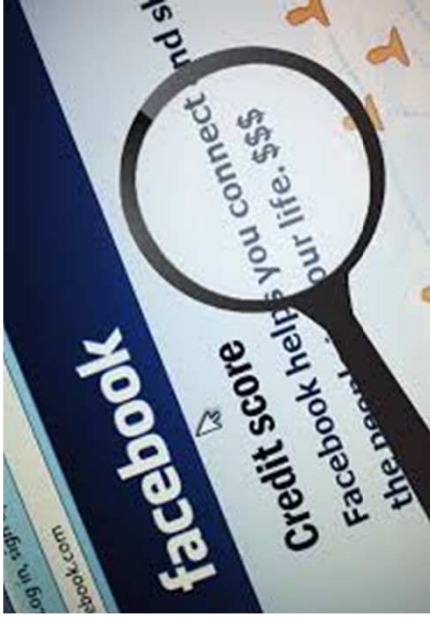


Big Data – Big Ethics

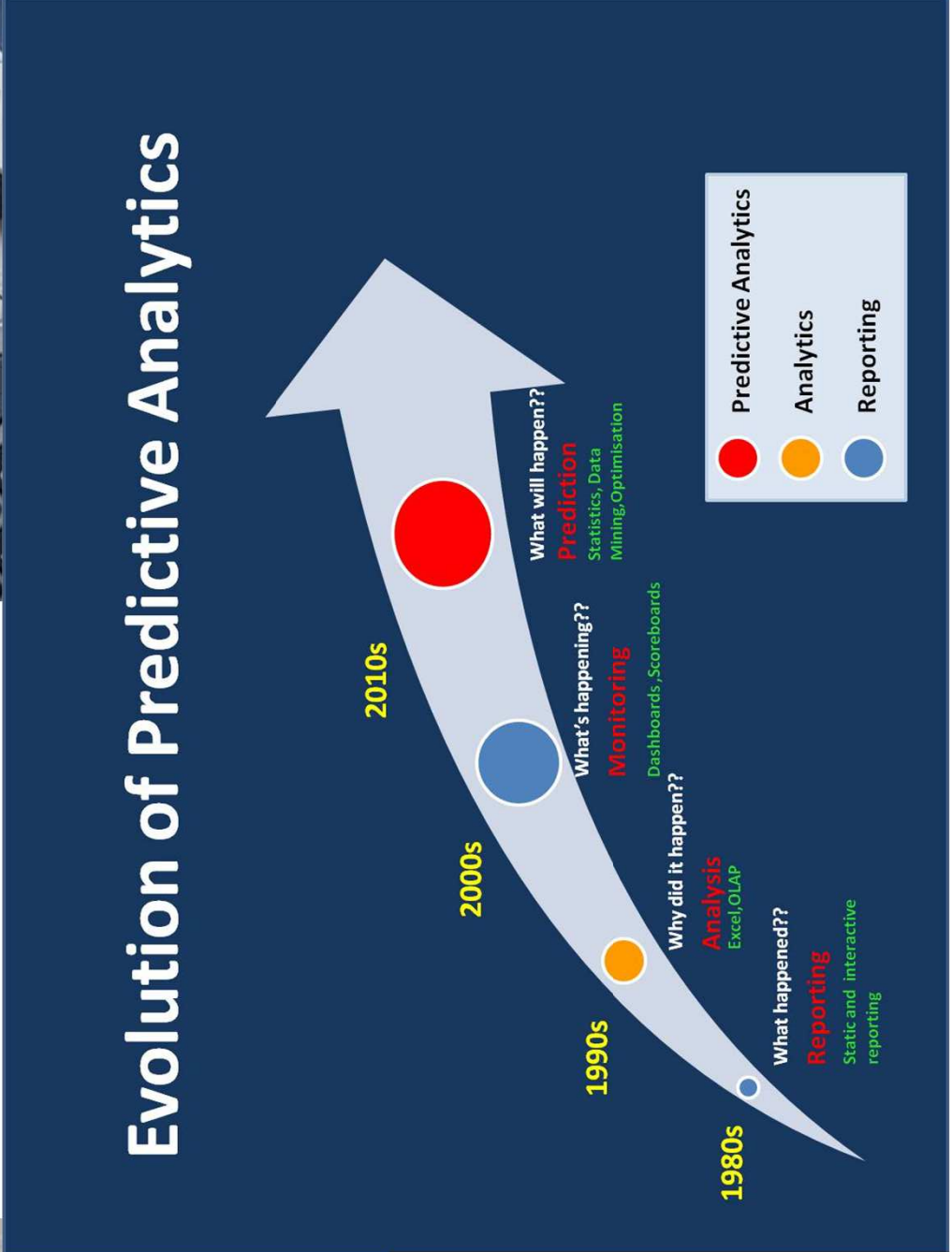
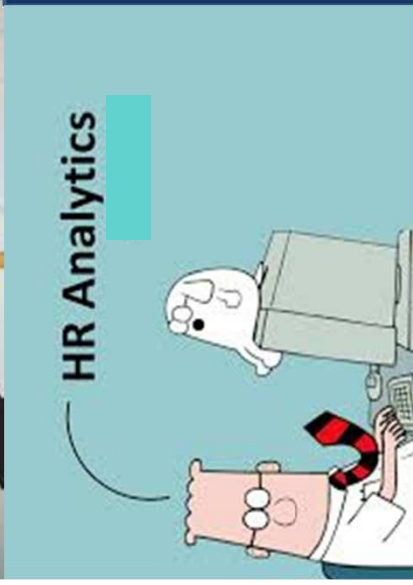
EDHEC Research Day

Geert Demuijnck & Björn FASTERLING

March 14, 2017

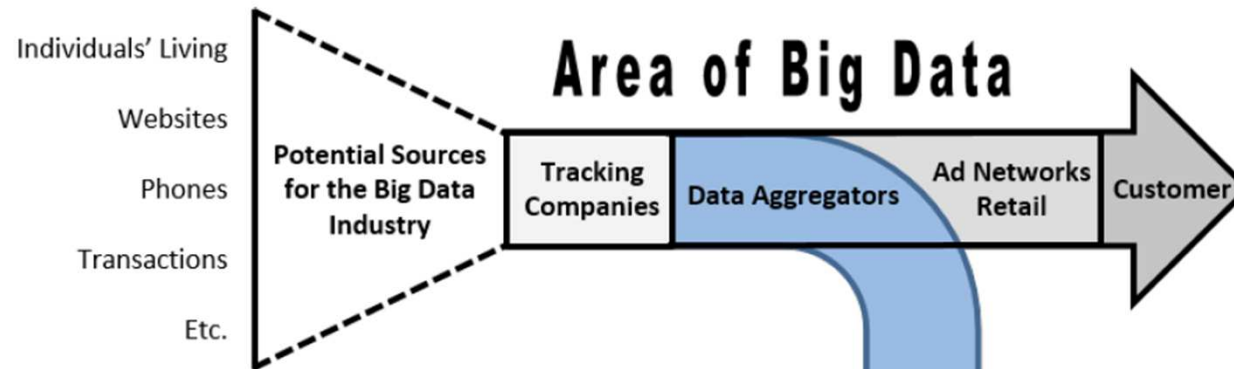


BIG DATA SCORING



The Big Data Industry's "Supply Chain"

Figure 1: Example of Information Supply Chain Within the Big Data Industry



What we are talking about:

- **High dimensional data sets with low-density information** content (that can be aggregated with high density, low dimensional data sets)
- Process consists of conducting **exploratory analyses** – inductive creation of models with **strong predictive capacities**
- **Process design, learning and error fixing is driven by customer demand**

Potential Uses of Big Data
Social Advertising
Hiring Decisions
Credit Decisions
Academic Research
Consumer Surveys

Figure from: Martin, K.E. (2015), "Ethical Issues in the Big Data Industry", *MIS Quarterly Executive* 14 (2), pp. 67-85.

Sources of error sources in the big data supply chain (examples)

- Protected Attributes are defined as observables
- Selection Bias
- Incorrect, obsolete data
- Sample size disparity (learning only occurs on majority classes)
- Patterns become invalid
- Aggregation problems (heterogeneity of sources, methods)
- Correlation/Causality
- Learning from the past doesn't mean predicting the future (*overfitting*)
- Label biases
- Concentration of errors in certain classes

Example: Being rationally unfair

Or: Turning the Past into Future
Amplification of bias and prejudice through systematic algorithmic « learning »

Examples of using big data to make complex predictions:

- predict crime or recidivism
- predict creditworthiness
- predict reliability of a future employee
- insurance premium computation

Take into account:

- **Nasty Feedback Loops**
- **Error correction and model adjustment is only driven by customer demand, and not to prevent or mitigate harm to individual people**



Data audits, impact assessments:

value-driven, routine verification, correction, and improvement of processes, in particular improved detection of discrimination and privacy violations (e.g. 'discrimination discovery', 'fairness-aware data-mining')

Research Questions:

- Technical feasibility, e.g. discrimination discovery, fairness-aware data mining, ...
- Legal solutions? (The REGULATION (EU) 2016/679 – General Data Protection Regulation, in force in May 2018, only contains few provisions regarding data/algorithm audits and risk management. See articles 24, 35, 40, 42.)
- Corporate responsibility of actors in the data supply chain, for example managerial responsibilities to conduct human rights due diligence according to the UNGP...