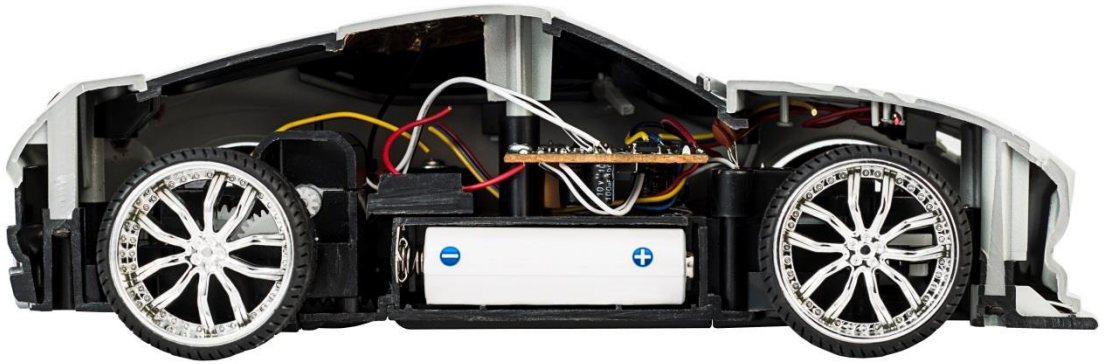
Deloitte.

Insurance Analytics

Driving insight to gain advantage



11 March 2014

Agenda

- **What is Analytics?**
- **Using analytics to overcome challenges in the Insurance industry**
  - *Retention*
  - *Customer Segmentation*
- **Overcoming the analytics challenges facing insurers**
  - *Data Management*
  - *Visualisation*
  - *Analytics Operating Model*
- **Demonstrations**

What is Analytics?

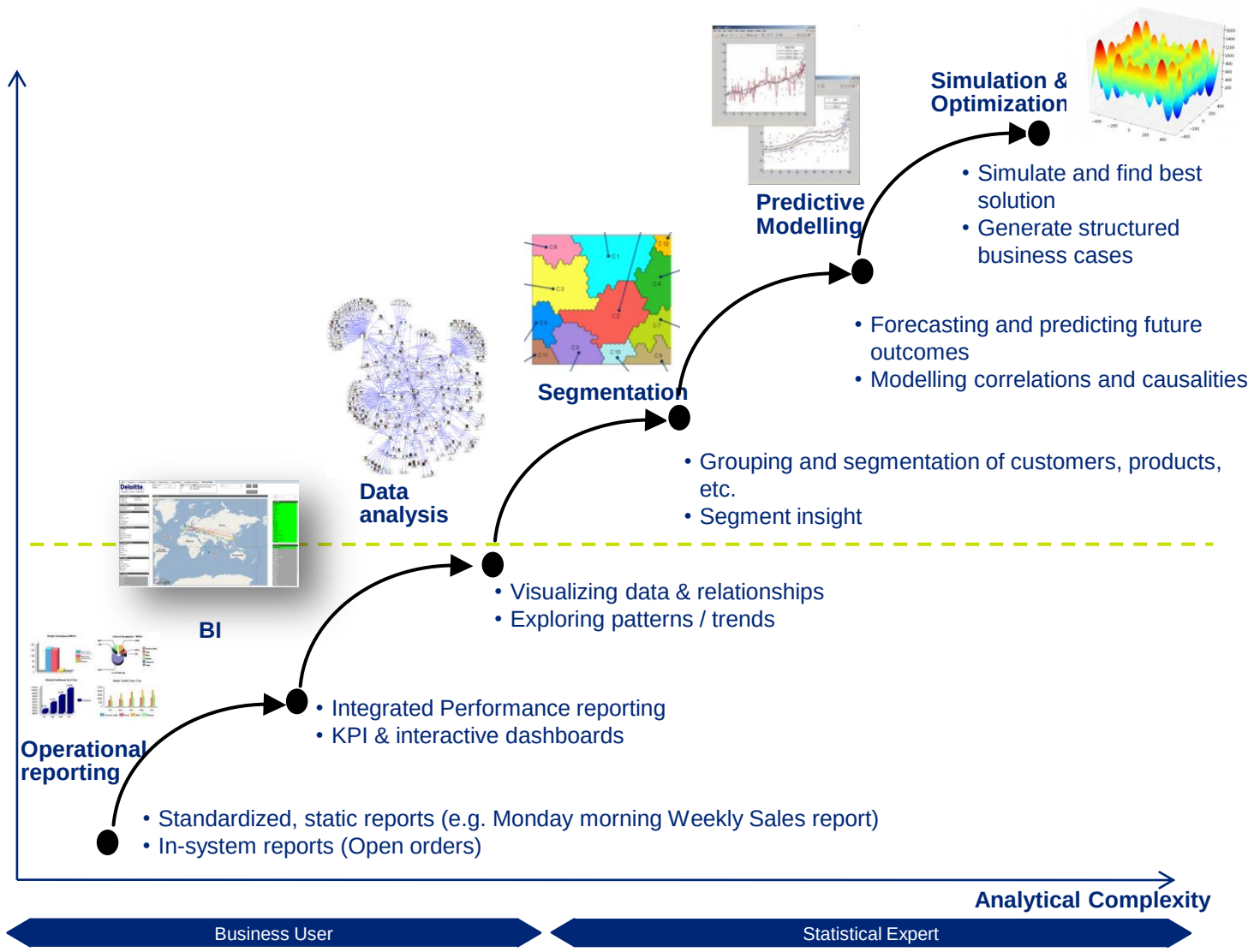
Evolution of Business Analytics?

Align analytics tools with your business needs

"In today's digital world, businesses that want to master the flow of information have to address three key challenges: the explosive growth in data volumes, the need to analyse those growing volumes in real-time, and the need to deliver the resulting insights to users…"

'Insights Everywhere'

Intel White Paper



How does analytics complement business intelligence?

Get ahead and stay ahead

Analytic Insights are typically enabled by existing business intelligence investments and newer advanced analytical techniques.

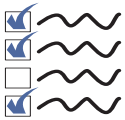
Techniques that use advanced analytics are the leading methods to answer the type of customer sales, marketing and customer service questions asked by today's leading companies

Over the last two decades, many of these companies have been investing heavily in business intelligence systems to support their processes

This has resulted in a significant increase in organised data and a shift in focus towards analysing information to improve performance

Business Intelligence

Objectives



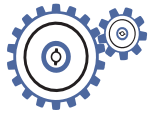
- Historical reporting
- "Slice and Dice" operational data
- Understand performance
- Focus on analyzing what happened
- Monitor Key Performance Indicators (KPIs)

Typical projects

- Core platform implementation
- Product system implementation
- Back-office consolidation
- Performance reporting

Advanced Analytics

Objectives



- Looking forward
- Discover and simulate
- Predict
- Optimize
- Monitor key performance predictors

Typical projects

- Advanced analytic modeling
- Performance management
- Data management and mining
- Predictive modeling

Using analytics to overcome the issues facing insurers

Market Challenges facing the industry

Non-Life	Life
Flat market growth	Flat market growth
Falling Retention Rates	Falling Retention Rates
Fraud identification and prevention cost	Lack of product innovation
Providing customised products to meet segment needs	Providing customised products to meet segment needs
Need to reduce operational costs	Need to reduce operational costs
Increased regulatory oversight	Increased regulatory oversight
Low interest rate environment	Low interest rate environment

Retention Analytics

Approach

1. Identify required data to generate insights
2. Combine data into a single view of the customer
3. Create customer segments
4. Build propensity model
5. Calculate customer value metric
6. Prioritise customers for inclusion in the initiative based on probability and value
7. Design benefit based on customer segment requirements
8. Integrate customer contact list into campaign management tools

Retention Analytics

1 Internal Data

- Our objective in the data phase is to create as rich a single view of the customer as possible.
- Assessing the availability of internal data across a range of core systems is the key first step – what is the unique identifier?

Quality

- Incomplete fields due to lack of data validation at input
- Inconsistent means to recording transactions

Access to systems

- Legacy systems generate issues extracting data
- Creating a common view of data across multiple policy admin systems

Retention Analytics

1 Third Party Data

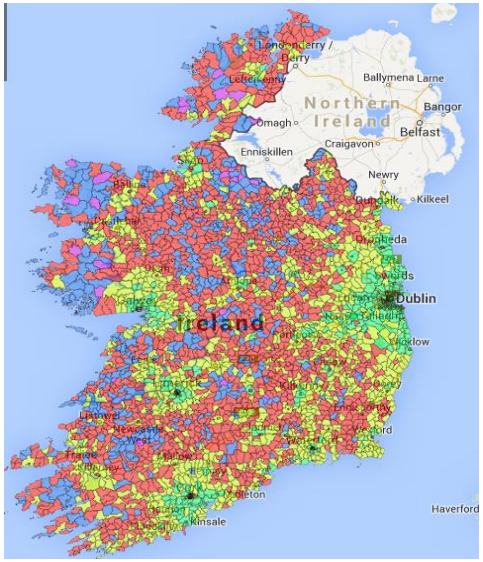
- The use of external or third party data is extremely useful as it gives the business a means of assessing your customer base against the wider population.
- Often customer analytics is so internally focused that it misses the opportunities that are available among people who are not yet your customers.

Open Data refers to free, publically available data usually published by government sources.

It is a growing movement globally and offers businesses an opportunity to incorporate it into their analytics capability as a means of generating insights across a wide range of business issues.

In Ireland, we have found the most useful means of utilising it has been geo-spatial analysis based on the 2011 Census data.

For the first time, the country was broken into 18,000 “Small Areas” each of which consisted of 150 - 250 households.



Retention Analytics

2 Creating a single view of the customer

- Accessing and amalgamating data from numerous different sources is often the most complex and time consuming stage of any analytics project.

Open Source tools

Distributed processing of large data sets across clusters of computers using simple programming models. At its core is the concept of MapReduce - parallel processing of large data sets.

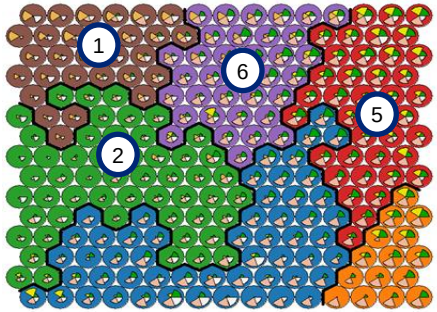
Talend's data integration product suite provides a set of tools to access, transform and integrate data from any business system in real time or batch to meet both operational and analytical data integration needs.

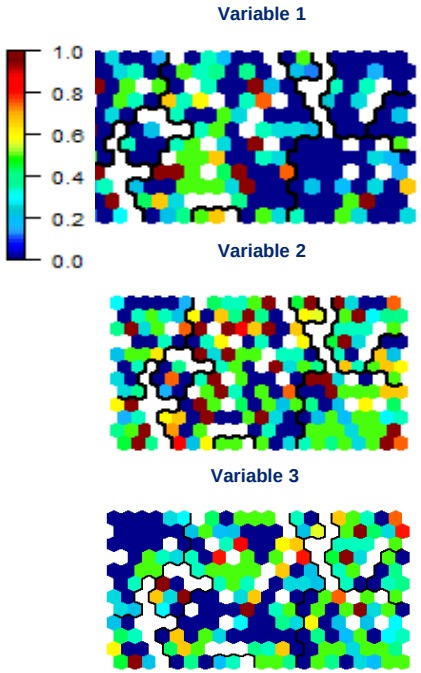
Retention Analytics

3 Customer segmentation

Deloitte's approach to segmentation

- Our approach to segmentation uses Self Organising Maps (SOMs) to visualise and interpret clusters.





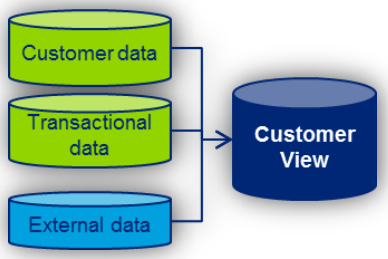
Analysing the variables on top of the SOMs enables us to build a rich picture of the characteristics of the segment.

When key metrics are then applied, real insight can be derived.

Retention Analytics

4 Propensity modelling

Propensity modelling predicts the likelihood of an outcome, for example how likely a customer is to default, churn or lapse. Accurate and reliable risk estimation on internal and external data plays a vital component in managing a portfolio and understanding the drivers of particular outcome.



Why do it?

Retention

Predict likelihood of customers churning or lapsing and help monitor portfolio quality over time

Cost Optimisation

Contact strategies and communications at the correct time to maximise impact

Xsell/upsell

Target customers with the right cross-sell and upsell offers at the right time

How do you do it?

The right approach…

- Agree the outcome that needs to be predicted (e.g. churn rates, fraud indicators, Xsell products)
- Collate and consolidate multiple data sources and seek out explanatory variables using statistical and qualitative techniques
- Using advanced analytics, build a model to predict outcome based on explanatory variables. Iterate and refine and validate.
- Incorporate the analytical process into relevant strategy development and/or operationalise

The right tools…

Propensity modelling requires statistical modelling tools, knowledge and understanding.

SQL R python tableau

The right data…

- Behavioural data
- Demographics data
- Product usage data
- Customer service data
- 3rd Party data

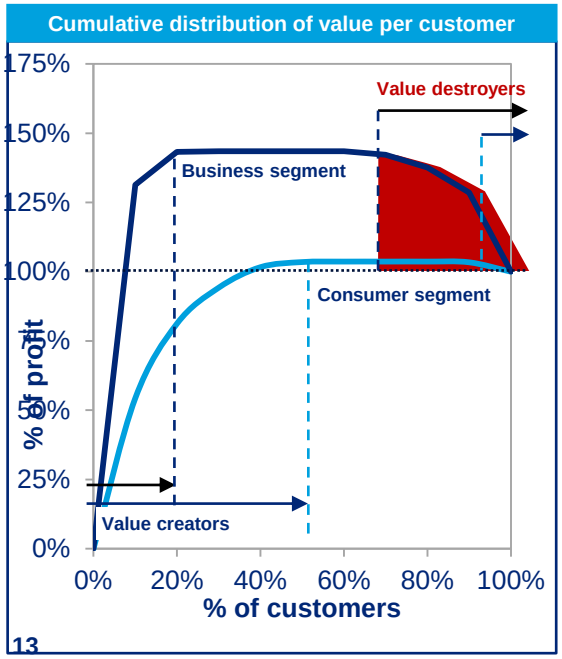
Retention Analytics

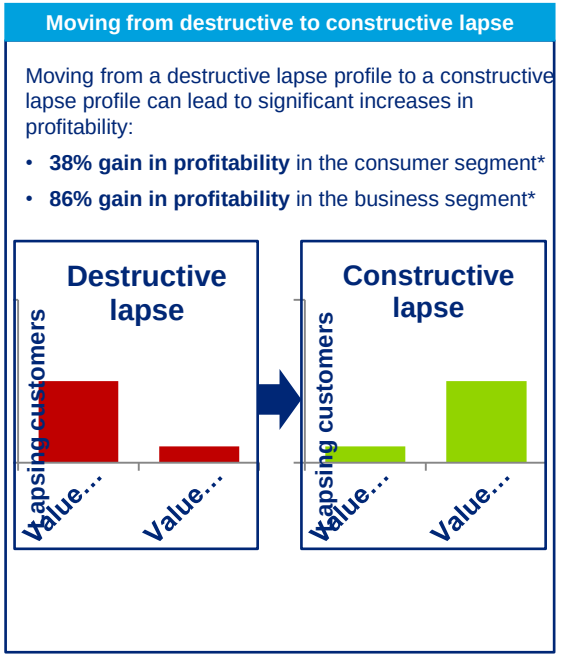
5 Customer value

Agreeing an approach to defining customer "value" can be one of the most complex decisions

- Time frame over which to assess value
- Metrics to claims cost – deciding how to incorporate claims development
- Assigning expenses

- Calculating the value of individual clients provides insight in those clients that add value and increase the profit, clients that are neutral and clients that destroy value due to negative profitability





Retention Analytics

6 Prioritising policies

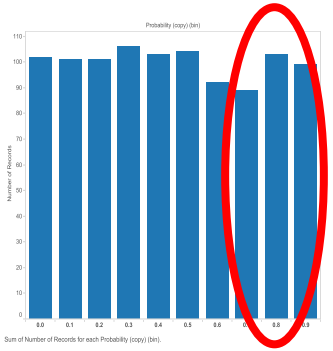
Only by combining the three data sets can a prioritisation of policies be effective.

1. By deciling your customers based on their probability to lapse, you can identify ones for initial focus. However there is no ability to understand their value to you or what their needs are.

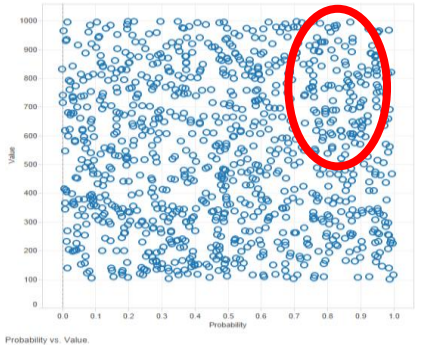
2. Combining value with probability at least creates some differentiation. Yet, you will still not be able to target these customers with incentives particularly targeted at their needs.

3. At the final stage, by combing all the data components, insurers are in a position to design and implement targeted initiatives to those customers who are most at risk of destroying the value of the business.

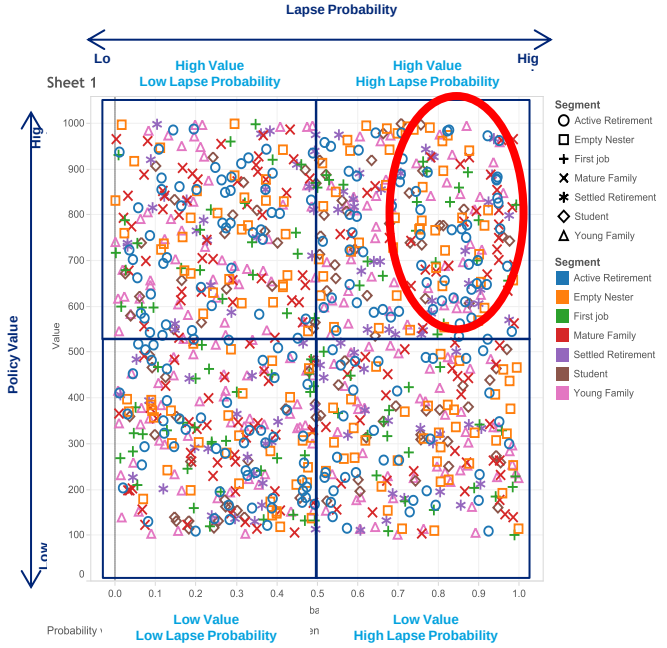
1 Lapse Probability only



2 Lapse Probability & Value



3 Lapse Probability, Value & Segment



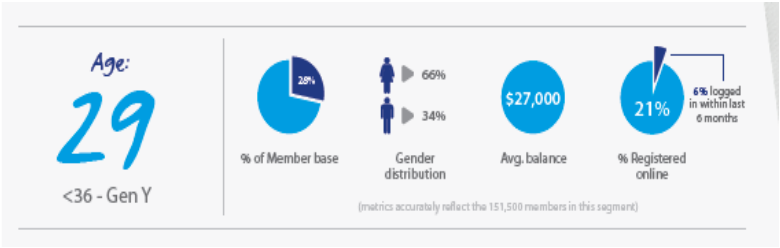
Retention Analytics

7 8 Building campaigns based on segmented needs

Using data insights from segmentation is key for designing incentives that will appeal

- Understanding the value drivers of particular segments is vital. We have found creating 'personas' is a useful way of:
  - Generating insights
  - Providing a mechanism for customer service agents to relate to the customer

Sample Segments based on life stage



Needs	Variable	Characteristic
Price	Price elasticity	High
	Income change	Med
Communication	Propensity for using online portal	High
	Propensity for using mobile app	Low
Product Requirements	Physiotherapy	High
	GP	Low
	Travel	Med

Next Best Action

Price feature

Product feature

Communication channel

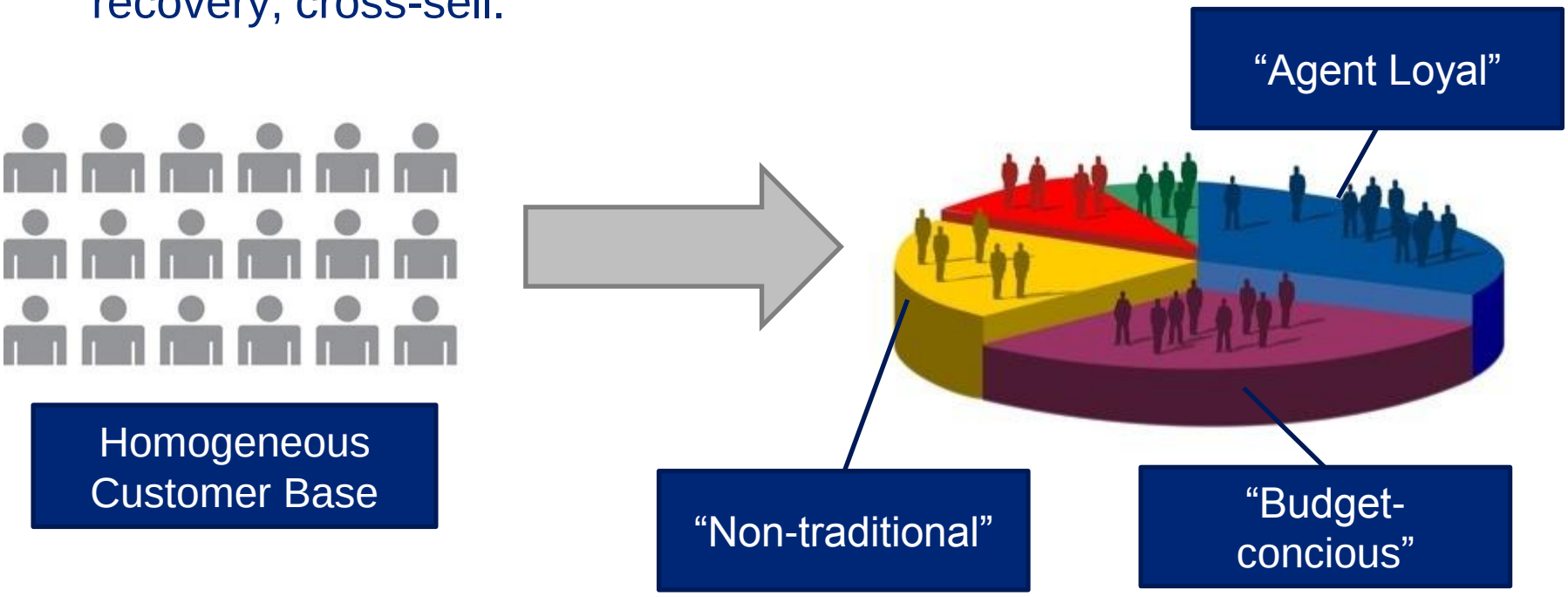
Self-Organising Maps

Overview

1. Why customer segmentation?
2. What is a self-organising map?
3. Example application

Customer Segmentation

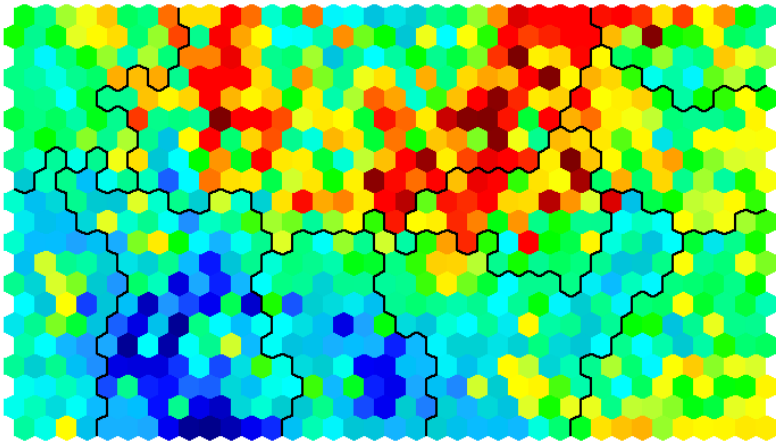
- Customer segmentation is the application of clustering techniques to customer data
- Identify cohorts of “similar” customers – common needs, priorities, characteristics, and behaviours.
- Example uses: Targeted marketing, customer retention, debt recovery, cross-sell.



Self-Organising Maps

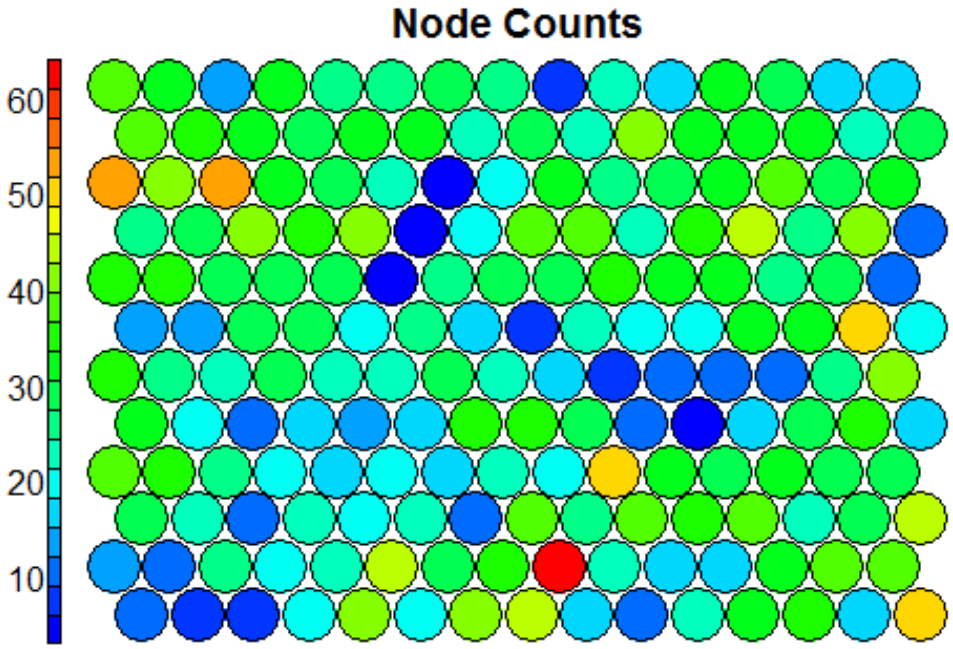
A Self-Organising Map (SOM) is a form of unsupervised neural network that produces a low (typically two) dimensional representation of the input space of the set of training samples.

- First described by Teuvo Kohonen (1982) (“Kohonen Map”)
- Over 10k citations referencing SOMs – most cited Finnish scientist.
- Multi-dimensional input data is represented by a 2-D “map” of nodes



Self-Organising Maps

- The SOM visualisation is made up of several nodes
- Input samples are “mapped” to the most similar node on the SOM. All attributes in input data are used to determine similarity.
- Each node is essentially a “model” of the input data types.
- There is no variable / meaning to the x and y axes.

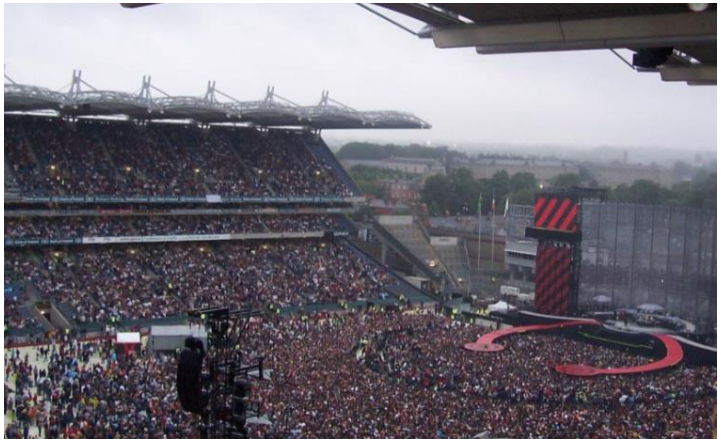


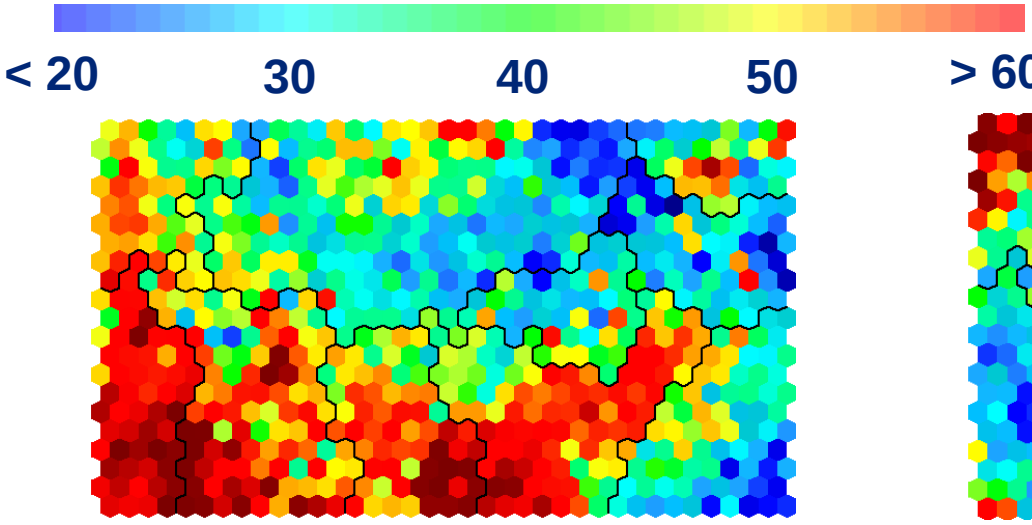
All nodes have:

- **Position**
- **Variable Vector**
- **Associated input samples**

Self-Organising Maps

- Everyone in this room stands on the pitch at Croke Park.
- Each person compares attributes – e.g. age, gender, salary, height.
- Everyone moves until they are closest to other people with the most similar attributes.
- If everyone holds up a card indicating their age – the result is a SOM heatmap





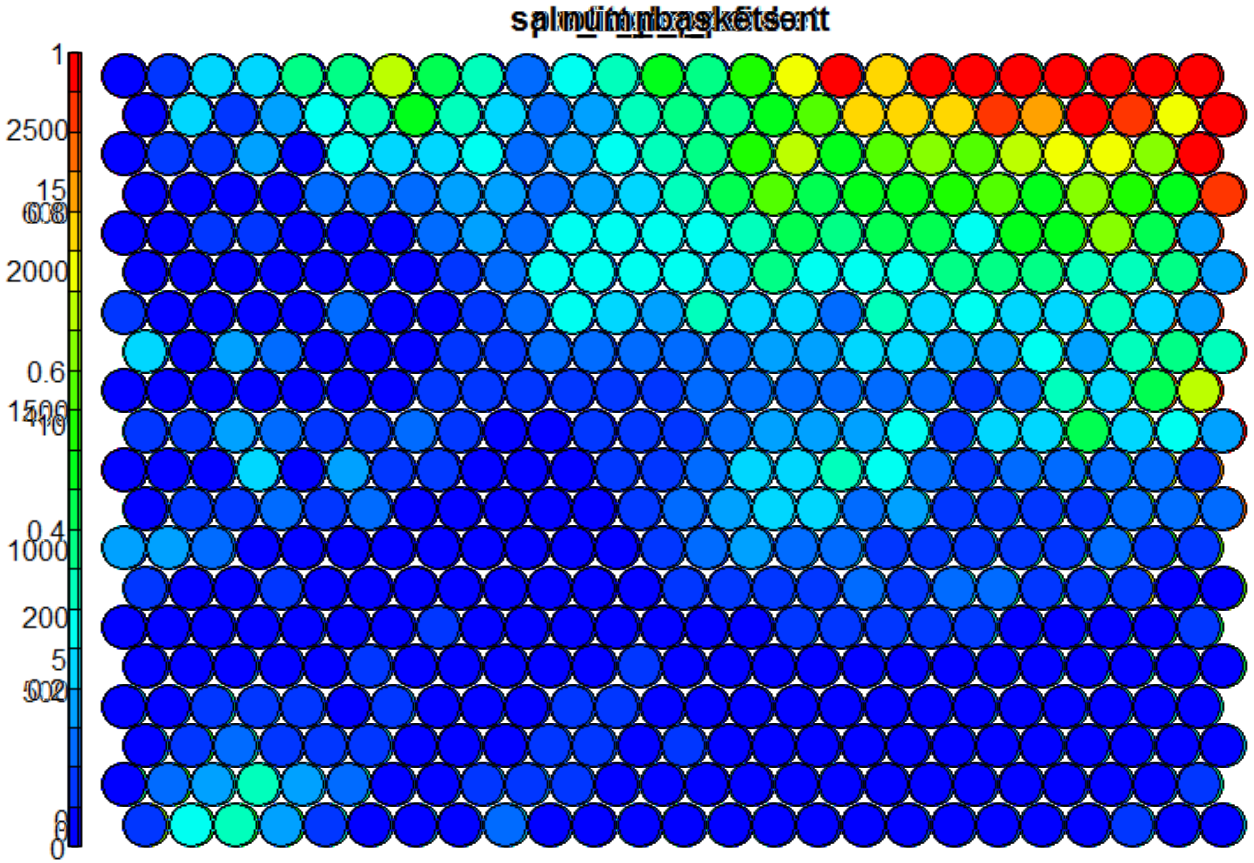
Grocery Shopping Data

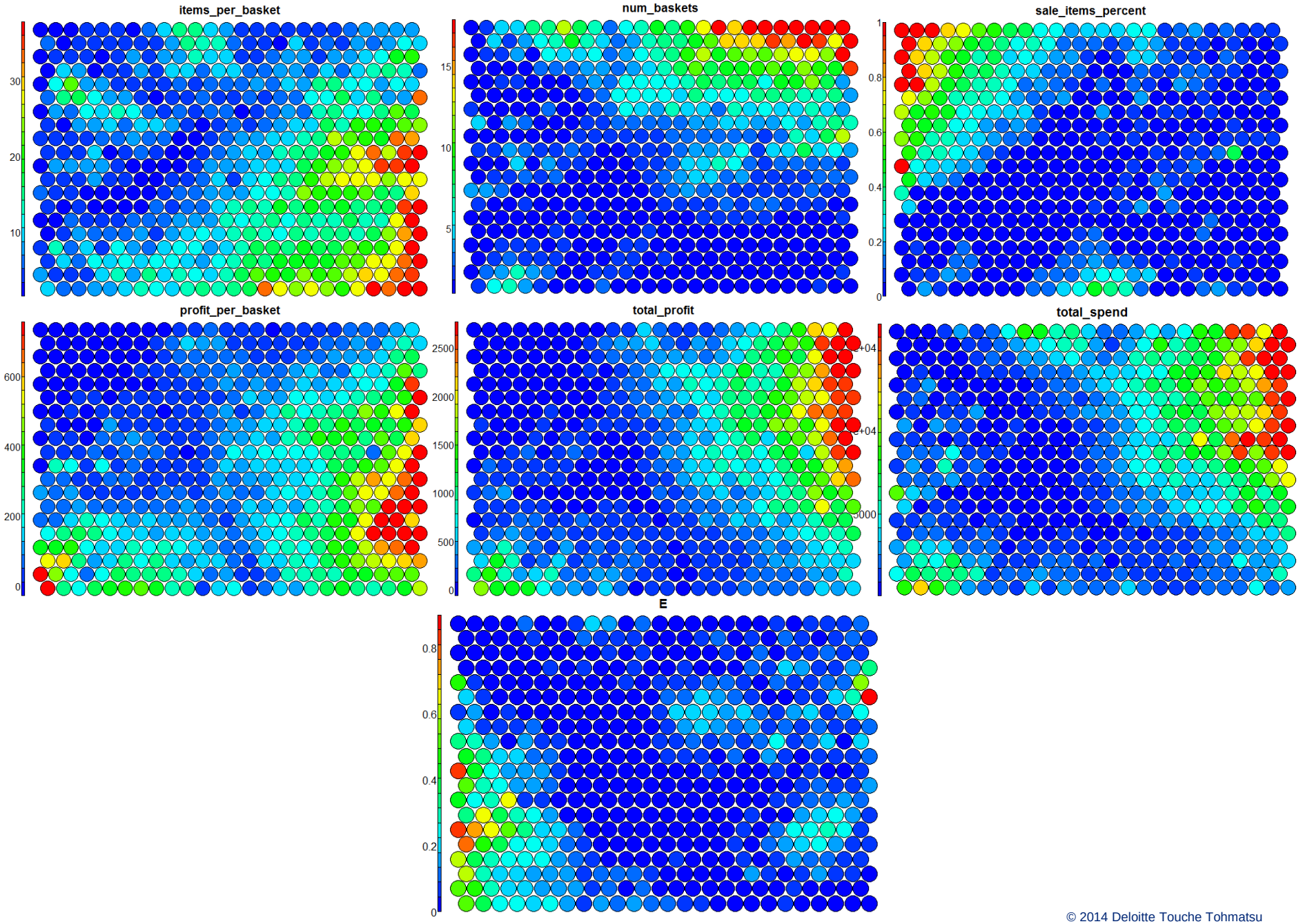
- Complex and realistic example of customer data
- Data set contains information on
  - –817,000 grocery shopping transactions.
  - –32,000 customers

date	customerid	age_group	address	product_subclass	product_id	quantity	asset	price
01/01/2001	141833	F	F	130207	4.71E+12	2	44	52
01/01/2001	1376753	E	E	110217	4.71E+12	1	150	129
01/01/2001	1603071	E	G	100201	4.71E+12	1	35	39
01/01/2001	1738667	E	F	530105	4.71E+12	1	94	119
01/01/2001	2141497	A	B	320407	4.71E+12	1	100	159
01/01/2001	1868685	J	E	110109	4.71E+12	1	144	190

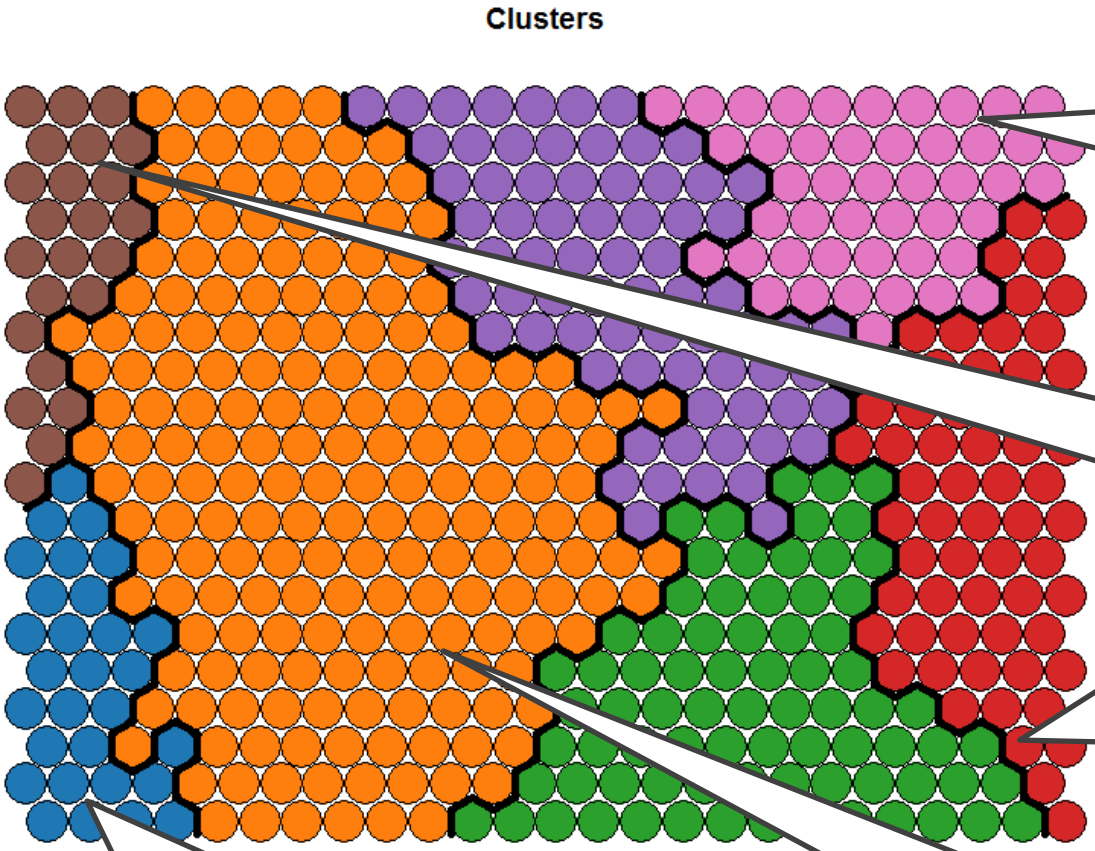
Grocery Shopping Data

- Explore heatmaps and variable distributions to find patterns





Grocery Shopping Data



“Steady shoppers”
- Many visits to store
- Profitable overall
- Smaller Baskets

“Bargain Hunters”
- Almost exclusively sale items
- Few visits
- Not profitable

“The Big Baskets”
- Few visits
- Largest baskets
- Large profit per basket

“Luxury Shoppers”
- Small baskets
- Expensive high-profit items
- Relatively few visits

“The great unwashed”
- Single / small repeat visitors
- Small baskets
- Large number of customers

Conclusions

- SOMs are a powerful tool for the analysis of complex customer data.
- Advantages include:
  - Intuitive method to develop customer segmentation profiles.
  - Relatively simple algorithm, easy to explain results to non-data scientists
  - New data points can be mapped to trained model for predictive purposes.
- Disadvantages:
  - Lack of parallelisation capabilities for VERY large data sets
  - Difficult to represent very many variables in 2-D plane
  - Requires clean, numeric data.
- Speak to us about what possibilities lie within your data

Overcoming the analytics challenges facing insurers

Challenges Insures face utilising analytics

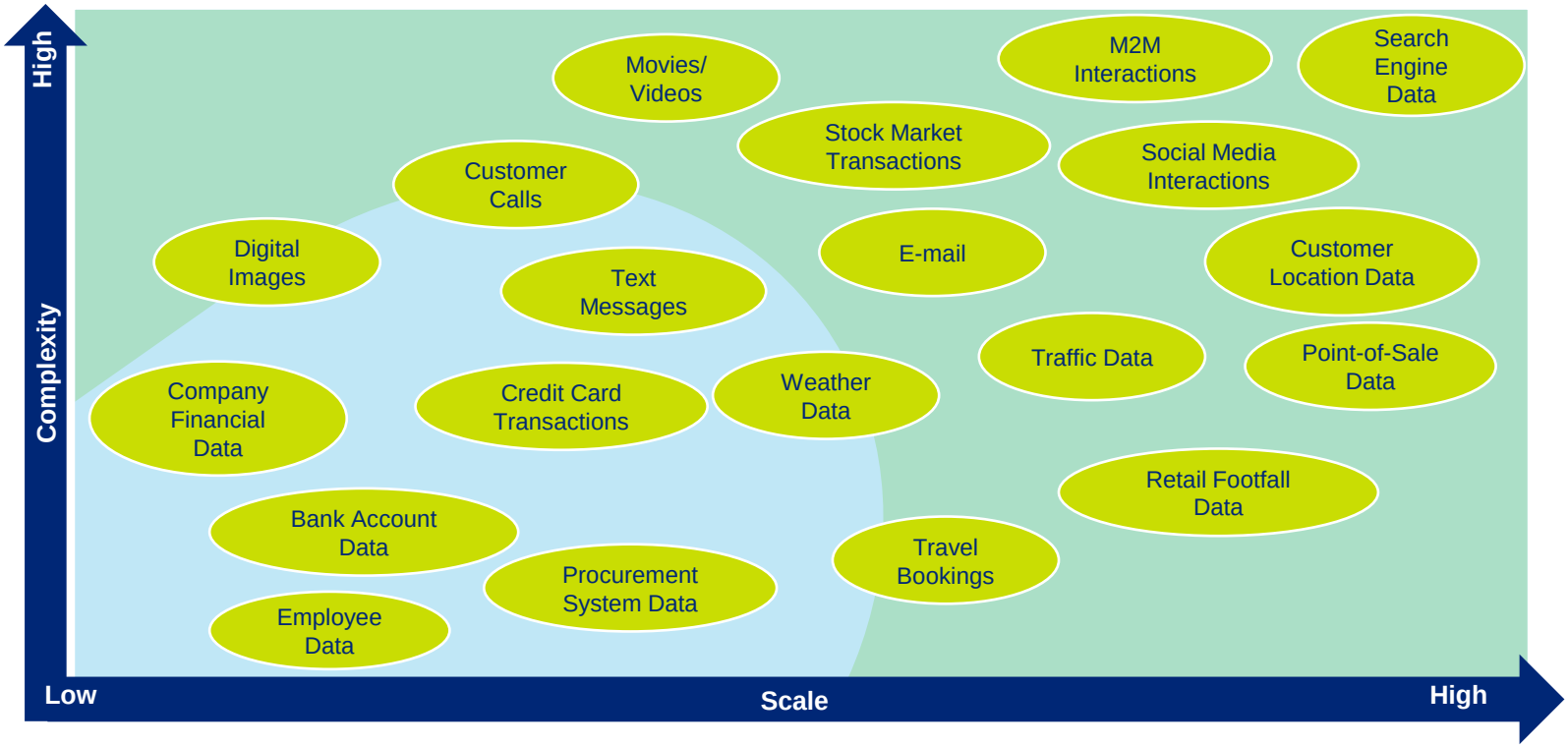
- Data Management & Governance
- Data Visualisation
- Analytics Operating Model
- Legacy systems and resource constraints
- Issue Identification
- Speed of analysis

Data Management for Analytics

The Challenges

*"In 2014, 85% of organizations will fail to deploy new strategies to address **data complexity and volume in their analytics**"*

- System complexity
- Types of data
- Volume of data
- Storage
- Quality of data
- Timeliness of data
- Security
- Preserving insights



Data Management for Analytics

Enabling Analytics in the Enterprise

- Data Management is the scaffolding that supports Analytics in the enterprise from two perspectives:

1. It establishes the systems and processes needed to:
    - **Capture** the diverse data sets
    - **Prepare** the data
    - **Store** the data

2. It operationalises and then supports the advanced analytical models and their ongoing management and support, thus enabling:
    - **Robust**
    - **Scalable** and
    - **Repeatable** analytics

Data Management for Analytics

The Process

- These are a set of standardised and proven methodologies for data management projects
- Together they constitute a framework to support analytics in the enterprise

Data Governance & Security

- Policies and strategies for data collection and data usage
- Identity and access management

Data Gathering & Storage

- Identify the key data sources (internal/external, structured/unstructured)
- Design and implement the automatic processes to collect the data
- Design and implement the storage mechanisms for the aggregated data

Data Management for Analytics

The Process

Data Preparation

- Data quality: including profiling and cleansing
- Data fusion/transformation – transform the data into formats/structures usable by the analytical models, without eliminating the hidden value
- Data enrichment: augment source data with relevant sources

Analytics Infrastructure

- Select and deploy the tools required to implement the analytical models
- Open source (e.g. Java, Python, R, Hadoop) vs commercial (e.g. SAS)
- Put in place the necessary technology and tools infrastructure to support all of the stages of enterprise-level analytics

Information Consumption

- Deliver the output of analytics to the users who need it
- Identify and implement the appropriate visualisation solutions and channel types (e.g. web, mobile)

Visualisation

"Computers speed the process of information handling, but they don't tell us what the information means or how to communicate its meaning to decision makers. These skills are not intuitive; they rely largely on analysis and presentation skills that must be learned" – Stephen Pew

Traditional approach

- Reporting has focused on the production of numbers.
- The output was large tables that gave the end user no immediate indication of what the numbers were telling them.
- Even the current generation of BI tools only allow single variable analysis. This results in focus on a set of predetermined questions.

Current trends

- New software is focusing on enabling users to better see what the data is telling.
- The use of graphs and story boarding are increasingly been used to communicate key insights.
- Visualisation tools are enabling users to view metrics across multiple dimensions simultaneously.

Visualisation

The increased focus on visualisation has both positives and negatives.

Positives

- Enables faster observation and better retention of key information - the human brain doesn't work in rows and columns.
- Visualisation democratises analytics and drives adoption.

Drawbacks

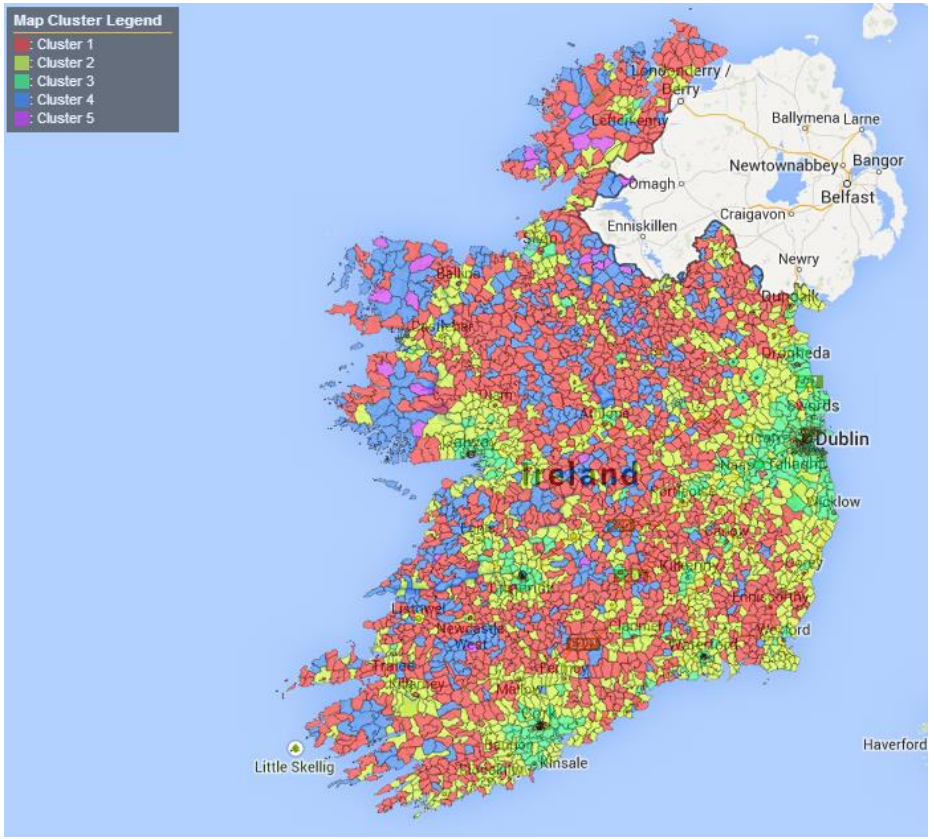
- Potential to focus on the aesthetic impacts of content rather than the effectiveness of communicating the message.
- Without proper supervision, important insights can be missed or misinterpreted.

Visualisation

Geospatial analytics is a new area that is fast providing users with insights previous unavailable.

- Maps make it easier for the eye to recognize patterns that were previously buried in spreadsheets, such as distance, proximity, contiguity, and affiliation.

- Location-based analysis can help decision-makers understand why solutions that work in one place often fail in another. It can also help them understand the locational aspects that influence broader trends and may have future consequences.

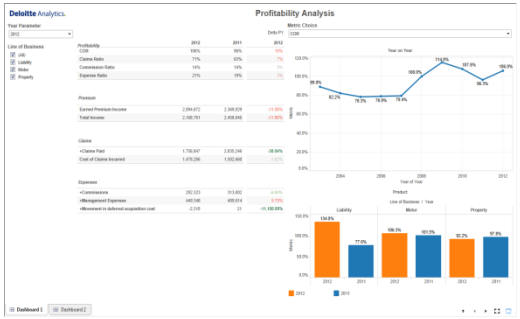


Visualisation

Clarity of purpose in report production will become increasingly important.

Frequency

Daily / Weekly



Regular Reporting - Dashboard

Displays summarised KPIs to show progress against strategic objectives.

- Consolidated reporting of an individual's KPIs.
- Variance against plan, trends & alters.
- Key drivers of results.

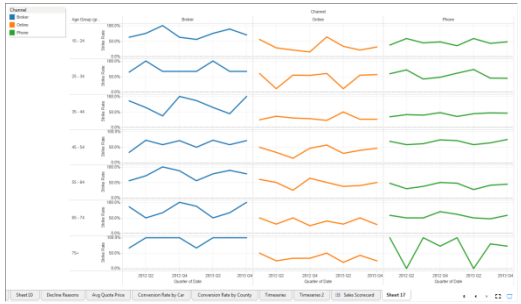
Weekly / Monthly

Standard Analysis

Enables drill-down and ability to slice and dice based on key data to identify issues and opportunities.

- Access and ability to visualise trends and variance for key metrics and data dimensions.
- Ability to filter data based on important variables.

Monthly / Annually



Ad Hoc Analysis

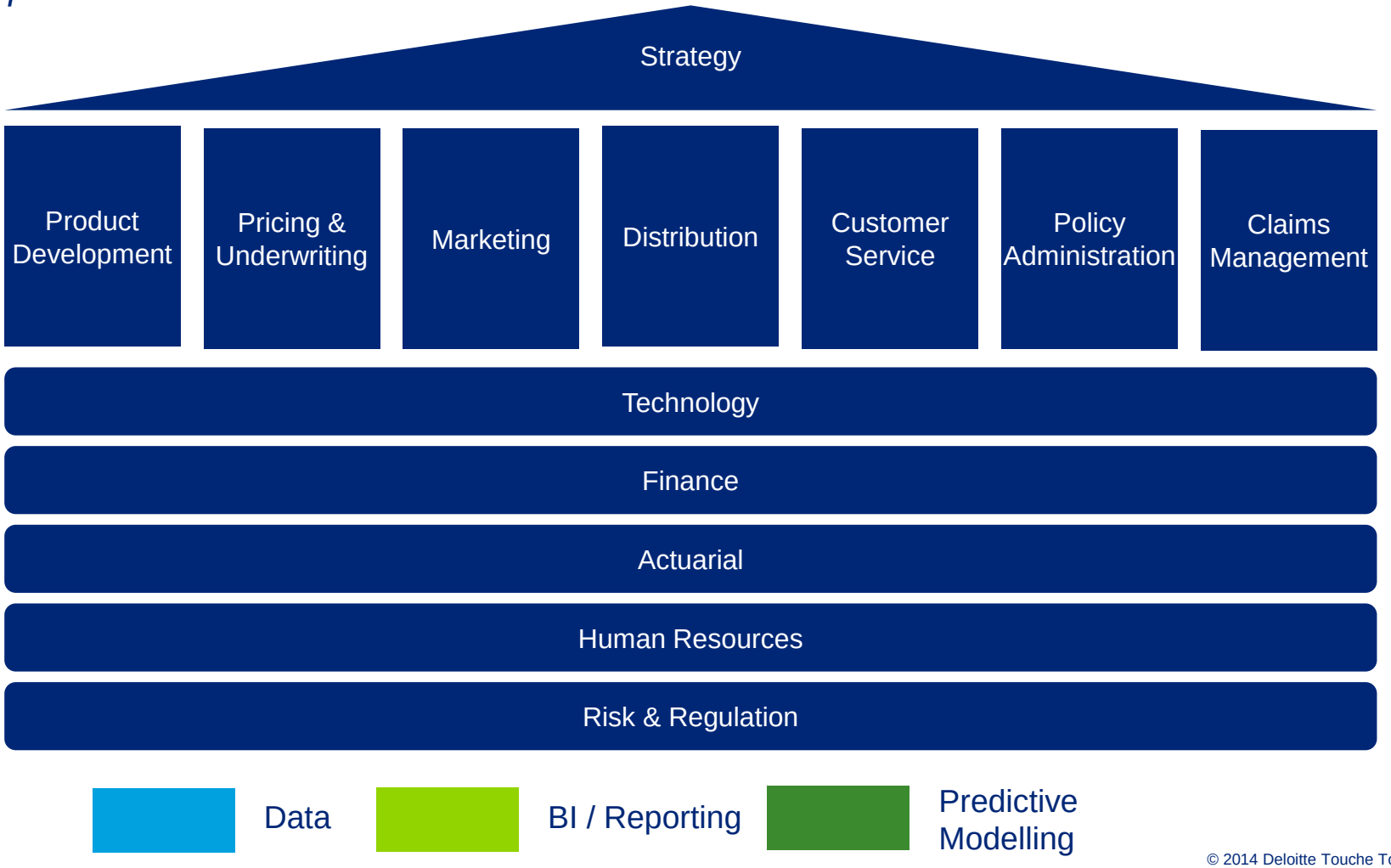
Access to all data for once off analysis and insight.

- Visualisation of high volumes of data

Analytics Operating Model

How to get the best out of your human analytics capabilities?

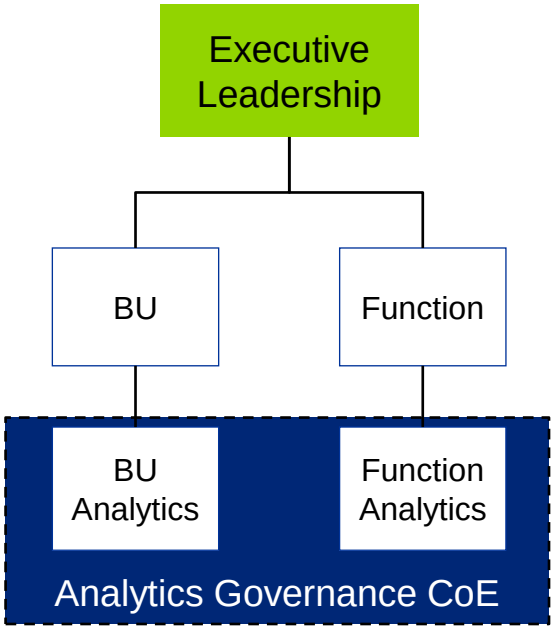
Resources needed for analytics are siloed throughout the organisation resulting in duplication of effort



Analytics Operating Model

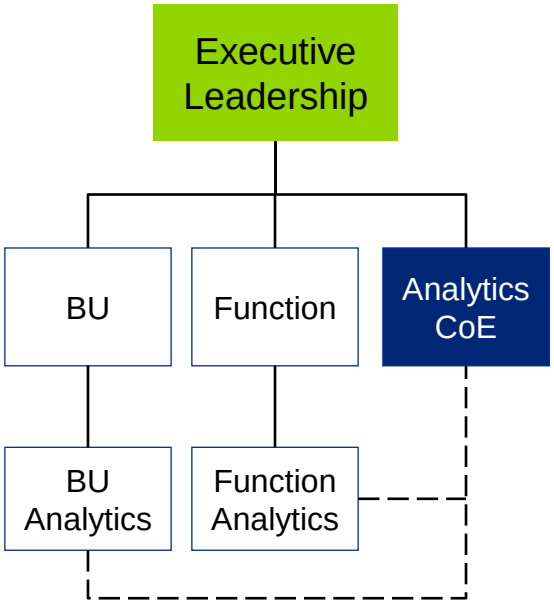
Degree of Centralisation

Virtual



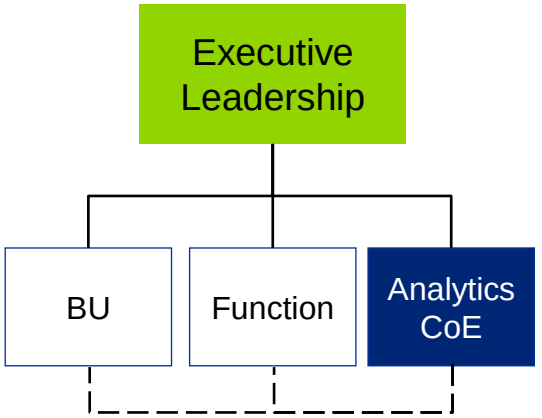
- No centralised control management.
- Lack of transparency in degree of use of analytics in decision making due to localised teams.

Federated / Hybrid



- Analytics output quality may suffer if no close coordination with CoE.
- Could result in increased costs as BUs/functions may direct analytical resources to non-critical projects.

Centralised



- Consistency in analytics output across enterprise.
- Improved cost management as all projects subject to same approval process and resources directed.

Conclusion

Demonstrations

Room 1

- Geo-spatial segmentation
- Twitter Sentiment analysis

Room 2

- Retention Analysis
- Portfolio Analysis
- Operational Productivity

Room 3

- Profitability
- Claims Performance
- Route Analyser