Analytics and Data Science Services

G-Cloud Service Definition Document

cognizant®

SERVICE OVERVIEW

Cognizant's advanced analytics and data science services enable an organisation to drive true insight and deliver outcome-based value through the application of analytical models and approaches that take advantage of the wealth of data that exists within public sector bodies, and the increasing availability of third party data

These can be used in a number of scenarios and Cognizant adopts a use case driven approach to ensure that appropriate outcomes are achieved with greatest efficiency and effectiveness.

We offer solutions that encompass, but are not limited to:

- Predictive Asset Maintenance
- Predictive Modelling
- Supply Chain Analytics
- Demand Forecasting
- Procurement Analytics
- Process Improvement
- Call Centre Analytics
- Workforce & IT Ops
- Fraud Analytics
- Compliance & Governance
- Governance
- Digital Analytics (Web, Social Media, Sentiment Analytics).

We deliver our services as bespoke analytical solutions adapted to your requirements and we predominantly utilise R, python, SQL, and SAS through a range of modelling techniques to deliver algorithm development linked to achieving the desired outcomes. We can provide visualisations to analytical insights through solutions such as Tableau or PowerBI to ensure these insights are embedded in operational processes.

Our Analytics services can be combined with other Cognizant services available through G-Cloud to provision an end to end : Information Management solution for the organisation. These services include:

- Information Architecture Advisory Services
- Business Intelligence Services
- Data Integration and ETL Services
- Data Modelling Services
- Data Governance Services
- Master Data Management Services
- Data Quality Services

There are five services within the Cognizant Analytics service family which cover the lifecycle of an analytics deployment.

- **Analytics and Data Science Advisory Services** – provide the organisation with an analysis of the benefits analytics can realise coupled with a roadmap to achieve these.
- **Analytics and Data Science Proof Of Concept and Pilot Services** – enable a low cost entry point to prove one or two use cases from the strategy to demonstrate the expected value outcomes.
- **Analytics and Data Science Setup & Migration Services** – provide services to setup an analytics solution and migrate data and users to the solution.
- **Analytics and Data Science Testing Services** – provide services to ensure the quality, correctness, and performance of an analytics solution
- **Analytics and Data Science Support Services** – perform business as usual activities to support the analytics solution and its users.

What Is Analytics?

Analytics is a data science that takes Business Intelligence a step ahead by predicting the events and prescribing the actions to be taken by relevant stakeholders.
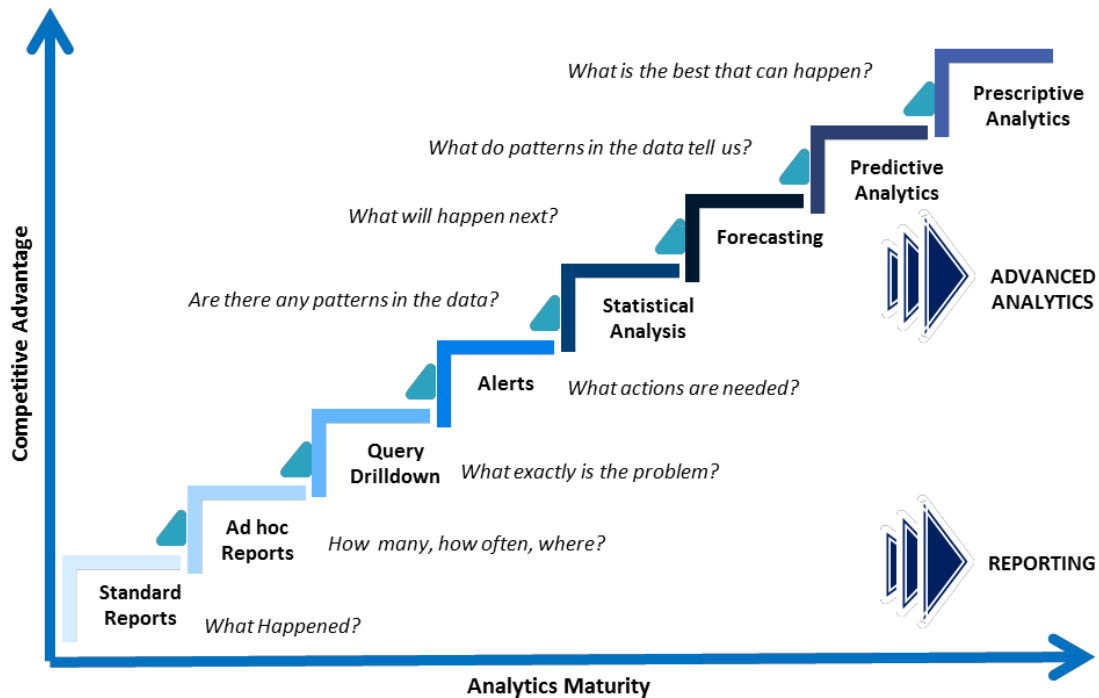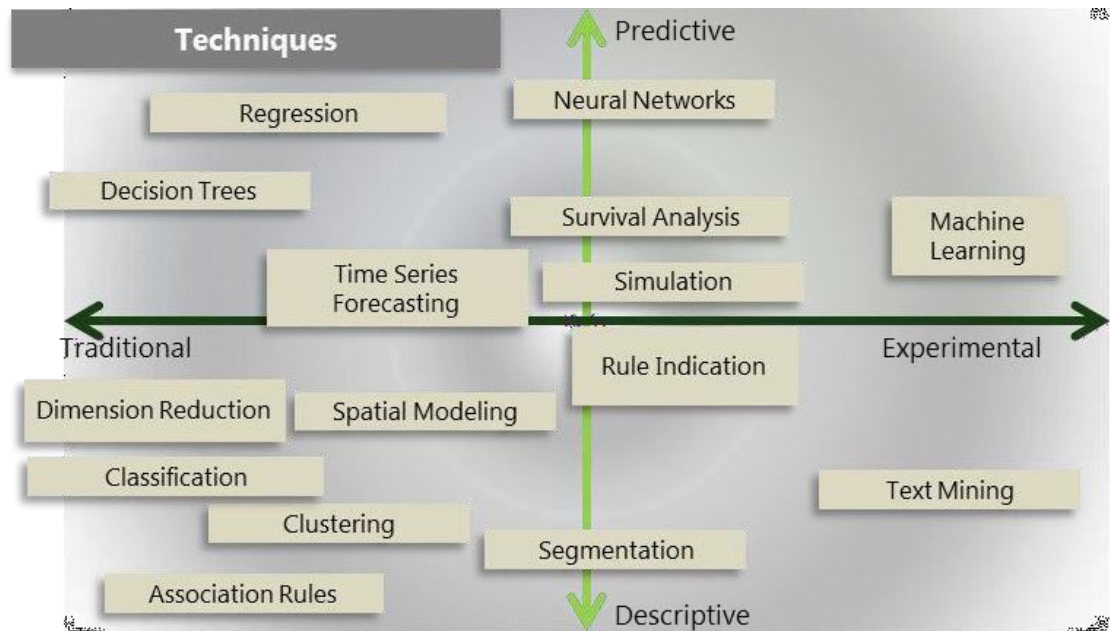

Through the adoption of advanced analytics an organisation can strive for preventative outcomes as opposed to reactive responses after the fact.

For example by applying predictive modelling techniques a local authority could identify citizens on the edge of care. Then by following through with a prescriptive analysis a recovery plan can be put in place to prevent the need for expensive intervention. This not only improves the outcomes before hardship is encountered for the individuals, but also protects the public purse as intervention techniques are normally much more cost effective than the alternatives of state support and care.

The accuracy, success and impact of an analytic solution are measured through the departments business intelligence solution coupled with observation of predicted outcomes.

There are many analytical techniques that Cognizant can apply to add value to an organisation as shown in the following diagram:

Techniques

- Predictive
- Neural Networks
- Regression
- Decision Trees
- Survival Analysis
- Machine Learning
- Time Series Forecasting
- Simulation
- Traditional ← → Experimental
- Rule Indication
- Dimension Reduction
- Spatial Modeling
- Classification
- Text Mining
- Clustering
- Segmentation
- Association Rules
- Descriptive

There are also many software tools in the market that enable analytics delivery and Cognizant's vendor neutral approach enables the analytic need to drive the solution rather than a technology bias limiting the art of the possible. Cognizant has partnership relationships with all of the leading providers in this space including the following :

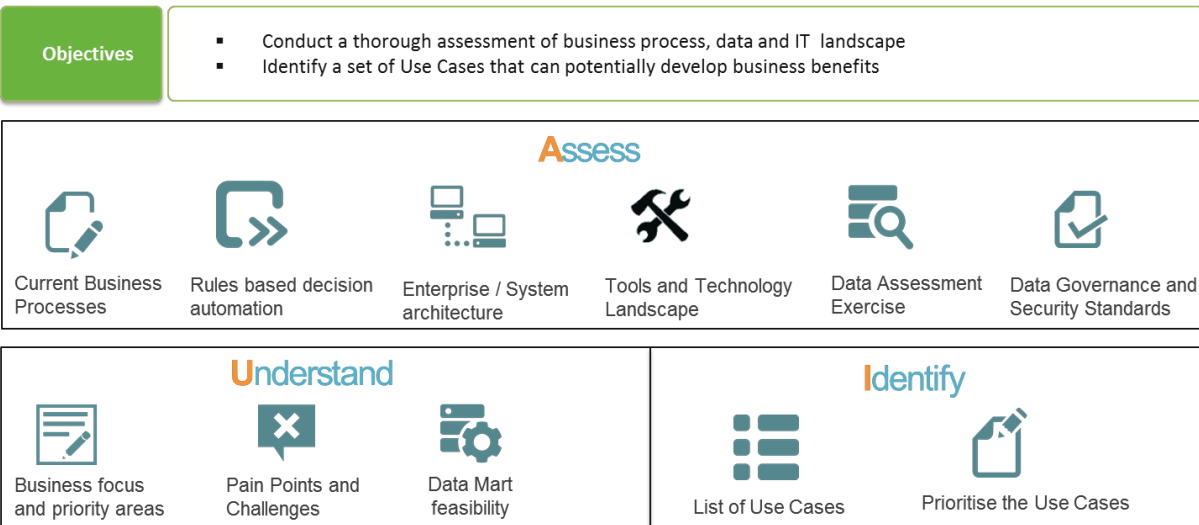|		
SAS	Revolution Analytics	R
SPSS	Amazon Web Services	Splunk
Alteryx	Clarabridge	Tableau
Qlik View & Qlik Sense	Attensity	Rapid Miner
Microsoft SQL & BI Stack	Python	Hadoop

Analytics and Data Science Advisory Services

The advisory services enable an organisation to accomplish any or all of the following objectives

- Identify the potential benefits that could be realised from adopting an analytics solution
- Analyse and understand their analytic needs
- Express those needs in stakeholder relevant use cases in plain English
- Define key measurement criteria that would demonstrate value has been realised through analytics
- Build a strategic vision for the pervasive use of analytics in the organisation
- Build a roadmap enabling the strategic vision
- Identify quick wins that ensure ROI is maximised at every point of the implementation of the analytics solution
- Complete a vendor selection exercise to choose the right tools to meet the analytic needs of the organisation
- Complete a readiness assessment of the organisation's infrastructure and people to determine ease of adoption and implementation of analytics solutions
- Understand internal and external data sources that can contribute to analytics driven insight including recommendations towards the incorporation of new data sets to increase analytic value
- Create a business case for the execution of part or all of the roadmap

These outcomes are achieved through a timeboxed discovery process. This discovery phase can be delivered as a fixed price or under T&M via the SFIA rate card. The discovery process is a deep dive seeking to Assess, Understand, and Identify as shown below

Objectives	▪ Conduct a thorough assessment of business process, data and IT landscape ▪ Identify a set of Use Cases that can potentially develop business benefits

Assess

Current Business Processes	Rules based decision automation	Enterprise / System architecture	Tools and Technology Landscape	Data Assessment Exercise	Data Governance and Security Standards

Understand

Business focus and priority areas	Pain Points and Challenges	Data Mart feasibility

Identify

List of Use Cases	Prioritise the Use Cases

The following key activities would typically be undertaken (this is an indicative list and the actual activities will be refined on a needs basis for each organisation)

| Data Discovery and Assessment	Analytics Requirements Gathering	Data Mart and Process Assessment
✓ Identify data sources ✓ Assess master data and metadata ✓ Identify ETL and data architecture ✓ Check accessibility of data ✓ Check data reliability ✓ Check data consistency ✓ Check Data Governance ✓ Check Data Security	✓ Identify insights that the organisation is interested in ✓ Comprehend business rules ✓ Identify variables and dimensions ✓ Spot constraints and exclusions that might come up during data collection ✓ Understand current analytics tool landscapes	✓ Analytics Data Mart and Workbench assessment ✓ Evaluate whether current processes in the organisation can support advanced analytics ✓ Resource skill gap analysis in terms of advanced analytics ✓ Identify gaps in data governance and security standards

As has been stated the business needs and potential outcomes will be articulated in a series of use cases which will be identified and prioritised through the discovery process as the following indicative example shows:
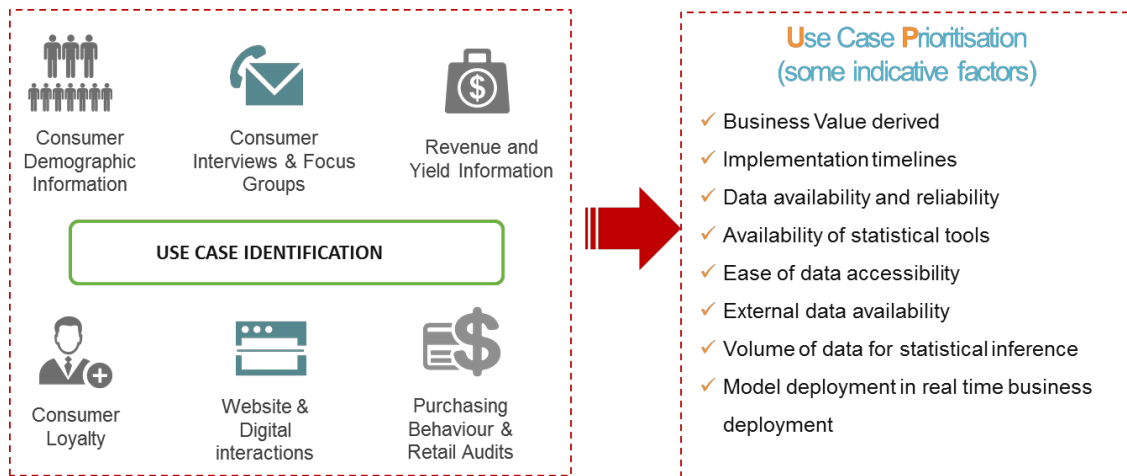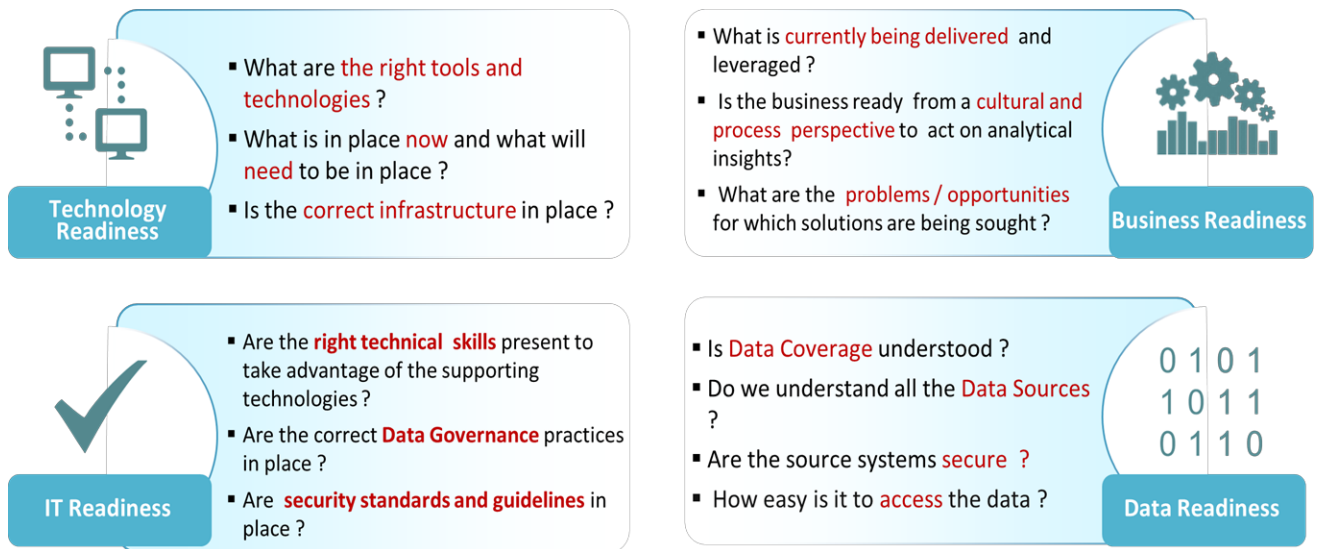

A simple prioritisation matrix can be arrived at by scoring each use case along a number of dimensions including potential derived business value, ease of creation, availability of data etc.

Once the use cases are known the appropriate software tools to meet the analytics needs can be identified. This will be done via an impartial vendor selection process that ensure the right tools are selected for the organisation taking into consideration all of the discovery findings.

A plan or roadmap for the implementation of the analytics solution will be created and socialised across the organisation. This can be supported by the input into or creation of a business case to support the execution of the roadmap.

The following diagram illustrates the key discovery points for an analytics roadmap.

Technology Readiness
- What are the right tools and technologies ?
- What is in place now and what will need to be in place ?
- Is the correct infrastructure in place ?

Business Readiness
- What is currently being delivered and leveraged ?
- Is the business ready from a cultural and process perspective to act on analytical insights?
- What are the problems / opportunities for which solutions are being sought ?

IT Readiness
- Are the right technical skills present to take advantage of the supporting technologies ?
- Are the correct Data Governance practices in place ?
- Are security standards and guidelines in place ?

Data Readiness
- Is Data Coverage understood ?
- Do we understand all the Data Sources ?
- Are the source systems secure ?
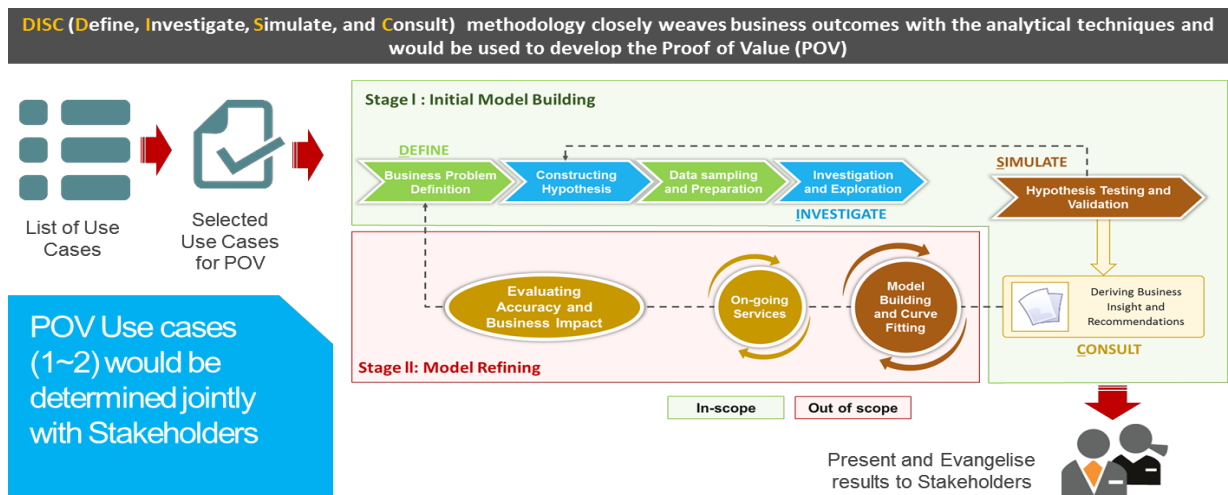- How easy is it to access the data ?

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Analytics and Data Science Proof of Concept and Pilot Services
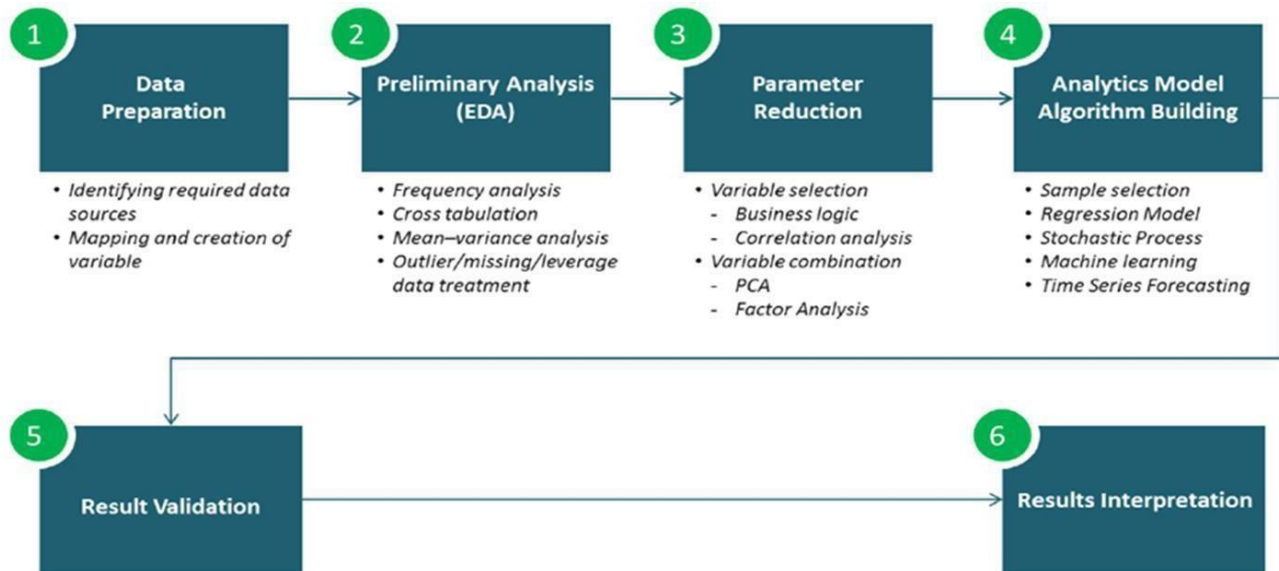
The analytics proof of concept and pilot services enable an easy first step into the implementation of an analytics solution. This will normally be the recommended first implementation step in an analytics roadmap. Cognizant normally refers to these deliverables as a proof of value as it is the business value that an analytics solution can bring that is the critical driver towards adoption.

A typical proof of value project will take one or two use cases and drive them to completion thus proving the benefits that can be realised for the organisation through the adoption of advanced analytics.

Cognizant's proven DISC methodology will be used to deliver the proof of value.

DISC (Define, **I**nvestigate, **S**imulate, and **C**onsult) **methodology closely weaves business outcomes with the analytical techniques and would be used to develop the Proof of Value (POV)**

List of Use Cases

Selected Use Cases for POV

POV Use cases (1~2) would be determined jointly with Stakeholders

Stage I : Initial Model Building

DEFINE
- Business Problem Definition
- Constructing Hypothesis
- Data sampling and Preparation
- Investigation and Exploration

INVESTIGATE

SIMULATE
- Hypothesis Testing and Validation

Stage II: Model Refining
- Evaluating Accuracy and Business Impact
- On-going Services
- Model Building and Curve Fitting

- Deriving Business Insight and Recommendations

CONSULT

In-scope | Out of scope

Present and Evangelise results to Stakeholders

The following six step process will be adopted to develop the proof of value solution.

1 Data Preparation	2 Preliminary Analysis (EDA)	3 Parameter Reduction	4 Analytics Model Algorithm Building

• Identifying required data sources
• Mapping and creation of variable
	• Frequency analysis
	• Cross tabulation
	• Mean–variance analysis
	• Outlier/missing/leverage data treatment
		• Variable selection
		  - Business logic
		  - Correlation analysis
		• Variable combination
		  - PCA
		  - Factor Analysis
			• Sample selection
			• Regression Model
			• Stochastic Process
			• Machine learning
			• Time Series Forecasting

5 Result Validation	6 Results Interpretation

The outcomes of this process will be shared with the business stakeholders thus successfully proving the value advanced analytics can bring.

Cognizant would recommend that the proof of value exercise be conducted as a time boxed fixed price project. We can however also offer the service as a T&M project as per our SFIA rate card for analytics.

Analytics and Data Science Setup and Migration Services

When it comes to the implementation of an analytics solution there are four key challenges to address.

Four Key Challenges

1 **Answer complex business problems; address the unstated challenges;** Grow analytics usage beyond decision support on tactical/strategic level, to support transactional business processes

2 Making analytics **pervasive**, growing analytics beyond the bulwarks for CIO/CTO's to **affect stakeholders across the board (CMO, CSO, CRO…)**

3 Getting analytics out of the exclusive hands of statisticians, and into the **hands of a broad base of frontline users**

4 **Embedding analytics into the operating model** and aligning the organisation, processes and technology to enable a scaled, data-driven enterprise

Our analytics setup and migration services are structured to address these four challenges whilst delivering quick return on investment and business outcomes. The projects will be aligned to an organisation's analytics strategy and roadmap where it is available. Cognizant would recommend our analytics delivery methodology which can be applied to a single project through to a programme to build an analytics centre of excellence for an organisation.
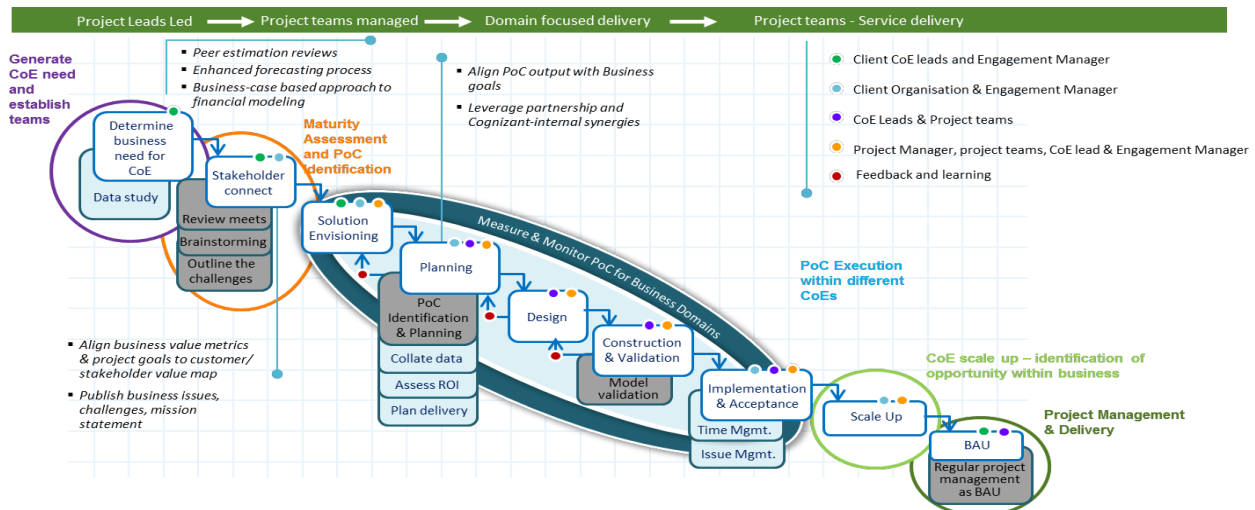
Analytics setup and migration projects can be delivered under T&M using the analytics SFIA rate card or as a fixed price engagement. Cognizant can take full ownership of the delivery or add expertise to an existing analytics function or team.

# Analytics and Data Science Testing Services

The analytics testing services enable an organisation to prove the quality and correctness of an analytics solution and if appropriate test its performance as well. With analytics solutions testing can be highly complex as you not only need to test for functional behaviours, but you also need to prove algorithmic correctness. This later process is tightly coupled to the use cases employed in the analytics solution and seeks to ensure that advanced analytical solutions are behaving as expected.

When dealing with predictive and prescriptive analytics a continuous automated testing and tuning approach can be adopted via machine learning techniques. This enables analytic solutions to improve their outputs over time.

Our core tenets in testing Analytics solutions are

- **Data Pre-Processing Validation** - Confirm the correctness of data processed from different sources to prepare for model inputs

- **Test Data preparation** - Test dataset identification and preparation with Hypothetical data coverage and distribution of data casing univariate, multivariate and outliers, through profiling & various sampling techniques to pass as input to the model

- **Model QA** - Testing the Model outcome with segmented historical and live data sets, Independent validation/verification of Model calculation logic and outputs in E2E integrated environment; Validation of model's business outcomes, Precision marks, Thresholds and comparison of actual vs predicted outputs

- **Information Delivery & Integration service testing** - Validating the presentation layers & other model Integration services with dependent application fixtures

- **Ongoing Model QA** - Perform automated tests to validate model's output consistency & efficiency (Parameter swapping/enhancements) over the time for different data sets and data distribution against the given measures

Our proven and perfected Analytics Model Validation framework is depicted below.
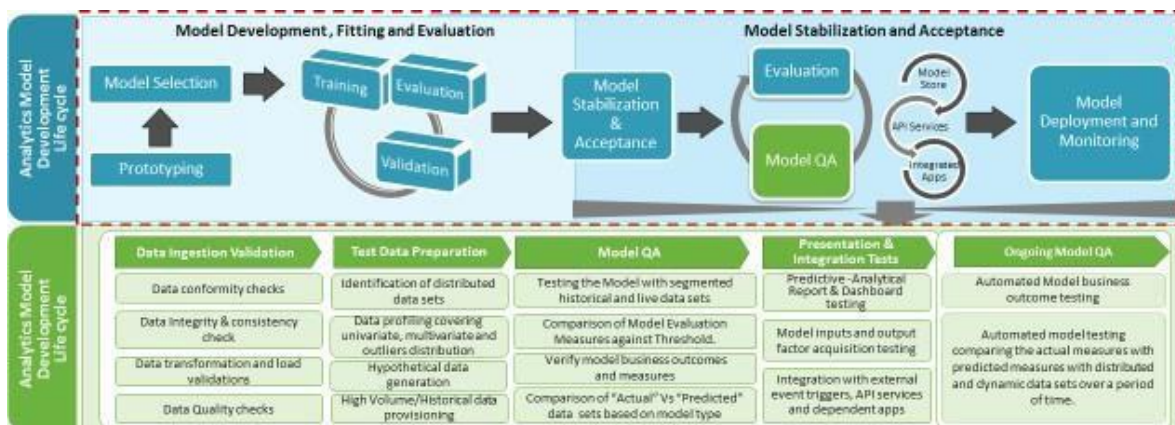
About Cognizant

Cognizant (Nasdaq-100: CTSH) engineers modern businesses. We help our clients modernize technology, reimagine processes and transform experiences so they can stay ahead in our fast changing world. Together, we're improving everyday life. See how at **www.cognizant.com** or **@Cognizant**.

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