ITC INFOTECH

Business-friendly Solutions

# BEHAVIOURAL ANALYSIS IN ASSET & LIABILITY MANAGEMENT

# Asset and Liability Management

"Asset Liability Management is a dynamic process of planning, organizing and controlling of assets & liabilities- their volumes, mixes, maturities, yields and costs in order to maintain liquidity and NII (Net Interest Income)"

"An effective asset liability management technique aims to manage the volume, mix, maturity, rate sensitivity, quality and liquidity of assets and liabilities as a whole so as to attain a predetermined acceptable risk/reward ratio."

A traditional approach of handling asset liability management has been to identify and address liquidity and interest rate risks as below:

**Liquidity Risk:**

- Identify sources of liquidity avenues (present & future)
- Identify funding needs (short-tem & long-term)
- Identify and address liquidity gaps by measuring and addressing maturity mismatches

**Interest Rate Risk:**

- Identify the sources of interest rate risks (present & future predictions)
- Measure interest rate gaps by means of :
  - Gap Analysis
  - Duration Analysis
- Identify means to address them

Incorporate these measures in the bank's overall ALM strategy. Liquidity Management is core to any bank and ALM fits into the liquidity management landscape as depicted beside.

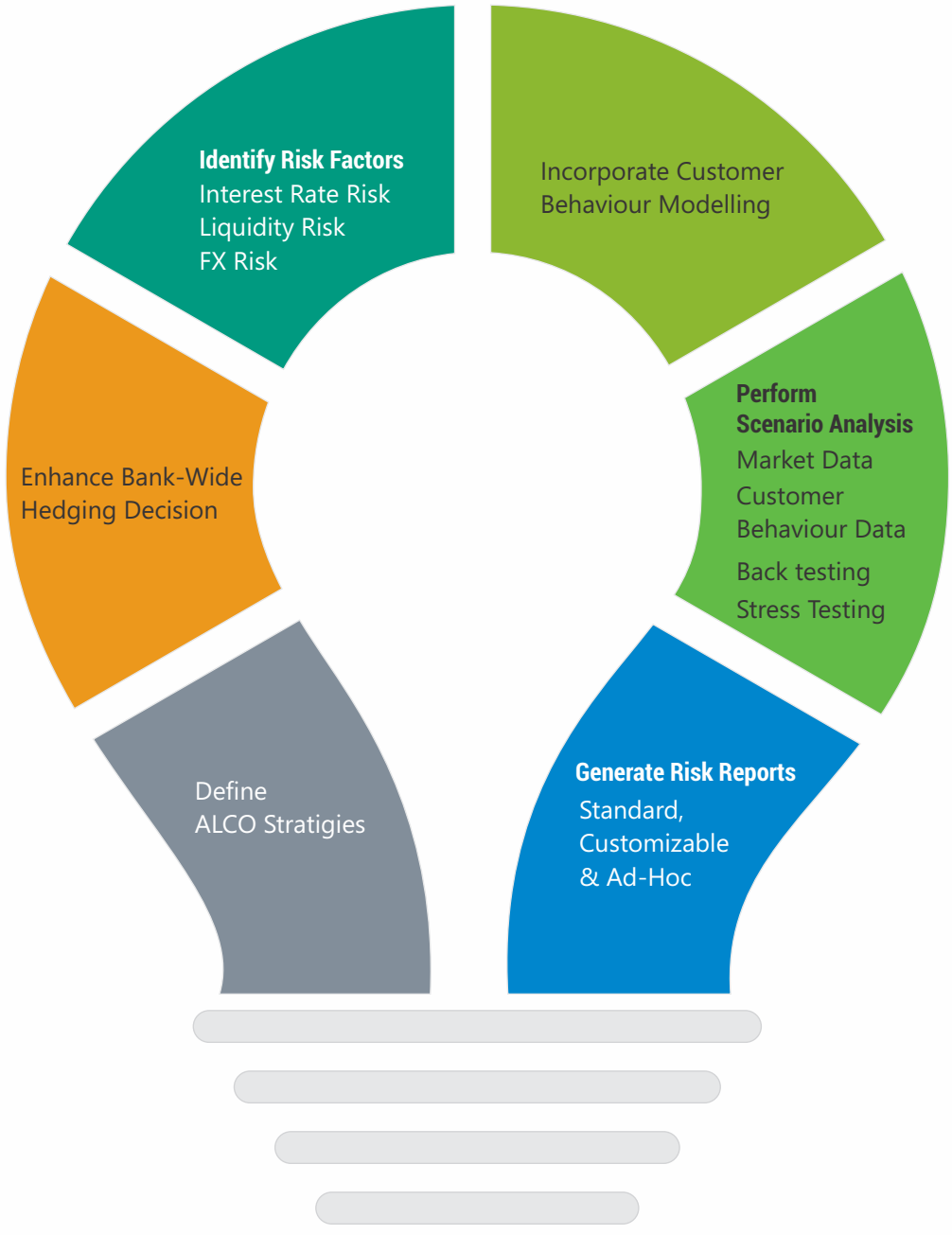
# Target Data flow in Asset & Liability Management

A sample data flow diagram of an ALM solution is depicted below. This landscape not only takes into account the above mentioned risks, but also forex risk, if a bank has foreign currency exposures.

In addition to that, customer behavior on accounts, deposits and loans which have no clearly defined maturity dates and some with in-built call/put options are also considered. Behavioral analysis is done as follows:

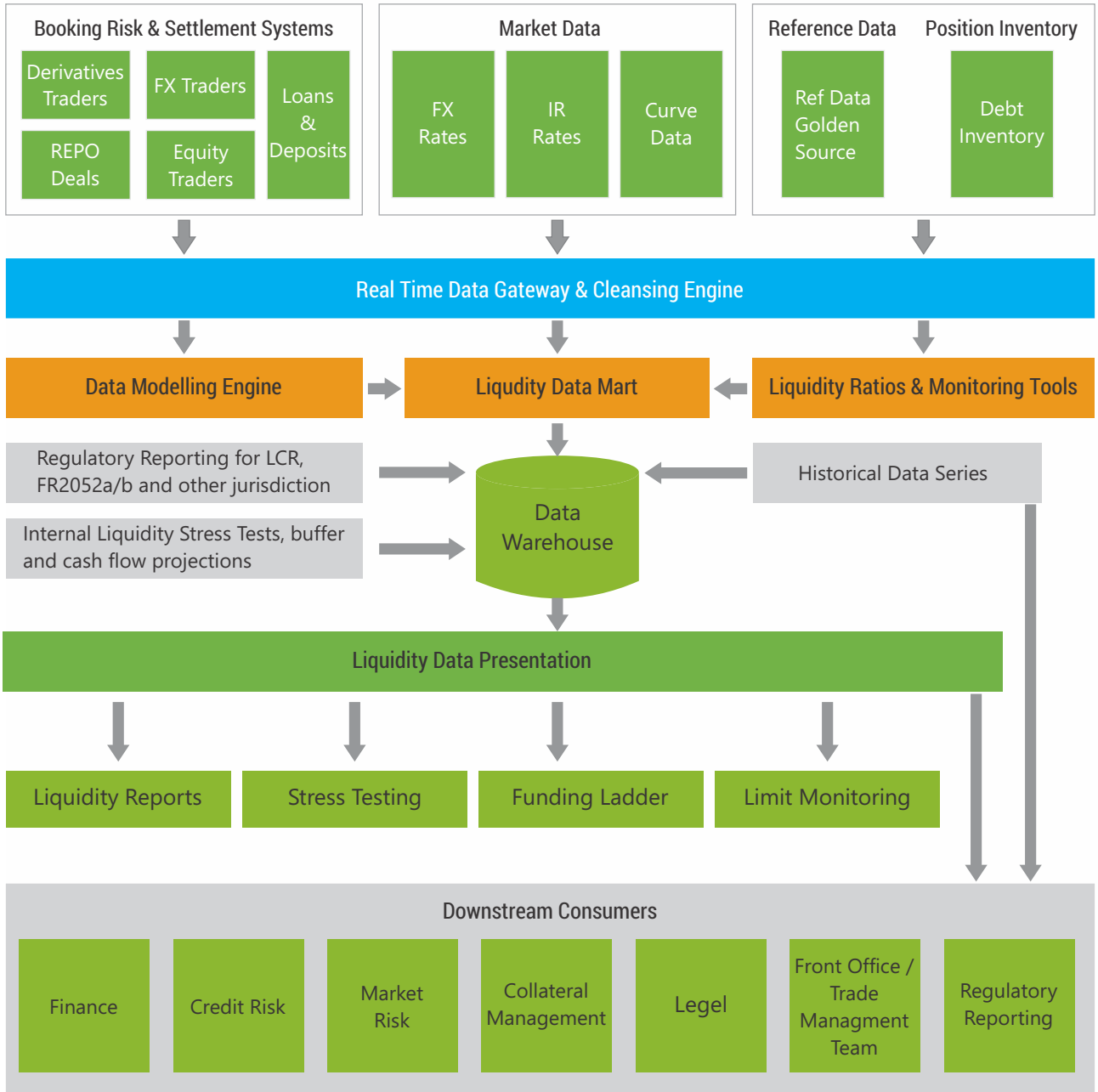
Scenario analysisis performed based on real-time and forecasted scenarios (best, moderate & bad) and the results are analyzed. Back testing is performed to validate the actual results, in order to validate and test the continued relevance of historically used behavioral assumptions.

All the results are then taken into consideration to come out with more comprehensive and predictable ALCO strategies that would help in taking up learned hedging decisions.



# Target ALM Application Landscape

Based on various business functions and tasks performed by each system in a bank, the target ALM application landscape will look like the picture depicted below – where trade data and static data move through a real-time data gateway, thus collecting data output from up-stream systems and sending it as input to the ALM modeling engine and scenario analysis engine. Post the metrics calculations, results are moved to the liquidity data mart where, through the presentation layer, it is distributed to respective down-stream systems for their management and regulatory reporting requirements.



# ALM Challenges in Behavioural Analysis

The behavioral scenarios may include one or more models that apply to particular segments of records like age, season, rates, etc., impacting banking-book products like current accounts, saving accounts, overdrafts, loans etc. Some of the behavioral analysis scenarios could be related to -

- Amortization profile for non-maturing deals (current account, savings, account, etc.).
- Prepayments of the tenured products

## Business Challenges

- **Asset prepayment characteristics (often the major component of the behavioral modelling):** Asset prepayment characteristics are volatile in nature, depending on individual customers, which makes them difficult to predict. There are a few inherent challenges in asset prepayment/behavior modelling:
  - Lack of historical data
  - Validity/Validation of assumption scenarios
  - Balance sheet positions
  - Lack of integration of different systems with prepayment model and reports
  - Lack of dynamic simulation
  - Reports
- Liability profile and stickiness characteristics
- The variability of asset and liability margins against general interest rate levels
- The variability of asset or liability volumes against general interest rate levels
- Modelling asset/liability “gaps” at different maturities
- **Regulatory Needs:** Increased regulatory requirements necessitates accurate asset liability management
  - Newer liquidity requirements by Basel 3
  - Increased capital requirements
  - Ability of the bank to perform stress tests at a shorter notice
  - Variance analysis to be performed once in six months to validate the assumptions used in behavioral analysis. These assumptions are to be crystallized over a period which will facilitate near reality predictions about future behavior of on/off balance sheet items.

## Technical Challenges in setup and reporting

- **Quantification:** Quantification of all relevant behaviors and creation of flexible forecast capabilities.
- **Consolidation:** Consolidation of defined risk data elements like loan age, prepayment, interest rates, etc.
- **Translation:** Translation of analyzed forecast results into existing ALM model inputs
- **Defining and Monitoring Program:** Prepare a strategic program to analyze the outcomes of the defined scenarios and implement a monitoring solution to track the patterns of these scenarios.
- **Maintenance of inputs:** Inputs maintenance over time for the defined scenarios and data elements.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# ITC's Framework to Overcome Behavioral Challenges

In ALM Behavior modelling area, solutions can be offered in three categories:

- Monitoring ALM metrics
- Maintenance of ALM data set and scenarios
- Reporting and visualization

## MONITORING ALM METRICS

### Compliance Monitoring Utility

Solutions can be developed for products like Loans, Overdrafts & Savings a/c as per the company's ALM policies. The compliance will work based on rules defined by the bank's policies under 3 major factors of behavioural modelling:

- Customers' behavior related to the age of the contract
- Customers' behaviors related to the season
- Customers' behaviors related to the interest rate
- We can define different behavioral scenarios in the newly implemented system and monitor compliance by monitoring utility.

### ALM Metrics Validations

We can validate/test different ALM metrics with respect to various risk factors vs time buckets in the newly implemented system. Like

- Principal Re-Payment, Outstanding Principal, Outstanding Principal Gap Calculation and Validation
- Interest Payment, Accrued Interest, Interest Margin Calculation and Validation

## MAINTENANCE OF ALM DATA SETS AND SCENARIOS

### Back-Testing validation

We can perform back testing of actual outcomes versus the forecast inputs in the model as per required frequency. These results can help validate the accuracy of the model. The goal is to compare actual income statement results to the ALM model's forecast and then to investigate breaks.

This shall help us in-

- **Design of chart of accounts:** Is the structure sufficiently granular for measuring portfolio IRR?
- **Test projections against behavioral expectations -**Do options, re-prising engage as planned?
- **Test reasonableness** of model forecast against the actual income/expense outcome
- Identifying and describing sources of deviation
- Using back-test results to guide model tweaks

### Stress Testing validation

We can perform stress tests on different scenarios to get the risk on current model like capital conversion buffer. Stress test provides a baseline, adverse and severely adverse scenarios that seek to capture the unique vulnerabilities, reputational risks, counter party risk, and idiosyncratic risks of bank's borrower and depositor base.

Stress scenarios could be applied and the impact could be analyzed on different risk factors and assumptions so that successful operations during both normal and adverse business conditions can be ensured. Following are the main criteria for stress scenarios:

- **Idiosyncratic Stress:** Scenarios that are particular to a bank's own operation and risk appetite
- **Market-wide stress:** Scenarios that are generic in nature and apply to all market participants
- **Combination of both:** Scenarios that combine both idiosyncratic and market driven shocks to create global "worst case" scenarios

## REPORTING AND VISUALIZATION

### ALCO Reporting &Validation

We can help clients generate and validate existing ALCO reports and dashboard views. We can help them review and include a comprehensive evaluation of ALCO reporting and ALCO-related policies (interest rate risk, liquidity and funds management, investments, derivatives, etc.). We can also help them generate and validate ALCO reports through newly implemented system, which can greatly influence a bank's ability to assess risk, proactively formulate strategies and take action.

### Dashboard Views

Generation of ALM Dashboard views to the senior management to make informed, timely and effective decisions

- ALM Executive Summary which provides views like EAR, NII, Maturity Summary in time-buckets, Portfolio Allocation, Credit Exposures, Counterparty Limit at
  - Region level
  - Entity level
  - Branch level
  - Portfolio level
- We can also help in developing and configuring customized views on dashboard for different users/roles in bank.

### Regulatory Reports

We can help generate various ALM related regulatory reports for regulators to meet liquidity and balance sheet regulations e.g., variance analysis on Behavioral analysis reportable every six months.

### Stressed Reports

We help banks perform stress tests on various scenarios (baseline, adverse, severely adverse) to validate the performance of various ALM models and assess the vulnerabilities.

### Standard / Ad-hoc Reports

We assist banks in generating other MIS (standard / ad-hoc) reports required by ALCO in performing their day-to-day tasks by sourcing information from various systems and performing due calculations/analysis.

## Sample Reports:

**Report 1** (Without Limit) – Day wise liquidity profile, drilling down to the currency and product level. Report can give the reference of the behavioral inputs used in calculations of the liquidity profile generation. There are no limits kept on the behavioral output matrix.

**Report 2** (With Limit) – Multi-frequency liquidity gap profile at the counterparty/country level. Report can give the reference of the behavioral inputs used in calculations of liquidity profile generation. There are limits setup at the frequency level on the behavioral output matrix. We can also generate *actual vs flash* based on the limits set.


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# Authors:


### Narayanan AK

Narayanan AK has been  a Lead Consultant with ITC Infotech in Risk and Regulation Solutions & Consulting space with over 9 years of experience in Capital Markets domain. His overall experience includes business analysis, maintenance & support of business applications, handling transitions, and implementation of regulatory requirements in financial firms like brokerages, treasuries, and custodians & top global banks.

### Ankur Kansal, FRM

Ankur Kansal, FRM Head Risk and Regulation Solutions & Consulting in Treasury and Capital Markets, has 15 years of experience in Capital Markets focusing on risk management solutions and middle office transformation, regulatory compliance including EMIR, Dodd-Frank Act. Ankur is also a CFA charter holder and FRM designation holder.

## About ITC Infotech

ITC Infotech, a fully owned subsidiary of USD 7 billion ITC Ltd, provides IT services and solutions to leading global customers. The company has carved a niche for itself by addressing customer challenges through innovative It solutions.

ITC Infotech is focused on servicing the BFSI (Banking, Financial Services & Insurance), CPG & R (Consumer Packaged Goods & Retail), Life Sciences, Manufacturing & Engineering Services, THT (Travel, Hospitality and Transportation) and Media & Entertainment industries.

For more information, please visit http://www.itcinfotech.com | or write to: contact.us@itcinfotech.com