

**Erasmus School of Economics  
Econometric Institute**

**Introduction to Business Intelligence**  
The journey through the BI architecture from  
Raw Data to Fancy Reports and Dynamic Dashboards

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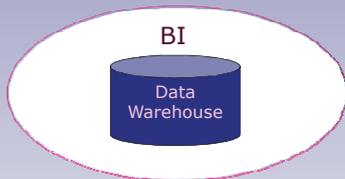
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**Introduction to Business Intelligence**  
The journey through the BI architecture from  
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**abstract**

- This seminar will introduce the BI architecture, from the very beginning showing systems components up to finally presenting business results and indicators using reports techniques. It is the journey of the raw data from source systems being transformed into relevant business information presented in a modern way on reports and dynamic dashboards. All BI-systems components will be briefly discussed, special attention is given to relevant aspects such modeling choices and user security. After the raw data is transformed and loaded into the data warehouse, a very important factor in BI success is the analyst's choice of reporting and measures, such as (key) result indicators, performance indicators and key performance indicators. Therefore indicators and reporting will receive a special attention during the seminar. Finally it will be presented a series of types of reports and best uses for graph types and dynamic dashboards.
- Key words: architecture, data warehouse, modeling, business indicators, reports, graphs, dynamic dashboards

**What is Business Intelligence?**



- "A data warehouse is a subject oriented, integrated, time variant, nonvolatile collection of data in support of management's decision-making process" Bill Inmon
- "A data warehouse is a copy of transactional data specifically structured for query and analysis" Ralph Kimball
- BI is the process of transforming data into usable information and knowledge 3

**Who uses BI?**

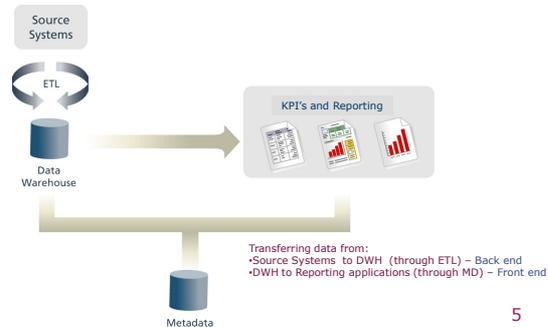


- Analytical Competitors use BI, they have lots of data, they organize it and put it in DWH. They integrate the data in areas of their business where it really matters.
- In domain where decisions must be made quickly or very often, BI will embed analysis into decisions systems.
- They make lots of money!
- They will lead us into the future!

Source: Davenport & Harris, 2007. Competing on Analytics: the new science of winning. Harvard. USA. 215p.

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**Introduction to Business Intelligence**  
General Architecture



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**sustainable business development**  
A general framework for sustainability evaluation  
and choice of business indicators

STEP	DESCRIPTION
1	Description of a business (example: production system)
2	Identification of EES issues (Economic, Ecologic, Social)
3	Choice of indicators
4	Measure sustainability indicators
5	Evaluation and monitoring

Source: Waltrick, B. 2003. Contribution of Holstein Cows to Sustainability of Dairy System in Brazil. PhD Thesis, Wageningen Universiteit, Nederland. p 184

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## Types of performance measures:

- Key result indicator (KRIs) tell you how you have done in a perspective or critical success factor
- Result indicator (RIs) tell you what you have done
- Performance indicators (PIs) tell you what to do
- KPIs tell you what to do to increase performance dramatically



Source: Parmenter, D. 2010. Key Performance Indicators: developing, implementing, and using winning KPIs. Wiley & Sons, Inc., Hoboken, New Jersey, 2nd ed., p 300. **7**

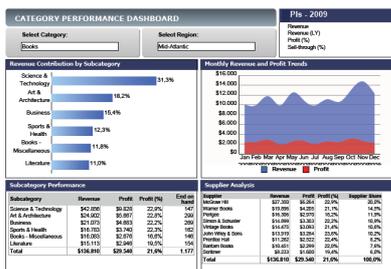
## Balanced Scorecard



Sources: KAPLAN & NORTON, 1996. The balanced Scorecard :Translating Strategy into Action. Boston : Harvard Business School press.  
PARMENTER, D. 2010. Key Performance Indicators: developing, implementing, and using winning KPIs. Wiley & Sons, Inc., Hoboken, New Jersey, 2nd ed., p 300. **8**

## Scorecards and Dashboards

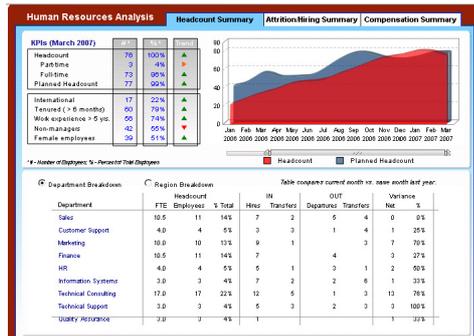
This dashboard evaluates category performance by region. It includes revenue and profitability details by subcategory and supplier.



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## Scorecards and Dashboards

Multiple Dashboards in a Single Document



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## Enterprise Reporting

Classic production and operational report that lists the sales cost and profit margins for various categories across different regions.

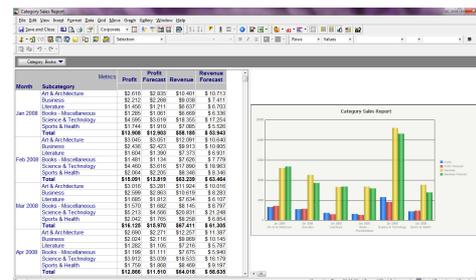
Category Sales and Profit Performance

Category	Sales				Profit			
	Revenue	Cost	Profit	Margin	Revenue	Cost	Profit	Margin
<b>Books</b>	\$2,798	\$754	\$2,044	73.2%	\$1,524	\$573	\$951	62.5%
<b>Business</b>	\$2,444	\$658	\$1,786	73.1%	\$1,022	\$361	\$661	57.4%
<b>Health</b>	\$3,114	\$841	\$2,273	73.0%	\$1,258	\$457	\$801	63.4%
<b>Technology</b>	\$4,328	\$1,054	\$3,274	75.7%	\$1,645	\$572	\$1,073	59.7%
<b>Total</b>	\$12,684	\$3,307	\$9,377	73.9%	\$4,449	\$1,563	\$2,886	64.6%

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## Slice and Dice Analysis

This report displays revenue and profit information by month for a particular category and subcategory. The category of interest is selected at the top



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### Advanced and Predictive Analysis

This dashboard analyzes certain demographic factors about each customer who are likely to churn (factors that determine the steady-state level of customers a business will support).

**Churn Risk Analysis by Demographics**

Spend by Region:

Region	Spend
South	\$120,000
North	\$100,000
Mid	\$80,000

Customer Scorecard for Felix Eckson:

Category	Value
Revenue	\$120,000
Profit	\$30,000
Churn Rate	15%
Customer Lifetime Value	\$1,200

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### Alerts and Proactive Notification

Reports can be designed to alert managers to business exceptions

### Inventory by Subcategory

Alert appears when certain business conditions are not met.

Alert: Inventory value reduced from previous month - monitor products for which inventory is falling below target.

SKU	Item Description	Units on Hand	Unit Cost	\$ on Hand	Months on Hand	Target	Excess
121	Microsoft Desk Mouse 1.5	22	\$38	\$836	41	0.3	1 (20)
122	Microsoft Natural Keyboard Elite V.2.0	6	\$44	\$264	42	0.3	(2)
123	New Media 64 MB Compact Flash	18	\$36	\$648	43	0.4	(3)
124	New Media 32 MB Compact Flash	19	\$146	\$2,774	22	0.9	(1)
125	New Media 32 MB Smart Media	14	\$71	\$1,004	42	0.5	(1)
126	3COM 56K Cellular Modem PC Card	5	\$141	\$705	21	0.2	(1)
127	3COM 56K Cellular Modem USB Modem	6	\$333	\$2,000	21	0.3	(1)
128	3COM 1600K CardBus	6	\$117	\$702	22	0.5	(1)
129	3COM Networking Kit	20	\$62	\$1,240	21	1.6	(1)
130	3COM Networking Kit	20	\$62	\$1,240	21	1.6	(1)
131	3COM Networking Kit	20	\$62	\$1,240	21	1.6	(1)
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### Advanced Visualizations

- Interactive Stacked Area Chart
- Interactive Bubble Plot

Region Display:

- Northeast
- Mid-Atlantic
- Southeast
- Central
- South
- Northwest
- Southwest
- Web

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### Advanced Visualizations: Single-Value Visualizations

- Gauge
- Thermometer
- Cylinder
- Time Series Slider

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### Best Uses for Graph Types

- Time series comparisons: Quarterly Trends
- Curved Lines

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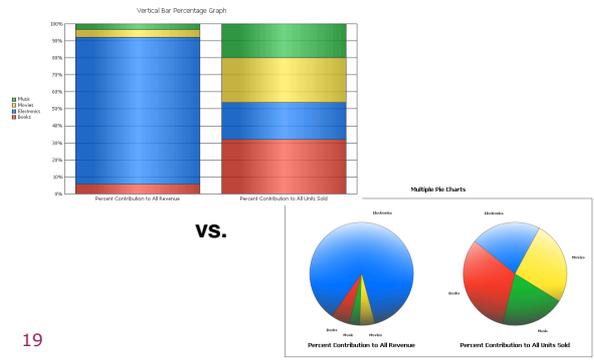
### Best Uses for Graph Types

- Frequency distribution: Histograms
- Targets and quota: Revenue vs Quota for Alert

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## Best Uses for Graph Types

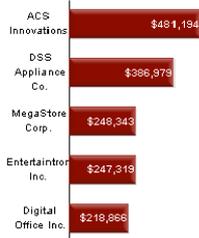
- Component comparisons for Components



## Best Uses for Graph Types

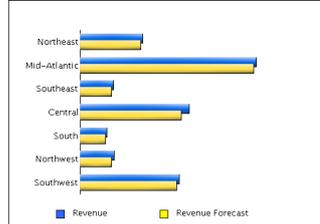
- Item comparisons:

### Top 5 Suppliers of Electronics



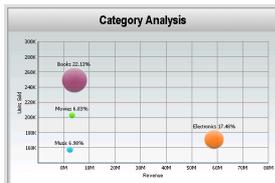
### Bevel Effects

#### Revenue vs. Forecast



## Best Uses for Graph Types

- Correlation comparisons:



### Gradients :

