STRATEGIC USE OF DATA FOR STUDENT ENROLLMENT MANAGEMENT: A CASE STUDY

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Abstract

Often performance and other organizational data in the form of reports, models and dashboards remain in the executive silo, however empowering all of the employees in an organization with some or all of this data can result in significant competitive advantage for the organization. In this work we look at an online MBA program that employed such a data empowerment strategy for the decade from 2003 to 2012. We show how it outperformed its peers by tripling the student enrollments during this period. We describe in some detail the organizational structure and information systems that the team managing this online MBA program employed. We also take a look at the size and growth of the MBA market in the U.S. for the decade under review, as well as, the economics of the online MBA market.

INTRODUCTION

The use of strategic information systems to data-empower all of the employees in an organization can result in significant competitive advantage for the organization (Porter & Millar, 1985; Brynjolfsson, Hitt, & Kim, 2011). This finding has helped fuel the data-driven-decisionmaking revolution that is sweeping the economy. This revolution began with the widespread adoption of enterprise systems and over the past decade its focus has shifted to the implementation of business analytics and Big Data solutions. With regards to the public higher education sector, a couple of questions arise. How can the data-driven-decision-making business model be applied? And if applied, what are the potential benefits of this business model?

In this study we present a case study of an MBA program at a public university, the University of Massachusetts Amherst (UMass Amherst), which across the board adopted a data-driven-decision-making business

model for the decade between 2003 and 2012. We describe the information system that was implemented in order to facilitate this business model. Using a simple ex post facto design we study the performance of this MBA program in terms of application volumes and student enrollments. We show that this program outperformed its peers in the U.S. MBA market, as well as, the other Masters programs at the Business School and at the University.

The rest of the paper is organized as follows. In the Background section we describe the Isenberg School of Management's part-time MBA program and we also define student enrollment management and outline the scope of our work. Next, we examine the MBA market in the U.S. and briefly review the economics of the online segment of this market. Using the findings from other research, U.S. Department of Education data and other industry data we estimate the size and growth rate of the U.S. MBA market between 2003 and 2010. The Information Systems section describes the design and architecture of the information system used by the team managing the Isenberg part-time MBA program; it also outlines how this information system was used. After this, the growth of the Isenberg part-time MBA program is examined. Other possible external causes for the program's growth are studied. In the Discussion section we discuss how the information system contributed to the growth of the program and the Conclusion section ends the paper.

BACKGROUND

The Isenberg MBA program, was organized around three options; the fulltime (*FT MBA*), the blended, and the online options. We will combine the last two options and refer to them as the (part-time) *PT MBA*. For the period studied in this report students were required to complete 11 core courses (34 credits) and 3 credits of elective courses for the part-time MBA option. The PT MBA option was a self-paced nonresidential program. Students in this program could take classes online or at one of the three satellite campuses in Massachusetts. Most PT MBA students only took online classes, however since non-FT MBA students could take classes online and/or at a satellite campus it was difficult to separate the online activity from the blended (i.e. satellite campus-based) activity. The FT MBA option was a cohort-based program with a two year residency at the Amherst campus.

Prospective students could take up to two courses that were offered as part of the PT MBA curriculum before applying and enrolling in the program. Each lecturer developed and taught their own course, there were no shell

courses or off-the-shelf courses that instructors followed. Most courses had at least two different faculty teaching a section of the course each semester and students were free to choose the section of the course that they wanted to enroll in, that is, students were not assigned to a class or a lecturer. In the PT MBA program students were presented with a recommended study path, however, they were free to take the courses in any order they preferred. Students had to be continuously enrolled once they were accepted into the PT MBA program. The Isenberg School had partnerships with several corporations and organizations. Internally, the students and prospects were segmented based on these partnerships and other data points.

In this paper we are going to focus on the management of the PT MBA program and the information systems that were used. The PT MBA administration team was focused on the challenge of marketing and providing customer service to a non-traditional student population in an institution that was primarily designed to serve traditional students. This is a challenge that has been noted by Stack (2009) when she opined: Graduate school has built-in challenges for this population of students trying to balance family and career while pursuing their education. The common theme I see is students who appear to be highly motivated and qualified, but choose for whatever reason, not to apply or enroll in graduate school. It is not to say that graduate study should not be challenging, for it should be academically rigorous. Where it should not be challenging is navigating the process of inquiring, applying, and enrolling. Universities need to find better ways to embrace students who want to make a change in their lives by enrolling in graduate study (p. 11).

Student enrollment management is a systematic process to improve recruitment, admission, retention, and graduation of students (Huddleston, 2000). According to Lapovsky (1999), the functional units within enrollment management are marketing, admissions, pricing, financial aid, admissions, student services, institutional research, retention, and advising. In this work we will look at the enrollment management of PT MBA students with specific emphasis on marketing, admissions, advising, course offerings and course enrollments.

The PT MBA advisors handled both the admissions processing and academic advising. In admissions processing, the advisors received the application materials, made sure that it was complete and followed up with the applicants as needed. They reviewed the applications and made recommendations to the admissions team. For academic advising, the advisors scheduled appointments with students for advising on course

enrollments (students could enroll for courses for four semesters/sessions each year), they handled any course transfers from other institutions, processed degree completion requests, fielded any general academic or quality concerns from students. Advisors were also involved with communications to their students about upcoming course offerings and course registrations. Over the decade under review the advisor to student ratio ranged between 1:200 and 1:600. Advising was primarily conducted over the phone or via emails; there were very few walk-in students.

The PT MBA marketing efforts involved creating awareness of the program, acquiring prospects who wanted to learn more about the program, developing new markets through partnerships or program customizations. Increased awareness for the program was created through advertising in local, regional and national media and by sponsoring events. The MBA portion of the Isenberg School website had a request for information form, as did the UMass Amherst website and the UMassOnline website where prospects could seek to learn more about the PT MBA. Local, regional and national recruiting events were the others sources of prospects. Prospects were regularly informed of upcoming events and course registrations.

THE MBA MARKET

Data on the size and composition of the MBA market is very sparse. While organizations, such as the Association to Advance Collegiate Schools of Business (AACSB), the Association of Collegiate Business Schools and Programs (ACBSP), the International Assembly for
Collegiate Business Education (IACB) and the Association of MBAs (AMBA), all collect information on the MBA programs offered by their membership, there is no central repository for this data and also these associations do not include all the universities and colleges that offer the MBA degree. Murray (2011) using statistical sampling techniques attempted to answer the following questions for the U.S. education market: (i) How many MBA programs are offered? (ii) How many students graduate from these programs? (iii) How many students are enrolled in these programs? She concluded that as of fall 2007 there were 972 institutions in the U.S. offering MBA degrees and that this represented 49.7% of all institutions that offered graduate degrees. She also concluded that at least 66.2% of all Master's degrees in business conferred were MBA degrees and that this represents at least 29.1% of students enrolled in all the MBA programs. Table 1 uses these conclusions and the latest U.S. Department of Education data (Digest of Education Statistics, 2012) to estimate the size of

the MBA market since 2003. Based on these estimates the MBA market in the U.S. represented by the number of enrolled students grew at a 5% compound annual rate between 2003 and 2010.

	2003	2005	2008	2010
Business (Master's degrees awarded)□	127,685	142,617	155,637	177,684
MBA degrees awarded£	84,527	94,412	103,032	117,627
MBA students enrolled£	290,472	324,441	354,061	404,216
□Source: Digest of Education Statistics (2012). £Lower end estimate based on Murray (2011) results.				

TABLE 1: The Size of the MBA Market in the U.S. 2003-2010

Market Economics
Competition in the online MBA market continues to grow. Top-rated MBA schools, like the University of North Carolina's Kenan-Flagler Business School, Carnegie Mellon University's Tepper School of Business, Indiana University's Kelley School of Business, IE Business School in Spain, Babson College's Olin School and Arizona State University's Carey School, now all offer online MBAs (Byrne, 2013). This trend looks set to continue as Figure 1, only representing AACSB schools, shows. However, this increasing trend in online MBAs has to be weighed against the possible rise in popularity of massive online open courses (MOOCs) that other universities with top-rated MBA schools are testing and the potentially disruptive economic models that these new course delivery platforms might introduce (Cerf, 2013; Kahn, 2013).

The Isenberg MBA required 37 credits to complete and for online courses it cost about $750 per credit, so it cost online students approximately $27,750 in tuition, while at the time of writing the IE Business Schools Global Online MBA cost about $50,000 (Byrne, 2011) and the UNC Kenan-Flagler Business School's online MBA cost $91,225 (Byrne, 2012) .

According to Blumenstyk (2012) the Isenberg PT MBA program generates about $15 million in revenue annually. Sixty percent of this revenue is used to cover 40% of the School's budget.
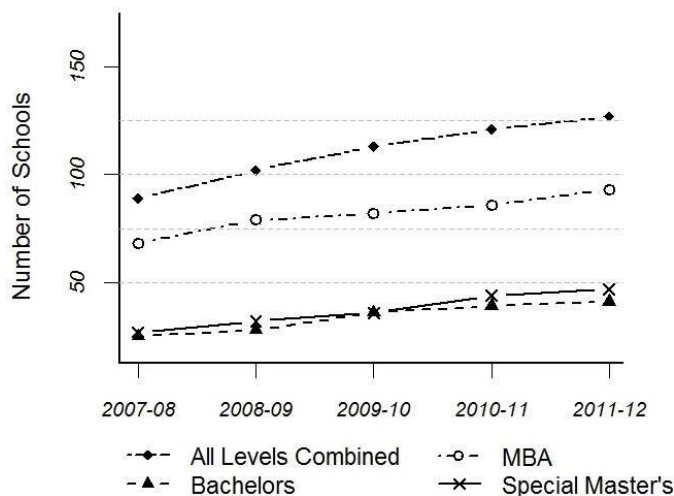
**FIGURE 1: Number of AACSB-accredited Schools Reporting
Fully Online Programs. Source: Nelson (2013)**

We have observed that in the case of UMass Amherst, nearly all of the students in the PT MBA program were not state-supported; they paid fulltuition often at a rate higher than that for residential (i.e. state-supported) students. Furthermore, there were less overhead costs associated with supporting PT MBA students, for example, in most cases these students did not need the use of the public safety department, the on-campus health services department, dining and residential halls and the sporting facilities at the main campus.

THE INFORMATION SYSTEM

We will adopt the definition by Piccoli (2012) of an *information system* as a formal, sociotechnical, organizational system designed to collect, process, store, and distribute information. The four components of an information technology (IT)-based information system are IT, people, process and structure.

For most of the period under review the PT MBA team averaged 8 members and it had a fairly flat organizational structure. The team was colocated and it was cross-functional consisting of student advisors, marketing, operations and IT staff.

The technology component of the information system consisted of two parts; a student management system (SMS) that internally was referred to

as the *Red database* and a prospects management system (PMS) that internally was referred to as the *ApplyYourself (AY) database*. The SMS was used to manage the data on all students and applicants in the PT MBA program. The PMS was used to manage the data on all the active prospects who had expressed an interested in the PT MBA program. The SMS was custom-built using in-house IT resources and it was rolled into production in May 2005. The PMS was a web-based solution from a third-party vendor; it was hosted off campus and was put into production in December 2005.

System Design

Design Principles. The two overarching goals for the system were ease of use and having "(data) management responsibilities lie with the parties that have the most to gain or lose" (Redman, 2012). The design of the system was guided by the following principles:

1. A single data store, with a flexible data schema, where all data on MBA students and prospects that was necessary for managing admissions, advising, course enrollments and marketing would be stored.
2. A user interface that would enable quick searches and navigation of student records, coupled with a backend system that would quickly load the complete student record once a student name was selected from the search results.
3. The IT manager would be the curator of the data in this system and the PT MBA team would all be 'owners' of the data. That would mean that anyone using or updating any part of the data in this system would be responsible for the accuracy of the accessed data and for notifying the curator of any anomalies.

System Architecture. The core component of the IT infrastructure was an independent logical data mart, as defined by Golfarelli and Rizzi (2009). This data mart had the SMS and PMS operational databases as its sole data feeds. Data from many disparate sources on- and off-campus were input into the operational databases using custom-built extract load and transform (ETL) tools as shown in Figure 2.

The SMS database was an in-house Microsoft SQL Server database management system (DBMS). PT MBA student and applicant data from the University's main student record management system (SPIRE) was uploaded daily to the SMS database. The 'Red database' interface was a desktop application that was developed in C#.
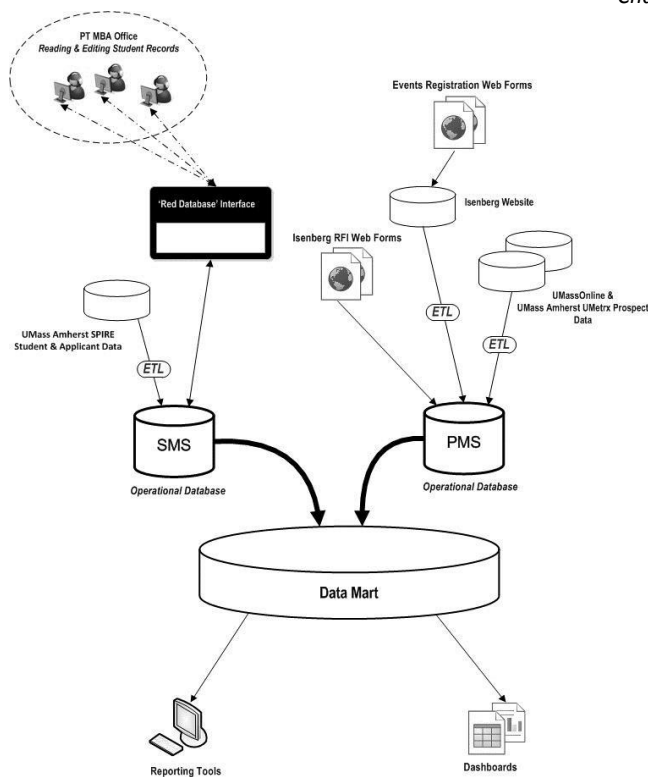
FIGURE 2: PT MBA Information System Architecture.

The PMS database was part of a hosted solution. Prospects entered their information directly into this database via a set of request for information (RFI) web forms at the Isenberg website. At the back-end the solution had a web-based query interface that was used to get information on current prospects for communication and other purposes. Prospect data was archived to the data mart before any changes were made to the data in the PMS database. In this way the data mart had a record of all prospects and was used only for data analysis, while on the other hand, the PMS database was the operational data source for communications with the active prospects.

For most of the period under review the Isenberg website was based on an Apache web server and a MySQL server DBMS, all running on the Linux platform. The event registrations information was extracted from the website database and uploaded into the PMS database using the ETL tools. Prospect data from UMassOnline and UMetrx, the university-wide data warehouse, was also uploaded into the PMS database using another set of ETL scripts. Reporting tools based on Microsoft SQL Server technology

were used to query the data mart. The dashboards were Microsoft Excelbased and they are described briefly in the next section.

Using the Information System

Quick and Easy Access to Student Information. The 'Red database' interface was a three-tabbed desktop application that the student advisors used to quickly access PT MBA students information. It was developed and regularly updated with direct input from the advisors. The goal here was to search for the student once and then quickly pull up all the academic information about the student from the SMS database, the advisors could then move between the tabs for the information that they needed. This was especially important when an advisor was on the phone with a student.

When advising students on course enrollments, advisors could see what courses the student had already taken, at which venue and with which instructor as shown in Figure 3. Using the student's academic background from Application Information tab and conversations with the student to gain more information, the advisors could help guide the student to the course section that was more aligned with their background, preferences and future career plans. This was helpful for students, given that instructors teaching different sections of the same course could teach it in different ways, for example, one instructor may have preferred a more quantitative approach, while another may have preferred a more qualitative approach.

FIGURE 3: Student Academic Summary Information.

They communicated about upcoming events, new course offerings, course registration dates and news about the PT MBA program, such as the release of the latest rankings. All communications were targeted by partnership,

location, student stage in the program or other categories. The system described here allowed for easy identification of these communication target groups.

Dashboards. The PT MBA dashboards were in the form of Microsoft Excel worksheets that queried the data mart for the latest information each time they were opened. These worksheets were then grouped into a tabbed workbook. All the members of the PT MBA team had access to this workbook. The team used these dashboards as operational and tactical tools. The main dashboard, shown in Figure 4, displayed the current enrollments categorized by satellite campus and partnerships. The corresponding statistics for the previous year were also displayed together with the percentage change between the two time periods. The numbers of applications received year-to-date were also displayed as well as the corresponding application numbers for the previous year.

PMBA APPLICANTS*

	APP_PERIOD-2012	YTD-2012	YTD-2013	% YTD-Change
ACPE	87	78	112	44%
Boston	0	0	13	N/A
HCA	2	7	45	543%
Holyoke	14	16	17	6%
Online	395	376	377	0%
Shrewsbury	39	30	27	-10%
Sutter	1	4	4	0%
SVH	2	0	1	N/A
Total	540	511	596	17%

Table source data last updated on: 10/08/2013
* APP_PERIOD-XXXX
represents app-periods (Feb. 1, Jun. 1, Sep. 1, Dec. 31) for previous year

MBA APPLICANTS*

	2014	2013	% Change
MBA/MS Sport	5	5	0%
MBA	22	11	100%
MBA/MPPA	0	0	N/A
MBA/Ind. Eng	0	0	N/A
MBA/Civil Eng	0	0	N/A
MBA/Env. Eng	0	0	N/A
MBA/Mech. Eng	0	0	N/A
Total	27	16	69%

Table source data last updated on: 10/08/2013
* Year-to-Date   2013 numbers are up to the end of Oct. 2013

STUDENT NUMBERS*

	2013	2012	% Change
MBA	77	66	17%
PMBA			
Boston	2	0	
Holyoke	33	40	
Online	1041	966	
Shrewsbury	81	97	
TOTAL PMBA	1157	1103	
ACPE	227	185	
Direct MD	32	29	
FDIC	7	7	
FSM	8	7	
MassMutual	10	16	
Military	97	96	
OAUG	3	3	
Sutter	3	1	
SVH	3	1	
UTC	36	30	

* Matrics count   2013 numbers are synched weekly with the Grad School numbers
* Matrics and Pending Graduation students only

MBA INQUIRIES*

	2013	2012	% Change
Full-Time	3117	632	393%
Online	2925	2829	3%
Shrewsbury	117	95	23%
Holyoke	108	103	5%
Boston	101	0	N/A
Total	6368	3659	74%

Table source data last updated on: 10/01/2013
* Year-to-Date   all numbers are up to the end of Sep.

Number of "Needs Foundations"	146
Number of PMBAs "Pending Graduation"	63

FIGURE 4: Program Summary Information.

These application statistics were again categorized by satellite campus and partnerships. Similarly, the numbers of inquiries by prospective students received year-to-date were displayed together with the corresponding inquiry numbers for the previous year. Daily, weekly and monthly the data on this dashboard was used by the marketing team to quickly inform them of the impact of marketing campaigns. The advisors used the dashboard to get a snapshot of the application volumes and the size or distribution of the student population that they were each charged with servicing. Using the dashboard, the program executives could quickly see if there were any significant changes in the trends that warranted immediate or longer term action.

Ad-hoc Reports. Reports from this system were used for, among other things, (i) communicating with and tracking registrants and attendees of the program's marketing and recruiting events, (ii) data for annual accreditation and rankings surveys and for other program reviews, and (iii) planning for course offerings based on knowing the number of students at a given campus who still required a particular core course, i.e. the inventory of course seats.

ANALYZING THE GROWTH OF THE PROGRAM

In this section we will look at the growth of the PT MBA program in terms of enrollments and application volumes between 2003 and 2012. We will then try to find possible explanations for this growth by studying a few candidates that were external to the PT MBA program, one factor at a time. We use three research hypotheses to qualitatively analyze the potential impact of these external factors.

Data Sources

This part of the research was primarily based on data from the Office of Institutional Research (OIR) at UMass Amherst (2013).

For the comparative analysis we looked at the other Master's programs at UMass Amherst that had been in operation throughout the period under review. For the on-campus or state-supported Masters (*FT Masters*) we considered the following programs: Master of Architecture (MArch), Master of Arts (MA), Master of Arts in Teaching (MAT), Master of Business Administration (MBA), Master of Education (MEd), Master of Fine Arts (MFA), Master of Landscape Architecture (MLA), Master of Music (MMus), Master of Public Health (MPH), Master of Public Policy and Admin. (MPPA), Master of Regional Planning (MRP), and Master of Science (MS/MS in Engineering). For the part-time or Continuing & Professional Education Masters (*PT Masters*) we considered the following programs: Master of Education (MEd) - CPE, Master of Music (MMus) - CPE, and Master of Public Health (MPH) - CPE. The Master of Science in Accounting - CPE was the only other part-time or Continuing & Professional Education Masters in the Isenberg School for the period under review, we will refer to this program here as the *PT MSA*.
The second major data source used in this part of the study was data collected by the Graduate Management Admission Council through its annual application trends surveys (GMAC, 2012).

Enrollments

The PT MBA enrollments more than tripled for the decade under review, starting at 320 students in 2003 and growing to 1065 students in 2012, for a compound annual growth rate (CAGR) of 13%. The enrollment growth in the PT MBA was in marked contrast to that of the other Master's programs at the University, whose enrollment growth rate was 2% for the PT Masters, -1% for the FT Masters and -4% for the PT MSA programs over the same period, as shown in Figure 5.
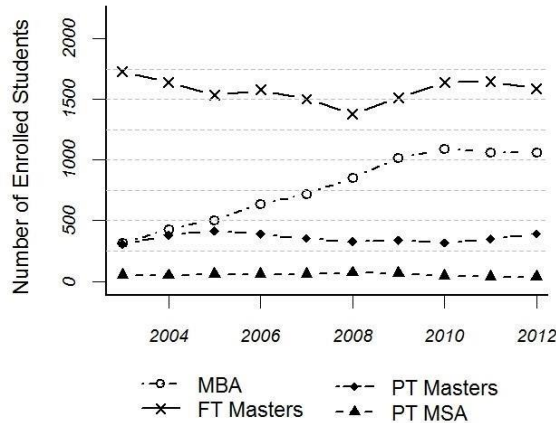

FIGURE 5: Number of Students Enrolled in the Masters Programs at UMass Amherst each Fall Semester from 2003 through 2012.

At the Isenberg School the other residential Master's programs in business, which we will now refer to as the *FT ISOM*, consisted of the M.S. in Hospitality and Tourism Management, the M.S. in Resource Economics and the M.S. in Sport Management. The programs in the PT MBA, PT MSA, FT MBA and FT ISOM categories make up all of the Master's programs at the Isenberg School. The degrees awarded for each of these categories from 2003 to 2012 are shown in Table 2. The average ratio of MBA degrees conferred to all Master's in business degrees conferred (MBA/Master's) at the Isenberg School was 73%. This result is in line with the findings of Murray (2011), where she concluded that between 66% and 76% of all Master's degrees in business that are awarded each year are MBA degrees. Using the degrees awarded data we see that the degree completion rate for the PT MBA program grew at a CAGR of 15%.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
PT MBA	84	96	110	134	195	210	253	276	376	342
PT MSA	0	13	50	42	56	54	54	58	101	31
FT MBA	25	36	24	41	36	35	35	32	34	26

FT ISOM	43	33	35	42	32	43	42	37	32	36
PT Masters	71	128	184	206	193	184	142	152	136	122
FT Masters	753	796	775	739	688	756	665	688	695	795
MBA/Master's □	72%	74%	61%	68%	72%	72%	75%	76%	76%	85%
□ Ratio of all MBA (PT MBA and FT MBA) degrees awarded to all Master's in business (PT MBA, PT MSA, FT MBA, and FT ISOM) degrees awarded.										

TABLE 2: Number of Masters Degrees Awarded at UMass Amherst each Academic year from 2002-03 through 2011-12.

Applications to the PT MBA grew at an 8% CAGR. Figure 6 shows the applications to the PT MBA for the fall and spring semesters for the period under review. The graduation rate of students from the program matched the enrollment rate, meaning that, students were not taking longer to complete the program. So, the enrollment numbers were not increasing due to students taking longer to complete the PT MBA degree. The PT MBA degree completion requirements remained the same for the period under review, so there were no structural changes to the program that could have affected some segments of the PT MBA student population.

Thus, we conclude that the growth in enrollments was primarily driven by the growth in application volumes.
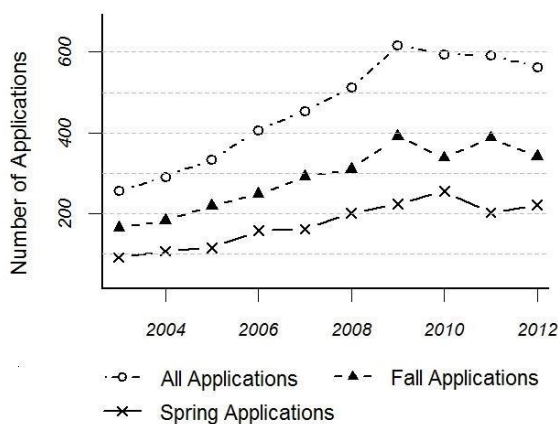

FIGURE 6: PT MBA Applications for the Spring and Fall Semesters from 2003 through 2012.

Next we will try to examine if there are any school-wide, university-wide or MBA market-wide factors that might help explain the tripling in PT MBA enrollments between 2003 and 2012.

Due to resource constraints, such as limited faculty, teaching spaces, and financial aid, the enrollments in some of the programs at UMass Amherst were capped. The capping of enrollments mainly affected the residential or full-time programs. The annual student enrollments represent a bounded variable. Applications to all programs were open; that is, there were no caps placed on the number of applications that could be received by any program. So, the annual application volumes can be used as a free variable. To measure the impact of the school-wide, university-wide or MBA market-wide factors we are going to use the number of applications received each year for the different Master's programs at the University.

System-wide Brand and Marketing Impact

Firstly, we want to see if the number of PT MBA applications grew primarily on the strength of the Isenberg School of Management brand or as a result of school-wide marketing initiatives conducted over the decade under review. *Hypothesis 1: There is no difference in application volume growth rates among all the Master's programs at the Isenberg School of Management between 2003 and 2012.* For accurate comparisons we will only consider fall semester applications, since for the other non-MBA Master's the fall is the only semester for which we have complete data. Figure 7 shows the applications for the Master's programs at the Isenberg School.

Clearly, Hypothesis 1 is not supported, since the PT MBA applications volumes grew at a CAGR of 8% and outperformed the FT MBA at 0% growth rate, the FT ISOM grew at a rate of -5% and the PT MSA at a rate of -6%. From the data, it appears the Isenberg School of Management brand or the school-wide marketing initiatives were not the primary cause of the growth in PT MBA applications, so we reject Hypothesis 1.

Next, we want to examine if the PT MBA application volumes grew primarily on the strength of the University of Massachusetts Amherst brand or as a result of university-wide marketing initiatives or from marketing initiatives that the Department of Continuing & Professional Education (CPE) undertook over the review decade.
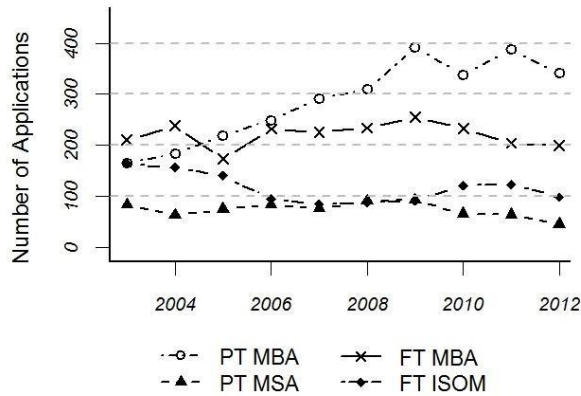
FIGURE 7: Isenberg Master's Applications for the Fall Semesters from 2003 through 2012.

Hypothesis 2: There is no difference in application volume growth rates among all the Master's programs at the University of Massachusetts Amherst between 2003 and 2012. Figure 8 shows the applications for the Master's programs at the university. While the applications volumes for all the UMass Amherst Master's programs grew over the decade, the PT MBA with CAGR of 8% outperformed the PT Masters at 2% growth rate and the FT Masters at 1% growth rate. So, Hypothesis 2 is not supported.

It does not appear as though any changes in marketing initiatives or in brand awareness of the University or the Isenberg School were primarily responsible for the growth in PT MBA application volumes and the resulting growth in enrollments in the program.
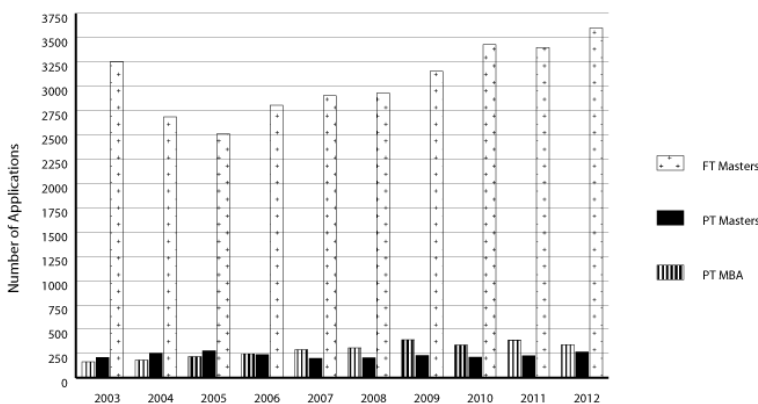

FIGURE 8: Master's Applications at UMass Amherst for the Fall Semesters from 2003 through 2012.

PT MBA Market Impact

We now turn to the broader MBA market to see if any changes there can help explain the growth in PT MBA application volumes. *Hypothesis 3: There is no difference in application volume growth rates between the PT MBA and its peers at other business schools from 2003 through 2012*. We compared the application volume growth rates for part-time MBA programs in the GMAC (2012) surveys with those of the PT MBA program using the Applications Trends Worksheet scale (Graduate Management Admission Council, 2012) as shown in Figure 9. We observe that application volume growth for the PT MBA program performed better than its peers from 2003 through 2009, with the exception of 2007 and 2008 when it matched its peers. The PT MBA program slightly underperformed its peers from 2010 through 2012. Using data from Table 1 and Figure 5, we also note that the overall enrollments for the MBA market in the U.S. grew at a CAGR of 5% between 2003 and 2010, while the PT MBA enrollments grew at a compound annual rate of 19% over the same period.
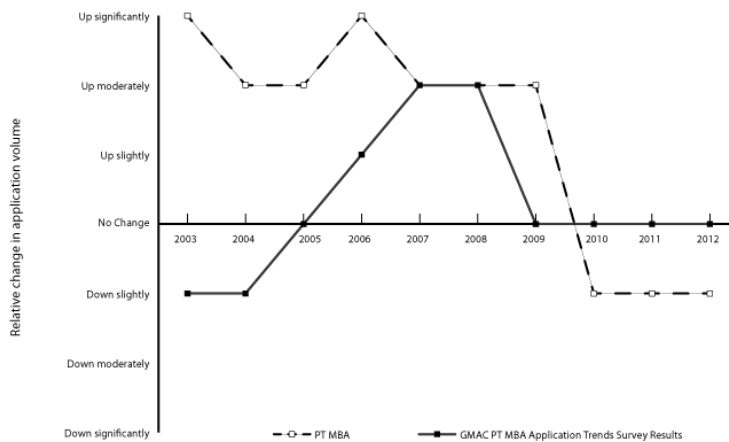

FIGURE 9: PT MBA Application Volume Changes Compared to Average Changes for GMAC Part-Time MBA Programs from 2003 through 2012.

The PT MBA program outperformed its peers for most of the decade in terms of application volume growth and for that latest 7 year period where data is available the PT MBA program outperformed the overall MBA market in terms of enrollment growth. We determine that Hypothesis 3 is not supported by the data and so we reject it.

We conclude that none of the external factors whether school-wide, university-wide or in the general MBA market appear to provide a possible explanation for the growth in the application volumes for the PT MBA

program at the Isenberg School. Next, we look at the in-house processing of the applications by the PT MBA team to see if there were any significant changes there that might explain the tripling of enrollments over the decade being studied.

Acceptance Rates and Yield

The acceptance rates are shown in Table 3. We note that PT MBA at 90% has the highest average acceptance rate followed by the PT MSA (84%), the PT Masters (83%) and the FT Masters (37%). One of the reasons for the lower acceptance rate in the FT Masters was the limited resources available to support large or growing numbers of residential students.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
PT MBA	98%	97%	74%	89%	92%	96%	94%	87%	80%	92%
PT MSA	71%	92%	85%	81%	88%	86%	83%	82%	90%	84%
PT Masters	90%	94%	83%	91%	88%	85%	76%	72%	73%	76%
FT Masters	33%	36%	41%	39%	36%	35%	39%	39%	37%	36%
[] Acceptance Rate: The percent of applicant who were accepted.										

TABLE 3: Master's Programs Acceptance Rates[] at UMass Amherst each Fall from 2003 through 2012.

Table 4 shows the yields. The PT MSA, at 82%, has the highest average yield followed by the PT MBA (79%), the PT Masters (76%) and the FT Masters (44%). Based on the acceptance rates and yields, the probability that any applicant will enroll in the PT MBA is 0.71, it is 0.69 for the PT MSA, 0.63 for the PT Masters and 0.16 for the FT Masters.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
PT MBA	90%	76%	83%	83%	71%	77%	78%	75%	81%	72%
PT MSA	97%	79%	92%	84%	85%	86%	82%	81%	65%	74%
PT Masters	92%	77%	69%	76%	76%	74%	71%	76%	74%	72%
FT Masters	58%	47%	44%	46%	41%	43%	42%	42%	39%	40%
[] Yield: The percent of accepted students from Table 3 who enrolled.										

TABLE 4: Master's Programs Applicant Yields[] at UMass Amherst each Fall from 2003 through 2012.

Adjusting the PT MBA acceptance rate and yield to match those of the PT

Masters would lower the CAGR of the PT MBA enrollments for the reviewed period from 13% to 11.5%, which is still much higher than the 2% CAGR for the PT Masters, the next highest one at the University. So, any changes in applicant acceptance rates or yields for the PT MBA program were not the primary cause of the growth in enrollments at this program.

DISCUSSION

This study has two significant limitations. Firstly, we were not able to conduct a formal survey of the PT MBA staff in order to try and measure the perceived importance or the effectiveness of the information system discussed in this work. Secondly, other PT MBA stakeholders, like the faculty and students, were not surveyed in order to explore other potential causes for the increased growth in application volumes. However, many of the faculty who taught in the PT MBA also taught in the other Isenberg Masters. The following observations regarding the information system were made by the author who was a member of the PT MBA staff for most of the period under review:

1. *Usage Patterns:*
   a. A consistently high usage pattern of the 'Red database' interface by the student advisors was observed.
   b. Resource reallocations and other program changes were implemented based on trends that were gleaned from the dashboards.
   c. There was a steady rate of requests for regular program reports and requests for new types of reports.
2. *Data Accuracy:* The team maintained a constant vigilance to ensure that the data in the system is was accurate as possible.
3. *Data-Driven Posture:* The team would always strive to make data-driven decisions whenever possible.
4. *Primary Data Source:* The information system under review was the primary data source for the PT MBA program for 8 of the most recent years out of the 10 years covered in this study.

Based on these observations, we infer that the information system discussed in this work was critical to the operations of the PT MBA program for the period under review.

In our view, the primary reasons why this information system gained acceptance and was able to contribute to the growth of the program are four-

fold. Firstly, the team's data-driven posture was led by the program executives and it filtered down to the rest of the staff, this meant that there was a shared view of how the program was performing. And also those individual team members, who wished to, could setup personal benchmarks to track their own performance. Secondly, accurate data was valued, since, it meant in turn more accurate reports and other statistics were derived from the information system. Thirdly, the user interface for accessing and editing the student data, the 'Red database' interface, was designed to be as user-friendly as possible for the student advisors - the primary users of this interface. Finally, the use of a single, flexible data source (the data mart) for all of the program's data meant that there was consistency in the results across all the data output views, such as the dashboards and the ad-hoc reports. Furthermore, because the data sets in the PT MBA data mart were smaller and specific to the MBA program, the system response of the 'Red database' interface were quicker than those of other university-wide IT systems.

CONCLUSION

In this paper we studied the growth in student enrollments for the PT MBA program at the Isenberg School of Management from 2003 through 2012. During this period, the growth in student enrollments in the PT MBA outperformed all of the other Master's programs at the School and at the University, as well as the enrollment growth rate of the overall MBA market. We showed that the growth in PT MBA student enrollments was driven by increased application volumes and that the growth in PT MBA applications volumes outperformed that of the other Master's programs at the School, the University and the broader PT MBA market. No external factors were found that could explain the above-industry average growth rate of the PT MBA program and this led us to the conclusion that it must have been the way that this program was being managed. We then described how the team managing this program was committed to datadriven decision-making. We also described the information system was used to manage the PT MBA program and showed how this information system was used to provide the data necessary for decision-making to all the members of the team. In conclusion, we concur with the findings by other researchers who have found that the use of strategic information systems to data-empower all of the employees in an organization can result in significant competitive advantage for the organization.

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