

Chapter 6

Importance of Project Management in Business Analytics: Academia and Real World



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Abstract Project management constitutes a powerful lever as organizations face increasing pressure to manage projects to budget, on time, and deliver more insights, in less time and with rapidly increasing amounts of data. This is critical especially in business analytics, with more than 75% of organizations planning big data investments over the next several years. But the manipulation of massive amounts of data presents challenges – budgetary, time constraints, execution, proper manager skillsets, and such like. These challenges have cramped recent project rollouts, as only 37% of organizations have deployed big data projects in the past year; this suggests that filling the gap between data and insight remains a substantial hurdle as well as evolving need of project management for such projects. This chapter offers real-world examples of how project management professionals tackle big data challenges in a rapidly evolving, data-rich environment. Simultaneously, it establishes a bridge between business and academia as they both recognize the joint necessity to develop highly trained project managers to utilize the powerful and cutting edge analytical tools available to create value.

Keywords Analytics · Project management · Business analytics · Data science · Business intelligence · Agile methods

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Introduction

Today, project management is a critical discipline in all areas of an organization, and these skills seem especially necessary in business analytics projects. Many studies and long experience have shown that managing business analytics projects can be particularly challenging; these projects are not much different in terms of project management challenges but often experience greater uncertainty and more change during project execution. According to 2013 Gartner research, more than half of all analytics projects fail to deliver the original features and benefits as well as running over schedule and budget.

Today's business analytics project managers need to develop a specific set of project management skills that help them become a stronger change agent, a coach, and an effective communicator to successfully manage and deliver projects (Viaene and Van den Bunder, 2011).

This chapter begins with the discussion of typical characteristics of business analytics projects followed by the importance of project management in business analytics projects. It also discusses the real-world examples from Epsilon – how project management tools and techniques are being used in Epsilon's business analytics projects. The last section of the chapter describes the efforts in academia (at Drexel University) to prepare business analytics students with project management skills.

Business Analytics Projects

As reported by Hendershot (2016), more than 75% of organizations have planned big data investments in the next 2 years, according to a 2015 Gartner report, yet only 37% of organizations have deployed big data projects in 2015, which suggests that filling the gap between data and insight remains a substantial hurdle as well as evolving need of project management for such projects.

This is part of a long and growing trend in business analytics. There is constant pressure to deliver more insight, in less time and with rapidly increasing amounts of data. The amount of analytical data has grown tremendously and continues to do so. Today, data comes from every device in an organization, rather than from a few privileged business applications (White, 2011).

The pressure to provide analysis based on these data is immense, with business decision-makers requiring ever tighter iterations to deliver insights; 64% of business managers report shrinking decision windows (White, 2011).

Business analytics projects are unique in many ways and typically face a variety of challenges primarily due to large amounts of data as well as uncertain requirements and outcomes. One of the primary differences between analytics projects and other IT projects is the focus on expanding understanding of data and the process it represents. This causes analytics projects to more frequently invite new inquiry as a result of successful execution. Other projects tend to be typified by more concrete

knowledge and are a formalization of existing understanding or process. Analytics projects, when successful, cause individuals to understand a process in new ways – this learning prompts novel questions. This is a cyclical process.

Some analytics project challenges are:

- Analytics projects include much experimentation.
 - The value of answering a question is often unknown until the question is answered.
 - Late arriving data and requirements are the norm.
 - Often, discoveries in an early phase of a project materially alter the scope and timelines of later phases.
 - In short, questions beget answers, and answers beget new questions.
- Business analytics straddles the fence between business and technical stakeholders more than most IT development projects.
 - End users expect massive flexibility to leverage an analytics deliverable in ways not anticipated during its delivery.
 - Reporting logic changes often and is not the domain of the individuals performing technical development.
- There are myriad of alternatives to IT-driven solutions.
 - There is a proliferation of “phantom analytics” solutions – reporting and analytical artifacts developed by end users on their desktops in tools like Microsoft Excel, Microsoft Access, SPSS, R, and Python. These are often developed independently and without organizational support but are required to be managed or merged into a formal business analytics program.
 - Most line-of-business applications include reporting functionality that will offer different results to what might be developed externally.
- Business analytics projects have visibility across the entire organization.
 - It is not uncommon for the C-suite and low-level analysts to use the same analytical solution and reports and all levels of management in between.
 - Past failures can sour organizations to new projects.
 - Different functional areas may require access to the same solution, but have different expectations, leading to a “kitchen sink” mentality of including all possible functionality.
- Data challenges.
 - For analytical purposes, strong data consistency is often a requirement, but unfortunately, that is not the case across many IT systems.
 - Analytics projects must rely on available data. Insufficient data can reduce or eliminate the value of analysis.
 - Data volume and velocity present challenges in ingesting new and historical data

- Limited expertise.
 - Business analytics is a relatively young technical discipline; thus there are few individuals with expertise in the area relative to the massive demand for more insight. IBM projects the demand for data scientist to soar 28% by 2020 (364,000 job openings) in the United States (Columbus, 2017).

Project Management

Today, project management has become in demand within all areas of an organization – skills, such as scope and time management, cost and quality management, resource allocation and coordination, team building and communication, risk assessment, stakeholder and procurement management, project leadership, post-project assessment, and the ability to implement strategic change, among others, are sought by employers.

Project Management Institute (PMI – <http://pmi.org>), founded in 1969, is the leading association for the project management profession. Conducted since 2006, PMI's Pulse of the Profession report provides the major trends for project management now and in the future based upon their global survey of project management practitioners. According to their 2017 Pulse of the Profession 2017 report, due to poor project performance, organizations are wasting an average of \$97 million for every \$1 billion invested. At the same time, the project success rate is much higher (92% versus 33% of underperformers) for those organizations that are more mature with their project management practices.

There is an ongoing trend for business to increase the priority of analytics projects (Viaene and Van den Bunder, 2011). Additionally, analytics projects are often crosscutting within an organization and have highly variable scope and requirements. These factors combine to make project management a critical discipline to achieve success in analytics.

Typically, two methodologies are used to manage analytics projects: agile methods and CRISP-DM.

Agile Methods

Agile methods play a large role in business analytics projects. With the highly variable scope and requirements, it becomes necessary to have tighter integration of development and business stakeholders. Additionally, to justify the often large cost of business analytics projects, it is required to deliver value early. Finally, as the nature of interaction with an analytics solution is more free form and ad hoc, it benefits the business stakeholders to have early and frequent exposure to the data, the modeling process, as well as the solution deliverables. Overall, agile methods seem to provide benefits to business analytics projects (Kisielnicki and Misiak, 2016).

CRISP-DM

As mentioned in (McMahon, 2016) report, in analytics projects, five elements are critical at all phases of the CRISP-DM (cross-industry standard process for data mining) process. Project management ensures that the business stakeholders do not change the principal aim of the analytics outcome. As described in Project Management Institute's 2017 Project Management Body of Knowledge communication among the project stakeholders is one of the core areas of the project management methodology. Such communication should help a project in terms of clear understanding of the requirements, managing risks and changes as well as better outcomes as it goes through the five major phases of project management: initiating, planning, executing, controlling, and closing.

About Epsilon

Epsilon is a data-driven marketing company founded in 1969 and based in Irving, Texas (<http://www.epsilon.com>). The company provides database marketing solutions and services that integrate data, creative, technology, and customer experience for large brands across industries. Epsilon serves customers in automotive, financial services, healthcare, nonprofit, retail, telecom and technology, and travel and hospitality industries in North America, Asia Pacific, Europe, the Middle East, and Africa.

Some of its more analytical services include marketing services such as strategic and analytic consulting, marketplace assessment, competitive analysis, customer experience design, marketing mix allocation, investment justification, and predictive modeling and optimization.

Epsilon's technology teams execute small- to large-scale business and marketing analytics projects ranging from \$50 K to \$2 M in average engagement value using various technical (analytical) and project management tools and techniques. For the technical part, Epsilon uses COTS (common-off-the-shelf) tools such as Microsoft Project and PeopleSoft and statistical software suites such as SAS and R.

While some of the projects have a repeatable set of activities (i.e., CRM lift analysis, look-alike modeling, customer segmentations), different clients and a variety of data sources require bespoke project planning and cost accounting. The template activities required on a project are therefore managed by project managers using Microsoft Project, and high-level cost, budgets, labor, and burn rates are managed with enterprise tools including PeopleSoft. While Epsilon's project life cycle is PMI-based (not PMI-certified), the Advanced Consulting Group responsible for analytics project has significant experience in executing marketing analytics projects across various industries including finance and life sciences where analytical rigor is mandatory.

In large projects (typically project which are over 1000 total hours), Epsilon takes a multidisciplinary approach, as shown in Fig. 6.1, to partner strategy and analytics talent with its campaign execution team. The strategy team is responsible for asking and defining the key business questions related to execution, while the

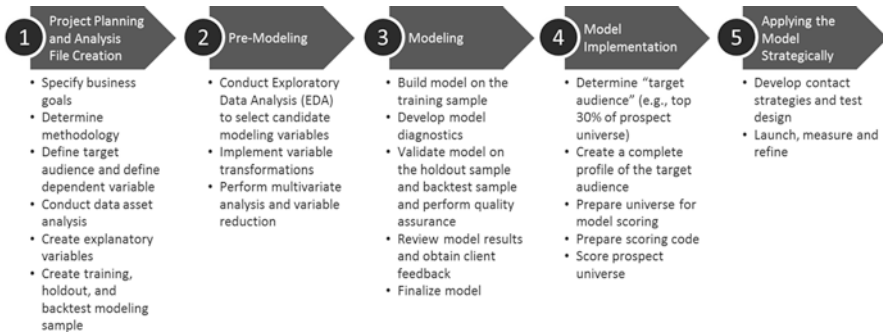


Fig. 6.1 Project management in analytics projects. (Source: Epsilon Data Management)

analytics team will define measurement standards and execute on the defined project that has been deemed to have enough practical utility for the business. Throughout this process, project management is essential for phasing the logical units of work properly across the execution team. Specifically, strategy is managed to provide quantifiable steps to the objective, while the analytics team iterates through the important steps of data collection, cleansing, analysis, modeling, and insights.

The model below (Fig. 6.1) has been useful in aligning clients, business representatives, and analytics subject matter experts to improve execution of projects. It does this by:

- Aligning business and analytical goals and objectives early
- Performing exploratory data analysis to understand data quality and assess project risks
- Obtaining client feedback during early model development and training
- Leveraging analytics SME to scale and apply the model to the business needs
- Testing in-market to provide client and business representatives with the proof points required to justify the effort and improve the business

This project approach has been especially useful with the increase in data-driven marketing which allows for a better understanding of audience needs, wants, and behavior using available client and third-party online data sources.

Typical Project Success and Challenges at Epsilon

Although many projects at Epsilon get completed successfully, they do face various challenges related to project management such as completing them on time and budget, lack of expertise in business analytics project management skills, and executing and interpreting results. Specifically, project management with business analytics projects falls into the following categories: (1) business risk, (2) data risk, (3) execution risk, and (4) staffing risks. Business risks are typically encountered when the business

representatives do not have the full understanding of the analytical objectives or the ability of the project to help their business. Data risks are related to governance, quality, and data acquisition issues. Execution risk is often related to incomplete understanding of the stage gates and milestones required to ensure a project successfully moves forward, and staffing risks are usually related to skills, training, and availability of resources on the project. Successfully executed projects tend to have strong project managers who adhere to a methodology, who identify risk and mitigation strategies early, and who assess data quality and volume early enough to reduce budget waste.

Below is the description of two Epsilon projects where use of project management tools and techniques benefited the successful outcome.

Project 1: Life Science Project

Project's Business Goals and Objectives

A life science company was looking to reduce and optimize its marketing investment across multiple channels. They required a new way to go-to-market that reduced emphasis on traditional sales channels and increased the use of inside sales and digital sales support. The objectives were to define a weighted measurement framework to assess promotional response and optimize it based on the segments being targeted for promotion. The project spanned 5 months and involved a strong analytically focused core team along with varied business stakeholders. The core team consisted of executive level sponsors, several analytics subject matter experts (primary research, digital analytics, and statistical methods), and many business stakeholders who provided data and inputs on goals and objectives.

Analytics Tools Used

Standard analytical tools and techniques were used. From SPSS for primary research to SAS for latent class modeling, many work streams worked on improving data quality and business rules to drive a better integrated model.

Project Management Tools Used

Due to the highly matrixed nature of the organization and the executive sponsorship level, project management was very rigorous on the project. Since the project kicked off with several high-level stakeholder interviews, the business representatives were involved at the start and required frequent updates on the project status including complete key activities, risk assessment, and budget updates. Project meetings were scheduled twice a month, and tracking was done via Gantt charts and risk matrices.

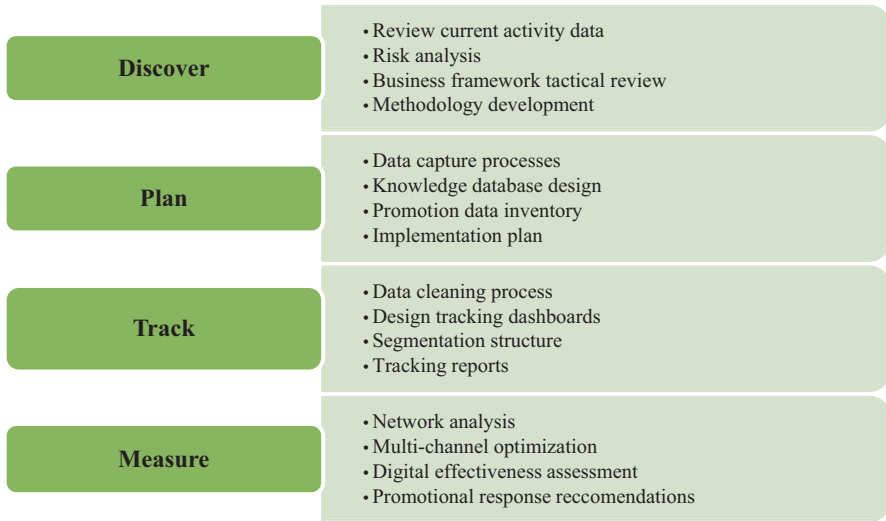


Fig. 6.2 Epsilon's integrated model

Key executives were interviewed to align on business objectives and goals, primary research was used where data was lacking, and data was aggregated, cleansed, and imputed where possible to create high-value data sets. Several work streams were undertaken simultaneously and combined to allow for an integrated model to be developed. The model, Fig. 6.2, was then trained and operated for several months before becoming the standard for the organization. The steps in this model are aligned to Stefan H. Thomke's four-step cycle: design, build, run, and analyze (Thomke, 2003).

The project helped commercial operations and marketing leaders better understand the digital preferences of their customers. This insight, in turn, allowed for an improved allocation of dollars to marketing tactics based on individual customer segments rather than channel allocations. It reduced some marketing waste and increased marketing operations yield.

Project Success and Challenges

The greatest success was establishing an enterprise-wide system for assessing and optimizing promotional response for the organization highest-value customers. The biggest challenge was obtaining organization buy-in to continue funding the project. The lack of an immediate deliverable in an organization with a medium analytics maturity meant constantly looking for low-hanging fruit to clearly demonstrate value and the practical usefulness of the work.

Lessons Learned

Rigorous project management was essential to align the different groups and to obtain buy-in for the project. Once all parties understood the potential benefit and quick wins the project would afford, momentum helped get the right resources applied to successfully complete the project. By having project management focused on delivering the solution and the analytics team focused on validating the solution for the business, the team was able to reduce organizational friction which could have caused the project to derail.

Project 2: Creative Performance Analysis Project

Project's Business Goals and Objectives

A specialty media advertising agency was looking to understand which aspect of their ad creative launched into market drove the highest level of performance. Experienced direct marketers have always executed tests to determine the optimal asset configuration to drive customer response; however, digital advertisers can be overwhelmed by the complexity of creative factors, media channels, and ad placements for similar analyses. The scope of the creative performance analysis project was to look for a way to understand what aspects of the creative drove digital performance and to what extent was the graphical choices material to performance.

Online/digital advertising, much like direct marketing, relies on various aspects of creative for effectiveness. While direct mail uses stamps, stickers, and other markings to invite customers to “act now, before the offer expires,” digital ads use prominent fonts, calls to action (i.e., buttons in ads), and images to invite online users to click or submit information. Due to rich measurement ability in digital analytics, it is possible to determine the “effect” of various facets and levels related to an online ad using fractional factorial analysis performed either manually or using sophisticated testing tools such as Adobe Test and Target® or Optimizely®.

The project took a manual approach to extract the key attributes of several thousand online ads and attempt to link overall performance to these attributes. For example, would ads with people be more successful than ads without, or would ads with authoritative calls to action (i.e. “Click here”) be more effective than those without (i.e., “More information?”)? The business request came from senior business leaders, and the project was conducted over several weeks with a small team of subject matter experts. The project was managed by the chief analytics officer in close partnership with the analytics lead and subject matter experts. Additional support was provided by data analysts who extracted and compiled performance data related to the ads.

Analytics Tools Used

Microsoft Azure, Kafka, Tableau, Oracle, and Python were used to execute the project. Each of the aforementioned tools provided a unique and complementary function on the project: Microsoft Azure for its AI and cognitive services, Kafka for its dynamic data dashboards, Tableau for exploratory data analytics and reports, Oracle for performance data management and table calculations, and Python for log processing.

Project Management Tools Used

Project management was used to define and execute a proof of concept, to define a go-to-market approach with sales executive, to perform the analysis, and to rollout the project in order to support sales. The project was executed in a tight timeline and needed to be timeboxed to keep activities on track and scope managed.

Since the scope was flexible, the project manager created a well-defined project plan with deliverables, resources, and scope. Also, since the project was a prototype, scope was aggressively managed to focus on key deliverables including image assets collection, performance data tables, and dashboard design. Initial data collection and complexity around image assets caused several project delays which had to be addressed. Initially, the project called for Tableau to be used for dashboards, but due to compressed timelines, the analytics SME suggested Kafka to accelerate development time and keep the project on time.

Project Success and Challenges

Success was defining a minimum viable product which got instant market uptake after being shown to clients. While this project was helpful in defining a practical solution, the lack of stakeholder management during the project meant that scaling past the initial completion was difficult for the organization. No additional resources were applied, and the project was left as useful proof of concept.

How Academia Prepares Students with the Proper Skills

According to the Master's in Data Science's *25 Top Schools with Master's in Business Analytics Programs* report, a degree program in business analytics seems to be one of the growing majors within business schools. In addition to the foundation courses in business analytics, many such programs offer a set of electives, particularly, in project management, industry projects, and interdisciplinary programs.

For example, the Clarkson University's MS in Data Analytics program offers an elective course in Strategic Project Management; the University of Chicago's

MSC in Analytics offers a core course in leadership skills – teams, strategies, and communication – and the University of Minnesota’s Master of Science in Business Analytics offers a core course, Project Management of Analytics Projects. Additionally, the University of Connecticut takes an interdisciplinary approach with its integrated MS in Business Analytics and Project Management, a program where students are trained with both advanced business analytics and project management skills.

Through such core, elective and interdisciplinary courses in project management, the universities aim to better prepare graduates with not only technical skills but also with the core project management skills to link between data analytics and business objectives which include managing projects within scope, time and budget, controlling and managing changes, understanding customer’s needs, leadership, and managing project risks.

At Drexel University, both the undergraduate and graduate business analytics programs are offered by the Department of Decision Sciences and MIS where students are provided to learn and apply project management skills. This includes dedicated courses in the areas of project management and their practical applicability. Some of these courses also include practical classroom projects where students develop valuable project management-related insights from real-world perspectives.

Course Offerings

At present, we offer two courses dedicated to project management – MIS 361 (IS Project Management) (undergraduate level) and MIS T680 (Special Topic: Project Management) (graduate level). Both these courses introduce and explore the basic concepts and practices of project management that help students understand how the use of project management methodologies and tools can aid managers to plan and manage projects successfully.

These courses are structured around the key phases of a project life cycle – project initiation, project planning, project execution, project control, and project closeout. It also pays specific attention to the ten knowledge areas of project management as defined by the Project Management Institute’s Project Management Body of Knowledge (PMBOK) – project scope, cost, time, integration, quality, communication, risk, human resources, procurement, and stakeholder management.

Additionally, the concepts of agile project management, international project management, and design thinking are also introduced. In the graduate version course, the related case studies and project management simulation – scope, resources, and schedule – from Harvard Business School are also discussed (Austin, 2013).

Business analytics students at Drexel can benefit learning from these project management skills and apply them to the business analytics projects. Table 6.1

Table 6.1 Project management skills and its applicability in analytics projects

Project management skills	Applicability in business analytics
Scope and time management	By definition, analytics projects are about learning new things and understanding business processes better. More than is typical in other technology projects; development leads to new questions and requests. It is critical to keep discipline around agreed-upon deliverables while balancing the need to answer current and relevant questions. Often the most critical questions to ask of data are unknown at the beginning of an analytics project
Stakeholder management	Analytics projects often involve a wide cross section of stakeholders, from line of business employees up to C-suite leadership. The wide range of interests and voices involved in defining the requirements of an analytics solution present challenges in managing expectations and balancing often conflicting needs
Strategic change management	Frequently, the goal of analytics projects is explicitly to identify new and better ways of doing business. By definition this changes the requirements of an analytics solution. Success in a project necessitates a future project to accommodate the results of the first project's success. This can be a virtuous or vicious cycle, and which it becomes depends on the ability of project leaders to react to changes they foment – change management is a core requirement of any successful analytics project
Team building and communication	Analytics projects often sit at a nexus of multiple source systems and groups of stakeholders. If a solution is to serve these groups effectively, it is necessary to be clear in communication among all stakeholders. Changes in a single source can ripple through a centralized analytical solution to affect many end users, who may or may not have any direct relationship to the source of a change. Similarly, instigators of changes may not realize how far the effects of their decisions might reach

describes how some important project management skills can be applicable in business analytics projects.

Real-World Project Offerings

In order to provide students real-world project management skills, an action learning multidisciplinary classroom projects are offered at Drexel as part of MIS 361 and another global classroom project course, MIS 347: Domestic and Global IS Outsourcing. These project problems are both domestically and globally based, ranging from working with profit, nonprofit, and government entities.

In some of these real-world problem-solving projects, students at Drexel typically collaborate with students from a major university in India as they develop the joint solution. The Drexel students are responsible for consulting with their customer – to understand the project requirements, to successfully communicate them to students in India, and to manage the overall project. The students in India are responsible for designing, coding, and testing the technical aspects of the business problem solution.

The purpose here is to help students in both countries develop valuable insights not only into how to produce joint solutions but to provide them opportunities to learn how to deal with project management-related challenges such as working with

the team with radically different work patterns, negotiations and trust, cultural sensitivity, project requirement interpretations, time zone difference, risk management, quality control, and, more importantly, distant communication.

In many cases, students worked on these projects for 8–10 weeks to fully develop the solution using cutting-edge technology. In addition to deposit their individual work hours, students typically exchange many emails and text messages and conduct face-to-face video conference meetings and social media communication, a critical aspect of the project management.

Conclusion

It is critical to understand the experimental nature of discovery and development in an analytics project while balancing these loose requirements against organizational and political constraints to ensure that the experimentation drives toward a solution-oriented deliverable that can benefit the organization.

Project management provides mechanisms to overcome the typical barriers to the successful completion of these types of projects thereby unlocking the potential for knowing new and exciting things. Project managers with the right skills and experience can act as the backbone of complex analytics project, and this body of knowledge will become more and more important as data grows, analytical techniques become more complex, and business demand for such services increases.

The best systems, designed with perfect domain understanding, will still be worthless if the data flowing through them is insufficient or incorrect. Often analytics projects highlight or even uncover data quality and management issues, but it is important to understand and emphasize that this is not the same as creating those issues.

Project management professionals, more than ever, must be key facilitators and drivers of the delivery process. Stefan Ahrens from SAS recommends that so long project manager pay attention to the critical success factors of analytics projects such as allow time to build domain expertise, limit the scope and try to be realistic, be aware of the iterative nature of analytics project, and allow time to fix data quality and data management issues, there should not be any reason why analytics projects should not benefit from project management (Ahrens, 2014).

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