

# **A Business Intelligence Strategy Proposal for The University of Michigan**

*A joint effort between*

*MAIS – Michigan Administrative Information Services*

*AIMS – Advisors on Information Management Strategy*

May 2005

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## **AIMS/MAIS Recommendation: Business Intelligence Strategy**

### ***Executive Summary***

What if the University of Michigan could track course enrollments during registration each term and notify course administrators of the need for additional sections based on pre-defined rules? Better yet, what if we could predict course demand in advance? Or improve student recruitment to yield the highest quality students while making efficient use of recruiting dollars? What if we could track purchasing patterns and direct purchasers to the best price for the equivalent product? Or could analyze research funding portfolios and predict the probability of future funding based on the state of the economy and the federal budget and then direct researchers to sources where they are most likely to get funded. These are examples of Business Intelligence (BI), which delivers insight and perspective to an enterprise by enabling data-driven decision-making. The University of Michigan is well positioned to take advantage of BI. The implementation of the M-Pathways systems and data warehouses provide a solid basis for BI: an enterprise data structure.

The University community needs to understand the positive impact BI can have and why a planned approach is in our collective best interest. BI strives to eliminate guessing and ignorance by leveraging the mountains of data collected daily in a variety of enterprise applications<sup>1</sup>. Beyond detecting and measuring specific indicators, BI extends to communicating findings about these indicators and making strategic decisions and effecting change based on those findings. BI initiatives will enable the University of Michigan to leverage our investment in M-Pathways and related systems on campus. The campus community needs to work together and begin treating BI as a core business process in order for it to become an integral part of building a more agile enterprise. In this report the Advisors on Information Management Strategy (AIMS) and MAIS recommend an approach for growing the use of business intelligence at the University.

This BI strategy proposal focuses on three keys to growing and sustaining BI in a large organization: 1) building an ideal application-neutral data infrastructure; 2) making technology choices that are aligned to business objectives and with each other; and 3) providing an organizational structure that adequately supports and promotes BI. BI will not succeed to its fullest potential even with these three keys in place, however, if they are not aligned with the information maturity stage of the organization. Organizations all have different abilities to manage, analyze, and use information to their advantage. Decisions regarding infrastructure, technology, and responsibility for BI need to account for these organizational differences.

One of the strengths of the University of Michigan is its decentralized management. With little interference, schools and colleges have the ability to respond to problems and take advantage of opportunities. We should use this strength to grow BI on campus. At the same time, we should be cognizant of the downside effects decentralization has in delivering BI. Decentralization leads to different management cultures, different priorities among our units, and different levels of information maturity. Therefore, it is

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<sup>1</sup> According to the Gartner, Inc., the leading provider of research and analysis on business and information technology.

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difficult to find solutions that fit well with every unit and that deliver information congruous with the priorities and practices of every unit.

Several successful efforts by multiple groups on campus already use the enterprise data infrastructure to gain a better understanding of their surrounding environment. These efforts, and similar future efforts, should be encouraged. However, while important needs are addressed when different units seek to resolve business problems through independently developed BI solutions, this piecemeal approach carries the danger of proliferating BI “silos” that become increasingly costly to maintain, represent multiple versions of the truth, are redundant, and prevent the delivery of the highest value BI – that which provides strategic insight into University-wide issues.

BI initiatives that are built on a common data infrastructure and are transferable to other units and other data areas pave the way for strategic BI. Enabling this requires a University-wide BI strategy – one that uses our decentralized management environment as a strength that will allow BI to grow and flourish while preventing that environment from hindering the pursuit of our collective best interests.

### **The key recommendations are as follows:**

1. Form a BI Leadership Center to bridge the efforts of MAIS, central offices, and schools/colleges in developing BI as a core business process on campus. The Center will be the BI communications hub, coordinator of BI efforts, and will strive to improve BI collaboration across campus.
2. Develop BI standards that align BI technologies within a framework to reduce redundancy, make wise choices in BI tool selection, and propagate successful BI projects across campus.
3. Encourage the pursuit of multiple BI projects, focusing especially on those with high potential for achieving one or more of the following benefits: it will improve decision making processes; there is potential for the project to be extended to other units or other data areas; the project will fill a gap in the BI infrastructure or tool suite; the project will raise BI awareness.

In short, we recommend that the University continue to take steps along an evolution toward information maturity. We need to: 1) Expose people to BI by pursuing BI initiatives in units and business areas that are ready and willing; 2) Publicize the success and benefits of these projects to increase BI awareness in order to further drive demand for BI throughout campus; 3) Increase collaboration across campus and strengthen the relationship of the schools and colleges with MAIS; and 4) Ensure that we do not end up with a redundant or disparate portfolio of technologies. As more projects succeed, awareness will grow, demand will grow, the culture will slowly change, user information needs will become more aligned, and BI will provide the strategic insight that we intended to gain when the decision was made years ago to implement M-Pathways.

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### *Introduction*

The goal of Business Intelligence (BI) is to deliver insight and perspective to an enterprise by enabling data-driven decision-making. “BI strives to eliminate guessing and ignorance in enterprises by leveraging the mountains of data that enterprises collect every day in a variety of corporate applications.”<sup>2</sup> In this context, BI is not a single computer system, but a framework for leveraging data for tactical and strategic use. BI processes go beyond detecting and measuring specific indicators to communicating findings about them and making strategic decisions and effecting change based on those findings.

*BI is not a single computer system, but a framework for leveraging data for tactical and strategic use.*

At the tactical level, BI can help enterprises optimize their business processes by identifying what trends, anomalies, and behaviors need management action. An example here at the University might be tracking course enrollments during the registration period to trigger automatic opening of additional sections based on pre-defined rules. At the strategic level, BI can provide significantly more business value by aligning multiple business processes with strategic business objectives through integrated performance management and analysis. A UM example at the strategic level might be improving student recruitment to yield the highest quality students while making efficient use of our recruiting dollars.

How do we decide how to invest and make progress in BI at the University? The Advisors on Information Management Strategy (AIMS) group was established by Laura Patterson, AVP for MAIS, in fall 2004 to partner with MAIS in setting business intelligence strategy for the University and providing management reporting and analysis to the Provost, Executive Vice Presidents, Vice Presidents, Deans, and Directors. AIMS, MAIS, and executive officers of the University are committed in their desire to leverage the enterprise data in the University’s administrative systems for strategic and management decision making throughout campus. The purpose of this report is to recommend an approach to increasing our efforts on BI at the University of Michigan.

### *The Case for BI at the University of Michigan*

We must help the University understand the positive impact that BI can have and why a planned approach is in our collective best interest. Good business intelligence does not just alert an enterprise to looming problems; it also highlights opportunities. For years members of the University community, as their counterparts in most other enterprises, have been using administrative data to make sense of their business by means of operational reports. According to Gartner, operational reporting accounts for up to 60% of an organization’s BI efforts. However, at this operational level there is no ability to see the big picture and analyze data to impact business processes. Real impact stems

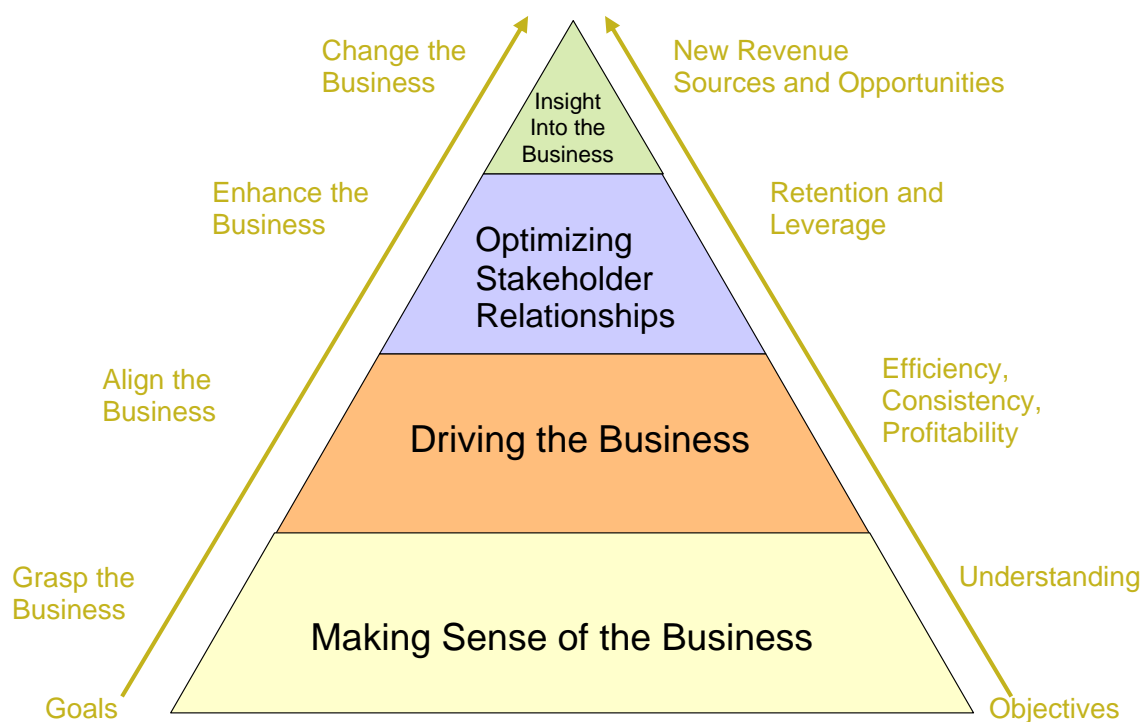
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from having the skills, organization, and ability to drive positive business change based on insight.

Gartner advises moving beyond the reporting level by making BI an active and aligned part of business management. AIMS and MAIS agree that we now need to treat BI as a core business process in order to leverage enterprise data for decision-making. Moving up the pyramid of BI (see graphic below), making sense of the business at the tactical level gives way to driving the business, then to optimizing stakeholder relationships, and finally to deriving insight into the business at the strategic level. In this progression BI becomes an integral part of the attempt to build a more agile enterprise: *understanding* the business evolves into aligning, enhancing, and finally *changing* the business. Goals include having more insight into the market than competitors do, adapting quickly to take advantage of changing business conditions, and creating new opportunities.



### *Examples of BI at the University of Michigan*

The University has several good examples of using data to improve decision making. The Medical School has developed an easy to use web-based application (M-Dash) that facilitates the transparency of information across departments in support of the School's defined key performance indicators (KPIs). Information from financial, human resources, space, local and external data sets are brought together in one virtual place on the web that offers a comprehensive graphical display for managers. Everyone now has the same data and a clear understanding of how the data is being used to measure

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performance, enabling the Medical School to make better decisions, and manage more efficiently. Moreover, the system provides the capability to do “what-if” analysis.

The Corporate Leadership Council (CLC) Metrics project brought together selected Human Resource (HR) representatives from the Ann Arbor, Health System, Flint, and Dearborn campuses to develop a common set of HR metrics using a web-based product. The product allows the user to drill into the organization from the campus level down to the unit level for fifty common HR measures with three years of trend data. Users of the tool can evaluate their approach and progress towards a diverse workforce, termination rates and reasons, and the impact of potential retirements, and evaluate how to reduce the cost of turnover. Benchmark information allows users to determine if their performance is consistent with others at the University, other public sector companies, companies of similar size, and companies within the region.

A very different example of BI can be found at the Ross School of Business where they created a Relationship Management System (RMS) that captures information on the life-cycle interactions of its various constituencies (applicants, students, alumni, corporations and friends). The system gives a broad overview of how individuals and corporations interact with the school and allows users to identify networking opportunities and utilize existing relationships more effectively. The RMS application has helped identify alumni volunteers, enabled the school’s Executive Education center to identify potential new corporate partners and individual participants for its programs, and has aided the school in the overall coordination of external relationships.

Yet a different example of BI is the push technology being developed and used in central Human Resources. Using data from M-Pathways HRMS and various procedures and technologies, HRAA Information Services delivers email to managers/personnel recipients/employees requesting they “take action”. For example, email alerts are sent when an I-9 or visa is about to expire, or to a supervisor when an employee’s probationary period is about to end.

The Financial Control reports are another good example of BI. MAIS partnered with the Financial Control Framework Task Force to determine what information was needed, the reports were designed and each School and College reviewed the full set of reports with their own data. Areas of concern were identified and practices were changed based on this information. The University lacks a centralized tool that pushes out this information to the decision maker. Currently, the decision maker is required to make a conscious effort to run the reports and do the review.

The above examples reflect ad hoc successful efforts of multiple groups attempting to use our data infrastructure to gain a better understanding of their surrounding environment. These successes establish a starting point in educating our community about the benefits of BI. In addition, those involved with these successful BI initiatives can become advocates for BI in the University community.

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### *Why is a BI Plan Needed?*

In many enterprises managers of different units seek to resolve answers to business problems through independently acquired BI solutions. Tactical business needs are addressed, but the piecemeal approach carries the danger that new BI application “silos” will be developed. This creates a BI application mess that becomes increasingly costly to maintain, creates multiple versions of the truth, and prevents the delivery of some high-value strategic BI goals (such as analyzing faculty retention) because the silos cannot share data or analysis due to the fact that the tools or data infrastructure required to support cross-enterprise BI initiatives is lacking. Gartner predicts that at least through 2005 companies will continue to adopt a large number of disparate and unrelated BI technologies, primarily by deploying applications, which will increase BI fragmentation.

One of the strengths of the University is decentralization. Schools and colleges have the autonomy to solve their unique problems and pursue opportunities that further their unit’s missions. Great things occur at the University because faculty and administrators

are empowered to act. While we should heed Gartner’s advice and be leery of creating application silos, we should also use the University’s decentralized management as a strength that will enable BI to flourish. Allowing and, in fact, encouraging units to pursue BI initiatives should not automatically result in a “BI application mess”.

*... use the University’s decentralized management as a strength that will enable BI to flourish.*

As noted above, several systems on campus are already in place or soon to be put into place that satisfy the needs of specific units, but are not available to others, or that focus on a specific area of administrative data (e.g., Human Resource, Financial, or Student) to the exclusion of others. The ability of individual units to independently pursue solutions to their problems is what enabled these projects to emerge. Collaboration and coordination among units – from project beginning to end – can prevent these individual projects from becoming application silos and enable more widespread use of each application.

Leveraging the University’s data to create meaningful return on the investment in our enterprise systems is not a goal that MAIS will accomplish alone nor can any one unit do this on its own. Success requires a campus-wide effort.

As BI is about aligning technology and data with management goals and objectives, we suspect that BI will continue to originate from both the technical/data side (MAIS) and out of the management goals in the academic, research, and service units. Wherever a BI initiative originates, it should be built on a common data infrastructure and should be transferable to other units or for other data areas. To enable this requires a University-wide BI strategy – one that uses our decentralized management processes to its advantage while managing the risk to that approach through communication, coordination, and collaboration, instead of control.

### *Avoiding Application Silos*

- *communication*
- *coordination*
- *collaboration*
- *not control*

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### ***Creating a BI Strategy for the University of Michigan***

AIMS, which includes key staff from central offices, schools and colleges, and MAIS, began work on a BI strategy recommendation in September, 2004. The group used written research from a variety of consulting groups, studied existing campus BI projects to help understand the challenges of delivering and using BI at Michigan, sought input from John King, Dean of the School of Information, and had lengthy discussions about environmental factors at Michigan that will play a role in successfully leveraging the University's data. The result is a proposed strategy built on expert advice, but tailored to the actual experiences of AIMS and MAIS at the University.

The group concluded that there are three keys to growing and sustaining business intelligence in a large organization: building an ideal application neutral data infrastructure; making technology choices that are aligned to business objectives and with each other; and having an organizational structure that adequately supports BI.

1. *Ideal Data Infrastructure:* Our data infrastructure should provide for timely, accurate data that is readily accessible through a variety of different applications. In 1998 a document entitled "Guiding Principles for Data Delivery" was prepared to guide the Data Delivery Team and members of the M-Pathways Project in building an infrastructure that did just that. While there are infrastructure issues that need to be addressed (such as speeding up the data warehouse load process, units and central offices improving timeliness of updates to the operational data, and filling data gaps in the data warehouse environment), the University possesses a data infrastructure that is ideally suited for delivering business intelligence to the campus.
2. *Technology Choices:* A variety of BI technologies exists and each of those technologies continues to evolve. There are tools for ad-hoc query and reporting, statistical analysis, data mining, graphical presentation, and many more. Many vendors have tools that provide several of these capabilities. PeopleSoft, our main operational application system provider, and Oracle, our operational database platform, are expanding into some of these BI areas as well. The University owns a suite of Business Objects tools for ad-hoc query and reporting. However, the version we own is not web-based. We also don't own their tools that support other BI functions, such as predictive modeling. Some schools and colleges have purchased their own tools to meet their particular needs. Gartner warns against the haphazard purchase of BI tools. This approach is more expensive and it leads to a series of redundant and silo applications that do not work well together. This approach typically does not lead to a common understanding of an organization's data. Because the University is large and diverse, we will need multiple BI tools to meet a wide variety of needs. But these tools need to be carefully selected in order to prevent the inefficiencies mentioned above.

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3. *Organizational Structure:* Having a clear understanding for which part of the organization is responsible for delivering business intelligence and having adequate staffing levels in those organizations is crucial. Gartner, Business Objects, and Accenture all recommend forming a central BI group to oversee and coordinate BI efforts. Currently, staff supporting business intelligence are scattered throughout the University. Many of them don't recognize their efforts as part of Business Intelligence. MAIS has some staff working on BI issues, but none devoted full-time. Some schools and colleges have staff that have implemented or are implementing BI applications. Many smaller units have nobody focused on this area. Coordination of BI could be performed by a small central group with many more BI people working within the schools and colleges or, this could be a large BI group with much broader responsibility and very few staff in the schools and colleges. The idea is to leverage the University's skills set and reduce redundancy while organizing BI support and dividing responsibility by what fits best an organization and its culture.

Decisions regarding those three keys must take into account what BI consultants refer to as the "information maturity" of the organization. A BI strategy needs to be tailored to the organization's current position along their information maturity cycle. Even with a great data infrastructure, the latest tools, and a BI organizational structure in place, BI will not succeed to its fullest potential if the infrastructure, technology and organization are not aligned with the information maturity stage of the organization.

The information maturity cycle takes into account the cultural and human factors, and the organization's awareness of the potential use of BI which can inhibit an organization's ability to leverage its data. An information mature organization is one whose culture and skills have evolved in their ability to sustain an environment where everyone believes in the value of business intelligence, information is trusted, widely shared and easily accessible, analysis of data is ingrained in the management decision making process, and that analysis is automatically fed back into the operational processes to improve the organization. Realistically, the University as a whole is just in the infancy stage of this evolutionary process. Some units or data areas within the University are further along.

Culture is perhaps the most difficult challenge in leveraging the University's data for strategic value. John King shared this view when he spoke at an AIMS meeting. There is concern that new types of management information, unfamiliar to many administrators, may not be used to its full advantage or could even have adverse impacts on our operations. Many employees are entrenched in their processes and will not easily embrace new ways of viewing their operations. From the Medical School's example, we know that deriving maximum benefit from an executive management system requires a commitment by the senior leaders to manage the organization in a

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different way and the courage to stay the course. Although there are deans and executive officers requesting better management information, there is not yet strong enough University-wide commitment to achieve maximum benefit from the data we collect in our enterprise systems. Implementing BI systems for a unit without commitment from that unit's leadership to manage and make decisions with the information provided may result in an unused system, wasted resources, and lost opportunities. It could even slow the adoption of BI on campus.

Our culture will also require strong collaboration among the units, especially between MAIS and the schools and colleges, for business intelligence to be successful. Recent results of the Gartner Business Intelligence Readiness Survey that AIMS members participated in, although not conclusive, indicate that schools and colleges have not been strong partners in the selection and implementation of new systems. Schools and colleges need to increase their level of participation and MAIS needs to increase its level of collaboration.

The results show a belief that the school/college user community is not driving business intelligence initiatives and pulling MAIS to develop new applications. This is an indicator that school and college administrators need to be made more aware of the capabilities and benefits of BI. Leveraging the University's data in a way that will have a significant, positive impact must be primarily driven by the schools/colleges and other leaders of the University's academic, research, and service missions.

The skills required to ensure success with BI are somewhat different from the technical skills we normally find in our traditional Information Technology departments. BI is about delivering information and insight and therefore, requires a high degree of analytical capability. A person with strong BI skills is one who has the right mix of technical and analytical skills with a strong understanding of the University's core business processes in order to link technology and information to the business needs. Advanced skills include statistical analysis and data modeling. There are many people scattered throughout the University who possess these BI skills. However, not every unit has people, or has enough people, with these skills. It may also be the case that some information areas are more saturated with analytical skills than others. For instance, we likely have many more financial analysts at the University than we have student data analysts. And we have fewer analysts that can work across different types of data (HR, SA, Fin, etc.). If true, it may be riskier to implement a BI project around multiple data types than to implement a financial or human resources data BI project. However, it is also true that we should invest in building skills in key areas (e.g., student, curricula, research) of the University, as that may have greater impact on the University in the long run.

We should also keep in mind that Gartner's research suggests there is a growing gap between the quantities of data organizations have in their data warehouses and the number of people they have to analyze that data. They say BI skills are scarce and predict that demand for these skills will outweigh supply by 2-to-1 in the next few years.

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It is not cost effective for all the units to create separate systems to solve their individual reporting needs. It would be ideal if we could implement just one or two applications that meet our most pressing, collective needs and would have a broad, positive impact. In itself, this is a difficult goal to accomplish in a decentralized university, but even more so for an organization that has yet to achieve a high level of information maturity.

Administrators need to spend time using and understanding the capability of BI tools before they can partner with AIMS and MAIS in prioritizing needs and choosing appropriate tools. Some administrators are ready. Others need much more exposure to increase their BI awareness levels. Multiple approaches will be required throughout campus.

### ***Recommendations***

Instead of searching for the major initiatives that will revolutionize the way we do business, we recommend that the University continue taking a series of steps along an evolution toward information maturity. We need to expose people to BI by pursuing BI initiatives in units and business areas that are ready and willing. We need to publicize the success and benefits of these projects to increase BI awareness in order to further drive demand for BI throughout campus. We need to increase collaboration across campus and strengthen the relationship of the schools and colleges with MAIS. We also need to ensure that we do not end up with a redundant or disparate portfolio of technologies.

Our major recommendations are as follows:

1. **Form a BI Leadership Center** (see Appendix A for more details) that can be a focal point for campus. The BI Leadership Center should help bridge the efforts of MAIS, central offices, and schools/colleges in developing BI as a core business process on campus. The BI Leadership Center will help MAIS understand user needs and help campus understand the value and capability of BI.

Those staffing the BI Leadership Center should include a combination of people who understand the University's technology and data, and people who understand the needs of the units. There should be a combination of people with analytical skills, technical skills, and knowledge of the "business." Good communication skills are a must. Gartner Research says to staff the BI Leadership Center with tech savvy business people rather than business savvy technical people. Having both seems even better.

The Leadership Center will be charged with the following:

- Increase awareness and understanding of BI on campus, and improve coordination and collaboration on projects as the communication center for BI
- Facilitate the development of a BI strategy and framework for campus
- Provide leadership, support and advice to BI projects across campus
- Lead key BI efforts that cannot be accomplished elsewhere

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- Develop training and education efforts that lead to increased BI skills on campus
- Ultimately evolve over time to become the center of expertise for BI on campus and provide high level analytical consulting skills.

The BI Leadership Center should report administratively to the Associate Vice President for MAIS. MAIS should identify a core team of dedicated staff who can start to develop the BI Leadership Center. We foresee central offices and schools/colleges identifying staff to work with this core team on specific initiatives or projects in order to leverage the skills, knowledge, experience, and resources already invested around campus. Some of these staff may even have temporary appointments in the BI Leadership Center.

The BI Leadership Center is just one of many units that will be contributing to the University's efforts in BI. However, we expect the BI Leadership Center to become our center of expertise that all of campus can leverage in one or more ways as we make progress in this critical area.

2. **AIMS, MAIS and the BI Leadership Center should work together to develop BI standards** with an aim towards aligning the University's BI technologies within a framework. The goal will be to reduce redundancy, make wise choices in our BI tool selection, and have the ability to expand successful BI projects across campus. The framework will guide us as we choose tools and prioritize BI projects. Working within a framework means that we choose tools that fit well with University or unit strategies, are adaptable to the culture of the end user units, can be supported by the organizational structure, and work well with the existing data infrastructure. Specific details of the proposed framework can be found in Appendix B.

We should use existing projects, future project proposals, and evaluations of potential tools to determine proper criteria for standards that will develop as the organization evolves.

3. **The University should pursue multiple BI projects.** For now, projects should be localized at the unit level or centrally by data area (finance data, admissions data, etc.) where common unit needs can be met. It is not necessary or desirable for the BI Leadership Center to lead every project. Units should be encouraged to pursue their own initiatives if they have adequate resources and knowledge. However, the BI Leadership Center should be aware of each project for reasons stated in recommendations number one and two. MAIS/AIMS "endorsement" of projects and contribution of resources should be provided for projects that have high potential for achieving one or more of the following benefits: it will improve decision making processes; there is potential for the project to be expanded to other units or other data areas; the project will fill a gap in the BI infrastructure or tool suite; the project will raise BI awareness.

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All BI projects should be accompanied by a curriculum/training to help users develop a common language around the information, understand how to interpret the data, learn the questions they should be asking about the data, and understand what conclusions they can and cannot draw from the data.

We do not mean to draw a distinction by size of project and imply that the University should prefer only small projects for now. Rather, the University should pursue projects where the demand is apparent and where benefits are clear and likely to accrue. As it is difficult to arrive at a common set of information needs among diverse groups, that probably means we will pursue smaller rather than large projects at this stage in our information maturity cycle. However, if the demand is there and the use of the tool has been well defined, we should not let the size of the project restrict our decisions. We simply should let user demand drive our decisions.

These recommendations closely follow the advice from BI strategy consultants for an organization in the early stages of BI. They suggest starting with small projects and building the organizational capacity for more complicated projects to succeed. As more projects succeed, awareness will grow, demand will grow, the culture will slowly change, user information needs will become more aligned, and software standardization will become a more realistic goal.

A key feature of this strategy is technology alignment, which should not be defined as having just one or two centrally supported tools or be meant to discourage individual units from pursuing their own initiatives. Alignment means that the tools work together as part of a common data environment and that overlap within the University is reduced as much as possible. Standardization enables that. Because there are many different types of users and different tools do different things, we likely need to have a portfolio of tools.

Success in aligning our BI technologies will not be determined by having a great policy about BI standardization. It will be determined by the strength of MAIS' partnership with the schools, colleges, and other units. We believe that our recommendations carry a secondary benefit in that they should naturally strengthen that partnership. Creating the BI Leadership Center within MAIS to become the center of expertise, working with campus units to develop BI standards, beginning with projects that have higher probability of success, and publicizing the successes will all help to build trust between MAIS and other units, thus enabling us to pursue more complicated initiatives in the future.

As our goal is to expose people to business intelligence as quickly as possible, it makes good sense for near-term projects to focus on uses of existing data rather than projects that require the creation of new data. We can also spread the use of BI around campus more quickly by expanding the use of existing BI applications as much as possible. AIMS is undertaking a survey of units in order to compile an inventory of BI tools being used by schools and colleges. The group also plans to discover what unique queries and

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reports people are creating and what types of information decision makers are asking for that is difficult to provide. The information collected will be used as a starting point for recommending projects that should be pursued.

More specific information regarding the proposed BI Leadership Center and the proposed BI framework for UM can be found in the following appendices.

## **Appendix A**

### **The BI Leadership Center**

Gartner Research, Business Objects, and Accenture all recommend the creation of a central group that provides a roadmap for BI and promotes consistency across the enterprise. The group should comprise skills and knowledge of the business, information technology, and analytical skills such as those of an econometrist, statistician, etc.—someone who understands the math behind the analysis). Consistent with that recommendation, AIMS recommends the creation of a BI Leadership Center.

The BI Leadership Center should help bridge the efforts of MAIS, central offices, and schools/colleges in developing BI as a core business process on campus. The BI Leadership Center will help MAIS understand user needs and help campus understand the value and capability of BI.

Those staffing the BI Leadership Center should include a combination of people who understand the University's technology and data, and people who understand the needs of the units. There should be a combination of people with analytical skills, technical skills, and knowledge of the "business." Good communication skills are a must. Gartner Research says to staff the BI Leadership Center with tech savvy business people rather than business savvy technical people. Having both seems even better.

The BI Leadership Center will be charged with the following:

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2. Facilitate the development of a BI strategy and framework for campus
3. Provide leadership, support and advice to BI projects across campus
4. Lead key BI efforts that cannot be accomplished elsewhere
5. Develop training and education that lead to increased BI skills on campus
6. Ultimately evolve over time to become the center of expertise for BI on campus and provide high level analytical consulting skills.

Let's take a closer look at what might be included in each item:

1. Increase awareness and understanding of BI on campus as the communication center for BI
  - Be aware of BI projects on campus
  - Publicize successful BI efforts and expose administrators to the power of management information
  - Be aware of other major projects that could impact BI and look for opportunities to improve BI (e.g., the HR Classification Project has an impact on BI)
  - Help leverage existing technology and skills by identifying common needs, demand for common skills, and opportunities to transfer existing BI to other areas
  - Engage University management groups such as BAG and HRCG in BI discussions

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- Help to encourage support of University leadership for BI initiatives with high strategic value
  - Coordinate user networks (electronic and face-to-face)
  - Be a leader in the push to encourage the use of data in decision making
2. Facilitate the development of a BI strategy and framework for campus
    - Work with AIMS and campus on development and continuous refinement of the BI framework
    - Help central offices, schools and colleges make good technology and project decisions
    - Recommend to AIMS and MAIS which central BI projects should be pursued and which unit projects require/deserve central resources
  3. Provide leadership, support and advice to BI projects across campus
    - Lead, support or advise on unit BI projects depending on the needs of the unit
    - Keep abreast of the status of all BI projects to help steer the University in the same direction
    - Assist with or lead tool evaluation
    - The BI Support Center would slowly evolve into the center of expertise on campus.
  4. Lead key BI efforts that cannot be accomplished elsewhere
    - Lead or support central BI initiatives. “Central” may apply to the whole University or some significant subset of the University (e.g., small schools who don’t have the resources to do a project on their own)
  5. Develop training and education that lead to increased BI skills on campus
    - Create or assist in the creation of curriculum to be delivered with BI projects
    - Develop or coordinate the development of training programs to teach people about BI software
    - Develop or coordinate the development of training programs to teach analytical skills
    - Be the “HR coordinator” for BI staff throughout the University to ensure employees have career growth and assist units with BI hiring
    - Work with existing groups such as CSAR to help build analytical expertise
  6. Ultimately evolve over time to become the center of expertise for BI on campus and provide high level analytical consulting skills.
    - For example,
      - Be the experts for data mining
      - Be the experts for statistical analysis

### Staffing the BI Leadership Center

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The BI Leadership Center should report administratively to the AVP MAIS. MAIS should identify a core team of dedicated staff who can start to develop the BI Leadership Center. Central offices and schools/colleges may identify staff who will work with the BI Leadership Center on specific initiatives or projects in order to leverage the skills, knowledge, experience, and resources already invested around campus. Some of these staff may even have temporary appointments in the BI Leadership Center.

The ideal BI Leadership Center staff members will have a combination of analytical skills, technical skills, and/or knowledge of the business (some that understand school/college business, some that understand central office business) and good communication skills. Detailed knowledge of particular data sets is less necessary in the initial stages as that expertise can be borrowed from elsewhere.

Secondary staff of the BI Leadership Center will have primary appointments in schools/colleges, other MAIS divisions, and central offices. These people can be called upon to support, staff, or lead projects as necessary for fractional time or at 100% for a small period of time. For example, the BI Leadership Center may need somebody with detailed knowledge of finance data sets so they borrow a staff member from the Fin CPU. Or the BI Leadership Center needs somebody to lead a project concerning faculty workloads for a particular school so they borrow somebody from a school/college who may have done something similar.

The availability of secondary staff is what allows the BI Leadership Center to grow and shrink depending on demand, and be agile enough to respond to a wide variety of needs. It is impossible to have a center with full time staff that knows everything that every BI project will require. The primary staff should be able to respond to many of the basic needs. The secondary staff is brought in when the needs are too big for the primary staff or very specific expertise is required.

### Project Support/Leadership Philosophy

The BI Leadership Center is just one of many units that will be leading and supporting BI initiatives. Some small schools and colleges may have nobody to lead or work on a project so the BI Leadership Center may lead, staff, or coordinate the project via its network of experts across campus. Sometimes a school or college will need extra help, some guidance or somebody to lead the project. The BI Leadership Center can help facilitate this.

Some BI initiatives might be best led under the direction of a MAIS division (SA, HRMS, Financial, etc.) if the scope of the project requires a lot of expertise and staff and has broad application. For example, a University-wide project centered on financial controls will probably require a lot of financial data expertise and might be best run by the Financial CPU, with some assistance from the BI Leadership Center. Other BI initiatives may deal with a combination of finance data, HR data, and enrollment data and neither CPU is perfectly suited to lead it. The BI Leadership Center may lead this type of project.

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Some projects will be too big for the BI Leadership Center to handle alone, such as a campus-wide Business Objects upgrade. The BI Leadership Center could lead this and pull in sufficient resources from other parts of MAIS. Or somebody else could lead this and the BI Leadership Center could just play a defined role within the project.

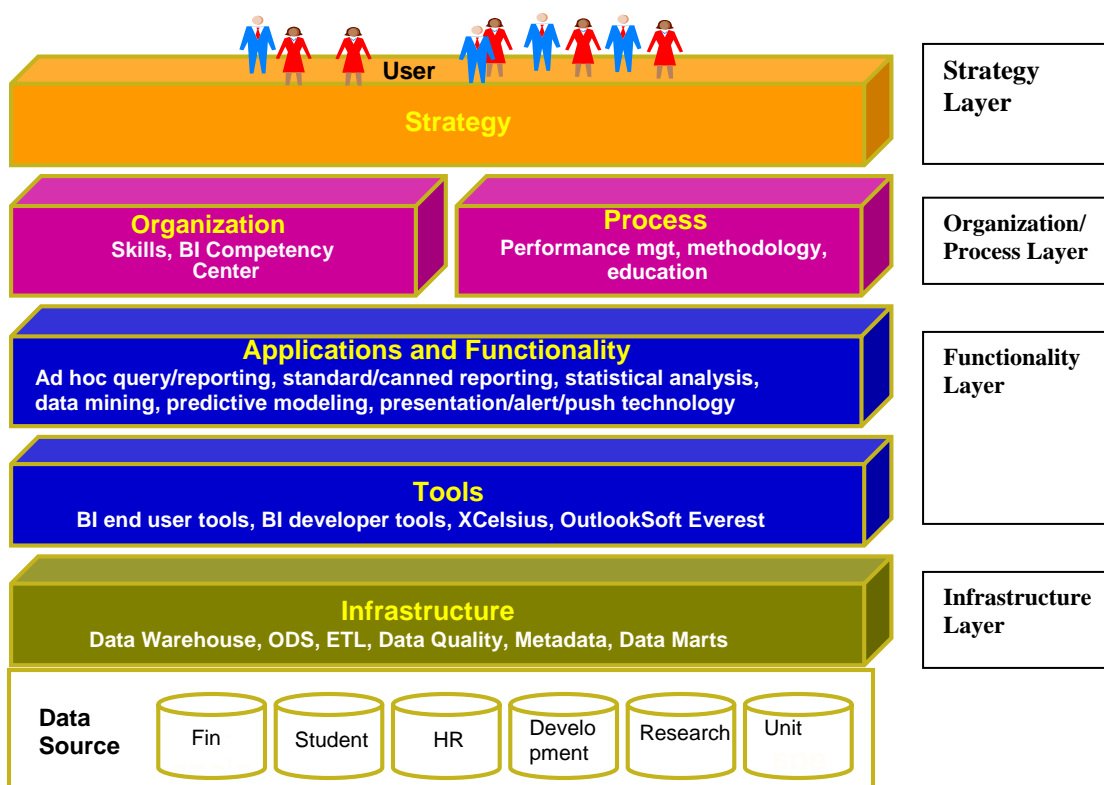
Spreading awareness and knowledge about BI and being the keeper of the BI strategy and framework are the two most important goals of the BI Leadership Center. This will be accomplished through communication, coordination of projects, and improving collaboration among units. Participating in projects is necessary for the BI Leadership Center to achieve those goals, but it is not important whether its participation is in a leadership role, a support role, or an advisory role. Decisions about leading, supporting, and staffing projects should not be made by the BI Leadership Center alone. Over time, criteria can be developed to help with this decision process. In the beginning, the BI Leadership Center has to make these decisions in consultation with AIMS and the rest of MAIS in order to ensure that each project is being run and staffed by the most appropriate people.

## Appendix B

### Proposed Supporting Activities – The Gartner Framework

Gartner Research has developed a framework<sup>3</sup> to enable an enterprise to align various BI initiatives in the most efficient and effective manner. Using this framework, MAIS completed an analysis of its current situation and proposed a number of activities. This analysis was shared with AIMS for input and there was consensus that this analysis was a good starting point for detailed BI planning activities.

#### UM BI Framework



The framework suggests that enterprises align their BI initiatives for each of these layers. Each layer affects the others, and maximum benefit is only achieved if we understand how each layer fits together. Layers have a meaningful return only if viewed in combination with the other layers. It is of little use to have an infrastructure if there is no BI functionality that uses it. And it is of no use to apply BI in a way that doesn't fit the

<sup>3</sup> Hostman, Bill, "Organizing for BI," Business Intelligence 2004 Conference, Chicago, IL; used by permission of Gartner, Inc.

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organizational culture. In an overall integrated framework, each layer has its own specific and indispensable contribution to the overall return on investment.

Gartner advises a building block approach to this framework—building on what already exists, rather than starting completely over for BI.

### Infrastructure Layer

The BI infrastructure leverages the data sources in the transactional systems. It is crucial to have an infrastructure level in which the data is collected, integrated, and generically made accessible. Optimally, this is done by developing a data warehouse fed by an extraction, transformation, and loading (ETL) approach. At UM, we have a solid foundation for moving forward with BI in this layer. A comprehensive and relatively integrated data warehouse with good data quality and supporting metadata already exists. Data stewards are in place to manage policy around data access, interpretation, sharing, and proper use.

### Functionality Layer

The BI functionality layer consists of BI applications and tools. No single tool is capable of meeting the broad spectrum of needs in BI, so enterprises need multiple tools to produce and deliver BI applications. However, an enterprise should minimize the number of tools that can deliver the same type of application (e.g., metrics, predictive analytics, statistical analysis, ad hoc reporting). At UM, we have some tools in place that can meet certain needs. BusinessObjects, a front-runner in the BI tool market, remains our supported tool suite for ad hoc queries and running pre-defined reports. However, more tools are needed to meet other needs, and in some areas the University may own multiple tools that meet the same need.

### Organization Layer

Organizational characteristics drive which BI functions are needed and how to deploy BI. At this level, several critical factors need to be addressed: Does the organization have the right analytical, business, and IT skills to deliver BI? Are the right decision-making processes in place to leverage BI and at what level (e.g., planning and control, balanced scorecard)? Does the information culture support broad sharing of information? Is there a central group that can advise and coordinate BI activities? Are the different types of users identified (e.g., power, casual, executive, managerial)? This level of the framework is the critical link that allows an organization to leverage BI. There are some good things started in this area but more needs to be done to get to where we need to be.

### Strategy Layer

The purpose of BI is to leverage data to make better decisions. At this level, the strategy of the University (or the school/college) should drive what is developed and delivered in all of the other layers. The need to form new partnerships, outsource something currently done internally, address mandates such as Sarbanes Oxley, etc. are all examples of strategies that can drive the need for BI. Clearly

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this is happening in pockets within the University (e.g., the Medical School and their M-Dash/M-Stat system). More effort is needed to align BI investments to the appropriate strategies to ensure a return on investment.

### **Proposed Activities**

The list of activities defined as a starting point can be categorized into the four layers above as well as by timeframe. MAIS has not identified a task in the Strategy Layer of the framework as that layer must be established by those managing the “business” of the University. The list of activities for MAIS is clearer at the lower levels of the framework. Additional input is needed to complete all levels. Work needs to be done to define the details of these activities, assess the resource requirements, confirm dependencies, set priorities, etc. A team should be identified to start to do this detailed planning effort.

There are four assumptions used as the basis for these potential activities. They include:

- The primary delivery mechanism for business intelligence applications will be the web.
- The primary source for business intelligence applications will be the data warehouse, though we do expect to leverage the transaction systems as needed.
- MAIS will collaborate with AIMS throughout the course of all BI planning and activities.
- MAIS will initially establish a project team with a project manager and a small group of dedicated staff.

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<b>Framework Layer</b>	<b>POTENTIAL ACTIVITY</b>
Organization/Process	Establish BI Leadership Center (identifying key resources on campus to assist with early BI projects).
Organization/Process	Work with AIMS to develop education/outreach plan; demonstrate initial BI efforts broadly around campus.
Organization/Process	Review Web Reporting Project goals for possible further action.
Organization/Process	Include in project methodology AIMS' review of large MAIS projects to identify BI opportunities.
Organization/Process	Consider revising training requirements for users who solely use predefined reports in the DW.
Organization/Process	Establish BI Project Team (identifying key resources on campus to assist with early BI projects).
Organization/Process	Assess BI skill sets within MAIS.
Organization/Process	Assess readiness for next phase of BI with AIMS.
Organization/Process	Document and develop a BI methodology based on initial projects.
Organization/Process	Train MAIS on analysis and other BI skills (e.g., data mining, predictive modeling).
Organization/Process	Increase education about Data Policy and Guidelines to broaden awareness of emphasis on sharing data and responsibility for correcting it.
Organization/Process	Increase frequency of labs; develop user groups/networks to leverage current query/reporting capabilities and educate on BI.
Organization/Process	Work with AIMS on long-term organization.
Organization/Process	Review large MAIS projects to identify BI opportunities.
Organization/Process	Solicit input from AIMS on projects that can contribute to functionality/data/tools gaps in the BI area as part of MAIS Strategic Planning.
Applications & Functionality	Manage and coordinate small initial BI efforts that use existing data.
Applications & Functionality	Investigate evolving BI-oriented capabilities of products MAIS already owns (Oracle OLAP/data mining, BusObjs drill-down, etc.).
Applications & Functionality	Investigate tool(s) for statistical analysis, data mining, predictive modeling, presentation/alert/push technology, BI developer tools.
Applications & Functionality	Investigate embedding analytics in operational applications.
Applications & Functionality	Determine requirements and conduct evaluations for tools investigated above. Purchase; implement.
Applications & Functionality	Create additional integration across data sets (e.g., by developing more reports that combine data from different data sets).
Applications & Functionality	Continue to work with central offices and units to identify necessary management reports.
Applications & Functionality	Continue to keep abreast of BI-oriented developments with products MAIS already owns.
Infrastructure	Identify/inventory unit data with University-wide value. Develop plan to move those to the DW.
Infrastructure	Investigate the possibility of more snapshot data in the DW.
Infrastructure	Create more aggregate data in existing DW data sets to ease metrics reporting and/or create more application data sets.
Infrastructure	Strategize on purpose/necessity of current ODS environments to determine if they have a role in BI.
Infrastructure	Develop archive/purge plan and determine its place in a long-term DW ETL solution, which seeks to decrease extract/load processing times, in part by moving only new/changed data where possible.
Infrastructure	Review OLTP environments to identify data not in the Data Warehouse that might be useful to users. Resolve data interpretation issues.
Infrastructure	Plan migration to WebI for BusinessObjects.
Infrastructure	Add more data to DW as needed to fill gaps and to help the data warehouse be the primary reporting source for all central data sources.

## **AIMS/MAIS Recommendation: Business Intelligence Strategy**

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