TECHNOLOGY RISK ASSURANCE

DATA ANALYTICS/DATA MINING IN RETAIL

By Graham Ward

BDO

INTRODUCTION

Who am I

- Graham Ward
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Employer & Role

- BDO
- Data Analytics Director

Experience

- ACA & CISA with 10+ years Data experience
- Worked on numerous retail engagements utilising data analytics.

DATA MINING

To do Data Mining effectively you need to:

Purpose
- Have a purpose for analysing the data

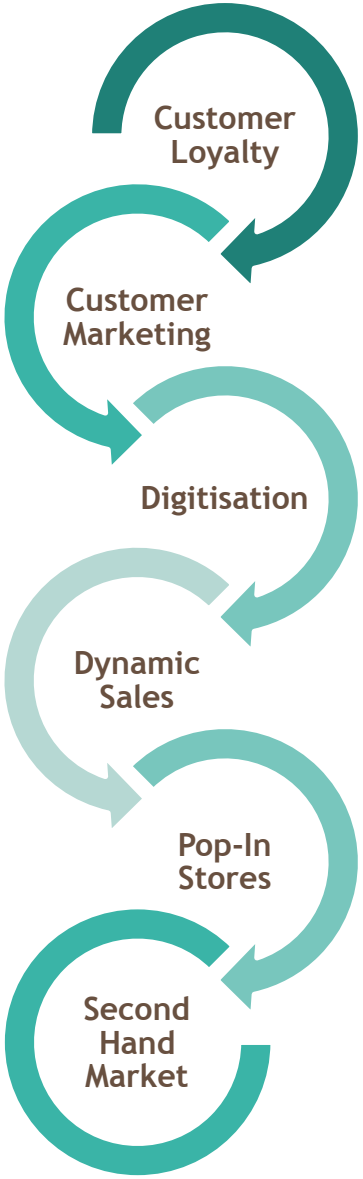
Obtain Data
- Obtain, understand & examine the datasets /IT Systems

Analyse
- Analyse & utilise the output generated

Definition of Data Mining:

"The practice of examining large pre-existing databases in order to generate new information."

THE CHANGING RETAIL INDUSTRY



Customer promotions/Loyalty programmes

Customer focused marketing - Understand shoppers trends/profile/spending habits

Digitisation – more mobile use, more online sales, Social Media Use

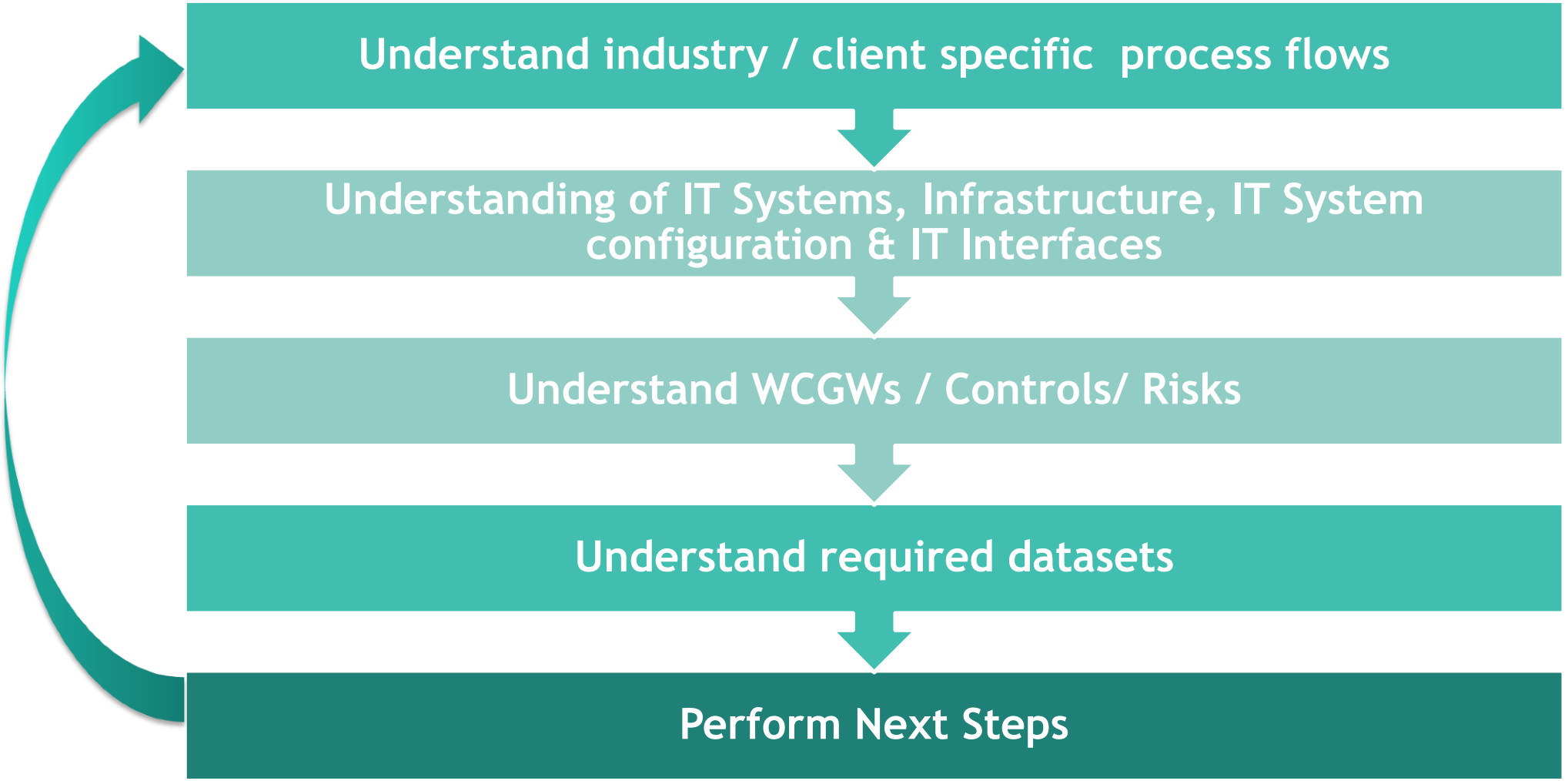
More dynamic Sales (product & Prices & discounts) across regions/stores/customers

Pop in Stores becoming more common

Movement towards renting/borrowing/trial goods

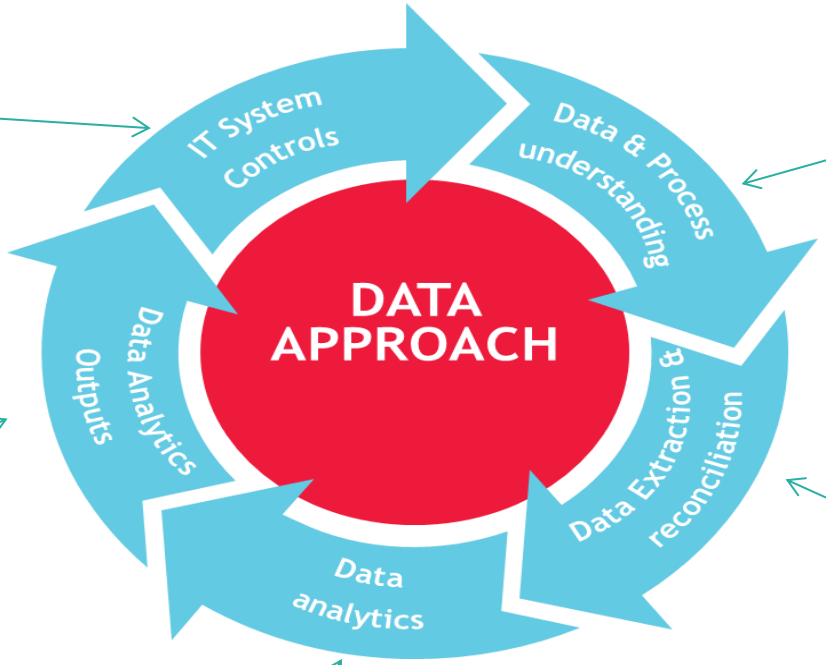
DATA METHODOLOGY APPROACH

RETAIL DATA AUDIT PLANNING APPROACH



DATA METHODOLOGY/APPROACH

To perform effective Data Analytics & Data mining, it is imperative that you understand the processes and systems, the underlying data flows. Only then can effective data mining be performed and dashboards be created.



5. FURTHER ANALYSIS / IT SYSTEM CONTROLS

- Identify if Data Analytics work has highlighted a weakness in the control environment, or area for further investigation

1. PROCESS UNDERSTANDING

- Obtain and review of data & pertinent process documentation
- walkthrough OF processes to understand data flow and relevant controls

4. DATA ANALYTICS VISUALISATION or DASHBOARD CREATION/OUTLIERS

- Create Data Analytics Outputs, to illustrate anomalies or potential exceptions for further interrogation.

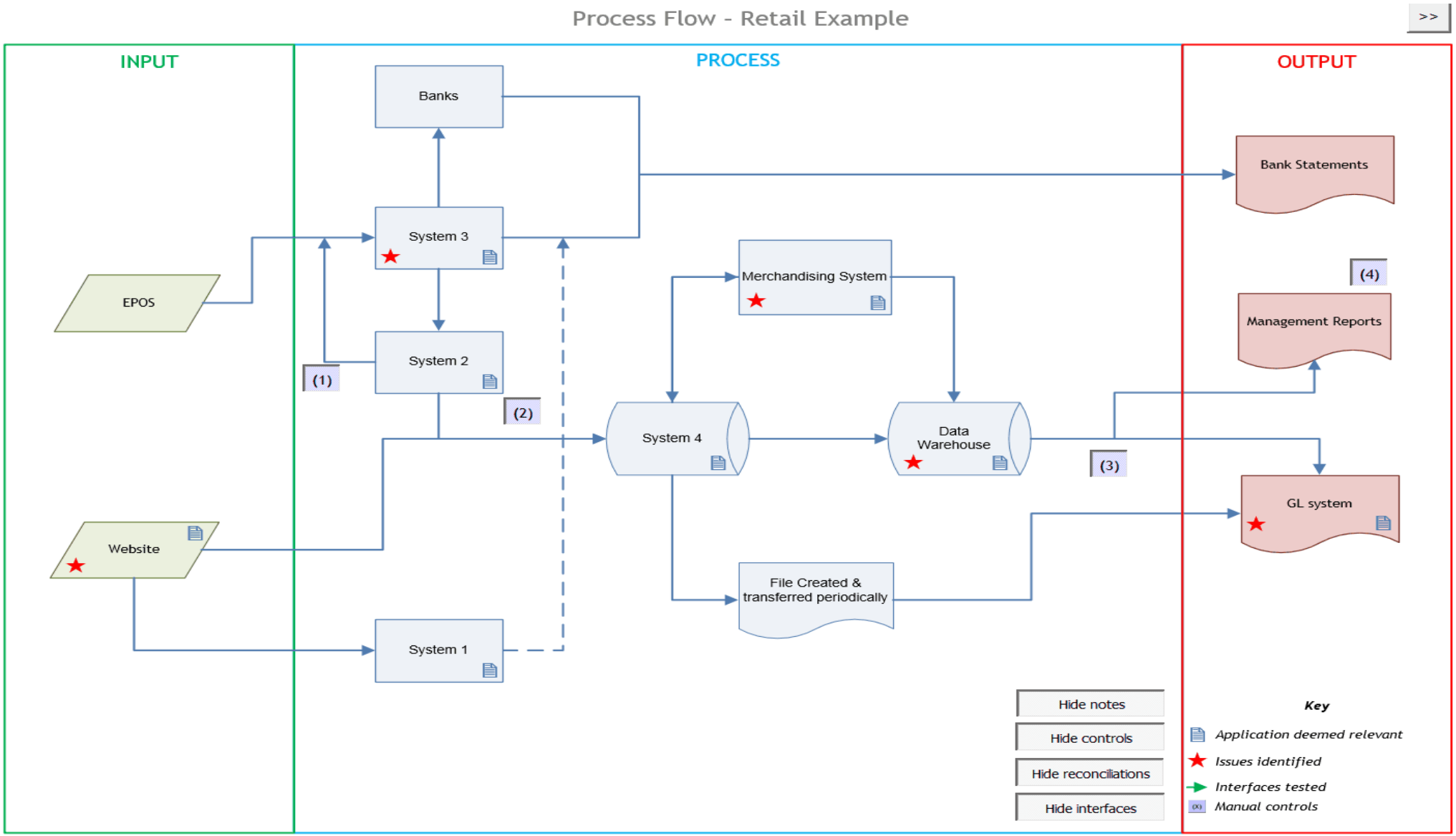
2. DATA EXTRACTION AND RE-PERFORMANCE

- Obtain and reconcile data
- Sense check data received against expectations

3. DATA ANALYTICS & DATA MINING

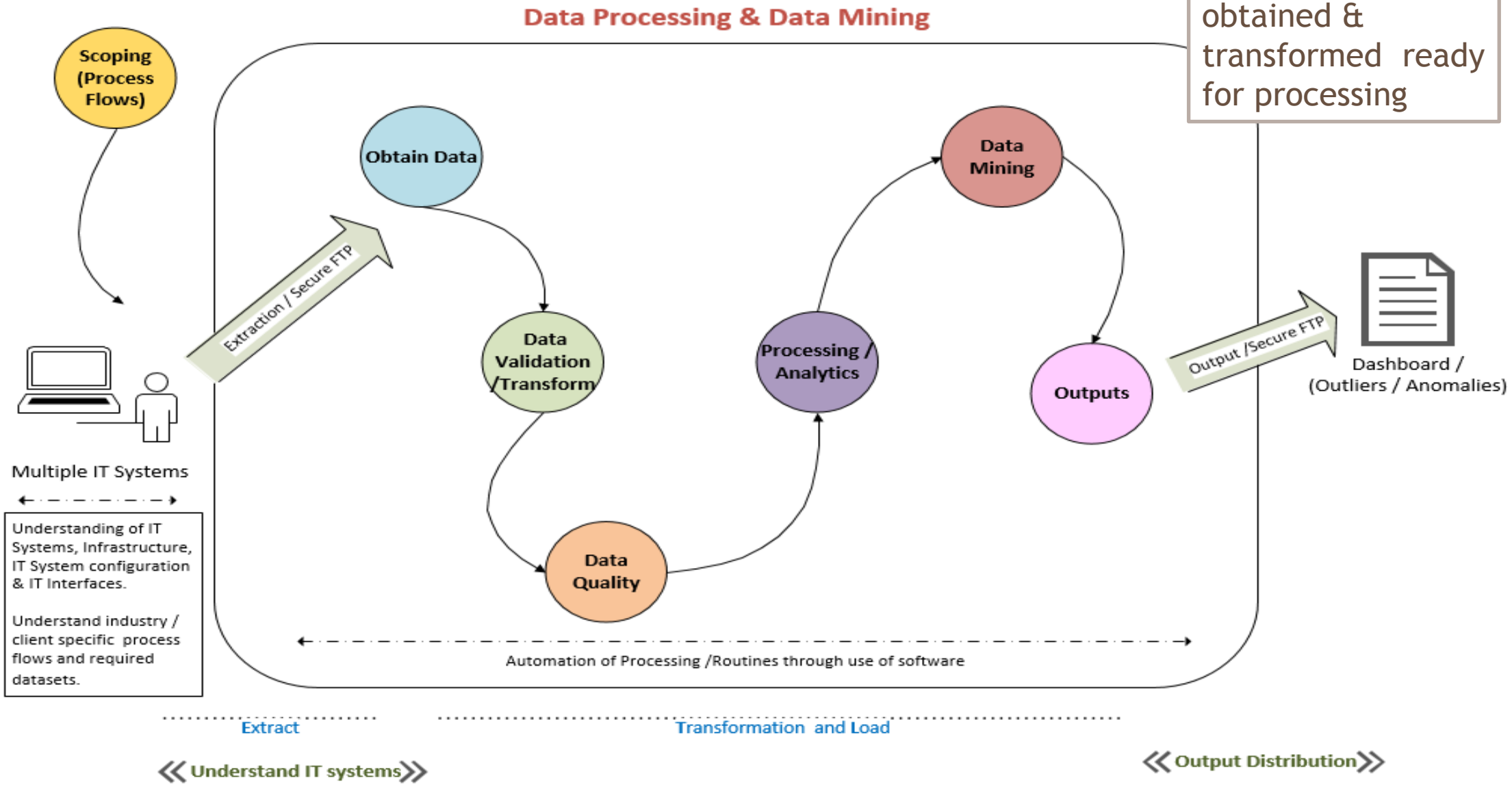
- Perform data analytics tests / data mining to identify potential anomalies in particular process areas or controls, or areas that don't meet expectation based on process documentation.

DATA PROCESS FLOWS & PROCESS MINING



THE BIGGER PICTURE (DATA TRANSFORMATION)

It is crucial that appropriate data is obtained & transformed ready for processing



DATA TESTS & BENEFITS TO USING DATA ANALYTICS

SOME BENEFITS OF DATA ANALYTICS WITHIN RETAIL

Sales of instore & online sales (seasonal, promotions, target/marketing)	Operational efficiencies (e.g. through process mining)	Inventory cost Reduction, Vendor Price Analysis
Inventory optimisation, warehouse & distribution	Customer activity & Target marketing	Review of markdowns/ Promotional items
Product Sales analysis, Product performance (Pricing Vs Sales Vs Demand Analysis etc.)	Store performance & Store Layout	Product return analysis, Obsolescence, Stock Quantity/Price Vs Product Sales Price & Seasonality

EXAMPLE RETAIL DATA ANALYTICS TESTS

Exception Reports / potential anomalies/outliers

- Negative prices/costs/quantities, zero price etc.
- Large Price adjustment transactions
- Sales value higher than usual for item type,
- Sales prices less than expected for product type or large discount given
- Strange trends in Sales by Region or Store etc.

Trend/profile/Sales analysis

- Identify high volume amounts by products, customers, sales representative, store
- Analyse sales, profitability, credit notes and returns by area, salesperson, month, store, category, product
- NRV calculation & Gross margin throughout period

Point in time Assessment (e.g. Year End)

- Sales occurred during particular periods (Cut-off for example)
- Aging of quantity and value of all stock at year end.
- Recalculation of closing stock value & quantity for each SKU
- Assessment of stock obsolescence based on ageing & sales price analysis.
- Analysis of open orders and open invoices by customer
- Analysis of goods in transit at year end

USING DATA & TECHNOLOGY TO ALTER THE WAY WE AUDIT

- Identify Outliers and Anomalies using data analytics & Data mining
- Create Audit Exception Reports
- Calculate Audit KPIs and trends to look for strange transactions

- Most often than not, IT systems work as intended
- Sample approach not enough in complex technology environment
- A system control approach informs us what SHOULD have happened while data analytics and data mining often tells us what HAS happened.

DATA PROCESSING &
DATA ANALYTICS/DATA MINING SOLUTIONS

USING TECHNOLOGY TO TRANSFORM AND ANALYSE DATA

Software used within our Data Analysers

Microsoft® SQL Server®

Microsoft® Visual Basic® for Applications

Qlik

Java

IDEA Data Analysis Software

Microsoft® .NET

BDO Data Analysers

-ADVANTAGE

(Generic Solutions)

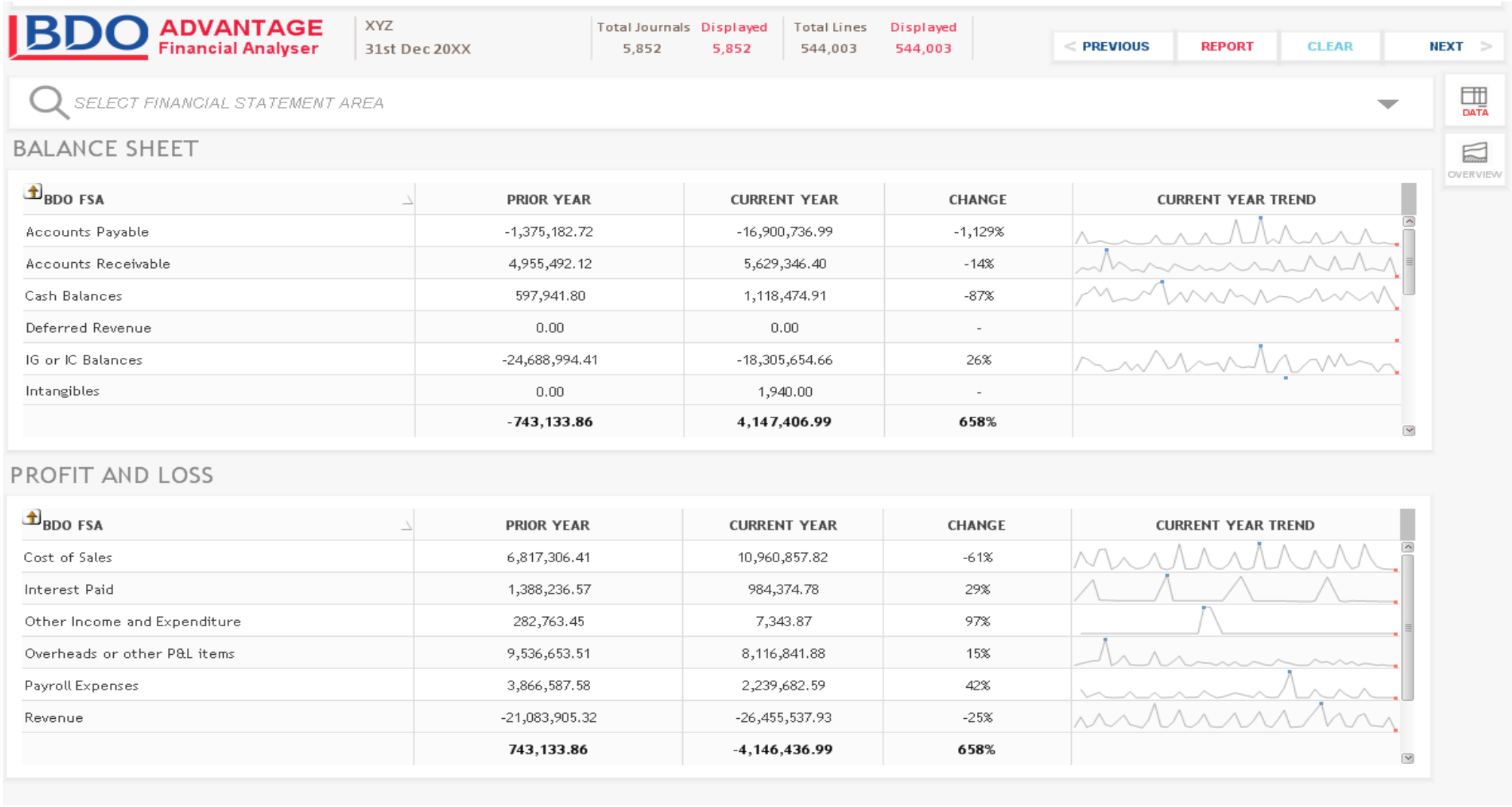
-MERLIN

(Industry based/ specific Solutions)

EXAMPLE DASHBOARD OUTPUTS

DASHBOARD: RECONCILING REVENUE TO GENERAL LEDGER

DASHBOARD: HIGH LEVEL PROFILE OF REVENUE



BDO ADVANTAGE Financial Analyser

XYZ
31st Dec 20XX

Total Journals	Displayed	Total Lines	Displayed
5,852	5,852	544,003	544,003

< PREVIOUS | REPORT | CLEAR | NEXT >

SELECT FINANCIAL STATEMENT AREA

DATA

OVERVIEW

BALANCE SHEET

BDO FSA	PRIOR YEAR	CURRENT YEAR	CHANGE	CURRENT YEAR TREND
Accounts Payable	-1,375,182.72	-16,900,736.99	-1,129%	
Accounts Receivable	4,955,492.12	5,629,346.40	-14%	
Cash Balances	597,941.80	1,118,474.91	-87%	
Deferred Revenue	0.00	0.00	-	
IG or IC Balances	-24,688,994.41	-18,305,654.66	26%	
Intangibles	0.00	1,940.00	-	
	-743,133.86	**4,147,406.99**	**658%**	

PROFIT AND LOSS

BDO FSA	PRIOR YEAR	CURRENT YEAR	CHANGE	CURRENT YEAR TREND
Cost of Sales	6,817,306.41	10,960,857.82	-61%	
Interest Paid	1,388,236.57	984,374.78	29%	
Other Income and Expenditure	282,763.45	7,343.87	97%	
Overheads or other P&L items	9,536,653.51	8,116,841.88	15%	
Payroll Expenses	3,866,587.58	2,239,682.59	42%	
Revenue	-21,083,905.32	-26,455,537.93	-25%	
	743,133.86	**-4,146,436.99**	**658%**	

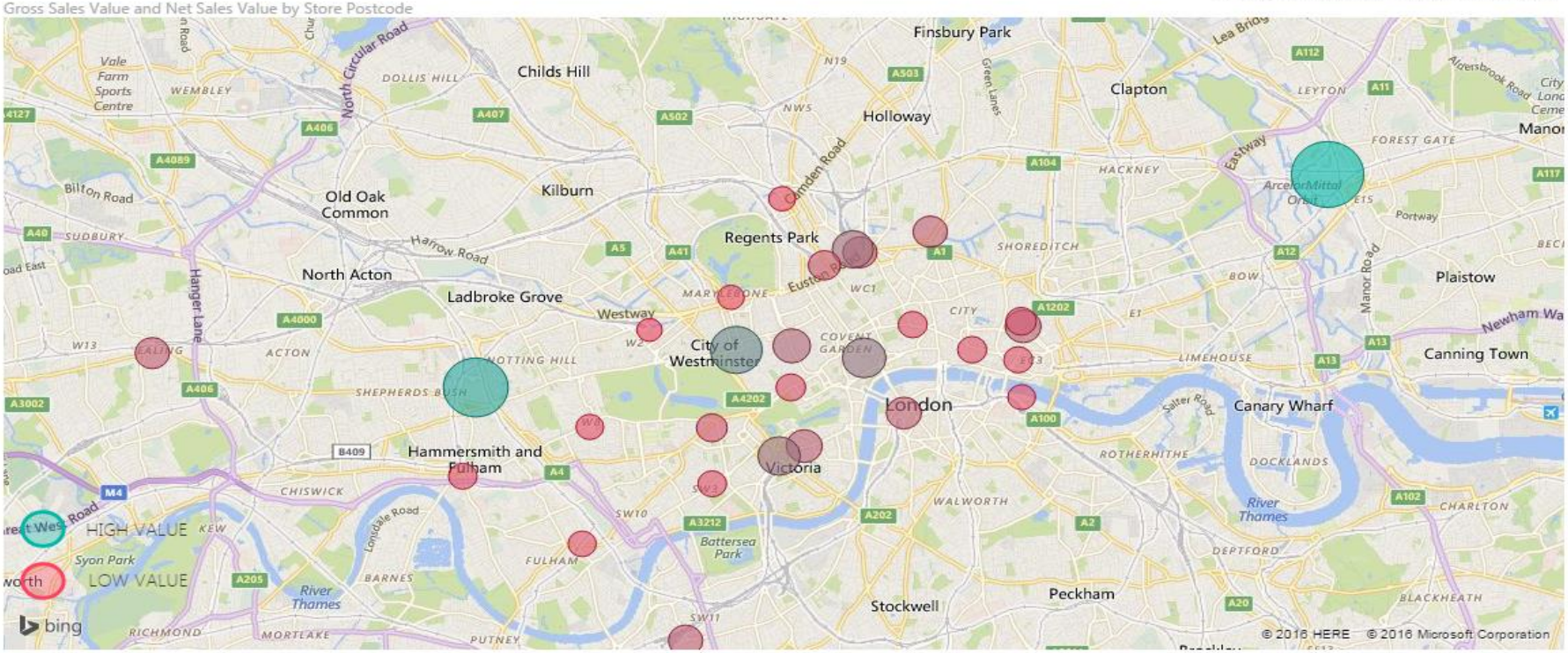
DASHBOARD: GEOGRAPHICAL REPRESENTATION OF DATA

BDO ADVANTAGE
REVENUE ANALYSER

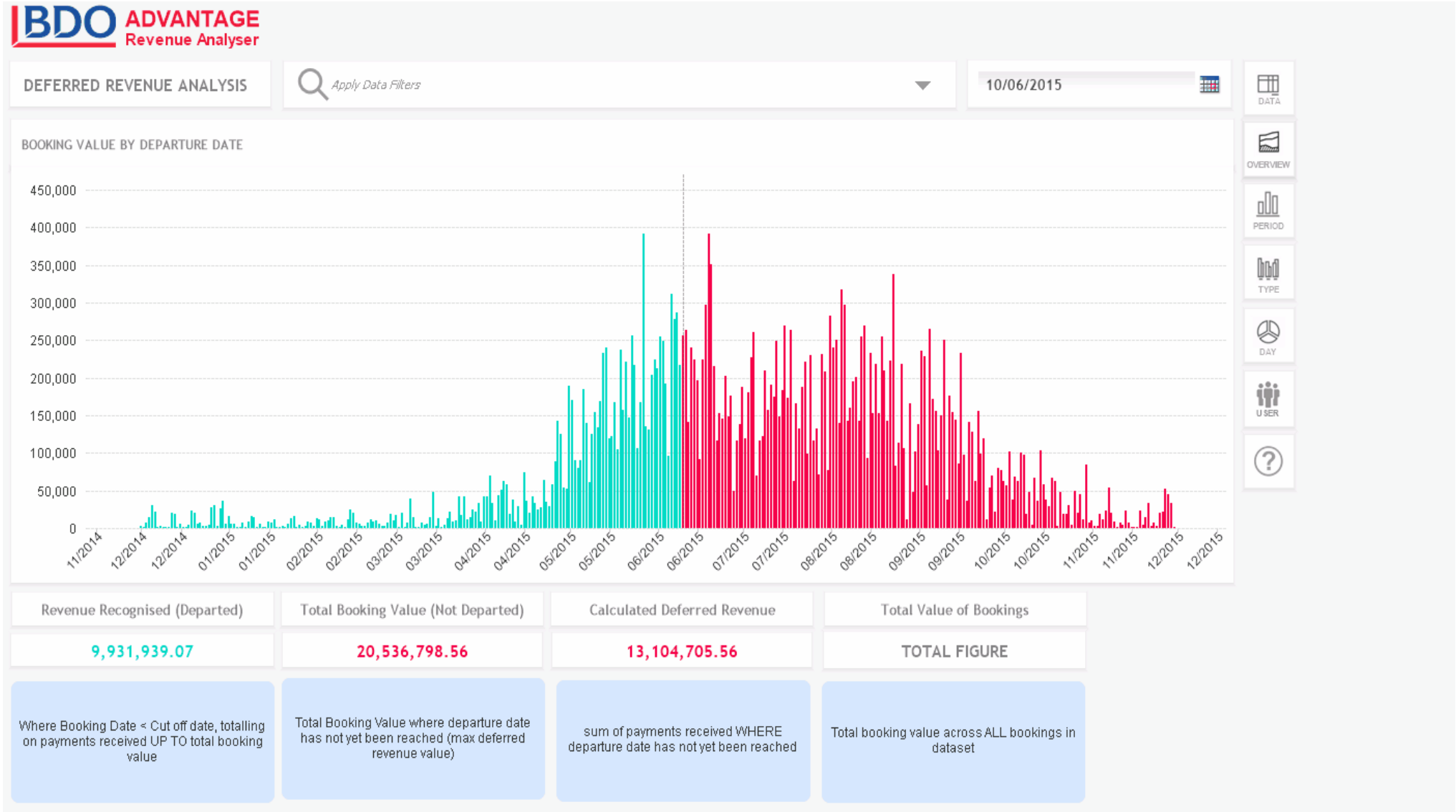
Store Postcode	Store Name	Gross Sales Value
E20 1EL	LONDON STRATFORD WESTFIELD	1,415,029.34
W12 7GE	LONDON WHITE CITY - WESTFIELD	1,201,277.32
W1C 1LQ	LONDON MARBLE ARCH - lease 1	834,468.71

Gross Sales Value and Net Sales Value by Store Postcode

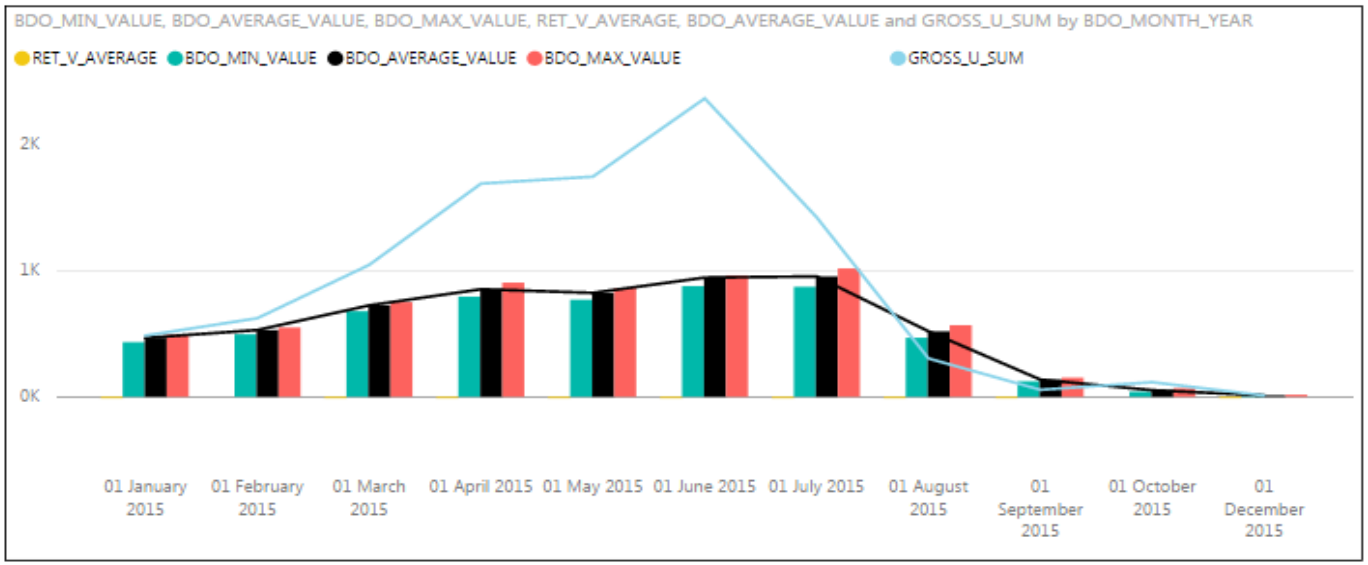
SALES / BOOKINGS BY STORE LOCATION

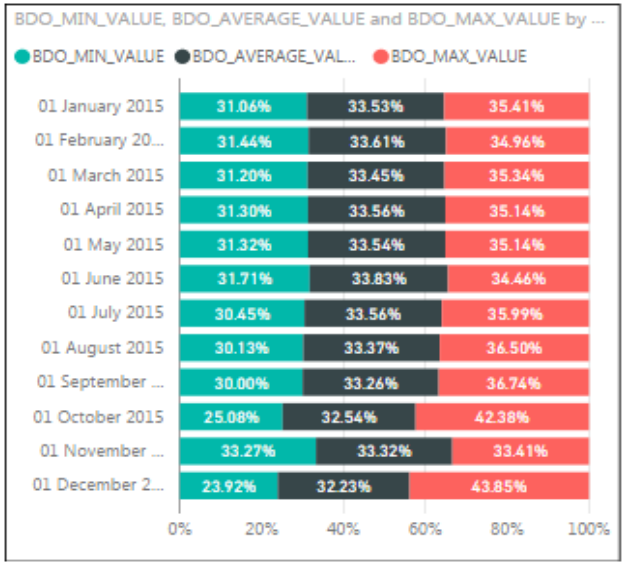


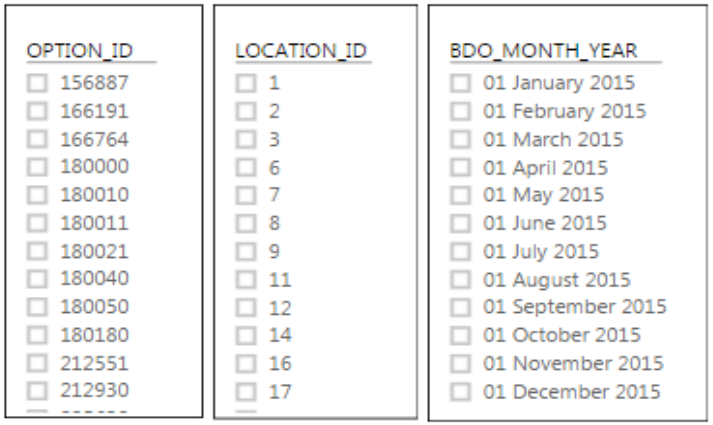
DASHBOARD: CUT-OFF & DEFERRED REVENUE

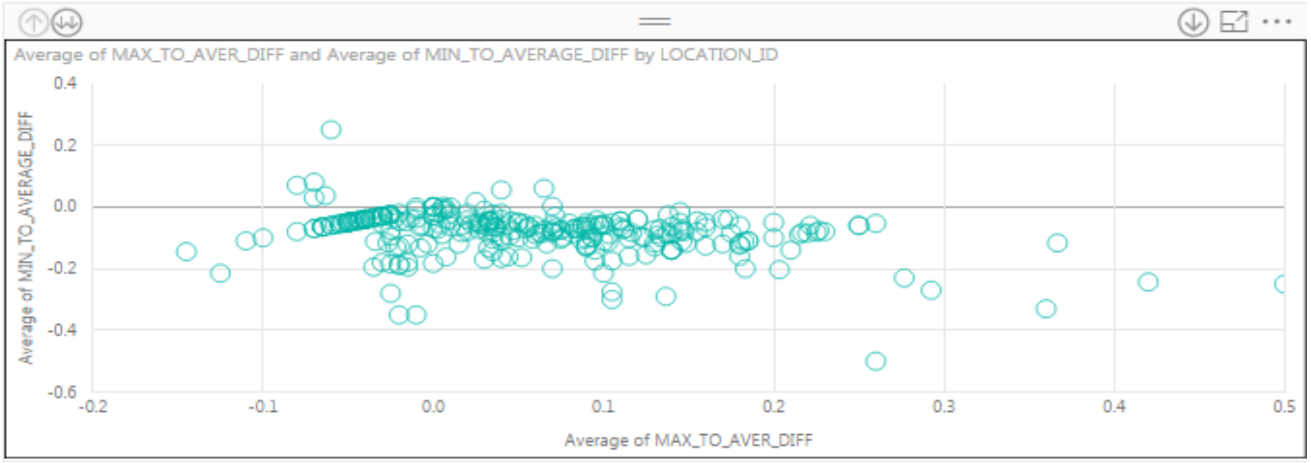


DASHBOARD: VARIANCES & POTENTIAL OUTLIERS

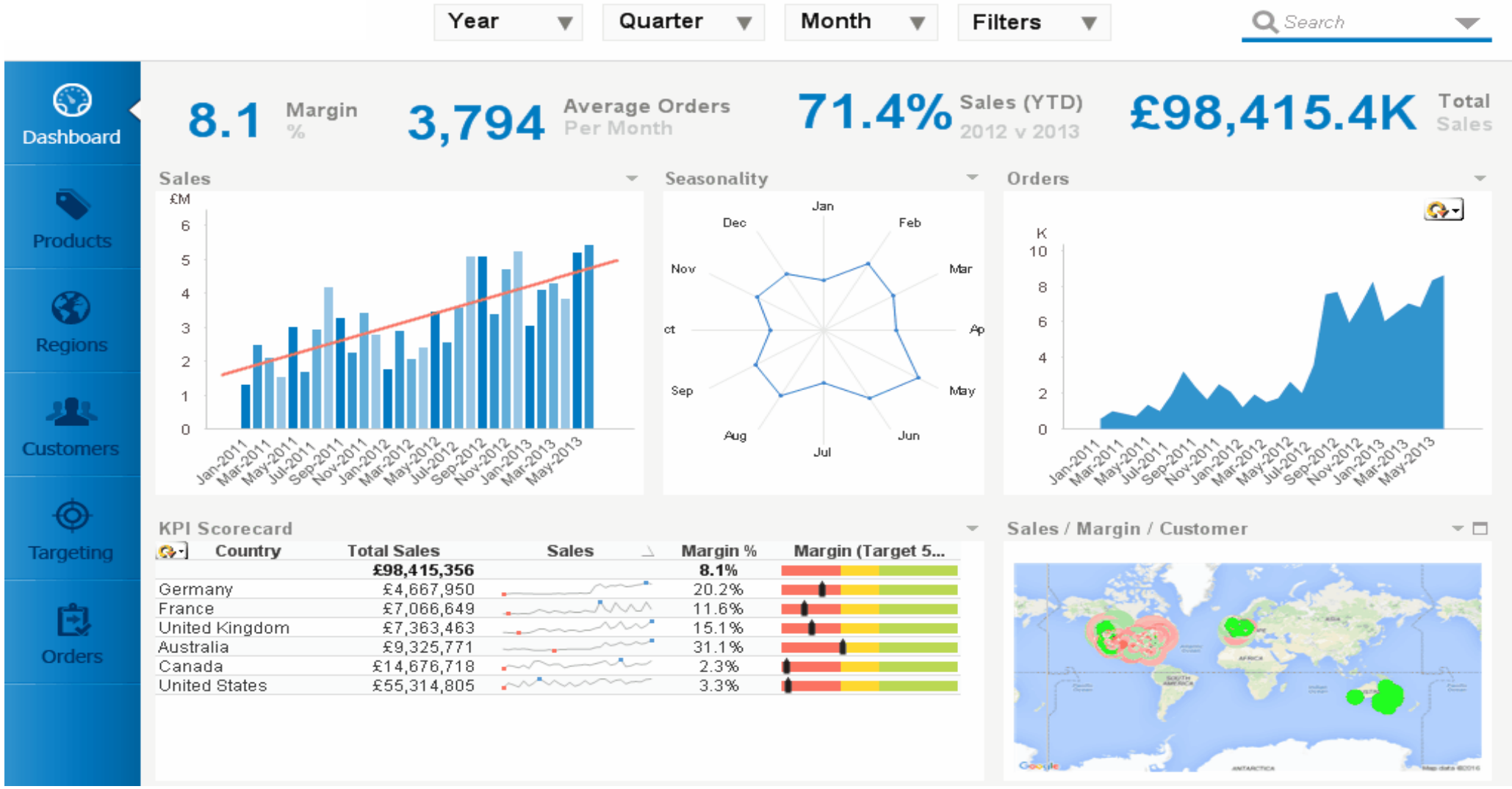








DASHBOARD: RETAIL GENERAL



QUESTIONS

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