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Enabling Data Driven Culture via Technology

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ABSTRACT

One of the modern-day challenges for organizations is to foster and cultivate a data driven culture. The more obvious choices are drastic changes in hiring practices and empowering internal business units and users to align to data-driven SOPs & work instructions. The often ignored and perceived as complex aspect of such transformation is the required technology and any investment in such efforts. With advancements in cloud based computing and GUI-driven data analytics and deep statistics, the answer is surprisingly simpler than perceived. With a combination of below tools and proposed approach, we could enable such transformation at a faster pace and a cheaper price

- Data science workbench to search, acquire, model/simulate and utilize any clinical trial data
- Enabling fit-for-purpose apps via an enterprise analytics app store

With the above two interfaces established, delivering information to business users and enhancing the post-data retrieval-activities with machine-enabled learning becomes a simpler task and enables us to take giant leaps towards a smart information delivery framework for enterprises.

Enterprise Information Management Framework

Today Information is treated as a commodity and before data is converted to information – it goes through certain metaphorical “industrial process” (cleansing, transformation & sometimes aggregation) before it gets presented to business and/or a functional user - who in fact may find meaningful insights into the near-real time raw data.

It is straight forward for the End consumer of the data to go to source and rebuild the end goal with appropriate assumptions and the right processing of data although it is highly technical not to mention manual and labor-intensive.

Is it okay to avoid asking a question just because it is expensive to answer or time/effort consuming to come up with a better answer? The answer lies in an organization’s agility to invent new work instructions and willingness to continuously evolve process and state of technology.

We will look at a sample information management process proposed below (**Fig. 1**). It mainly consists of five major components:

1. Simplified User Interface (Insights Home) for Information Management mainly serving:
    a. Search & Surface data from any available data sources
    b. Ability to bridge the gap between search result and “what happens next?” (for example: Analysis, Modelling etc.)
2. Near-real time data highways from Source systems
3. Data Science Workbench
4. Enterprise Analytics Apps Store
5. Machine learning (ML) driven Data Review, continuous surveillance & “auto-complete” of routine tasks per functional area

Below diagram depicts components 2, 3 & 4 clearly while Insights-Home (Component 1) is the primary way an end-user interacts with the system and Machine Learning-driven automated task completion (Component 5) is generating continuous Machine-to-Human communications as Machine Learning generates new insights based on clustering, correlation and routine established data review checks.

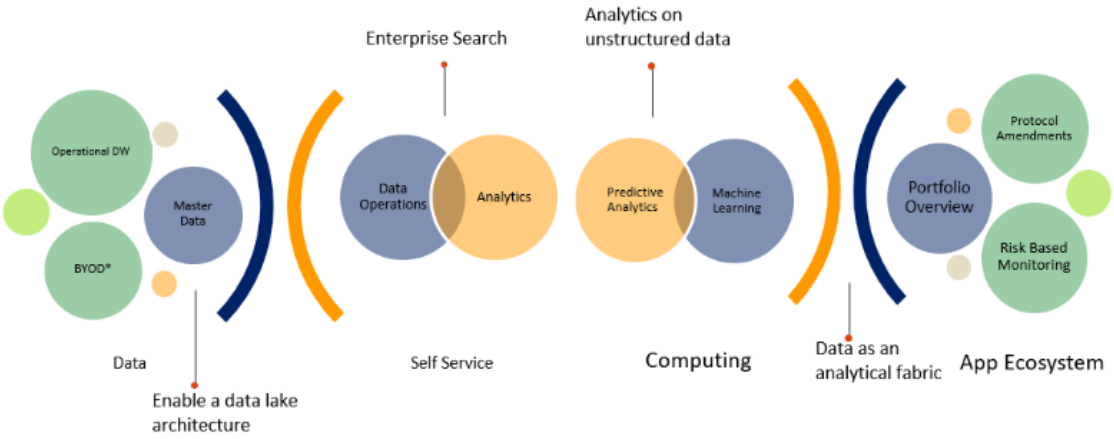

Fig 1: Sample Enterprise Information Management proposal

Data Science Workbench:

Data Modeling and Simulation is a highly technically-skilled task and it typically happens with PhD Statisticians – An easier way to lower the bar for such functions is to elevate the skill of a casual business user by industrializing a data-model library where all they will need to know is which inputs to provide for a specified set of outcomes and thereby establishing a basic know-how of Data Science.

The below will help towards these goals:

- Enabling Enterprise-wide Search across systems, across databases
- Create an immersive Search experience to customize search result to “know-in-depth” about typically searched entities such as Patient, Site, Study, Drug Portfolio etc.
- Extend Immersive Search to “Push” search results into
    - An analytical workflow (any commercially available BI system such as Tableau, Spotfire, QlikSense etc.)
    - A GUI driven statistical environment where users can pick and choose available “packaged” data models
        - Fit a handful of statistical models
        - Compare such models and select the one that fits
        - And enable a simple prediction result completely driven by GUI

Enterprise Analytics App Store:

Historically analytics has always stopped at pointing to “interesting trends” and it leaves it to the users on the action to be taken – thoughtfully built applications would have ability to “act” on such interesting trends and let the business users spend all their day in such interfaces and let them accomplish their day to day activities.

Analytics - Task/Workflow Management – Learn & Recommend feedback cycle

Presenting analytics-only-app (typically referred to as Dashboards) will lead to manual effort of maintaining Issues & actions logs outside such ecosystems – a thoughtful approach would be to wrap business process around analytics:

- Enabling pro-active identification of a potential issue before it becomes one
- Enabling a workflow for issues that already are severe
- Implementing a feedback system between all permutations of “Issue Identified & Action performed to remediate the issue” can lead to a new “Recommended Actions” part in the analytics leading to machine-learning assisted issue resolution.

Enabling Alerts & Notifications:

One of the largest concerns for business users is, they don't want to be monitoring 20 different tabs in a dashboard(s) if there isn't anything compelling enough for them to monitor.

A quick way to avoid such decision-fatigue is to find innovation workflows such as AI driven Performance monitoring and alerts – which alert the business user only when there is something that's compelling enough for a user to act on (via a Conversational Interface) and not expect every day monitoring of the app.

Machine-enabled Learning:

Establishing above approaches push us towards finding a new frontier for acquiring information or intelligence via new and innovative formats.

Some examples of such innovative technology applications:

- Predict and provide factors on how to avoid Protocol Amendments
- Predict and provide factors that may drive a Site to a lower performance

Conclusion:

By utilizing an intelligent combination of data science workbench, analytics app stores and Machine Learning-driven alerts and notifications, organizations can provide a technology environment that makes it a "low bar of entry" for business users to not only adopt but sustain and nurture a data driven culture.

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