TCS DATOM™ ASSESSMENT

WORKSHOP CASE STUDY

TCS DATA & ANALYTICS TARGET OPERATING MODEL

TATA

TATA CONSULTANCY SERVICES

DATOM™

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1. Company Profile

ABC Inc (~$4bn yearly revenue) has been providing various kinds of healthcare services to physicians and medical practices in the North America geography. It typically helps physicians in setting up a clinic and running the operations including scheduling appointments, arranging patient transport, conducting laboratory tests, and providing prescription medicines. It got separated as a new business from its parent organization XYZ Inc couple of years back. ABC Inc wants to leverage data and analytics capabilities for optimizing cost, gaining competitive advantage and delivering better business outcomes to become preferred healthcare partner for patients and healthcare professionals.

2. Industry Profile

The healthcare industry value chain is constantly evolving. Several stakeholders are involved in adding value to the products and services provided to customers. Information flow is substantial, and with exchange of patient records between stakeholders, data privacy and security are of highest concern. Healthcare companies need to identify new opportunities amidst multiple challenges like expected increase in future health care spend, rapid advancement in technologies, rise in medical tourism and new global competition. Trends in health care are particularly complex due to the diverse and fragmented nature of the industry. Information technology is an important enabler in cost containment, data integration, information sharing and patient safety improvement.

The health care industry can be broken down into four sectors:

- health care services and facilities
- medical devices, equipment, and hospital supplies manufacturers
- medical insurance and managed care
- pharmaceuticals

These sectors are related to and supplement each other in delivering services to patients. Members in the health care services sector – such as hospitals, independent groups of caregivers, or individual health specialists – provide services directly to patients. Hospitals use devices, equipment, supplies, and medicines from manufacturers, vendors, and pharmaceutical companies to deliver care to their patients.

The health care industry value chain is constantly changing, and it varies from country to country. Many stakeholders are involved in adding value to the products and services provided to customers.

The health care industry value chain connects five major stakeholders:

- **producers** - manufacture health care devices, equipment, hospital supplies and drugs, and sell them to health care providers, such as hospitals and doctors
- **purchasers** - buy and distribute health care products and hospital supplies in quantity from the producers
- **providers** - choose the equipment, devices, technologies, products and supplies to use and make them available to patients
- **intermediaries** - accept money from the payers; they include companies such as insurers, health maintenance organizations (HMOs), and pharmacy benefit managers
- **payers** - individuals or organizations that pay money to the providers of products and services through intermediaries.

3. Key Challenges

The IT estate of ABC Inc got initially separated from its parent XYZ Inc, and then evolved over a period of time into a disparate and fragmented IT system. These systems are difficult to change and scale, and have inherent problems with respect to data driven decision making, human interface experience, data quality and infrastructure. Key focus area of management is to identify and prioritize current issues, evaluate and establish an innovative to-be architecture, and solution and plan to incrementally build the capabilities that helps to overcome the existing constraints, thus maturing into a "data driven organization".

4. Ask from ABC Inc.

ABC Inc, with the objective of improving data maturity, is in the process of creating an information strategy and roadmap. It has requested for conducting a TCS DATOM™ assessment to evaluate the current data maturity and identify potential areas of improvement.

5. Assessment Interactions

Your team has started TCS DATOM™ assessment and in the process have interacted with a number of key stakeholders, analysed available artefacts, and evaluated some of the existing systems. This has revealed the following facts and insights:

1.1 Current Data & Analytics Landscape in ABC Inc

The current state of Data & Analytics is disintegrated with fair amount of disjointed reporting capabilities, and business decision-making process is mostly guided by manual processing with multiple versions of data. Data Governance have different levels of maturity across the organization. Data Quality Processes are still in a very nascent stage. Clearly defined data ownership for different data domains still not in place. Data Stewardship roles and associated practices are just being discussed. Efforts are underway to formalize the governance process. An enterprise data platform combined with an efficient operating model is very desirable and will serve the Data and Analytics organization effectively.

The following picture depicts the current state of data flow. There are instances where data still flows to the parent organization for financial reconciliation purpose. The data processing in ABC Inc. is very specific to a data source with its own set of rules and reference data. Operational reporting is carried out either through Cognos for reports needed for operational control, or OBIEE on archived data for more complex analysis. OBIEE and R are used by Data Analytics Team for trend analysis, and limited predictive modelling for Member risk forecasting.

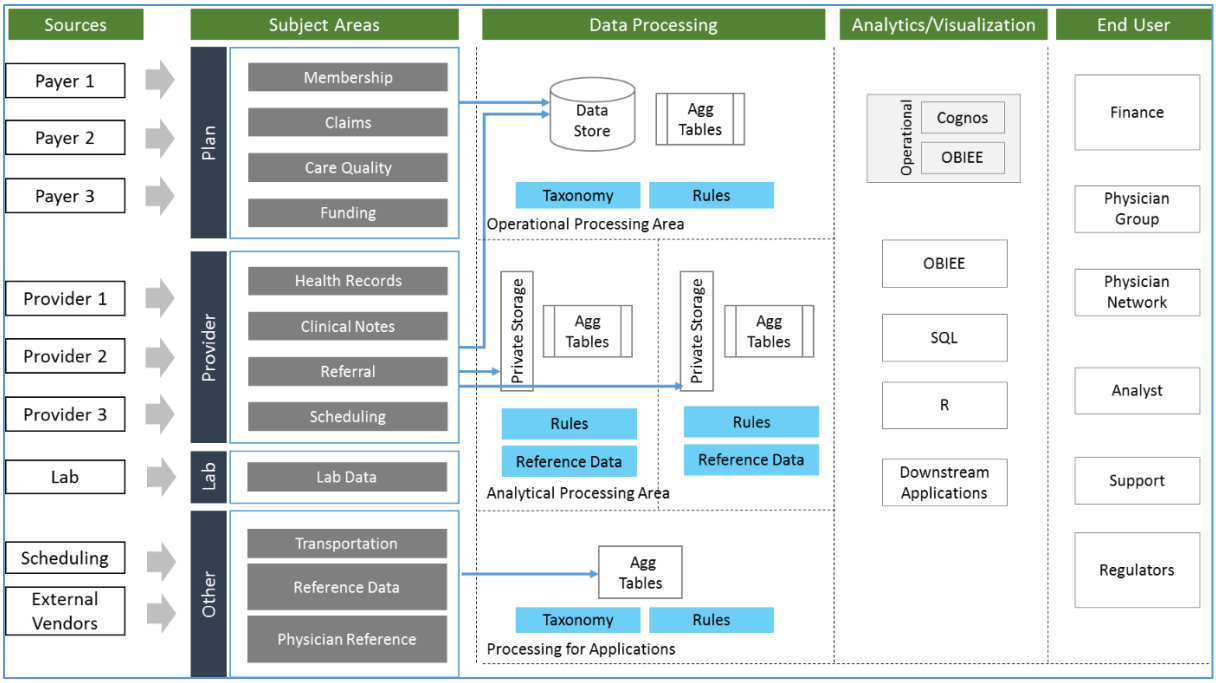

Fig 1 - High Level Data Architecture

ABC Inc, due to its relatively small size with about $4 billion of yearly revenue, has a mix of business and IT individuals in team composition, providing a rich source of knowledge in executing any data & analytics initiative. The business users are empowered to self-service reporting, while some of the IT team is equally capable of business decision-making. In certain cases, the roles overlap against an individual, resulting in a unique competency situation.

1.2 Output of the Interaction Sessions conducted with key individuals

Managing Director

Primary business model of ABC Inc is providing healthcare solutions by engaging into multi-year contracts with physician groups and care providers. As a heavily regulated business, ABC Inc remains at close scrutiny for its actions by both regulators as well as its shareholders. The vision for ABC Inc is a future state with a data-driven organization with an innovative to-be architecture where data and innovation are central to the organization's operations. Digital transformation through estate modernization, mobility and enablement of robust self-service capabilities are some of the important future plans. These will enable ABC Inc to serve its customers better, with a rich set of effective services, and will achieve better operational efficiency and effectiveness through easy access to information, increased information transparency and data driven decision making.

Business Unit Head

Since the regulatory requirements change from time to time, the type of operational reports also change along with the associated data. The data exchange between entities being complex, there is regular breakdown of operational reports. This leads to unavailability of automated reports on time to meet regulatory requirements. As a workaround, business needs to spend significant manual development of the reports, plan the workforce in advance, and in turn, loses resources to do actual business work.

For the pre-canned and stabilized reports, there are occasions when it breaches the daily availability SLA of 8 AM. This results in unavailability of information at the clinics to take decisions ahead of time, particularly related to pre-scheduled appointments, physician's availability on a given day, and general workforce planning.

Sales and Marketing Head

Marketing is targeted towards general population through paid media advertisements and other digital channels to choose ABC Inc as a preferred partner. Prior segmentation of the general population with respect to age groups, income brackets and types of insurance policies helps in targeting the right candidates. However, there is a lack of sufficient demographic information in-house to be able to do such segmentation effectively, and many a times the activity needs to be outsourced to a vendor at a significant cost.

A new payer or a provider is onboarded through a legal contract. This process takes over three months due to lack of IT automation. Sales team needs to engage with IT development team to explain the rules of the contract, even if such rules have already been used in earlier contracts.

CFO

Quarterly finance closure is a concern. Usually the closure takes almost 30 days, there had been attempts in the past to bring it down to 15 days or less. However, the attempts were not successful, and still there is significant manual reconciliation effort involved across various departments.

CIO / IT Director

In terms of the current state, following are some of the key inputs:

- The overall architecture governance process is not in place yet and is one of the key priorities of the management. Initially, individual business functions took technology decisions independently in consultation with different product vendors. Now, efforts are underway to establish an enterprise architecture governance process and framework.
- The Data & Analytics organization has not been defined yet. There are separate teams for each of the functional domains, managing the data analysis and reporting needs.
- The involvement of business in the context of information management is restricted to providing reporting requirements and then validating the reports during user acceptance phase only. The development cycle is long and turnaround time is quite high. Delivery methodology is "Waterfall". This is perceived as an important issue in the context of a rapidly changing business environment.
- The maturity in terms of advanced analytics, enabling predictive & prescriptive capabilities is low. Business decision making are mostly based on expertise and experience. Usage of analytical models are

rare & localized in very few areas and are mostly manual. In few cases, business users explore data directly without depending on IT, however, as mentioned before, not all Business users are exploring data due to lack of centralized data platform and technical competency.

- Currently there is data duplication across different subject areas managed by different teams. At this point the organization is seriously thinking about implementing a Master Data Management capability.
- Published information with respect to domain entities and their structures are not in place. This information are currently available in different functional specifications and architecture & design documents available with the individual teams. They are being maintained in a configuration management tool. In fact all information assets are maintained in the configuration management tool separately by each team. However, the configuration management process is not established.
- Top level Key Performance Indicators are available, however no business glossary is available yet. The process to maintain and extend the list of KPIs and ownership is yet to be defined.
- Enterprise Process Maps are available in Process Documents, and the related SLAs are available. Detailed level KPIs for Sub-Processes are yet to be defined.
- Apart from some of the stabilized pre-canned reports, business reports data issues quite frequently.
- Data Quality processes are at a very nascent stage. Processes to assess impact of poor data quality is not yet in place.
- External data (e.g. demographic, HCP (Health Care Professional) information etc.) are not procured directly yet and this is an important consideration going forward. In such situations, Sub-contractors / Vendors are engaged by business functions to generate required insights.
- The existing data & analytics operating model is sub-optimal. And management is looking forward to this assessment process to receive guidance in terms of establishing an effective operating model.

Integration Services Lead

- Acts as gateway to most of the data sources (text files from sftp locations) – Payer, Provider, Lab, Scheduling and a few others.
- Some data are incremental while some are full refresh. Overall transaction volume estimated to be 60mn/month.
- SQL Server instance holds the main databases, though the instance is shared by few downstream applications.
- Each Payer/Provider has a separate data flow into the database with its own set of ETL maps and transformation rules. Any new Payer/Provider will need a new set of ETL maps along with a database. Reusability or configurability is minimum at this point.
- Data is usually held in its source state due to regulatory requirements. Mostly attributes get added for enrichment purpose.
- Lab data cannot be used widely as the patient key does not match.
- Data is sent to different User Groups, Data Analytics Team, reconciliation needs at Finance, and to several consuming applications.
- Basic forms of data quality checks primarily focusing on syntactic issues are available. Remediation involves quarantining and manual review and correction (if possible).
- Some basic auditing and alerting are in place to alert in situations such as job failures, unavailability of source files etc. Jobs are often long running and have performance issues. Security auditing and monitoring is limited to network & network components only.
- Whenever issues are reported system/database administrators gets involved to resolve those.
- In the testing and production environment access to the database is restricted and is available only to a super user group. However changes to the data & data structures cannot be traced.
- Often support teams need to carry out manual data processing.

- Data retention strategy follows regulatory requirements. Historical data is stored in domain specific private storage areas along with the current data sets.

Operational Reporting Lead

- Operational application runs at ABC Inc as well as in the Clinics, leading to multiple instances.
- Each operational report, created on in-built Cognos specific to that operational application, needs to be physically replicated to each operational application instance.
- For larger reports, data is downloaded into an archive and OBIE is used.
- In case additional data is required for analysis, manual process is required to upload the data in some temporary tables and new reporting interfaces are needed to be built. The entire process has reasonably high turnaround time.
- Plan is to provide Tableau for self-service reporting and reduce the number of data downloads in individual user's environment.

Chief Analytics Officer

- Responsible for business analytics for ABC Inc.
- Interacts with medical centers to consolidate data across parent and current organization to process data for analytics.
- Organization has different levels of maturity in data consolidation, organization, control and consumption. This disparity results in increased effort to perform analytics.
- Since the organization is closely aligned with business function, necessary technology strength is housed to perform the required analytics.
- An approach to data governance process has been laid out. Efforts are underway to formalize governance process and align it to strategic direction, but the progress is slow.
- The current design does not enable tracing the data lineage and any changes to the data.
- Analytics penetration is limited to certain use cases. Lack of a sandbox environment with necessary data hinders the users in performing analytics, and significant time is wasted in data preparation.

Member Risk Assessment Lead

- Responsible for monitoring business risk for ABC Inc by evaluating Member risks.
- Utilizes various sectors of data points to design a strategy and monitoring controls.
- Better data consistency and timeliness would enable the easy adoption of strategy and it's monitoring across organization.
- Techniques like Natural Language Processing can yield significant impact in finding certain text in progress notes and help in adopting standardized practices.
- Limited predictive analytics has started recently as use cases to understand the efficacy of such models in a given scenario.

Head Human Resource

- Centralized HR Management System in place.
- Structured performance management process exists.
- Employees put in their objectives in the system and it is ratified with the managers to ascertain alignment with organizational goals.

- Performance development plans are also created in the HR Management System. Employees who need any additional help are also connected with to ensure they get the right support in their career progression and career related concerns.
- However, currently competency management is handled by the relevant function heads. There is no centralized training and competency development function within HR Department.
- The existing competency management in the context of Data & Analytics is quite ad-hoc with very little focus of advanced analytical capabilities. Trainings are budgeted, planned and organized by individual business functions. The trainings are mostly external, facilitated by vendors. The mode is Instructor Led Training. The details of training and training feedbacks are maintained within the individual business function only.
- Enterprise level definition of Data & Analytics competency levels for IT & Business has not been established yet.
- Currently there is no enterprise platform for Learning and Knowledge management. As such retaining and maintaining acquired knowledge is perceived as a challenge as well.

Additional Inputs from available artefacts and evaluation of existing systems:

- Three environments (Development, Testing & Production) are available to manage the software development lifecycle.
- There is very limited automation in terms of IT Delivery and IT Operations. Only automated regression test suites have been developed in some of the areas to facilitate regression testing. All other activities including build and deployment are manual.
- Release Management and Change Management processes are pretty well defined.
- Security is managed through user roles & privileges at the reporting layer. Access Control Lists facilitating object level control does not exist. However there are no cases of reported security breaches.
- Information is shared with other legal entities in standardized machine readable formats using a secured file transfer protocol.
- Any handover, takeover process required during IT Delivery and IT Operations involve handover takeover of the information assets as well.
- Though real time information would have been useful in a number of business scenarios (e.g. managing appointments), the current infrastructure does not enable that.
- The absence of product / technology experts in the teams is quite conspicuous.
- No existing strategy for application rationalization or future roadmap in terms of estate modernization was available. Management is looking forward to this assessment process as the starting point towards defining a future roadmap for ABC Inc.

6. Assignment

ABC Inc, with the objective of improving data maturity, is in the process of creating an information strategy and roadmap. It has requested for conducting an assessment to evaluate the current data maturity and identify potential areas of improvement.

About TCS Analytics & Insights

TCS' Analytics & Insights (A&I) service line helps organizations view, understand, and reimagine their businesses through an intelligent data-centric approach. We design innovative solutions for superior business outcomes and help customers execute effective data-driven strategies. The A&I unit researches key emerging trends, including Artificial Intelligence, immersive analytics, mobility, cloud computing and social networking to develop innovative, practical, and powerful applications to deliver business results.

The founding principles of A&I unit is to provide Business Stakeholder Advocacy, Full Services Play, and IP-based Value Realization and the NextGen strategy is powered by:

DATOM™ - Our Data & Analytics maturity assessment, consulting and advisory framework

DAEzMo™ - Data and Analytics Estate Modernization powered by TCS' off-the-shelf offerings and solution accelerators

Decision Fabric™ powered contextual industry offerings

TCS DATOM™ helps organizations to adopt best practices depending on the context of their data and analytics programs. By simplifying operating models, we help organizations leverage complex technologies with ease, and set up frameworks aligned with their business goals.

We offer **DAEzMO™** (Data & Analytics Estate Modernization) powered solutions to simplify, synergize, and scale an organization's data landscape and analytics portfolio to enable exponential business growth through agile transformation as technology continues to evolve at rapid pace.

Our award winning solution accelerator, **Decision Fabric™**, caters to disruptive innovation for next generation contextual industry offerings. It weaves components from different disciplines of AI such as Reasoning, Learning, NLP, Perception and Knowledge Representation, to continuously learn and take decisions for advanced automation as well as human assistance.

To help enable scaling up the execution of A&I strategy, we have created an A&I Evangelist Community Development Program. **TCS DATOM©** assessment will be one of the first goals of this community.

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