Enterprise Case Study: Improving Financial Decision-Making with Data and Analytics

How Robert Morris University focused on data quality to drive profitable investment decisions

Surya Mukherjee
Summary

Catalyst

Across industries, financial planning/management is critical to sustainable enterprise growth, and education institutions are no different. Resources are finite, but investment opportunities are many, which means less capital ends up chasing more avenues. Difficult choices need to be made by enterprises and institutions every day; difficult, because the results and ramifications of choices made today will only be apparent years from now. However, many enterprises and institutions continue to analyze "blind," making decisions on outdated, abstracted data that oversimplifies the complexities of programs/business processes. While financial performance management technologies and practices are mature and well understood, institutions struggle more with the cultural and organizational dynamics surrounding the application of data-driven approaches to investment and programmatic decisions. In addition, these projects tend to be disruptive in nature, requiring a lot of patience and commitment in the early stages to ensure data is granular and credible before analysis can begin. This case study sheds light on how one institution navigated the process successfully, and offers important "lessons learned" that can be leveraged across industries.

Ovum view

The higher education industry is experiencing a period of significant turmoil. Shifting student demographics, a changing competitive landscape, and an increasingly challenging business environment are driving the demand for accountability and demonstrable outcomes. Unfortunately, most institutions struggle to understand the true costs and benefits of individual programs, simply because there is not enough curated and validated data to arrive at any conclusions. The only way to run a lean and effective learning portfolio is to treat data as an institutional asset that can provide substantial returns – if it is invested in, curated, and enriched on a regular basis. This is a large-scale transformation that requires holistic vision, willingness to invest time and effort in the initial stages (building a data warehouse can be laborious, expensive, and time-consuming), and a conscious effort to change the institutional culture. One-off data exercises performed in a silo cannot achieve these ends. Also, making financial plans and investment decisions that impact everyone cannot be the office of finance's burden alone. Unless every part of the enterprise invests in, co-owns, and believes in its data, financial planning and analysis will continue to be myopic in nature at best. Ovum believes that building a holistic financial plan from the lowest level of granularity is of paramount importance to education institutions, but it is no less important to any industry that faces resource allocation dilemmas.

Key messages

- Extreme competition, tight regulation, and demographic shifts have resulted in margin pressures for the higher education industry, leading many players to consider program portfolio adjustment.

- To create sustainable growth, Robert Morris University (RMU) needed to understand its business better and make smarter, data-driven decisions on how to run its operations, which needed a fundamental change in data architecture.
The business strategy was to conduct a nuanced evaluation of each program in a great level of detail and choose a technology platform that would help create a holistic analysis of data.

Based on their industry credibility, prior experience, and interoperability, RMU chose Oracle's planning and analytics solutions.

Using Oracle, RMU was able to bring data discipline and examine programs in detail in multiple ways (by student, program) to provide prescriptive insights.

Recommendations for the higher education industry

Recommendations for institutions

Think about data hygiene before, alongside, and after the analysis

Although analysis is the ultimate goal, data paves the path to get there. It pays to clean up as much underlying data as possible in a broad sweep before commencing analysis; problems compound very quickly if data quality is treated as an afterthought, and the price of fixing bad data that has already been analyzed is much higher than getting it out of the way before the project begins. Even after the project is put into production, it is worth putting safeguards in place (such as field-aware forms) to ensure that identified errors do not creep into new data again.

Identify stakeholders, assess IT and business culture to get buy-in

For institutions trying out an analytics platform for the first time, it pays to be mindful of the quantum of change involved at both the business and technology level; ultimately, the solution only works if it creates a win-win for all affected parties. Often, decision-makers from academics, administration, and IT will have divergent requirements, different levels of authority, and conflicting experiences with vendors. To push a successful business case, the champion must identify the key stakeholders and have a rough idea of their propensity to support the decision. A business case that is tailored to address specific needs and concerns will greatly improve the chances of approval. Culture change in itself is a mammoth task and needs executive sponsorship. Presidents and provosts need to be change evangelists and challenge recommendations when inadequate data is provided to support the decision being made.

Do not forget the softer aspects of planning and avoid data silos

While the importance of structured financial data cannot be overstated, nuanced analysis can only come from a blending of semi-structured and structured data. Students leave a long trail of data behind them across multiple channels. They are also one of the most receptive demographics when it comes to soliciting opinions about institution performance, which can benefit any data collection and analytics exercise. However, this data is seldom captured and codified. It is imperative that institutions look to blend data from these multiple channels, both financial and non-financial, into a cohesive entity. This is easier said than done, not least due to the mix of technologies, the divergent pace of evolution of platforms, and the lack of expertise in analytics. However, rather than considering this as an afterthought, it pays to invest time up front to ensure that there are minimal analytic/data silos in the institution.
Higher education in particular suffers from severe planning silos. At a minimum, enrollment, academics, finance, and marketing must work together to produce an integrated plan. Shared assumptions are the first step in this process.

Recommendations for vendors

**Remember, product + services = solution**

Institutions are in a perpetual state of dichotomy when it comes to technical and data analysis skills. Many train PhD students on data science but are laggards when it comes to taking their own advice. Vendors need to realize that low-touch models that throw technology products at problems will rarely work, especially when it comes to analytics. Even in commercial enterprises, 60–70% of the effort and time is spent building and refining the data infrastructure before analysis can commence.

Hand-holding or professional services are necessary to ensure product adoption and configuration. Implementing new solutions is never simple, and vendors frequently win over competitors largely because of tertiary factors such as the presence of a strong collaborating user group, reasonably priced 24×7 support, and readily available skills in the market. Although providing professional services may not be possible for every vendor, it pays to have a system integrator partner joined at the hip with the technology team so that users have an easy adoption and break-fix path. In most cases, this service can be bundled with the solution and enterprises are happy to pay to receive a higher level of service.

Using analytics and data discipline to steer institutions toward sustainable growth

**Setting the business context**

**Understanding the true levers to profitability and revenue**

For education institutions, the need for accountability and better/smarter decision-making has never been more important than it is now. A largely predictable classroom-based ecosystem and business model has undergone a dramatic shift across multiple planes: rapid digitization and competing online learning models; changes in student/industry preferences; continual funding shortages; and, most importantly, the ever-expanding level of scrutiny of student debt continue to plague institutions. The cost of doing business continues to grow, and so do public and accreditor expectations around accountability. Institutions are expected to do a better job of providing evidence that they are fulfilling their educational missions – also known as "outcomes assessment" – than they have in the past. As a result, many institutions today are choosing program depth over breadth, focusing on investing in learning areas that they can truly differentiate on and profit from over the longer term. They are also looking to reduce costs, increase productivity, and keep healthy cash flows while planning for sustainable growth – the list keeps getting longer. Student success as measured by job placement is also an important criterion for institutions.

Easier said than done. Large institutions typically run complex webs of programs spanning hundreds of learning modules with interconnected resources and outcomes. Also, unlike other industries, higher education is "mission based" rather than profit/revenue based, which means that definitions of success and value can vary from program to program. This makes assessing individual programs
very difficult. The industry as a whole needs a better way to forecast the short- and long-term impacts of rebalancing their program portfolios. One of the key reasons for the lack of forecast accuracy is rooted in data, or the lack of it. Higher education institutions have good visibility into total operational costs and total revenue collected, but little or no visibility into individual program, degree, and course costs or the cost per student. The pitfalls of making suboptimal decisions can be significant; not only could it impact profitability, but it could also have human costs – hurting the interests of students that are most in need of help.

**RMU caters to a wide range of educational needs, each with varying payoffs**

Based in Moon Township, Pennsylvania, Robert Morris University was founded in 1921. It is a private, masters-level university with five schools: business management; engineering, mathematics, and science; communications and information systems; nursing and health sciences; and education and social sciences. It enrolls more than 4,400 undergraduates and more than 800 graduate students.

Like many other traditional institutions, RMU is highly dependent on tuition revenue, a trend that will likely continue with declining endowments across the US. It is also negatively impacted by declining traditional student demographics (first-time full-time freshmen) in the northeast, which forms a large part of its student demographic.

To deal with these challenges, RMU decided to examine program rebalancing, which first and foremost required it to capture and evaluate granular data about each program. The university realized that such data, if properly collected and harnessed, could be used across multiple projects and thereby benefit the institution on multiple fronts. The initial intent with data was to know conclusively which programs, student groups, and modules were profitable, and to find some softer benefits behind programs that were not making money – for example, a certain program that is enrolled primarily by presidential scholars that raises the profile of the university, but not its profitability. The ultimate aim was to end or limit data silos and develop granularity in assessments.

RMU determined that to collect, collate, and analyze all the data manually would take more than a year, by which time the data would be outdated. Also, doing this manually would make the data inherently error-prone, damaging stakeholders' trust. The institution needed a technology solution that would automate parts of this process, saving time and helping it slice and dice the data in any way that it wanted, whether it be by students or every course.

**Program portfolio rebalancing required an in-depth understanding of every activity**

In preparation for the university's next five-year strategic plan (2013–18), RMU conducted a strategic review of every program, both academic and non-academic, at the university. The project's objective was to determine if a broad, consistent set of evaluation criteria could be applied to identify operating units at RMU that should be priorities in the next strategic plan. The plan was to identify particularly promising units based on their prospects for enhancing the university's reputation, mission, enrollment, or other positive outcomes, and to not focus resources narrowly on short-term profitability alone. Key goals for the strategic review project were to identify criteria for evaluating successful programs, establish linkages to RMU's mission, and make recommendations for reallocation.

Eventually, the broad criteria agreed upon by the project included the assessment of the following:

- program relevance
- quality of outcomes
demand
competition
fit with mission
opportunity analysis
quality of outcomes
cost effectiveness.

The role of ICT/services in solving the problem

Existing landscape and solution selection

The strategic review pointed to a need for profitability data and initiated the groundswell for analytic data. Before the completion of the strategic review, RMU's data and analytics initiatives were largely rudimentary. Requests for analysis were handled ad hoc with disjointed spreadsheets based on data that was not as granular or thorough as it needed to be. The group lacked analytics and data tools as a whole, and although it did have pockets of capabilities, the absence of an institution-wide strategy limited any true effort at meaningful analysis. Overall, the group had an Oracle database for data storage, relied on MS Excel for analysis, and leveraged a poorly used implementation of IBM Cognos Data Warehouse.

<table>
<thead>
<tr>
<th>Category</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data storage</td>
<td>Oracle database</td>
</tr>
<tr>
<td>Analysis</td>
<td>MS Excel</td>
</tr>
<tr>
<td>Data warehouse</td>
<td>IBM Cognos (limited use)</td>
</tr>
<tr>
<td>Data sources</td>
<td>Oracle EBS, homegrown student information system, payroll provider</td>
</tr>
</tbody>
</table>

Source: RMU

Arguably, the bigger challenge was not the lack of software, but changing the internal culture, which was not sensitized to the benefits of analytics tools. To be successful, the project would require buy-in from all categories of users. However, the academic side did not have a clear idea of the benefits of analytics, which required education and convincing to overcome. It was important to assure the faculty that the exercise would not end up being a myopic "witch hunt" focused on culling non-profitable programs, but instead would look at granular qualitative data as well so that the true economic and mission impact of programs could be ascertained. Similarly, IT and administration needed assurance that an investment of this scale would be easy to maintain and provide a quick time to value.

Interestingly, the lack of an existing analytics solution turned out to be one of the key positives for the transformation program. Often in enterprises and institutions there are multiple point tools preferred by different audiences for their specific needs. When implementing a standardization program, the biggest challenge is to persuade users to get rid of their personal tools and preferences for an institution-wide standard. Because RMU started with a near-blank slate, it did not have to tackle a lot of opposition on that front.

There was wide agreement that new technology would have to be inherently scalable and flexible (to incorporate granular data); be based on a codified analytics framework (not MS Excel–like, preferably
a relational database–based system); allow them to spot errors in the data to build credibility; allow analysis/comparison of historical data; and allow the ability to build models that could be updated as ground realities changed. With those broad parameters, the institution started looking for a solution. One of the initial reasons to look at Oracle was that the institution had used an Oracle database before. The internal IT team felt that using Oracle did not require any major investment in skill acquisition, and that the platform would allow freedom in analysis (multiple ways to slice and dice the data) while enforcing structure and discipline to how data was stored. Also, another critical assessment parameter was the future ability to budget and plan on multiple dimensions and in a variety of ways, including incentive-based budgeting, enrollment management, performance-based metrics, academic program reviews, and resource prioritization. Finally, the solution also needed to be able to cater to extremely technical report-writing needs as well as ad hoc user queries.

Ultimately, RMU decided to standardize on Oracle because it was the solution that received the most support from all stakeholders, and because it had the most current and future potential to help RMU achieve its objectives. With Oracle Hyperion, the institution was still able to use MS Excel (which it was most comfortable with) as a front end, but with the assurance that the software would mitigate all the risks associated with siloed desktop MS Excel analysis. Given that data was at the core of the issue, Oracle Hyperion’s extensive data validation experience and tools made a big impact on vendor selection. Oracle Hyperion is arguably the most-used performance management tool catering to the office of finance across industries, with sophisticated validation capabilities that begin right at data entry forms (e.g., the form will not let you enter a phone number in an email field) and sophisticated and automated data matching rules that take the manual legwork out of validation. The institution purchased licenses to Oracle Business Intelligence Foundation Suite (BIFS) and Oracle Hyperion Profitability and Cost Management, which would help them with both data and analysis for finance and non-finance departments. Oracle Hyperion was a well-known name in the sector and had multiple proof points and clients to back up its claims. The solution also had extensive content and frameworks that helped accelerate time to value for the institution.

Bringing the strategy to life

Implementation/rollout

For RMU, the implementation started with the strategic review program itself. It was clear that the existing paradigm would not work in the future, and with that in mind, it carried out an extensive internal review with all concerned stakeholders (academics, administrators, IT, enrollment), with two committees for each area. There were almost 200 distinct units that participated in this exercise and shared information about their parts of the institution, with a business case around what they do and what value they bring to RMU. As part of the process, the institution realized that although there was a lot of good information, one common theme across units was the lack of good financial data. While enrollment served as a loose proxy for critical cost data, tuition discounting, etcetera, it did not provide an accurate picture of profitability or financial sustainability.

The overall implementation started small and slowly gained credibility and trust. The team met all the key stakeholders at regular intervals, reviewed the nuances of their data, and made them invested and comfortable with the exercise. The implementation did not require any specialized hardware, and the installation and initial modeling/training was provided by an external consultancy on a time-and-materials basis. The institution’s cost for the entire exercise included software licenses, hardware, and consulting time costs. It engaged one hardware partner and an implementation partner for the data modeling.
One of the first pilot projects, prioritized due to its potential for immediate impact, was program pricing. From a first cut of the results, the pilot was able to point out some programs that were now three to four years old, but still priced aggressively to attract more enrollments. Every additional student in these programs was actually contributing to losses and offsetting gains from successful programs. This was a key finding that helped the team build credibility and expand the scope progressively. On the data front, the institution made sure that it had access to total financials, including both restricted and unrestricted data, so that analytics could reflect true costs. Subsequently, in Phase 1, RMU went from approval of project to building the system, validating and finalizing three years' worth of data, sharing findings and insights with the president and senior vice presidents, and supporting change in behavior and thinking related to use of resources.

**Figure 1: Implementation timeline**

<table>
<thead>
<tr>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic review (September 2012–August 2013)</td>
</tr>
<tr>
<td>Internal discussions about model (spring–fall 2013)</td>
</tr>
<tr>
<td>Hired consultant/initiated project (August 2013)</td>
</tr>
<tr>
<td>Working model/Initial results reviewed by work group (October 2014)</td>
</tr>
<tr>
<td>Initial results to deans (February 2015)</td>
</tr>
<tr>
<td>Presentation to senior leadership team (February 2015)</td>
</tr>
<tr>
<td>Completed three-year history (May 2015)</td>
</tr>
<tr>
<td>Fourth year of results (October 2015)</td>
</tr>
</tbody>
</table>

Source: RMU

**Outcome assessment**

Using the solution, RMU was able to accomplish its primary objective of understanding the financial performance of segments of its organization in a high level of detail through data. The immediate benefit was the ability to accumulate all data at the lowest level (student), then roll up data into different views, with the intent of answering questions such as "what are the revenues and expenses for teaching undergraduate accounting courses?" or "what are the revenues and expenses for teaching undergraduate accounting majors?"

Over the medium term, the solution helped RMU analyze financial performance across its organization by major/program/subject, identify high-growth programs and strategic enrollments, and roll out targeted tuition discounting and profitable pricing changes with consideration for the related financial impact.
Although RMU has not yet performed a formal return on investment (ROI) analysis, the university estimates that savings from repricing programs (that were identified as a direct result of using the software) will quickly pay for the entire deployment several times over.

The institution plans to further expand the use of Oracle Business Intelligence Foundation Suite (BIFS) and Oracle Hyperion Profitability and Cost Management. Its roadmap includes an expansion of the model to include profitability analysis of athletics teams, individual housing facilities and product segments (online delivery mode vs. traditional on-ground), and other "profit centers" across the university. All new program pricing and introduction analysis will now be conducted on Oracle’s portfolio. RMU is also evaluating the acquisition of Oracle's Profitability and Cost Management Cloud Service to eliminate on-premise hardware support and potentially leverage the HPCM Cloud Marketplace.

Lessons learned

Involve stakeholders and sponsors from the beginning

In order to effectively prepare for and address change management, institutions must identify and involve key stakeholders from project initiation. A huge project that requires significant investment and a change in culture requires commitment from all sides. It pays to find strong management "champions" who will see the project through and continue fiscal support even when there are no immediate payoffs. On the other hand, it may also be prudent to find and develop underserved influencers who can tilt the adoption and interest scales in your favor. While the solution may be targeted at one department at inception, it will likely find its way to other departments in the future. Thinking ahead to ensure that relevant stakeholders are involved in pre-purchasing and implementation will serve institutions well. For example, in RMU's case there were a variety of use types (from novice to technical) and a variety of user groups in-house, so it was a good idea to get
different parts of the institution invested in the technology selection. Doing so helped identify and mitigate possible risks quickly, including resistance to using the solution among some stakeholders. Beyond deployment, institutions must think about how to develop appropriate training programs for stakeholders. Driving engagement needs extensive training and hand-holding, as well as exploring self-service models to reduce the burden on IT.

**Do not fall into the trap of stopgap analytics, remember GIGO**

Across verticals, we observe that medium to large organizations tend to develop siloed pockets of analytics, or worse still disjointed tools such as MS Excel for ad hoc work. Each analytical silo serves a critical customer/divisional need (and therefore its genesis), but the sum of parts does not help management to see the "big picture." In addition, ad hoc reports built on unverified and outdated data end up compounding the problem — garbage in, garbage out (GIGO). An integrated analytics and data environment, while time-consuming and resource intensive, is the bedrock of successful analytical transformation. It is important that institutions resist the temptation to invest in multiple point analytics and data management tools, or, if they do, ensure that they have considered integration up front. Sometimes, the cost of an enterprise-grade solution can seem daunting, but ultimately buying into a stack can prove valuable, especially for organizations that have small internal IT teams. In some ways, RMU's medium-sized, resource-constrained endowment enabled it to avoid some of these mistakes by requiring it to identify the most effective and efficient way to leverage its investment.

**Battle-test your consultants, but also build internal capabilities**

Change management is an essential requirement from consultants that is often overlooked. Analytics and performance management solutions need a lot of customization and tweaking to ensure that they accurately reflect institutional processes and can be changed as the institution changes. In addition, there is usually a learning curve associated with such solutions. Most institutions therefore choose to employ external consultants in the initial phases to ensure smooth adoption and training. The role of a consultant is paramount in ensuring adoption and quicker ROI, and therefore it is advisable to battle-test consultants with real institutional data and test cases before making the final choice. Ideally, the consultant should be "joined at the hip" with internal IT teams, which implies that they should be assessed on institutional culture fit, prior experience in the same industry, and prior experience in the same geography, along with product expertise. In the same vein, building some internal capability and product/data expertise can be helpful over the longer term. This does not mean that institutions need to become IT powerhouses, but ensuring that there are skilled people in-house who can oversee the process and initiate knowledge transfer will help avoid problems.

**Appendix**

**Methodology**

Ovum Enterprise Case Studies leverage in-depth interviews with key enterprise stakeholders as well as a review of any available documentation such as strategic planning, RFP, implementation, and program evaluation documents.
Further reading

*Enterprise Case Study: Moving to a Higher Level of Operational Performance*, IT0008-000261 (January 2016)

*2016 Trends to Watch: Analytics*, IT0014-003065 (October 2015)

Author

Surya Mukherjee, Senior Analyst, Information Management

surya.mukherjee@ovum.com

Ovum Consulting

We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Ovum’s consulting team may be able to help you. For more information about Ovum’s consulting capabilities, please contact us directly at consulting@ovum.com.

Copyright notice and disclaimer

The contents of this product are protected by international copyright laws, database rights and other intellectual property rights. The owner of these rights is Informa Telecoms and Media Limited, our affiliates or other third party licensors. All product and company names and logos contained within or appearing on this product are the trademarks, service marks or trading names of their respective owners, including Informa Telecoms and Media Limited. This product may not be copied, reproduced, distributed or transmitted in any form or by any means without the prior permission of Informa Telecoms and Media Limited.

Whilst reasonable efforts have been made to ensure that the information and content of this product was correct as at the date of first publication, neither Informa Telecoms and Media Limited nor any person engaged or employed by Informa Telecoms and Media Limited accepts any liability for any errors, omissions or other inaccuracies. Readers should independently verify any facts and figures as no liability can be accepted in this regard – readers assume full responsibility and risk accordingly for their use of such information and content.

Any views and/or opinions expressed in this product by individual authors or contributors are their personal views and/or opinions and do not necessarily reflect the views and/or opinions of Informa Telecoms and Media Limited.