-house
- Yes - This task is currently outsourced
- Yes - We plan to outsource this task
- N/A - We do not conduct this activity
### Data Modeling, Visualization Skills in Demand

Only One in Four Employ or Plan to Employ Map Reduce Programmers

**What are the skillsets of your current and planned BI staff?**

\( n = 47 \)

<table>
<thead>
<tr>
<th>Skillset</th>
<th>Current</th>
<th>Planned</th>
<th>No Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL or other programmers</td>
<td>82%</td>
<td>7%</td>
<td>11%</td>
</tr>
<tr>
<td>DBAs</td>
<td>82%</td>
<td>7%</td>
<td>11%</td>
</tr>
<tr>
<td>Report writers</td>
<td>77%</td>
<td>18%</td>
<td>5%</td>
</tr>
<tr>
<td>Data Modelers; including predictive and prescriptive</td>
<td>41%</td>
<td>48%</td>
<td>11%</td>
</tr>
<tr>
<td>Data Visualization experts</td>
<td>22%</td>
<td>46%</td>
<td>32%</td>
</tr>
<tr>
<td>Statisticians</td>
<td>22%</td>
<td>34%</td>
<td>44%</td>
</tr>
<tr>
<td>Data Scientists</td>
<td>11%</td>
<td>29%</td>
<td>61%</td>
</tr>
<tr>
<td>Map Reduce programmers</td>
<td>8%</td>
<td>16%</td>
<td>76%</td>
</tr>
</tbody>
</table>

*Note: The chart indicates the percentage of organizations with current staffing, planned staffing, and no plans for each skillset.*