Bocconi

# MANAGEMENT IN THE DIGITAL ERA: BACON, COPERNICO OR GALILEO?

*with a focus on SMEs*

Conference:

Making the digital economy and society inclusive, open and secure

*Reggia di Venaria Reale, Venaria Reale (To)*


Università Bocconi
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The Invernizzi Center for Research on Innovation, Organization and Strategy

**Alfonso Gambardella**
alfonso.gambardella@unibocconi.it


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# Why management?

**Management matters, especially in the digital era**

- Differences in managerial practices explain sizable difference in productivity across firms
- Good managerial practices
  - increase the productivity of IT investments
  - facilitates data-driven decision making, which raises performance
- *(Bloom & Van Reenen, 2007; Bryonjolfsson & McElheran, 2016a and 2016b)*

# What data can do

**Two main areas of advances of artificial intelligence**

— Perception: voice & visual recognition

— Cognition & problem-solving:

- Amazon's system produce recommendations for customers
- Palantir's algorithm prioritized areas of interventions after Hurricane Sandy in NYC
- Bridgestone predicted best allocation of 22k employee retail location to cope with peak demand
- *Main applications: marketing, operations, production*

*More data have been created in the past two years than in the entire previous history of the human race (Forbes, 2015)*

# SME

**Higher relative benefits for SMEs**

- Power to use & elaborate data does not require large capital stock
- Publicly available NASA 185x185km maps of the entire earth
  - doubled the rate of significant gold discoveries
  - disproprotionately by smaller firms
  - *(Nagaraj, 2017)*

*SME can rent algorithms from the cloud, machines can learn from few data*

# What data cannot do

**The superiority of ... the human manager**

- Questions: *«Machines can only give you answers»* (Picasso)
- Biases: machines embody and perpetuate biases of the programmer
- Generalizations: humans recognize a tree from its abstract notion
- Causality: cannot improve growth of your startup by shortening its name (see box)

*Guzman & Stern (2016) predict 69% of the top 1% growth startups in 15 US States using as predictor, among other things, the letters in the firm's name*

# Bacon, Copernico

**Explain the world as it is versus imagine how it could be**

— Lego:
  - Data predicted that boys like lego bricks much more than girls, indeed 85% of kids playing lego are boys
  - CEO Knudstrop insisted that they had not understood how to get girls play with lego: Invented Lego Friends in 2012

— Business analytics: makes firms **more efficient in managing the world as it is** (more efficient operations, finds ideal customer targets for your product)

— Manager's imagination: enables the firm to **imagine new ways of doing things** (for which there is no past data)

— *(Martin & Golsby-Smith, 2017)*

*Innovation vs more efficient operations*

# Galileo

**A scientific/experimental approach to managerial decisions**

— For innovation, managers have to develop theories and run experiments

- Innovation does not start with data, but theories
- Test your theory (with data, whether big or small)
- Try to falsify them (to overcome biases – confirmatory etc.)
- Pivot to new theory/idea if the old one proves to be false (experimentation)

*The Galilean manager starts with a theory like Copernico and unlike Bacon, but unlike Copernico, and like Bacon, checks her theory against data*

# The Bocconi startup experiment

**116 start-ups followed for 12 months (Camuffo et al. , 2017)**

- Treated group (59): taught to develop and test theories about their business idea
- Control group (57): follow their own approach
- Treated firms:
  - Fail at the same rate
  - Pivot more to a new business idea
  - Exhibit higher performance

- *Design Thinking (Brown, 2008)*
- *Discovery by design (McGrath & McMillan, 2009)*
- *Lean start-up (Ries, 2011)*

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# An example from the Bocconi experiment

**Original business idea: *develop an algorithm to search online for the right supplier of a personal cosmetic service***

CONTROL STARTUP

- Asks family and friends
- No metrics for rejection (confirmatory biases)
- Keeps with the original idea, no pivot

TREATED STARTUP

- Develops 3 hp: Customers ...
  - change supplier frequently
  - search for supplier online
  - finds online all info to make a choice
- Tests hp setting threshold for rejection: 60%
- Picks real users as sample
- Pivots to online consulting service
- Tests email or chat delivery setting higher bar for chat

# What competences do firms need?

**SME in particular**

- Technical business analytics skills: how to run computers with big (and smaller) datasets: **technical data science skills**
- Managerial creativity: to **ask the right questions** and unleash imagination to see the world as it could be
- Managerial scientific method: to **make decisions** using theories, understand how to use data to test the theories, understand and imagine when, where and how to pivot – a scientific/experimental approach

You can teach (1) and (3), and encourage (2)

# Two (provocative?) policy proposals

**Use the potential of digital to make digital open and inclusive**

— Demand policy: make public data openly available for services
  - E.g. in Italy acts of civil trials are digital: easy to create a service that predicts outcome of trials (big savings in costs and time of justice)

— Disrupt the training business: *Encourage* consulting firms, universities, expert firms, to produce mass online open courses on the technical and managerial competences for digital
  - Encourage? Has to be figured out (Support? Diffusion? Else?)
  - In competition? Demand will choose what course to follow
  - Use data to test the most effective courses/tools, including innovations – a new «objective» way of making evaluations

# THANKS.

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Università Commerciale Luigi Bocconi
Via Sarfatti 25 | 20136 Milano – Italia | Tel +39 02 5836.1

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