

Hey Bud,
What is
Business
Intelliigence??

Business Intelligence
is companies
investing money in
tools and people to
either save money or
get more money..!!

That's
a lot of
Money.



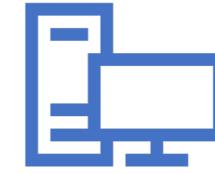
CSCI 5408



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Outline

- Why do we need analysis?
- Is Analysis == BI?
- Concepts of Business Intelligence



Need for Data Analysis (Example 1)

Organizations tend to grow and prosper as they gain a better understanding of their environment

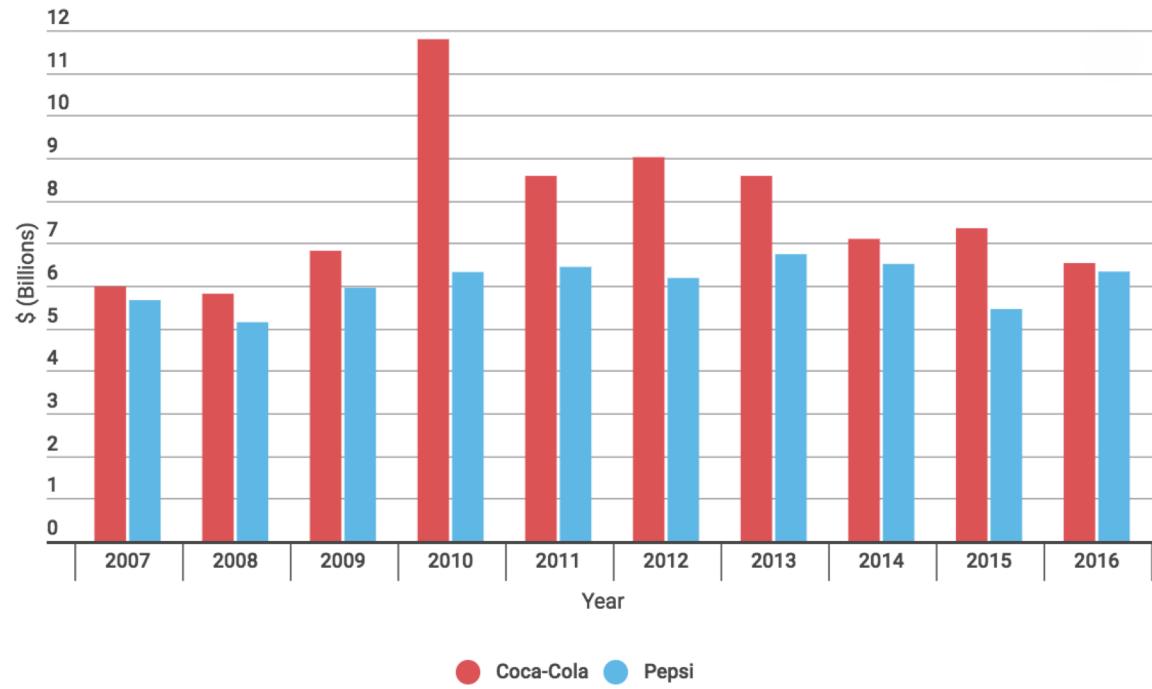
- Evaluate through tracking daily transactions and analyzing company data
- Example: A retail store data, Which product is sold more in the morning

Transaction_id	Time	Items_bought
101	6:35	milk, bread, cookies, juice
792	7:38	milk, juice
1130	8:05	milk, eggs
1735	8:40	bread, cookies, coffee

Need for Data Analysis (Example 2)

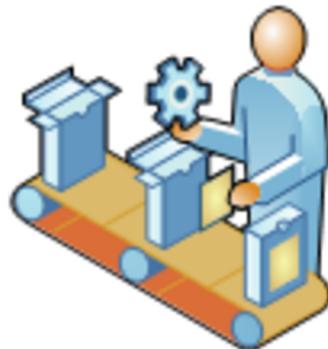
Organizations are always looking for a competitive advantage

- Product development, market positioning, sales promotions, and customer service



Need for Data Analysis (Example 3)

Whenever companies want to build strategy, take critical decisions etc., they require understanding of the available data and oftentimes do some predictions.



Revisit basic Concepts

- Raw Data
 - 1 pm, Halifax, NS, Canada, Jul 6, 2023, 25 C, POP 30%
 - 6 pm Halifax, NS, Canada, Jul 6, 2023, 25 C, POP 30%
 - Data into information

The recorded afternoon temperature is 25 degrees C in Halifax on Jul 6, 2023 with the POP 30%

The predicted evening temperature is 25 degrees C in Halifax on Jul 6, 2023 with the POP 30%
 - Information into knowledge

It is relatively hot during the summer months in Halifax. There is a chance of rain as well.
 - Knowledge into wisdom

If I am in Halifax in the Summer then I should carry an umbrella
- 

Business Intelligence (BI)

- Comprehensive, cohesive, integrated set of tools and processes
 - Captures, collects, integrates, stores, and analyzes data
 - Generates and presents information to support business decision making

Business Intelligence – What does it provide?.

- Collecting and storing operational data and aggregating it into decision support data
- Analyzing decision support data and presenting generated information to end users to support business decisions
- Making business decisions which generate more data
- Monitoring results to evaluate outcomes and predicting future outcomes with a high degree of accuracy

Solving Problems with BI Tools

COMPANY	PROBLEM	BENEFIT
CiCi's Enterprises Eighth-largest pizza chain in the United States; operates 650 pizza restaurants in 30 states Source: Cognos Corp. www.cognos.com	<ul style="list-style-type: none">Information access was cumbersome and time-consumingNeeded to increase accuracy in the creation of marketing budgetsNeeded an easy, reliable, and efficient way to access daily data	<ul style="list-style-type: none">Provided accurate, timely budgets in less timeProvided analysts with access to data for decision-making purposesReceived in-depth view of product performance by store to reduce waste and increase profits

Solving Problems with BI Tools

COMPANY	PROBLEM	BENEFIT
Pfizer Global pharmaceutical company Source: Oracle Corp. www.oracle.com	<ul style="list-style-type: none">Needed a way to control costs and adjust to tougher market conditions, international competition, and increasing government regulationsNeeded better analytical capabilities and flexible decision-making framework	<ul style="list-style-type: none">Ability to get and integrate financial data from multiple sources in a reliable wayStreamlined, standards-based financial analysis to improve forecasting processFaster and smarter decision making for business strategy formulation

BI Applications

- BI tools are required in almost all industries and functions.
- The nature of the information and the speed of action may be different across businesses
 - But, every manager today needs access to BI tools to have up-to-date metrics about business performance.

BI Applications (Example 1)

In Retail

Understanding emerging customer shopping patterns can help retailers organize their products, inventory, store layout, and web presence in order to delight their customers, which in turn would help increase revenue and profits.

1. *Optimize inventory levels at different locations:* Retailers need to manage their inventories carefully. Carrying too much inventory imposes carrying costs, while carrying too little inventory can cause lost sales opportunities. Predicting sales trends dynamically can help retailers move inventory to where it is most in demand.

2. *Minimize losses due to limited shelf life:* Perishable goods offer challenges in terms of disposing off the inventory in time. By tracking sales trends, the perishable products at risk of not selling before the sell-by date can be suitably discounted and promoted.

BI Applications (Example 2)

In Health Care and Wellness

BI applications can help apply the most effective diagnoses and prescriptions for various ailments.

1. *Diagnose disease in patients:* Patient's current condition, history, family health are considered for possible suggestions and treatments. This saves time and cost.

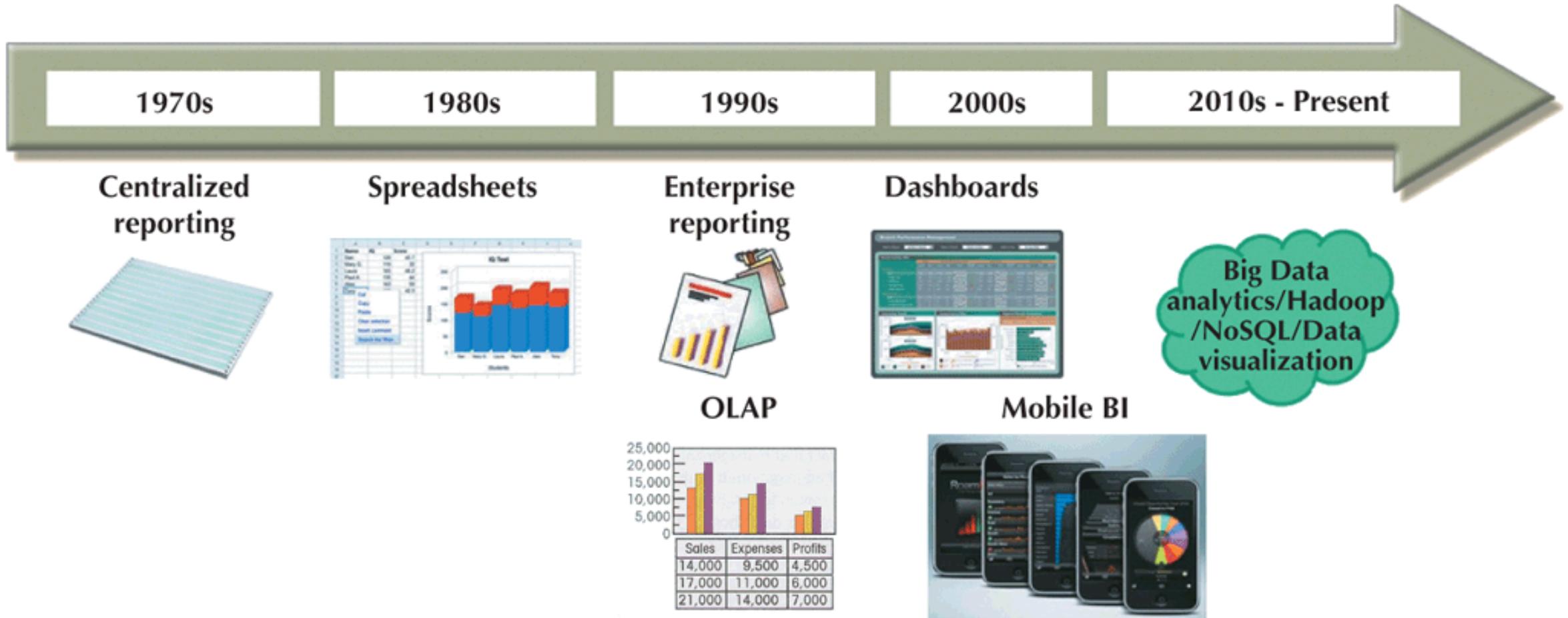
2. *Treatment Effectiveness:* If there is any drug interaction, it can be found by a decision tree-based system.

Hidden Costs of Bad Business Intelligence

WHO HAS THE RIGHT SPREADSHEET?



Business Intelligence Evolution



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Business Intelligence Benefits

Decision support system (DSS) is an arrangement of computerized tools used to assist managerial decision making

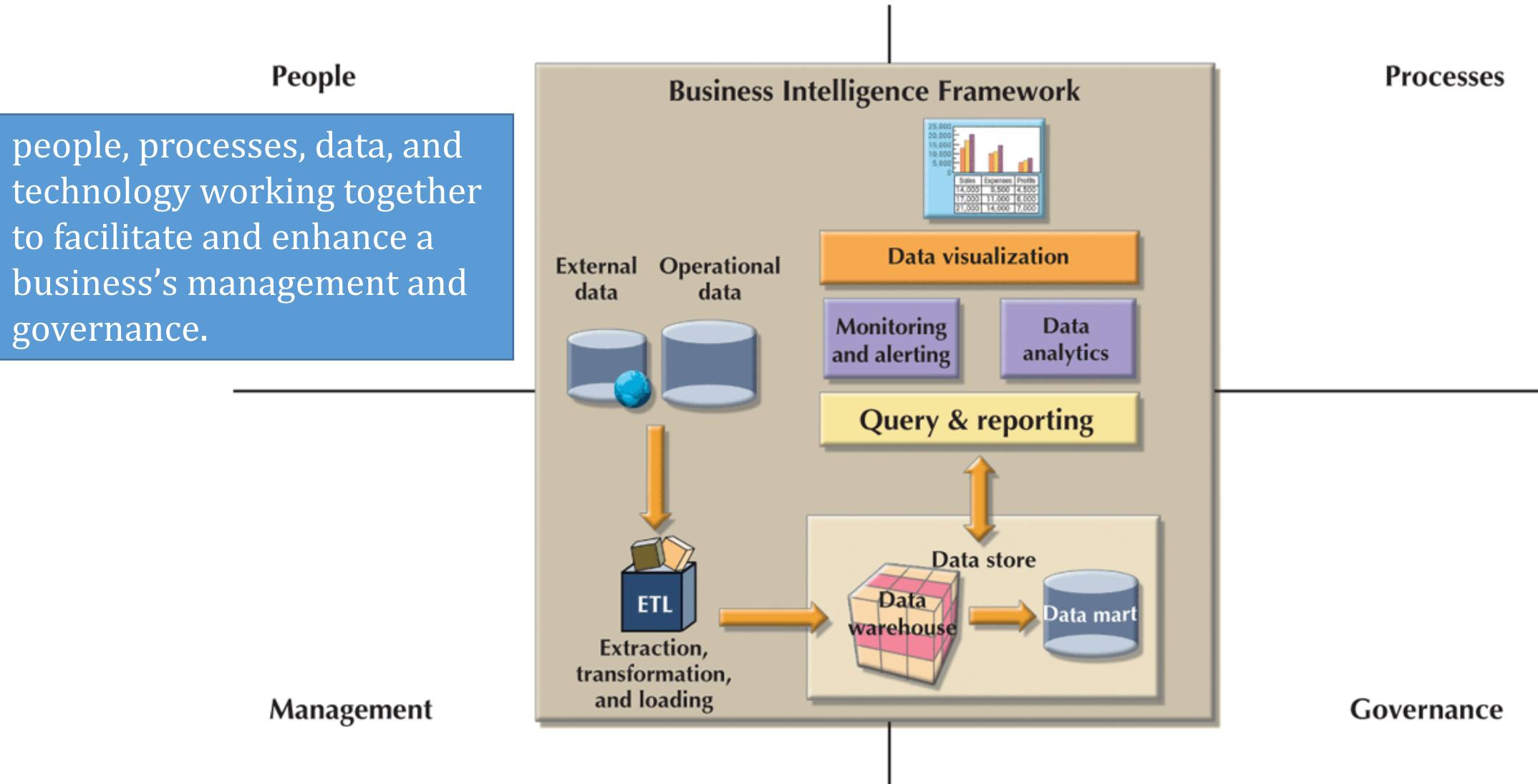
- Typically has a much narrower focus and reach than a BI solution

BI information technology has evolved from centralized reporting styles to the current, **mobile BI** and **Big Data analytics** style in the span of just a few years

- The rate of technological change is not slowing down; technology advancements are accelerating the adoption of BI to new levels

**Can we say,
Analysis ⊂ BI ?**

Business Intelligence Architecture



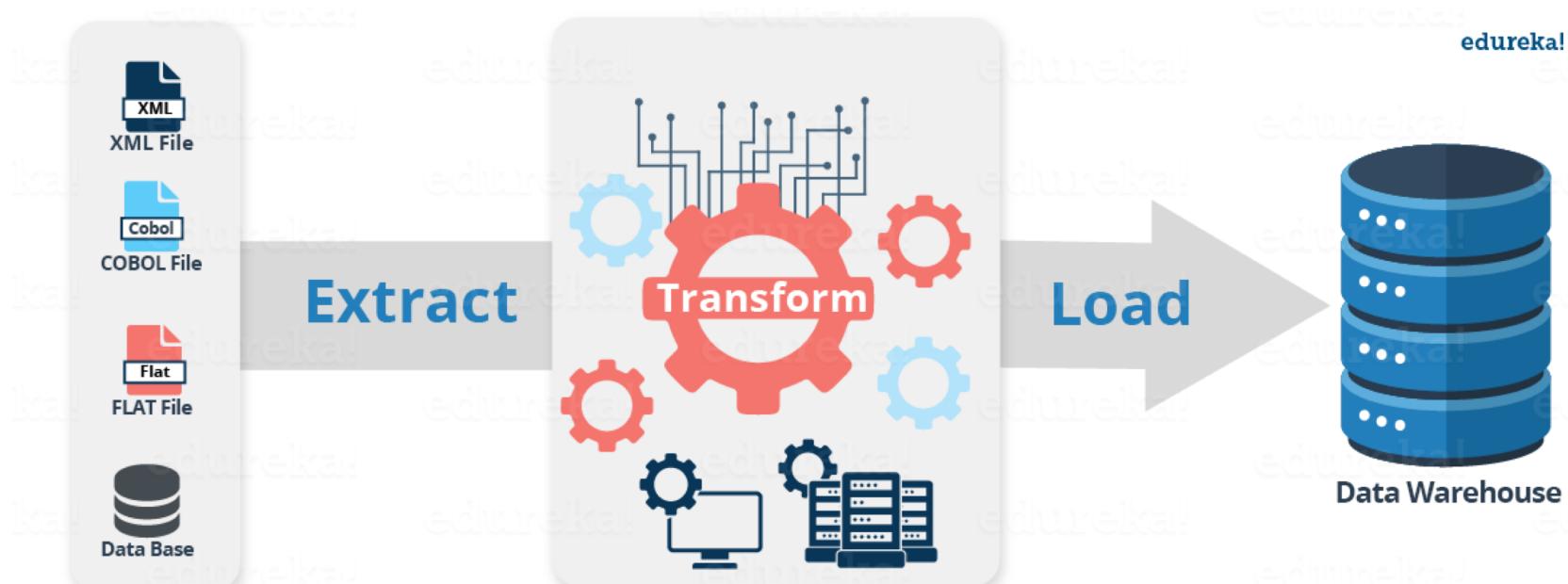
GET ALL THE
INFORMATION YOU CAN,
WE'LL THINK OF A
USE FOR IT LATER.



Basic BI Architectural Components (1- 6)

ETL Tools:

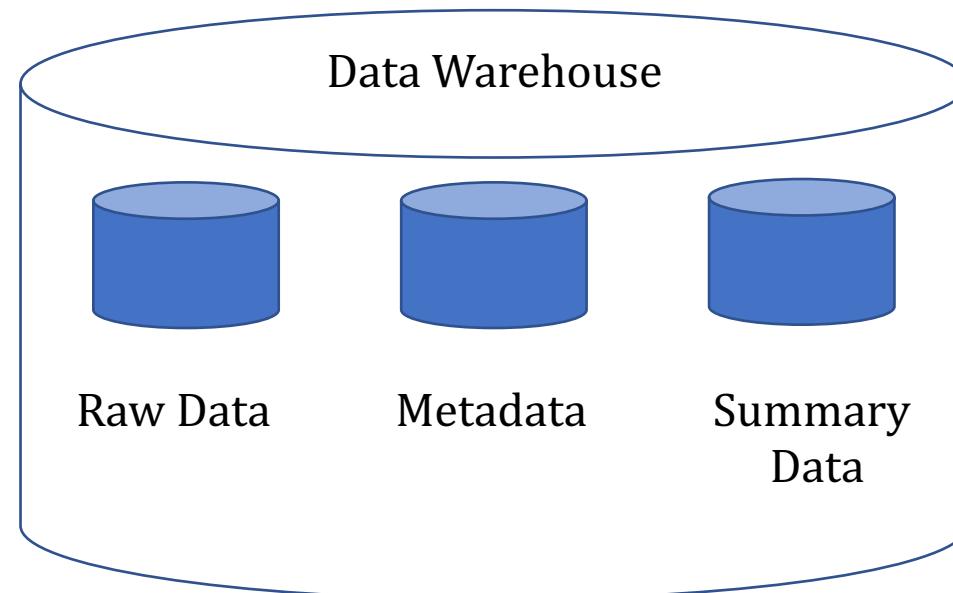
- Data **extraction**, **transformation**, and **loading** (etl) tools collect, filter, integrate, and aggregate internal and external data to be saved into a data store optimized for decision support.



Basic BI Architectural Components (2 - 6)

Data Store:

- The data store is optimized for decision support and is generally represented by a data warehouse or a data mart. The data is stored in structures that are optimized for data analysis and query speed.



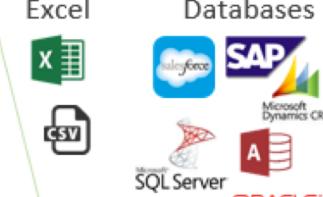
Basic BI Architectural Components (3 - 6)

Query and Reporting:

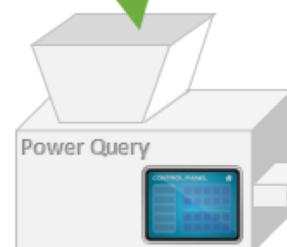
- This component performs data selection and retrieval, and it is used by the data analyst to create queries that access the database and create the required reports.

Power Query Transforms Your Data

1. Add data from almost any source



2. Transform it with Power Query



3. Output to Excel

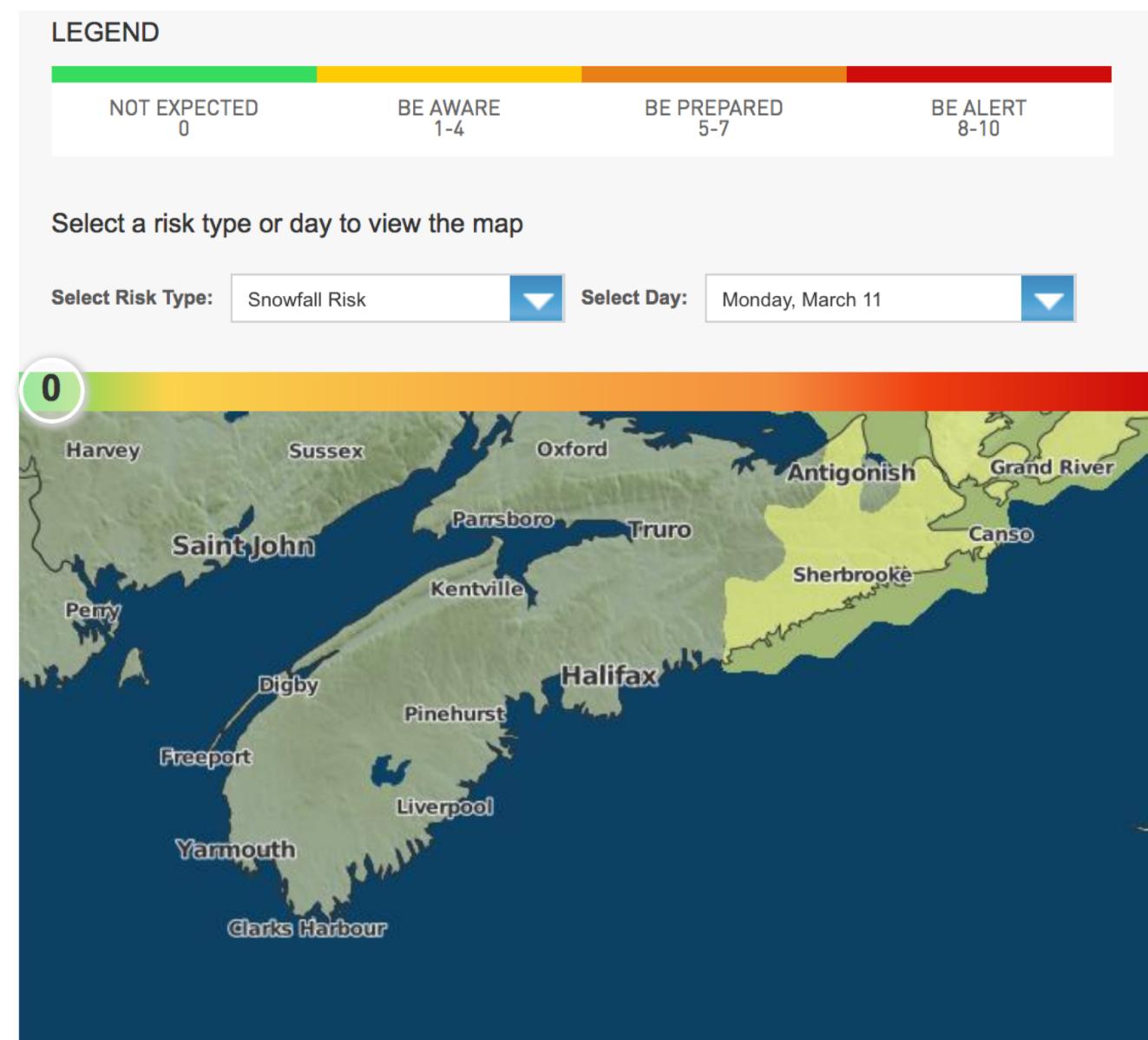
A	B	C
Product Name	Month	Sales Amount
Product A	Jan-14	192.375
Product A	Feb-14	285.75
Product A	Mar-14	38.25
Product A	Apr-14	200.25
Product A	May-14	221.625
Product A	Jun-14	349.875
Product A	Jul-14	165.375
Product A	Aug-14	499.5
Product A	Sep-14	40.5
Product A	Oct-14	259.875
Product A	Nov-14	343.125

Image source: <https://www.excelcampus.com/powerquery/power-query-overview/>

Basic BI Architectural Components (4 - 6)

Data Visualization:

- This component presents data to the end user in a variety of meaningful and innovative ways.
- This tool helps the end user select the most appropriate presentation format, such as summary reports, maps, pie or bar graphs, mixed graphs, and static or interactive dashboards.



Basic BI Architectural Components (5 - 6)

Data Monitoring and Alerting:

- This component allows real-time monitoring of business activities.
- The BI system will present concise information in a single integrated view. This integrated view could include specific metrics about the system performance or activities, such as number of orders placed in the last four hours
- Alerts can be placed on a given metric; once the value of a metric goes below or above a certain baseline, the system will perform a given action, such as emailing shop floor managers, presenting visual alerts, or starting an application.

Basic BI Architectural Components (6 - 6)

Data Analytics:

- This component performs **data analysis** and **data-mining** tasks using the data in the data store.
- This tool advises the user as to which data analysis tool to select and how to build a reliable business data model.
- Business models are generated by special algorithms that identify and enhance the understanding of business situations and problems.

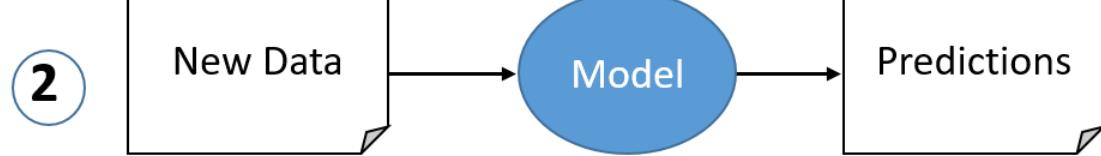
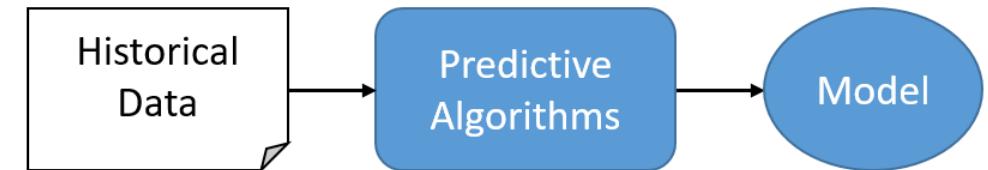


Image Source: <https://www.logianalytics.com/bi-trends/what-is-predictive-analytics/>

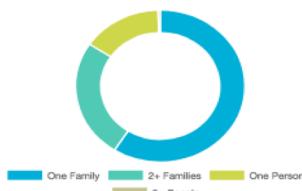
Sample Business Intelligence Tools

TOOL	DESCRIPTION
Dashboards and business activity monitoring	Dashboards use web-based technologies to present key business performance indicators or information in a single integrated view, generally using graphics that are clear, concise, and easy to understand.

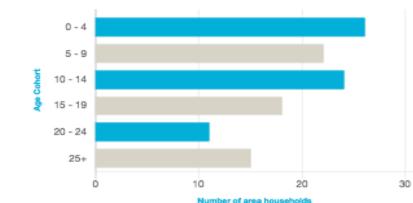
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Household Population

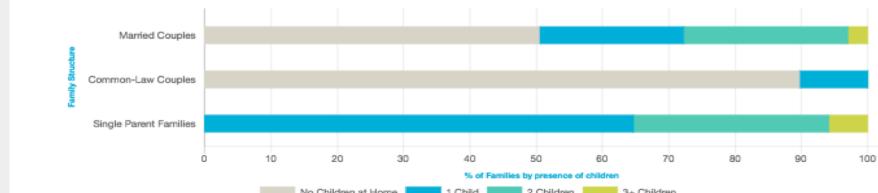
HOUSEHOLD STRUCTURE



AGE OF CHILDREN



FAMILY STRUCTURE AND PRESENCE OF CHILDREN



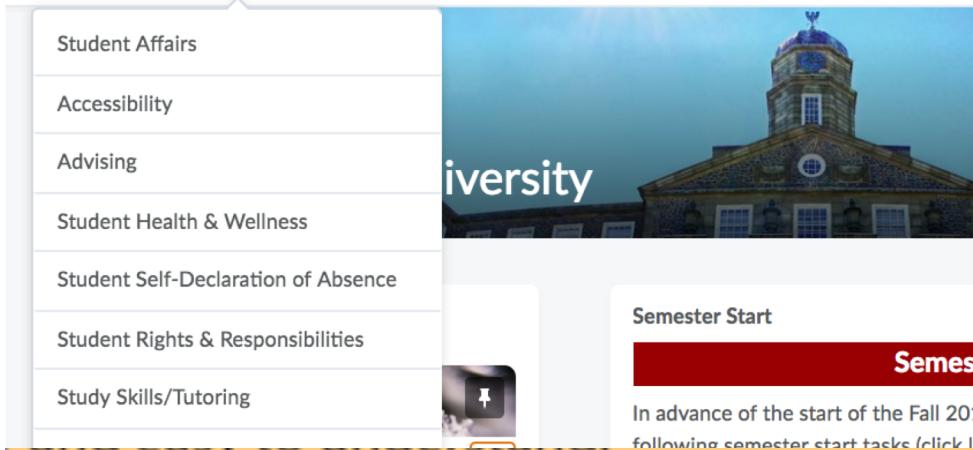
Education

EDUCATION LEVEL

High

Sample Business Intelligence Tools

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Student Affairs
Accessibility
Advising
Student Health & Wellness
Student Self-Declaration of Absence
Student Rights & Responsibilities
Study Skills/Tutoring

Portals provide a unified, single point of entry for information distribution. Portals are a web-based technology that use a web browser to integrate data from multiple sources into a single webpage. Many different types of BI functionality can be accessed through a portal.



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Semester Start

Semester Start Check

In advance of the start of the Fall 2018/2019 term, all ins following semester start tasks (click links for more details)

Fall course and set

arse space into you

as

Absence dropbox

Compare Auto Insurance Quotes in Nova Scotia

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Get Started

Compare rates from Nova Scotia's leading auto insurance companies:



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INSURANCE**



**[intact]
INSURANCE**



RSA



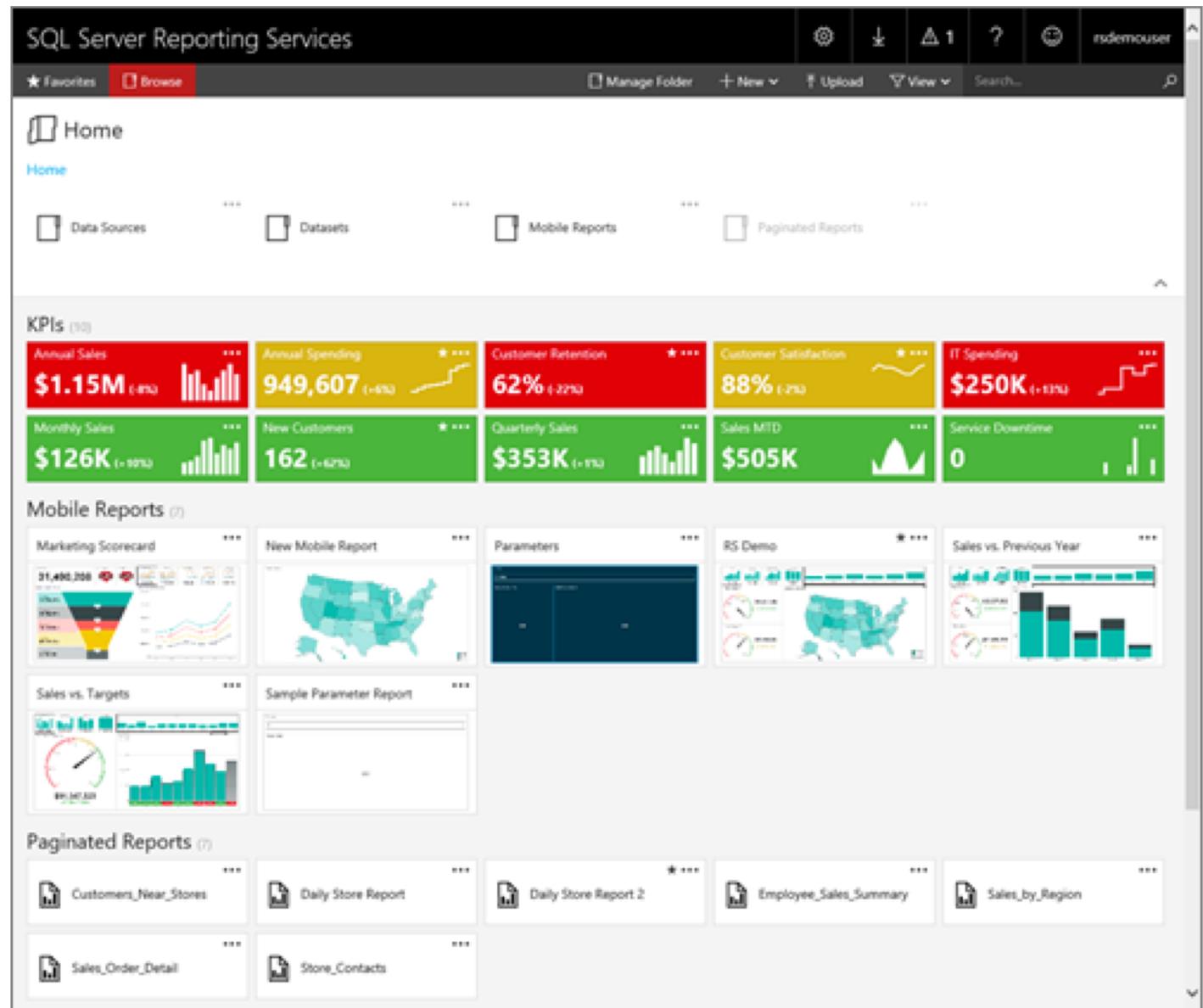
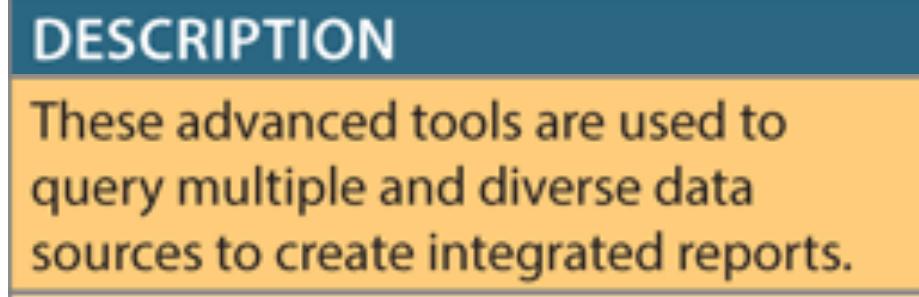
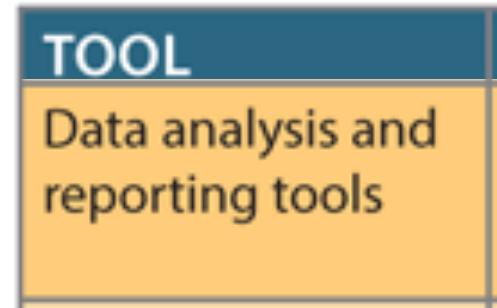
TRAVELERS



**Wawanesa
Insurance**

Compare car insurance quotes to get the lowest rates in Nova Scotia

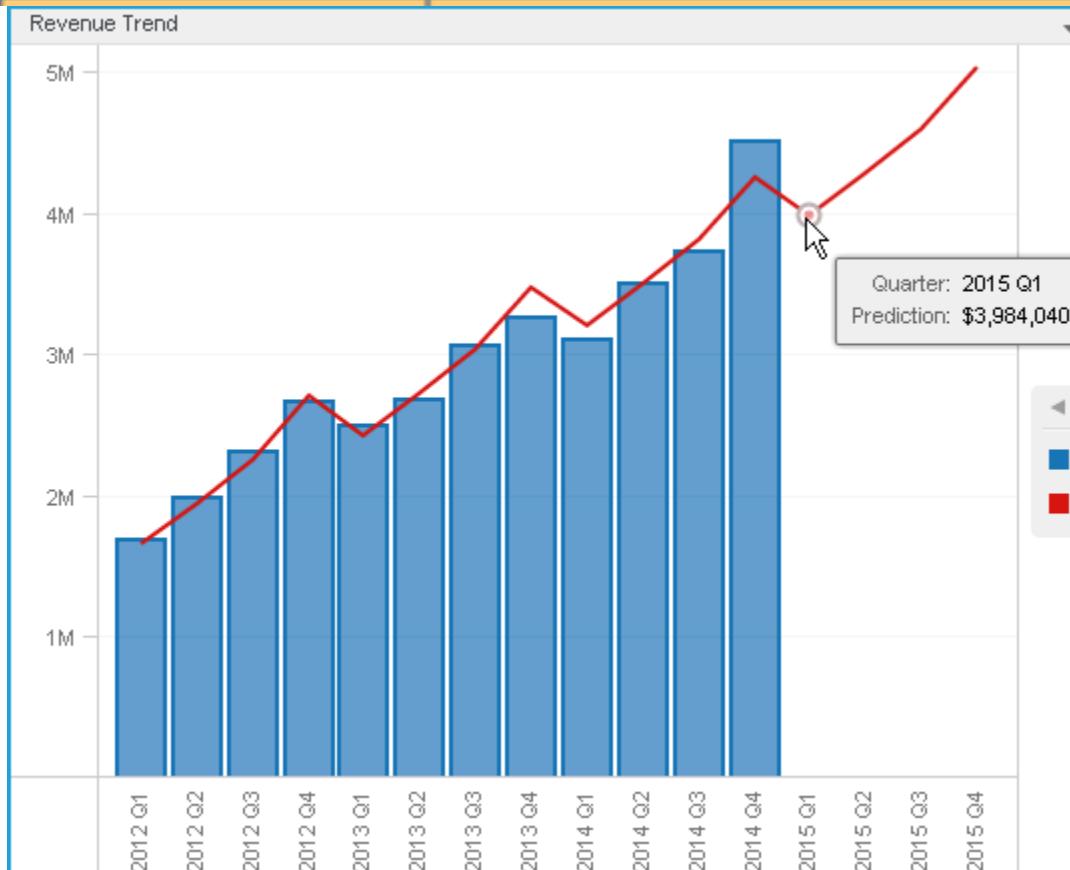
Sample Business Intelligence Tools



Source: <https://docs.microsoft.com/en-us/sql/reporting-services/web-portal-ssrs-native-mode?view=sql-server-2017>

Sample Business Intelligence Tools

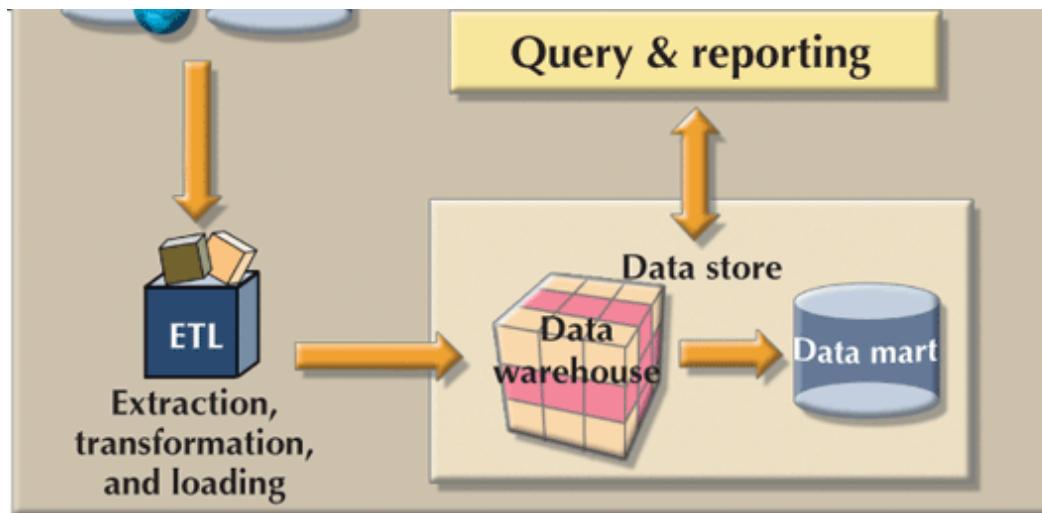
TOOL	DESCRIPTION	SAMPLE VENDORS
Data-mining tools	These tools provide advanced statistical analysis to uncover problems and opportunities hidden within business data.	SAP Teradata MicroStrategy MS Analytics Services



Source:
https://www2.microstrategy.com/producthelp/10.6/AdvancedReportingGuide/WebHelp/Lang_1033/Content/AdvancedReporting/Revenue_forecasting_example__using_linear_and_seas.htm

Sample Business Intelligence Tools

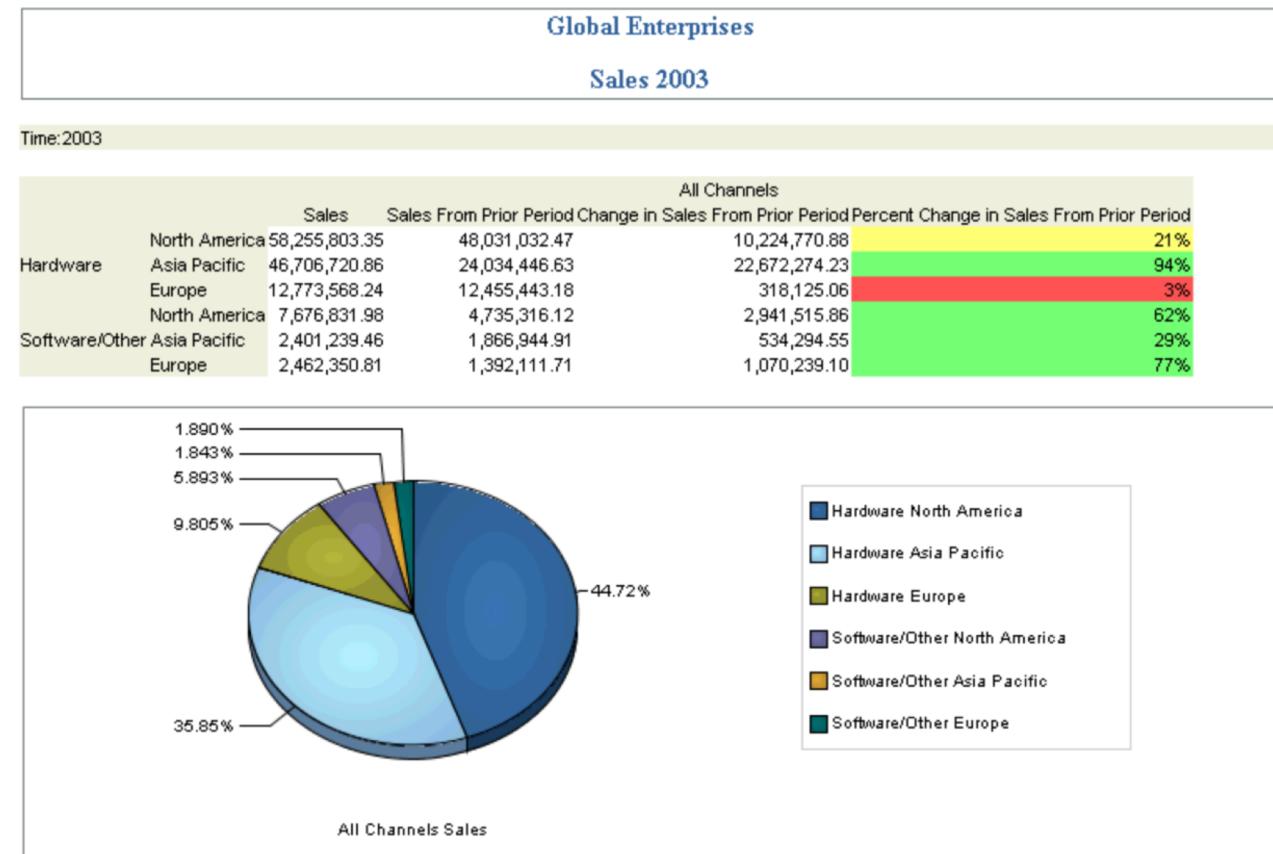
TOOL	DESCRIPTION	SAMPLE VENDORS
Data warehouses (DW)	The data warehouse is the foundation of a BI infrastructure. Data is captured from the production system and placed in the DW on a near real-time basis. BI provides company-wide integration of data and the capability to respond to business issues in a timely manner.	Microsoft Oracle IBM/Cognos Teradata



Sample Business Intelligence Tools

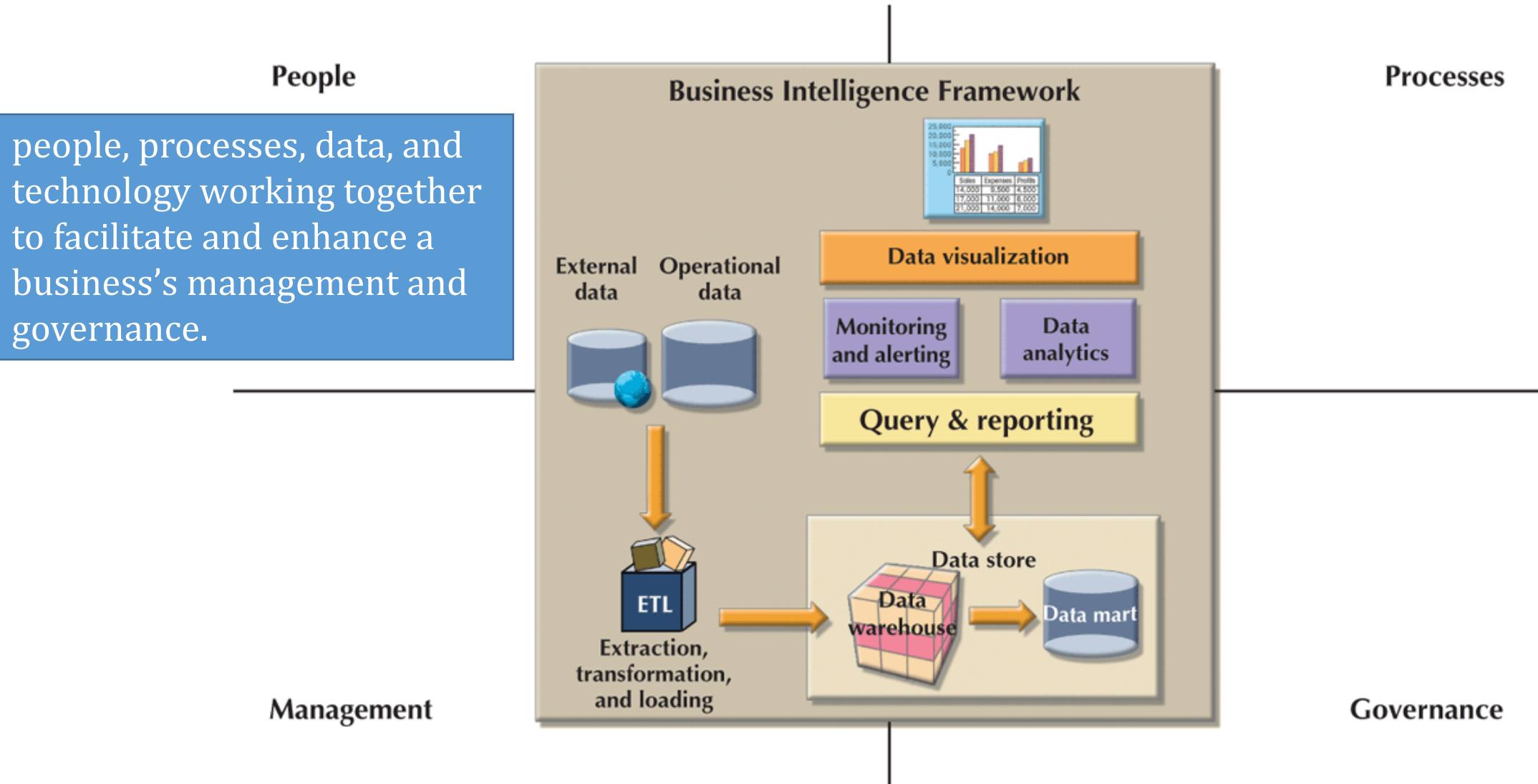
TOOL	DESCRIPTION
OLAP tools	Online analytical processing provides multidimensional data analysis.
Data visualization	These tools provide advanced visual analysis and techniques to enhance understanding and create additional insight of business data and its true meaning.

Figure 5-6 Sales Report Generated by Discoverer Plus OLAP



Description of "Figure 5-6 Sales Report Generated by Discoverer Plus OLAP"

Business Intelligence Architecture



Decision Support Data

Although BI is used at the strategic and tactical managerial levels within organizations, its effectiveness depends on the quality of data gathered at the operational level

Operational Data versus Decision Support Data

Operational data and decision support data serve different purposes

- Operational data is useful for capturing daily business transactions
- Decision support data gives tactical and strategic business meaning to the operational data

Decision support data differs from operational data in three main areas

- Time span
- Granularity (level of aggregation)
- Dimensionality

Operational Data versus Decision Support Data

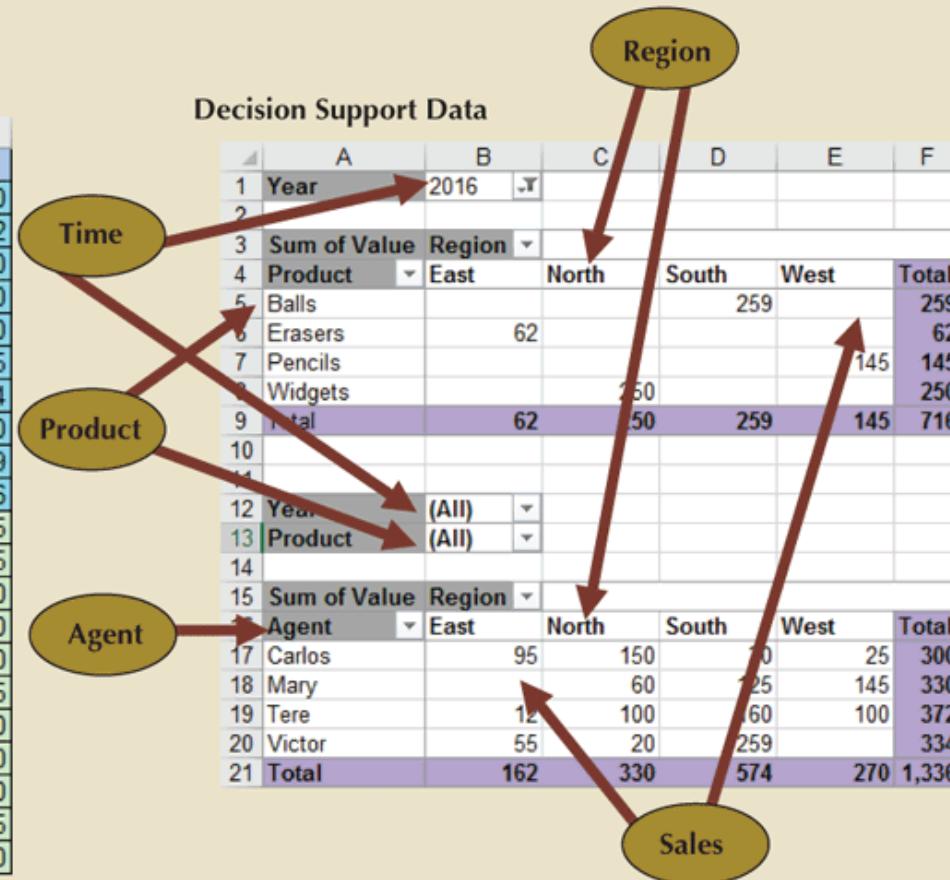
FIGURE 13.3 TRANSFORMING OPERATIONAL DATA INTO DECISION SUPPORT DATA

Operational Data

	A	B	C	D	E
1	Year	Region	Agent	Product	Value
2	2016	East	Carlos	Erasers	50
3	2016	East	Tere	Erasers	12
4	2016	North	Carlos	Widgets	120
5	2016	North	Tere	Widgets	100
6	2016	North	Carlos	Widgets	30
7	2016	South	Victor	Balls	145
8	2016	South	Victor	Balls	34
9	2016	South	Victor	Balls	80
10	2016	West	Mary	Pencils	89
11	2016	West	Mary	Pencils	56
12	2017	East	Carlos	Pencils	45
13	2017	East	Victor	Balls	55
14	2017	North	Mary	Pencils	60
15	2017	North	Victor	Erasers	20
16	2017	South	Carlos	Widgets	30
17	2017	South	Mary	Widgets	75
18	2017	South	Mary	Widgets	50
19	2017	South	Tere	Balls	70
20	2017	South	Tere	Erasers	90
21	2017	West	Carlos	Widgets	25
22	2017	West	Tere	Balls	100

Operational data has a narrow time span, low granularity, and single focus. Such data is usually represented in tabular format, in which each row represents a single transaction. This format often makes it difficult to derive useful information.

Decision Support Data



Decision support system (DSS) data focuses on a broader time span, tends to have high levels of granularity, and can be examined in multiple dimensions. For example, note these possible aggregations:

- Sales by product, region, agent, and so on
- Sales for all years or only a few selected years
- Sales for all products or only a few selected products

Questions to Consider

- Is there any alternative of BI framework?
- Is report generation a part of BI framework?
- Is BI a subset of Machine learning? If so, provide a justification.

