# 

Big Data is The New Drug

Case Study Analysis

Yahia Ali

Central Washington University

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# **Executive Summary**

In contemporary industries, Big Data is leading element for businesses to effectively analyze and pull insights from internal and external, primary and secondary data. As an essential member of the global pharmaceutical industry, UCB Pharma can face substantial challenges as their market share declines and client trust weakens. For an extended period, UCB's staff mostly made decisions based on limited information that they collected and processed individually. Their narrow approach correlated with many inefficiencies for the previous Decision Support Systems. When confronting performance declines, it is indisputable that changes are essential.  
 This report outlines recommendations as developed to address these changes, particularly taking aim at the specific definitions of the dimensions where results are desired. Several alternatives are evaluated to identify the most beneficial approach to improve the existing decision support system. These potential alternatives include: Establishing a Big Data team, Develop Data Analytics Methodology, or stay on Status Quo. The following crucial decision criteria are applied: Cost of Implementation, Time of Implementation, and Clients Satisfaction. Based on these criteria, it was determined that Developing a Data Analytics Methodology is the most beneficial alternative   
 Implementing this recommendation of Developing a Data Analytics Methodology Environment will require changes in policy and collaborative efforts by all joint business units and stakeholders. More broadly, the implementation plan expected to last for three years with initial budget of $500.000. This implementation plan should be re-evaluated on quarterly and annual basis and results are to be presented to the board of the executive team. Overall, these recommendations are presented as a balanced package; therefore, it is essential that this proposal is implemented in a balanced and sustainable way.

# **Problem Statement**

As one of the global leading biopharmaceutical drug companies, UCB Pharma spends a quarter of its profits on research and development (R&D) (UCB Annual Report, 2017). R& D is extensive process that generates huge quantities of data. However, it is not possible to manage using traditional data management tools. Therefore, UCB Pharma must determine if it should develop a new clinic decision support system, and if so, they must establish a time-bound strategy for success.

# **Problem and Data Analysis**

## **Growing Global Regulations to Protect Patient’s Privacy**

Privacy involves variables including data, data producers, consumers, content owners, analyzers, and rights. Privacy is a considerable issue in the U.S. and worldwide. Increasing regulations to protect patient privacy correlate with the rise of large-scale privacy breaches, including 115 million healthcare records in the U.S. breached in 2015 (Munro, 2015). Usually patients have no knowledge when their records are being analyzed for a research and development or best practice purposes. Thus, Federal law prohibits medical providers from disclosing certain health information without patient consent. There is a debate between those claiming that these activities fall under “quality improvement”, in which patients should not be informed their medical records being studied by scientists or data analysts. The other side of the argument addresses that people do not feel comfortable with researchers of any kind using their health records. As a matter of respect and patient-centeredness, privacy laws determine that patients’ permission must be acquired.

Public trust and data security are closely related. Secure data platforms improve data security, which in-turn will boost public trust. If patient data is breached, it is a very serious privacy concern that reduces individuals’ trusts in institutions and data platforms. There have been many challenges with regards to customers buying medications, after which medical companies would attempt to use their information in marketing efforts to promote higher quality and higher priced products. The industry should allow users to decide whether their data can be shared, which would allow for more of a fair balance between privacy and utilization of data for research purposes.

## **Impact of Stakeholders Unique Concerns**

Stakeholder involvement is critical factor to the success of this project, no matter how drastic or minor the proposed solution is. UCB is a vast firm operating in more that forty countries. UCB collaborates with many educational institutions and technology solution partners. Thus, all stakeholders might have unique concerns and interests pertaining to possible solutions. Ultimately, stakeholders are humans with varied material and financial needs to account for.

It is a challenge for a project manager to identify and consider all stakeholder concerns, and to prioritize these interests in order of highest priority, in addition to identifying what should be a secondary goal. Including many stakeholders in the process is expected to increase the cost of coordination and the response time. For instance, two of the project stakeholders could set heavily debate regarding a proposed solutions, resulting in a major conflict to either side depending on the ultimate decisions made. Educational institutions would prefer study, develop, and test many hypotheses before providing a solution, whereas technology partners would prefer using their own existing software solutions to come up with a quick fix to the issue that benefits their own organization. Neither partner could effectively solve the problems without the other, but their contrasting approaches and priorities can quickly become sources of conflict rather than collaboration.

## **Solution that Supports Business Key Functions**

At minimum, a big data analytics platform in healthcare must support the key functions necessary for processing the data. The criteria for platform evaluation may include availability, continuity, ease of use, scalability, ability to manipulate at various levels of granularity, privacy and security enablement, and quality assurance (Figure I). Additionally, while most platforms currently available are open source, the typical advantages and limitations of open source platforms apply. To succeed, big data analytics in healthcare need to be packaged so it is menu-driven, user-friendly and transparent.   
 Real-time big data analytics is a key requirement in healthcare. It is vital to address the lag between data collection and processing. The dynamic availability of numerous analytics algorithms, models, and methods in a pull-down type of menu is also necessary for large-scale adoption. The important managerial issues of ownership, governance and standards need to be factored in. Additionally, woven through these issues is the challenge of continuous data acquisition and data cleansing. Health care data is rarely standardized, often fragmented, or generated in legacy IT systems with incompatible formats. Thus, the structure must factor in long-term considerations including system navigation, storage, and overall data management.

# **Alternatives**

During this case study, UCB’s current efforts to support clients with the latest available research and data continue at a stagnated and outdated level. The alternatives phase is to consider different methods for UCB’s IT team to develop robust data solution system goals using the most effective strategy. This strategy involves considerations of the industry overall, as well as specific needs, resources, and expertise within UCB.

## **Establish Big Data Management Team**

There are many distinct functions at the core of UCB data management team. Data engineers will be responsible for the process of ETL (extract, transfer, load), with key tasks like preparing data, cleaning data and piping ready-to-use data to the right place. Data analysts will be responsible for answering the business and client’s questions, bridging between available data and business insights. Data scientists have a specific purpose of building predictive models and to develop classification models using available data to guide future decisions. To organize these roles, most organizations rely on a hybrid form of centralized/decentralized strategy that combines elements of the two strategies.

**Centralized strategy.** Centralizeddata management organizations have their data management team reporting into a single manager or department within the organization. For this strategy, data teams tend to be more efficient and flexible in resourcing allocation. The team have more opportunities to participate and collaborate with their peers on a broad range of projects. **De-Centralized strategy**. In this strategy, an organization has data scientists reporting to distinct functions or business units throughout the organization. Decentralized organizations are often attractive from an accountability perspective since they provide business units with greater flexibility to control their own resourcing needs.

## **Develop Data Analytics Methodology Environment**

UCB senior leaders are concerned they may not be accessing full value from the massive amounts of information the organization generates each day (LaValle, Lesser, Shockley, Hopkins, & Kruschwitz, 2011). The ever-increasing data collection coincides with the growing concern of not being able to understand and interpret data effectively. This has given rise to new thought processes in big business to go beyond the intuitive approaches to decision-making as seen in the past.

In a field like pharmacology, there is interplay between the tangible and the intangible variables. The tangible can be objectively measured and analyzed for an understanding. In contrast, intangible variables are difficult to be predicated and are dependent on the feelings and emotions within client and patient-bases (Olenski, 2012).

The six-sigma process can become an integral part of digesting big data as well as deploying a global process improvement methodology. Through the five phases of the process (Define, Measure, Analyze, Improve, and Control), Six Sigma can effectively be utilized to provide big data solutions.

## **Status Quo**

Due to high-risk factors over UCB’s market share position, considering massive data management project production could add more financial and time risks for UCB to maintain its business functions. Also, there an elevated risk of failing to produce a final product with competitive features to stand in for UCB’s process and client needs. It might be recommended to abstain from pursuing a new data management tool plan, to instead focus UCB’s efforts in improving already existing products.

# **Key Decision Criteria**

# Key decision criteria are elements that are important to the organization, and they will be used to evaluate the suitability of each alternative recommended. Each alternative must be compared to each criterion, and its suitability is ranked in Table 1. All scores are based on a score of 1 to 3, in which a score of 1 is the lowest, and a score of 3 is the highest. The most beneficial alternative is the one that receives the highest overall score. **Cost of Implementation**

The cost to implement parameter is an estimate of the cost incurred by UCB by implementing a specific alternative. Lower costs are preferred. With implementation costs of $15 million, scoring will be conducted according to the following:

* Less than $3 million, 3 points.
* Greater than $3 million and less than $15 million, 2 points.
* Greater than $15 million, 1 point.

## **Time of Implementation**

This parameter is an estimate of the amount of time required to implement an alternative. The alternative that can be implemented in a shorter time frame is ideal, with 9 months or less chosen as the ideal timeframe. This timeframe is selected so the effects of an alternative may be measured against the previous fiscal year’s quarterly performance metrics. Alternatives will be assigned accordingly:

* Less than or equal to 9 months (3 quarters) to implement, 3 points.
* Greater than 9 months but less than 2 years, 2 points.
* Greater than 2 years, 1 point.

## **Clients Satisfaction**

UCB’s primary goals is to exceed clients’ needs and expectations, and to maintain trust and relationships in UCB’s business solutions and practices. Any alternative that scores less than 40% in client satisfaction will receive a score of one. An alternative that scores between 40% and 75% in client satisfaction will grade two points. An alternative that scores 75% and up in client satisfaction will receive three points.

# **Analyze and Evaluate Alternatives**

## **Establish Big Data Management Team**

**Cost of implementation.** There is a higher cost factor for this alternative as UCB’s senior team is not sure of the size and job specializations required to put this team into production. UCB has to scan and collect information about their global branches cultural, regulatory, and economic differences. These factors will be used in defining all phases of the project. This alternative will be given two points in the cost scale.

**Time of implementation.** Building big data team is a time consume process as the organization should answer these questions beforehand: When should I start hiring? What does the work load look like? How to define the data collecting process? Where will the data team fit within the organization? The time table will depend on the organization answers to the questions above. The score for this criterion is one.

**Client satisfaction.** UCB is not new to big data practices, but the organization is expecting a timely process to identify, attract and recruit a solid data scientists team, including individuals who can work with stakeholders to define the company’s data strategy. For that reason, crucial questions raise about if UCB ready to treat data as a first-class priority for meeting clients’ needs. Can a data team do their job as soon as UCB recruit them, or do they have to set up their data infrastructure first? The score for this criterion is one.

## **Develop Data Analytics Methodology Environment**

**Cost of implementation**.This criterion comes with heavy cost factor. If approved, UCB has to invest heavily in elevating both clients’ and employees’ data analytics skills. There is little evidence that UCB will generate profits off this investment in the short term. However, strategically UCB is building its own army of data science and statistical experts who can drive the process from A to Z. UCB’s future return on investment forecast should show improvement. The score of this criterion is two.

**Time of implementation**.This is an ongoing strategy which requires frequent quality control examination to check the efficiency of the methodology. It is likely that UCB will consume many time sprints executing the required phases of this strategy. Implementation time of this alternative is expected to last for three years. The score for this criterion is 1.

**Client satisfaction**.With no doubt,the future belongs to organizations that completely integrate data analytics into the foundation of how they practice business in the marketplace. By embedding a big data methodology in UCB’s strategy, data analytics will not be any more a luxury tool that is not available to everybody in the organization. Clients will feel very comfortable interacting with the data analytics tools. The score for this criterion is 3.

## **Status Quo**

Although, there is no cost or time associated with this alternative, however, adapting this solution comes with significant risks. It is predictable that UCB market position and share will be negatively affected. UCB will be at risk of falling behind its competitors and becoming more incapable of meeting client’s needs. The company would be at risk of spending many years of work trying to build up solutions the organization missed by approving the status quo.

This alternative will be given one point on the time and cost scales and clients’ satisfaction decision creation as well.

# **Recommendation and Justifying the Preferred Alternative**

Referring to the total score in Table 1, it can be determined that the most beneficial alternative would be Develop Data Analytics Methodology Environment with a score of 6. The second most beneficial alternative, with a score of 4, would be Establish a Big Data Team. The least beneficial alternative would be Status Quo, with a score of 3. The Develop Data Analytics Methodology Environment alternative is recommended as the most feasible technique given its superiority in terms of cost of implementation, time of implementation and client satisfaction rate as compared to the other alternatives.

# **Action Items and Implementation Plan**

UCB’s executive board will need to evaluate the organizations ability to finance the recommended alternative for the year 2018/2019. The project team will compile its performance on monthly and quarterly bases, and then communicate it back to the joint executive and senior managers board.

Based on health data evolvement, analytics techniques are scaled up to the complex and sophisticated analytics necessary to accommodate volume, velocity and variety. This analysis recommends executing the following action plans in a consequential way.

Utilization of the six-sigma process can help UCB with embedding solid data analytics methodology as a business strategy through the five phases of six-sigma process (Define, Measure, Analyze, Improve, and Control).

In the first phase, the organization can identify the client needs and feedback to process intangible information into a technical requirement form (Martinez, 2011). The second phase, measure, allows for value analysis, a data collection plan, and baseline analysis of even big data. The third phase, analysis, is centered around the collected data and its statistical meaning with the goal of providing practical solutions to the problems at hand. During the analysis phase, the project team can develop experiment tools to use to adequately analyze the causal relationship between the measured variable and the quality measure. The improvement phase will implement simulation models of the more-likely changes that could impact the data flow process. These models will help in developing control charts to identify irregularities. The final phase of the Six Sigma process, control, is designated for monitoring the variability in the changed system. It is recommended to tie this tool into an organizational dashboard or report system (Martinez, 2011).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Score | |  |  |
| Alternatives | **Cost of Implementation** | | **Time of Implementation** | **Clients Satisfaction** | **Total Points** |
| Establish Data Management Team | 2 | | 1 | 1 | 4 |
| Develop Data Analytics Methodology | 2 | | 1 | 3 | 6 |
| Status Quo | 1 | | 1 | 1 | 3 |

## **Table 1**



**Figure I** - Big Data analytics conceptual Architecture

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