

HIMSS Clinical & Business Intelligence Community



An Operating Model, Staffing, and Skills Guidance for Analytic Maturity

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Introduction

Healthcare is facing unrelenting demands for cost containment, quality, and safety. Proficiency in data and analytics is the new core competency. This guidance and recommendations that follow assume that your organization already values data as a core enterprise asset and has senior executive backing for an analytics program. At that juncture, an organization is ready to create a defensible, flexible, and vendor neutral roadmap for achieving analytics maturity.

HIMSS Analytics has created the [Adoption Model for Analytics Maturity](#) (AMAM) for just such a purpose. The adoption model is prescriptive on essential capabilities, yet leaves flexibility in how to get there, recognizing that each organization has its unique culture and set of circumstances. The recommendations presented here focus on the staffing, skills, and operational models needed for a successful analytics program.

Healthcare organizations almost always have well thought out mission and vision statements and key process indicators (KPIs). Unfortunately, few have well-established enterprise-level data governance that aligns technical resources with prioritized business goals, or an enterprise analytic infrastructure capable of supporting the complexity of today's data environment. If an organization is truly to become data-driven, analytics must be embedded strategically, programmatically, and culturally into the entire organization. Finally, having a properly organized, skilled, and well-supported analytics labor force is essential for this transition from simple reactive reporting to advanced proactive analysis and ongoing improvement.

With that in mind, the objective of this guidance is to provide insights to help answer to some of the most common skills and staffing resources questions your organization might face along its journey to analytics maturity. This guidance will provide key considerations in five (5) topic areas that will help you be able to do the following:

- **Understand how to arrive at the right data and analytics** organizational and operating model for your organization,
- **Identify, develop, and organize human resources**, knowledge management, and talent to support that strategy,
- **Identify capabilities that will best support maximizing analytics maturity** of action and insights,
- **Define and identify the needed skills and abilities** of the people driving the analytics capabilities, and
- **Measure the ROI** on analytics investment.

A future HIMSS Operating Model, Staffing and Skills for Analytics Maturity Toolkit will provide tangible artifacts and resources to assist you in these efforts.

1. Essential Elements

Readiness Assessment

Organizations should start the process with a robust current state assessment of their resources, support, readiness, business needs, and organizational structure around data and analytics. Combining the current state assessment with an organizational vision of future state will allow both a gap analysis and a prioritized roadmap to be created. This process should be done with a high level of stakeholder engagement in order to sustain their support throughout the process. Chart 1 shows key differentiators to consider during the transition from a more traditional approach to a more directed focus on sustaining adoption of analytics in healthcare.

Chart 1: Being Effective in the Transition to Analytics Maturity

FROM Traditional Approach	TO Mature Analytics Adoption
Managing Projects	Developing Products
Analytics as a demand-driven support function	Analytics as a strategic business function
Data development driven by demand, developed for single use	Strategically building reusable data assets
Proliferation of dashboards and reports	Focus on capabilities and support using a repeatable framework of tools
Hypothesis (Questions) are pre-defined	Questions are not pre-defined, start with data
Timeline is project-driven	Timeline is based on solving business needs

The rapid pace of change in healthcare is exceeding the ability of traditional program and governance structures to adopt and innovate. Success in analytics therefore requires an agile framework and mindset. Implementation of an effective organizational structure and operating model for analytics is necessary, but not sufficient. The culture of the organization must also embrace the need to explore, learn rapidly, and keep moving forward.

The framework defined in John Kotter's [Accelerate](#) book and article is an excellent resource for thinking in this way. Figure 1 summarizes some key features of considering how to manage adaptive change.

Figure 1: Traditional Functions Must Adapt

- John Kotter's "dual operating system" describes how convergence is needed to adapt to transformational changes
- Allows organizations to capitalize on rapid-fire strategic challenges and still meet fundamental needs
- Transformation for analytics adoption works as a dual structure that empowers traditional functions to react more effectively to change

Accelerate; John P. Kotter; Harvard Business Review Press; 1 edition (April 8, 2014)



2. Choosing the Right Organizational and Governance Model

To start, it is important to establish clear roles and responsibilities that typically support data and reporting needs, especially the IT organization. You must determine what aspects of the analytics development process belong in what functional area of the organization. This varies based on the existing structure and dependencies, but should be evaluated carefully with the end goal in mind to mature the organization's advanced analytics capabilities and empower more stakeholders to make better decisions with data and analytical tools.

When determining the strategy for your governance and organizational model, it is critical to perform an assessment of the readiness of stakeholders to engage in the process. Unlike typical IT operations that are seen as a support function, analytics is most effective when it operates as a strategic business function that works in partnership with analytics staff.

Determining which Data / Analytics Governance Model is a Best Fit

As organizations evolve from traditional, basic, descriptive reporting to expertise in advanced analytics, they will need to be aware of how differing options for organizational structure, operating model, and roles and responsibilities might best fit within their organization's unique culture. Below are some examples:

- **Centralized** – a traditional approach where analytics is seen as a system-level support function. All data, tools, build, and analysis are housed centrally and driven by a demand model (request system, triage, etc). This approach makes it easier to create standard work, but may be slower to meet business needs. There is a risk of generating “shadow IT” if the centralized system is not deemed agile or responsive.
- **Distributed or Center of Excellence** – a model where the majority of the responsibility is organized and funded by individual units, service lines, sites, etc. This model requires a strong enterprise data management strategy to ensure a single source of truth. This model can be a challenge in large or complex organizations if cross-department collaboration is not the norm.
- **Hybrid** – an approach where creating data sets, maintaining databases and visualization software, and developing analytical solutions is centralized, but the actual analysis of data is performed by de-centralized analysts. This approach can accelerate adoption and maturity, but requires significant leadership support and a clear vision and operating model.

3. Identifying, Organizing, and Managing your Core Set of People Resources

Aligning Needs with Positions, Roles, and Responsibilities

It is essential to acknowledge that this work cannot be done successfully without some level of investment of new dollars for people, process, and technologies. Of all of the investments, the employment of trained and experienced Data Scientists or Statisticians is of utmost importance, even if a decision is made to outsource some or most of the higher skill level analytics work (which may make sense for many smaller healthcare entities). The reason being that most off-the-shelf solutions or services cover the majority of basic analytical problems, but there is still a need for a skilled resource that can manage and work through problems and solutions that are highly specific to your organization. The American Hospital Association (AHA) makes it clear in this [guide for 'core competencies' and 'must-do strategies'](#) that analytics must be a part of your strategy to survive in our industry's transition to value based care.

✓ *Sample job description for Data Scientist/Statistician:*

Job Summary	
<p>Data Scientists are the leading experts within the organization regarding the application of statistical, computational, data and advanced analytical methods to improving health care delivery, cost, quality, and outcomes. This role is able to tell great stories with data, and builds reusable data and analytical assets that empower other people to tell great stories with data. It uncovers novel clinical and business insights by modelling complex clinical / business questions, and designs and executes specific reusable data, computational, analytical, and visualization inquiries to address those questions. By analyzing diverse clinical, financial, administrative, genomic, and behavioral data sets, Data Scientist are able to evaluate historical trends, characterize factors, develop predictive models, and identify optimization opportunities. In addition to their analytical skills, Data Scientists are also proficient at integrating and preparing large, varied datasets; architecting specialized databases and computing environments; and communicating results to both technical and non-technical audiences of both internal and external customers including senior management and physicians. The Data Scientist works closely with clients, partners, developers, other statisticians, data stewards, and other teams to translate data into sound organizational decisions. This position educates users and stakeholders of all types regarding the appropriate application and interpretation of analytical methods to clinical and business questions.</p>	
Description of Job Duties	
<p>Statistical Modeling Design, Development, and Analysis</p>	<p>Designs and develops enterprise-class statistical models to understand and solve complex business problems. Participates in design/development of comprehensive data processing, reporting and analytical solutions. Participates in design/development of innovative business solutions. Develops and/or enhances database objects, including queries, procedures, and views. Leads the design, execution, and interpretation of data studies – including sample size calculations, statistical methods selection, population profiling, segmentation, and model development / tuning, and other analytical tasks – in order to develop and characterize insights into clinical, financial, operational, and behavioral performance and outcomes. Establishes scalable, efficient, automated processes for large-scale data analyses and model development, validation, and implementation. Creates predictive models by analyzing large data sets from various sources.</p>
<p>Technical Reporting & Documentation</p>	<p>Writes statistical methodology and results for technical reports and publications. Develops metrics and scorecards. Creates graphics for data visualization and information display. Develops and documents technical designs such as Entity Relationship Diagrams (ERD), data flow diagrams, object-oriented design documents and UML diagrams.</p>

Technical Support and Expertise	Works closely with teams to identify and advise strategic product decisions. Provides application support by analyzing reported defects and replicating/fixing the defects. Acts as a resource for team members in translating business needs into technical designs. Ensures design quality by creating, conducting, and documenting testing. Identifies technical roadblocks and troubleshoots and resolves functional and performance related issues.
Collaboration and Teamwork	Works with teams to generate and organize methods, plans, and data constructs necessary for effective clinical and business analyses. Develops and maintains working relationships with internal departments and external contacts as appropriate.

Examples from the field

One example is of a hybrid model deploying the creation of a new position to act as a catalyst for the adoption of advanced analytics. This role can be known as an Analytics Manager, Solution Manager, Analytics Advisor, etc. The purpose of the role is to use tactics to frame problems and refine and find consensus on what capabilities need to be built. It is a way to ensure both readiness for adoption of the analytics and that the focus of development is focused on the real priorities of the broader organization, not reliant on a demand-driven request process.

✓ *Sample job description for a Solution Manager:*

Job Summary	
The Solutions Manager is the functional lead for enterprise analytics and data within a specific business or clinical area of the healthcare system. Reporting directly to the System Executive Director of Analytical Solutions, the Solutions Manager establishes, leads, and manages virtual teams of clinical and business staff across the system to drive consensus on data and analytical needs and priorities. As the Enterprise Analytics subject matter expert regarding enterprise-level data and analytical requirements for a designated system area, this position serves as the internal customer account manager, working with both leaders and end users to characterize requirements and ensuring the successful delivery of solutions to meet those needs.	

Description of Job Duties	
Analytics Functional Leader	Establishes, leads, and manages virtual teams of clinical and business staff from across the system to drive consensus on data and analytical needs and priorities.
Solutions Management	Serves as the internal customer account manager, working with both leaders and end users to characterize requirements and ensuring the successful delivery of solutions to meet those needs. Leverages product management processes and principles to drive the iterative creation of new data and analytical capabilities and assets for the system.
Communication and Building Relationships	The Solutions Manager is a versatile leader, equally fluent in communicating with senior executives and operations staff, and in orchestrating multidisciplinary teams through contentious discussions into system-wide consensus.
Project Management	May provide project leadership for enterprise analytics initiatives. Defines projects, develops project plans, and sets priorities for working teams. Uses foresight to keep projects focused and on track. Plans and facilitates meetings. In close partnership with development management, manages agile development activities, tasks, processes, and deliverables.

4. Core Skills Development

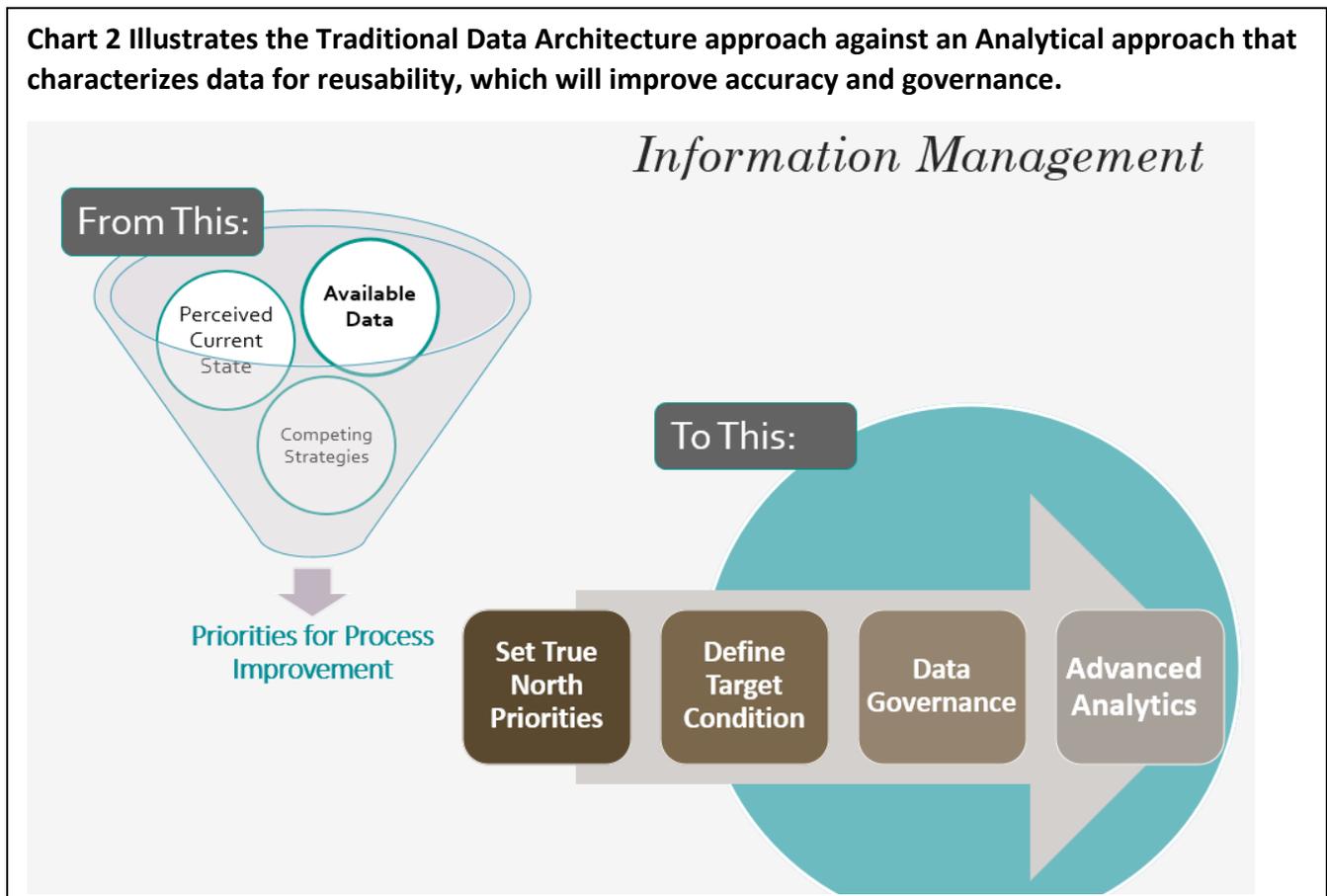
Data Architecture and Integration

Traditional skills needed to transform transactional data into usable data assets must mature in order to support analytical development. To better impact real-world situations, analysts should hypothesize from “practice-based evidence” using data sets that are refined based on the strategic priority, rather than from the data set most readily available for analysis (leading to a perceived current state and misaligned strategies). This is why the AMAM model has information management and data governance as a first stage foundation.

In addition, the data strategy should anticipate reusability of the data assets in order to promote institutional standards for a single source of truth. Traditional data warehousing and data architecture are designed to support descriptive or operational reporting, and traditional business intelligence (BI). Maturing an organization’s analytics competency requires transitioning from being able to count and report on past performance to being able to model and synthesize future performance, which often requires a new or extended data architecture and strategy.

Data should be characterized and architected to support advanced analytics. This takes a different strategy than traditional BI, where the norm is to establish a database or access layer to meet the need of each use case, rather than having a data architecture modelled for re-usability to accommodate many different use cases. As Chart 2 describes, the traditional approach puts an organization at risk of having to manage multiple sources of truth rather than establishing a data architecture and information management strategy that can manage all use cases.

Chart 2 Illustrates the Traditional Data Architecture approach against an Analytical approach that characterizes data for reusability, which will improve accuracy and governance.



Data Science and Advanced Analytics Skills

In order to achieve advanced analytic capabilities, an organization must develop or acquire skills in data science and advanced analytics that are not the norm in healthcare today. Examples include:

- **Actuarial Science** – traditionally reserved for the insurance industry, this computational method for measuring risk is growing in importance as healthcare providers enter into more partnerships and alternative payment models where they take on risk.
 - **Operations Research** – this method includes techniques and methods to apply data and analytics to improved decision-making and efficiency, particularly in the techniques of simulation modelling, optimization, queuing theory, and the like. (see INFORMS www.informs.org for more information)
 - **Economics** – this field applied to healthcare analytics is becoming more relevant when looking at precise activities to apply practice-based evidence to future decision making. Specific key techniques include risk stratification, feasibility analysis, econometrics to determine the relationship of variables such as cost and quality, and what-if scenario analysis.
 - **Data Visualization** – techniques that help end-users effectively interpret the significance of data through visual context in support of effective decision-making are rapidly being adopted in healthcare. Data visualization goes beyond just describing what happened to enabling data exploration by end users and analysts.
 - **Machine Learning** – this area gains new knowledge through the use of big data to inform intelligence about a given problem or circumstance. This can be applied in a predictive / prescriptive model, or in exploring the use of new big data sources (such as device data or consumer behavior data) as an influencer on our understanding of how we improve care.
- ✓ *Recommended reading:* See this recent NEJM publication for more insights on the evolving field of data science in healthcare: [Use it or Lose it? The Case for Data Scientist Inside Health Care](#) (May 4, 2017)

5. Strategic and Governance Model

Align to Organization’s Mission, Goals, and Values

When aligning the development of analytics capabilities to your organization’s strategy and achieve scalable adoption, here are a few suggested tactics to initially consider:

- **Start Small.** It will take some time and exposure for all levels of the organization to “get it.” Establish some early wins by selecting a strategic area or a business unit with a defined vision to start that can result in a real-life example of success for future reference.

- **Ask Questions.** Working with your operating model to engage stakeholders to refine requirements, begin to ask the organization key questions. Clearly state the vision of maturing the organization's ability to become data-driven and adopt analytics.
- **Measure.** In order to clearly highlight the correlation between investments and results when it comes to analytics, the right outcomes to measure the connection of the use of analytics to tangible return must be carefully selected.

Analytics Governance Model

An enterprise governance model that addresses both data strategy and data tactics is critical. Good governance enables analytics resources to align with business priorities, ensure data quality, and ultimately provide the desired return on investment (ROI). For instance, an analytics governance board might prioritize investments into population health over profitability. This would engage population health stakeholders into establishing its own governing model to curate requirements to achieve population health analytics maturity, as well as be involved in validation and acceptance of the solutions being developed. Meanwhile, the finance stakeholders would still establish a governing model, but would be staging a backlog of business problems and development needs that would be promoted to development after the population health analytics deliverables are met.

Return on Investment

Finally, ROI in analytics resources should be measured through articulating the portfolio of capabilities built and how it meets the agreed upon success criteria, along with time spent to achieve capabilities. Once this measurement is established, you can use it to further contextualize future build vs. buy decisions.

For further information and reference

- **Data governance tools and resources**
 - ✓ [Clinical & Business Intelligence: Data Management - A Foundation for Analytics](#)
 - i. [Overview](#)
 - ii. [Data Governance](#)
 - iii. [Data Integration](#)
 - iv. [Data Enrichment / Enhancement](#)
 - v. [Data Storage](#)
 - ✓ [Three Questions for a Strong Data Management Strategy](#)
 - ✓ [A ROADMAP TO EFFECTIVE DATA GOVERNANCE: How to Navigate Five Common Obstacles](#)
 - ✓ [Practical Steps to Enterprise Data Governance](#)
 - ✓ [UPMC Data Governance Program Overview](#)

- ✓ [Architecting a Next Generation Data Platform: An Information and Analytics Blueprint](#)
 - **How to use technology tools and resources**
 - ✓ [Unlocking the Hidden Power of Communications Analytics](#)
 - ✓ [Clinical & Business Intelligence Executive Analytics Review Series](#)
 - [Part 1](#). Needs Assessment
 - [Part 2](#). Building a Business Case
 - [Part 3](#). Industry Capabilities – Available Tools, How and Where Applied
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