



Business Intelligence Explained – February 2016 – v1.0

The term Business Intelligence (BI) is a relatively new one – having said that, you can expect to hear a lot more about it in the future as businesses realise they need to make better use of their data. To a large extent businesses have at best underutilised it and at worst ignored it.

Before defining BI, let us deal with two words that are commonly used interchangeably, yet have very different meanings – **data** and **information**.

Data vs Information:

If you can imagine a database or an Excel spreadsheet, they both contain columns (*fields*) and rows. Each column stores data of a similar type – for example a person’s first name, where you would expect to see values like Paul, John, Peter and David. Another column is likely to hold data about a person’s surname – so you might see Smith, Jones, Brown and Wills. Each of these *values*, either individually or as a column, is referred to as **data**.

The image below shows an example of data in a table – in this case the data relates to sales transactions.

OrderDate	Customer...	SalesTerritor...	SalesOrderNu...	Sales...
31/07/2004 00:00:00	14680		9 SO75088	4
31/07/2004 00:00:00	15160		4 SO75105	4
31/07/2004 00:00:00	21524		10 SO75113	4
31/07/2004 00:00:00	13671		8 SO75118	4
31/07/2004 00:00:00	11981		1 SO75119	3
31/07/2004 00:00:00	23381		1 SO75098	3
31/07/2004 00:00:00	13753		4 SO75110	3
31/07/2004 00:00:00	21163		4 SO75099	3
31/07/2004 00:00:00	26564		9 SO75092	3

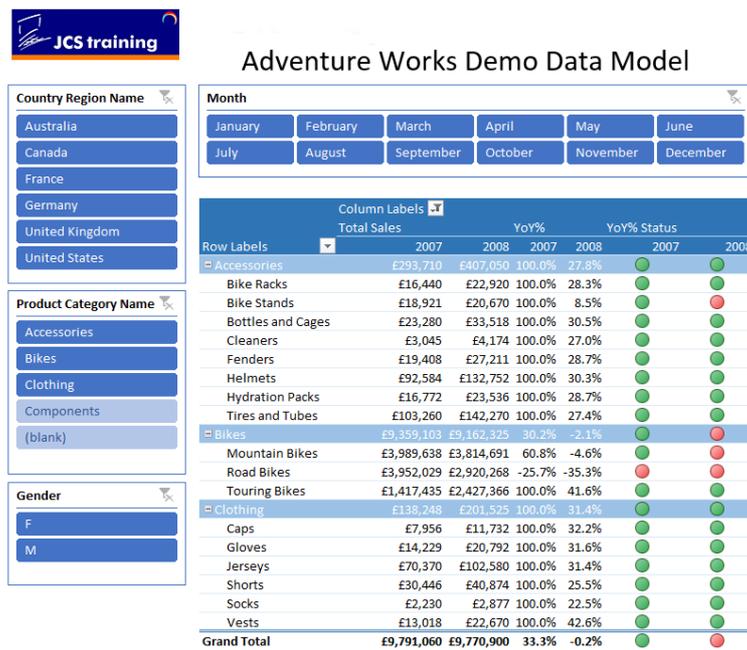
Fig 1:

Looking at **Fig: 1** above, you can’t really draw any conclusions based on the data in its current format. For example, you can’t tell what the total sales were for July 2004, or which customer purchased the most product in week one of July 2004 or what were the total sales by product group for the same period.

Only when data has been aggregated and arranged into a particular pattern can you start to draw conclusions.

Below in **Fig: 2** is one example of how data can be organised – a pivot table aggregates data by various headings, for example Month, Country and Product Group. We can now refer to this as **information** – and can now start to interpret and draw conclusions from the information, which hopefully will help us to answer some of the questions above.

“Without data you’re just another person with an option” W. Edwards Deming



Adventure Works Demo Data Model

Country Region Name

- Australia
- Canada
- France
- Germany
- United Kingdom
- United States

Product Category Name

- Accessories
- Bikes
- Clothing
- Components
- (blank)

Gender

- F
- M

Month

- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

Row Labels	Total Sales		YoY%		YoY% Status	
	2007	2008	2007	2008	2007	2008
Accessories	£293,710	£407,050	100.0%	27.8%	●	●
Bike Racks	£16,440	£22,920	100.0%	28.3%	●	●
Bike Stands	£18,921	£20,670	100.0%	8.5%	●	●
Bottles and Cages	£23,280	£33,518	100.0%	30.5%	●	●
Cleaners	£3,045	£4,174	100.0%	27.0%	●	●
Fenders	£19,408	£27,211	100.0%	28.7%	●	●
Helmets	£92,584	£132,752	100.0%	30.3%	●	●
Hydration Packs	£16,772	£23,536	100.0%	28.7%	●	●
Tires and Tubes	£103,260	£142,270	100.0%	27.4%	●	●
Bikes	£9,359,103	£9,162,325	30.2%	-2.1%	●	●
Mountain Bikes	£3,989,638	£3,814,691	60.8%	-4.6%	●	●
Road Bikes	£3,952,029	£2,920,268	-25.7%	-35.3%	●	●
Touring Bikes	£1,417,435	£2,427,366	100.0%	41.6%	●	●
Clothing	£138,248	£201,525	100.0%	31.4%	●	●
Caps	£7,956	£11,732	100.0%	32.2%	●	●
Gloves	£14,229	£20,792	100.0%	31.6%	●	●
Jerseys	£70,370	£102,580	100.0%	31.4%	●	●
Shorts	£30,446	£40,874	100.0%	25.5%	●	●
Socks	£2,230	£2,877	100.0%	22.5%	●	●
Vests	£13,018	£22,670	100.0%	42.6%	●	●
Grand Total	£9,791,060	£9,770,900	33.3%	-0.2%	●	●

Fig: 2

The Data Explosion:

Just about every business generates data of some sort. An example might be when creating an invoice. More data is generated when the invoice is emailed to the customer and when Credit Control sends out debtor letters. Finally, when the invoice gets paid, you guessed it – more data.

If you extrapolate the above scenario across all areas of a business, you start to get a feel for how much data is being generated every day – and don’t forget that data is still being generated outside of business hours.

Here's a staggering fact: 90% of the world's data has been generated in the past two years. It is estimated that by 2018 we will be generating **50,000 GB of data per second**.

You don't have to be a Data Analyst to realise that businesses need to engender a data-centric culture and be able to collate, manage and interpret the vast array of data they generate on a daily, hourly or minute-by-minute basis. Data is the lifeblood of most businesses!

It's important to be able to understand that, to truly interpret, contrast and compare data, businesses need to combine it with other external sources such as socioeconomic, political or even environmental data.

Business Intelligence:

Data plays an important role in almost every business. Today, there are more ways than ever for customers to engage with your business and, indeed, more ways for you to reach out to them. These new communication streams generate a significant volume of data and therefore it's essential that all businesses learn how to harness this so you know all you can about your customers, what they want, what they like and need, and how they perceive your business compared with another.

The real challenge, however, is to master and tame data in such a way as to uncover insights that might affect your business performance in the short, medium and long term.

This becomes even more important and harder as *unstructured data* (the type of data generated by social media and email, for example) sky-rockets!



Not only does data tend to be disconnected, the quality of it is also poor. Accurate reporting can only be achieved if the under-pinning data is fit for purpose.

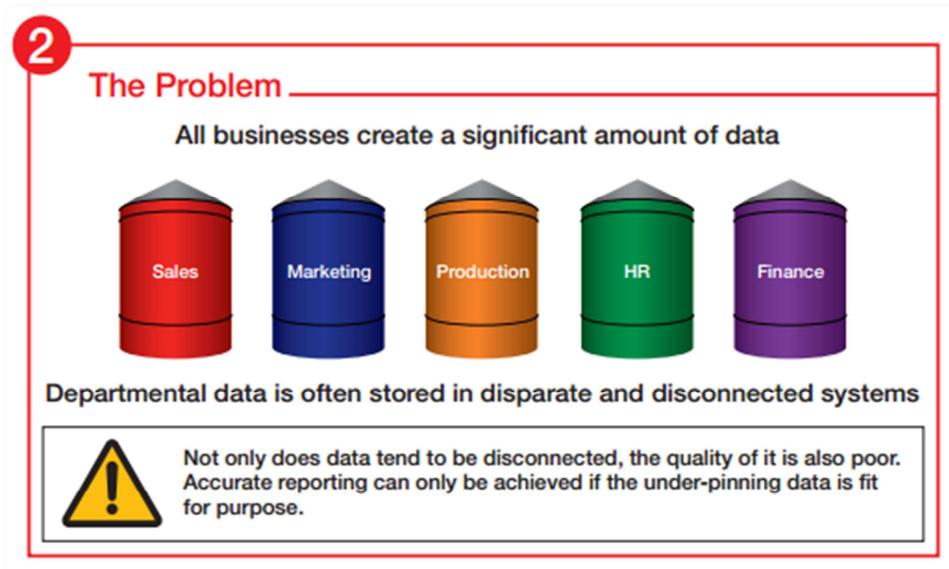


Fig: 3

If you look at how most businesses develop over time, it tends to be at a steady and evolutionary pace. As a result, data is generally created and stored at a departmental level, and more often than not it's generated by and stored using different technologies. As a result, data is rarely blended with other departmental data for the purpose of taking a holistic view of how the business is performing – not just in isolation, but compared with others within the same sector, geographical location or at the same stage of growth.

Typically, data is stored in databases such as SQL and Access, but it's also stored in Excel spreadsheets, text files and many other disparate systems that speak different languages and have their own particular limitations.

Business Intelligence or BI is about bringing together as many of these data streams as possible so as to provide meaningful insight which will help to identify hidden opportunities or threats that management can recognise and act upon.

This might sound like good common business sense, which of course it is, but up until about five years ago the cost of acquiring the technology to blend and transform data as described above was for the most part prohibitive.

One of the leading providers to bring this technology to the masses is Microsoft.

Business Intelligence (BI)

Transforming Raw Data into Meaningful & Useful Information

To understand the power of BI you need to be clear about the three key steps involved:

1. **Data Acquisition & Transformation** – The first stage is about finding and connecting to the data source(s). Typically these include databases, spreadsheets, text files, websites etc. Having connected to the data source(s) you may need to perform some transformation. This might be as simple as capitalising names or removing unwanted blanks or formatting dates. A more complex example might be to concatenate values such as joining first name to last name.
2. **Data Modelling** – Once the data has been transformed, it can be loaded into a data model whereby relationships can be established between the various data tables and measures defined that return scalar values such as gross profit £ or gross margin %.
3. **Data Visualisation** – Having built the data model you are now free to build visualisations, usually known as dashboards. Generally speaking, these will be in the form of either a pivot table or a graphical representation such as a bar, pie or column chart.

Utilise the software you are familiar with:



Excel's capability can be extended by utilising the various BI add-ins: Power Query, Power Pivot, Power View & Power Map.



Go mobile by downloading the Power BI app which is available for all mobile platforms.

The following information is not a definitive list of Microsoft's BI products but it provides an insight into the most common applications that are readily available.

Power Query is Microsoft's **Data Acquisition & Transformation** tool. It's an Excel add-in that can be used to extract data from many different data sources, clean, transform and aggregate that data, and finally load the results into a table on the worksheet or in the Excel Data Model. Each job or unit of work in Power Query is called a *query*.

Power Pivot is the **Data Modelling** tool, which is available as an add-in for Microsoft Excel 2010 and 2013 and enables you to import millions of rows of data from multiple data sources into a single Excel workbook, create relationships between heterogeneous data, and create calculated columns and measures using formulas.

Power View is a **Data Visualisation** feature of Microsoft Excel 2013, and of Microsoft SharePoint Server 2010 and 2013 (as part of the SQL Server 2012 Service Pack 1 Reporting Services Add-in for Microsoft SharePoint Server Enterprise Edition). Using Power View you can build a range of interactive visualisations that connect directly to the data model.

More recently Microsoft has launched a SaaS product called **Power BI**, which uses the same three BI steps described above. The Power BI product also makes it easier to share information with colleagues and publish it to a wide range of mobile devices.



Self-Service Business Intelligence:

The above term is now common since the technology became widely available. In the early days creating data models was the remit of the IT department, which meant the process was long-winded and costly. Now that Microsoft and the like have made this technology available at realistic prices, end-users can

generate their own data models and visualisations on the fly – this speeds up the decision-making process and reduces cost, hence the term ‘Self-Service BI’.

The Solution:

Develop a data-driven culture whereby everyone takes responsibility for the accurate collection and management of data.

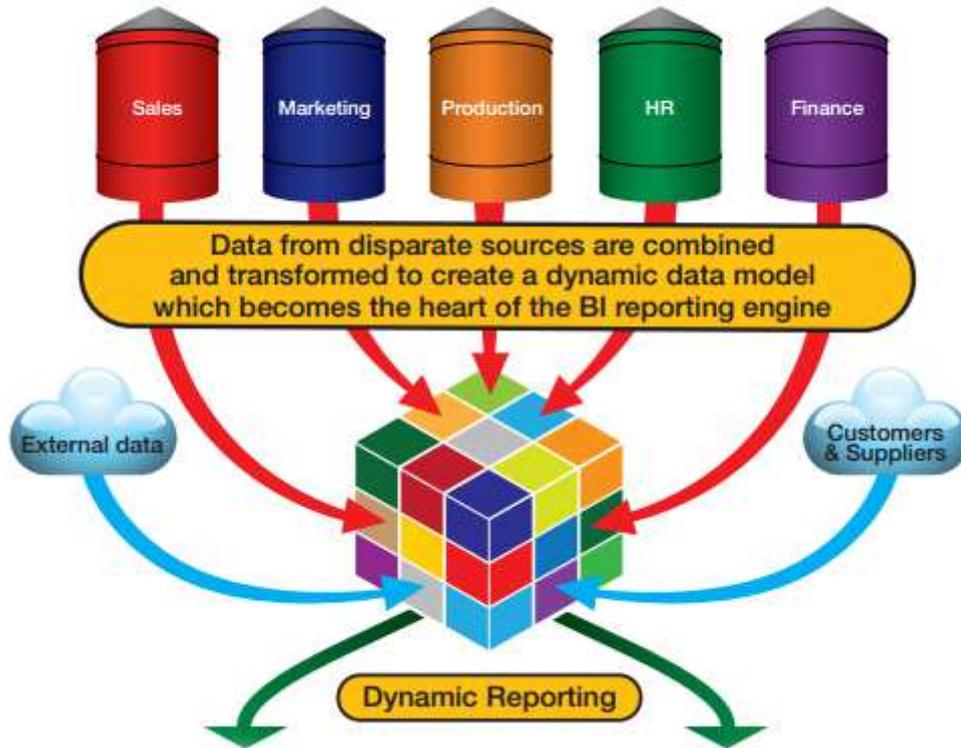


Fig: 4

The Benefits

- Reduces the burden and cost on IT departments
- Promotes ‘Self-Service’ Business Intelligence
- Encourages improvements across all departments
- Aids faster decision making
- Promotes a data centric culture
- Delivers tangible improvements

JCS Training provides a range of Business Intelligence training courses. These courses introduce the candidate to the Microsoft “Power” BI tools. These courses have three primary themes. Firstly, we cover a number of methods for importing data (from a database, text files, or other sources) into Excel. The primary emphasis is on Excel’s Power Query.

Moving forward we spend time on Excel Data Modelling and Power Pivot for analysing data within an Excel Power Pivot table. These take traditional pivot tables to a whole new level.

Finally we look at how Power View and Power Map can be used to create insightful and dynamic dashboards and maps.



For more information on any aspect of Business Intelligence or issues discussed above please get in touch using the contact details below.

Talk to us to find out how we can help your business

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