

This is 2015. Things change.

Digital Business is the goal, and not a description of the problem.

Dr. Ashwin Ittoo
HEC-ULg

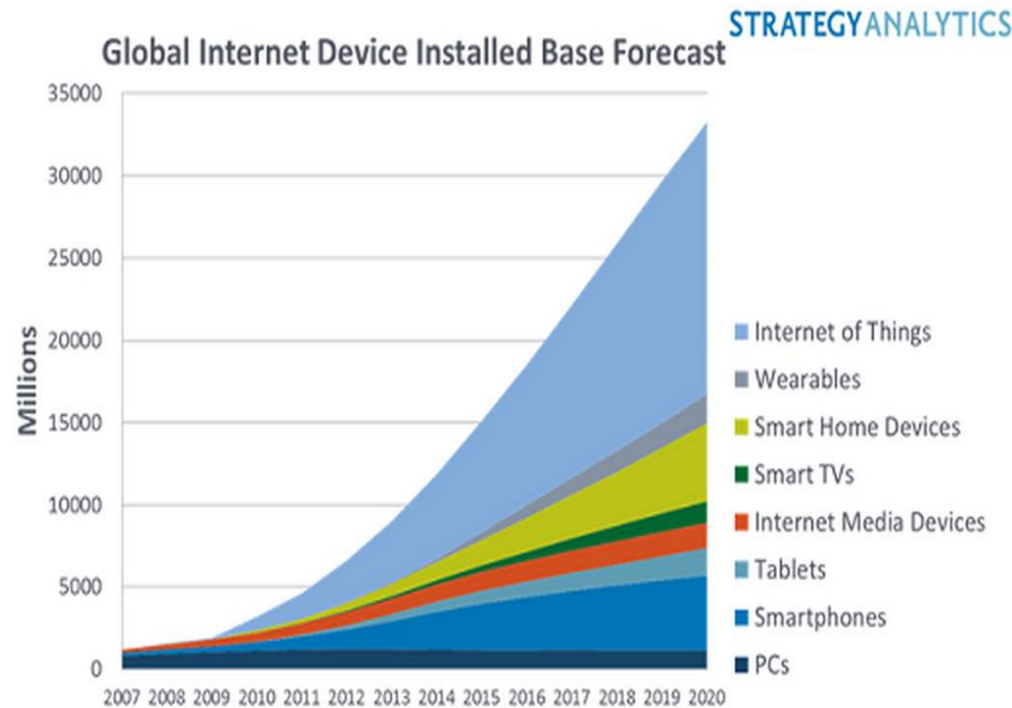
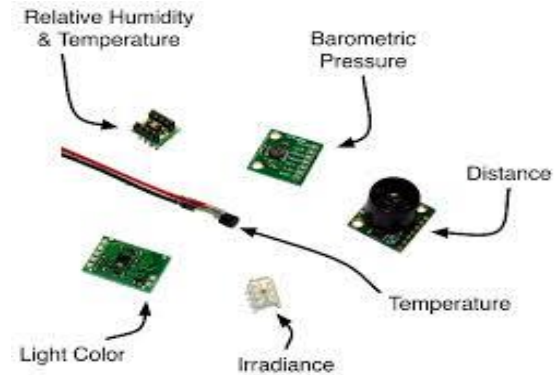
Presentation Overview

1. Digital Technologies for Prayon
2. Digitalization and the Rise and Fall of Empires
3. Lessons Learnt / Take-home Message

Internet of Things (IoT)

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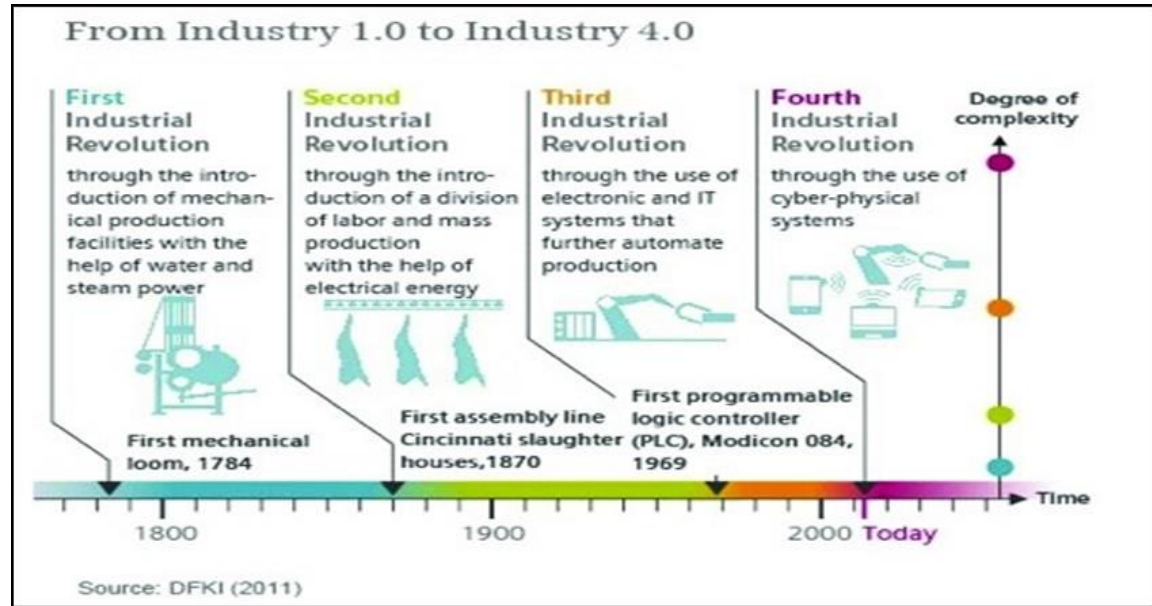
- Sensors, microchips embedded in everything
 - Products, raw materials, machines, ...
- ***Digital voice*** to passive objects
 - Sense, interpret environment
 - Communicate status
- ***IOT***: Network of interconnected devices
- Strategy Analytics survey
 - 35 billion connected devices by 2020
- Whole plethora of devices
 - Sprinkler systems, fridges, cars, ...



Source: Strategy Analytics, October 2014

IoT Applications – Discrete Manufacturing

- Industry 4.0
- Smart social machines



- Trumatic 6000 Punch-Laser
 - Independent operation, unmanned shifts
 - Sends completed orders to ERP
 - Detects, removes jammed parts
 - Stop faulty production
 - Email line manager



IoT Applications – Process Manufacturing

- **Applications in Chemical Industry**

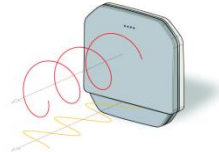
- Informed Manufacturing

- Autonomous (smart, social) machines
- Manage complexities in production lines
- Energy management and resource optimization



- Predictive Maintenance

- Remote monitoring and management of critical assets
- Assess performance data via sensors
- Predict malfunctions, maintenance



- Logistics

- RFID tags embedded in products, transportation assets
- Tracking and tracing → minimize loss, theft
- Detect extreme environmental fluctuations (perishable, chemical goods)

IoT Applications – New Business Models

- Disruptive potential of IOT → Enabler of new **Business Models (BM)**
- Adoption of BM by Prayon → Competitive advantage
- BM for Prayon
 - Generates revenue streams via innovative **services**
 - Prayon as a **service-provider**
- Illustration in farming/fertilizer (agricultural) domain

IoT Applications – Service Provider

- Mrs. Bardot
 - Farmer in Hannut
 - Owns 15 greenhouses
- Ambient temperature in greenhouse_1?
 - Physical visit, manual measures
- Drawbacks
 - Time-consuming, inefficient
 - Error-prone (measurement errors)
 - Real-time data difficult to get
- Manual greenhouse management problems = Market Opportunity for Prayon
- How to tap market opportunity?
 - 2 possible models
 - Service Model 1, Service Model 2



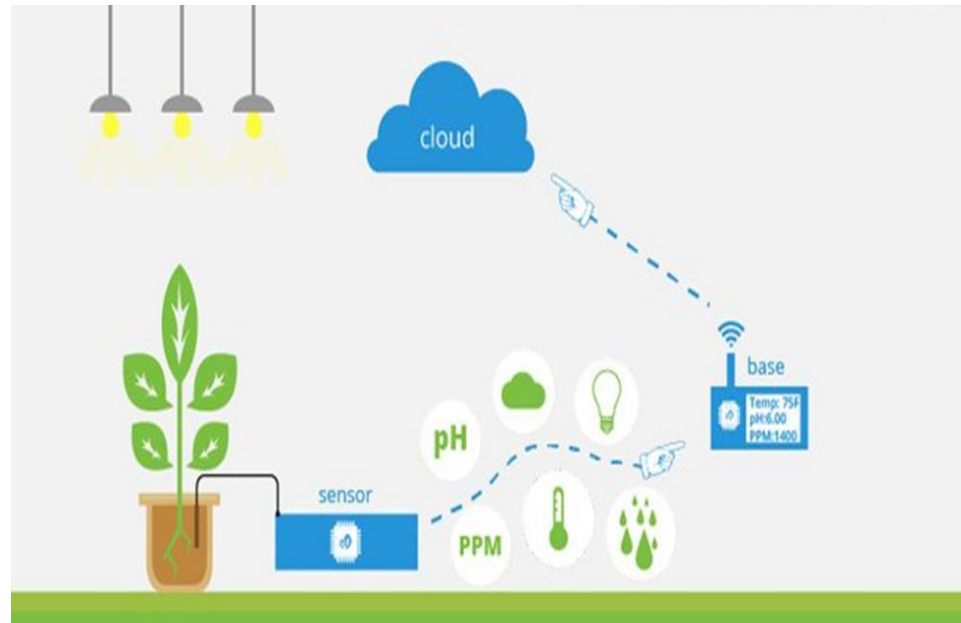
IoT Applications – Service Model

- **Model 1:** Prayon offers **Advanced Monitoring Services**
- Prayon in contract with farmers, greenhouse owners
- Greenhouses equipped with sensors, microchips
 - Measure relevant data
 - Temperature, humidity, lighting, fertilizer and water flow, ...
- Data uploaded in the “Cloud”
 - Any Cloud computing provider (e.g. Amazon)
- Data monitored by Prayon experts or outsourced
- Extreme conditions, fluctuations
 - Alarm raised
 - SMS sent to experts, farmers



IoT Applications – Service Model (cont)

- Remote evaluation, controlling of greenhouse parameters
 - Watering of crops
 - Application of fertilizers
 - Adjustment lighting, temperature, moisture levels



- Main benefits
 - Less wastage of water, fertilizers; 70% of water savings → Less harmful to environment
 - Sweeter fruits, more Vit. C with “smart” IoT-enabled irrigation systems

IoT Applications – Service Model

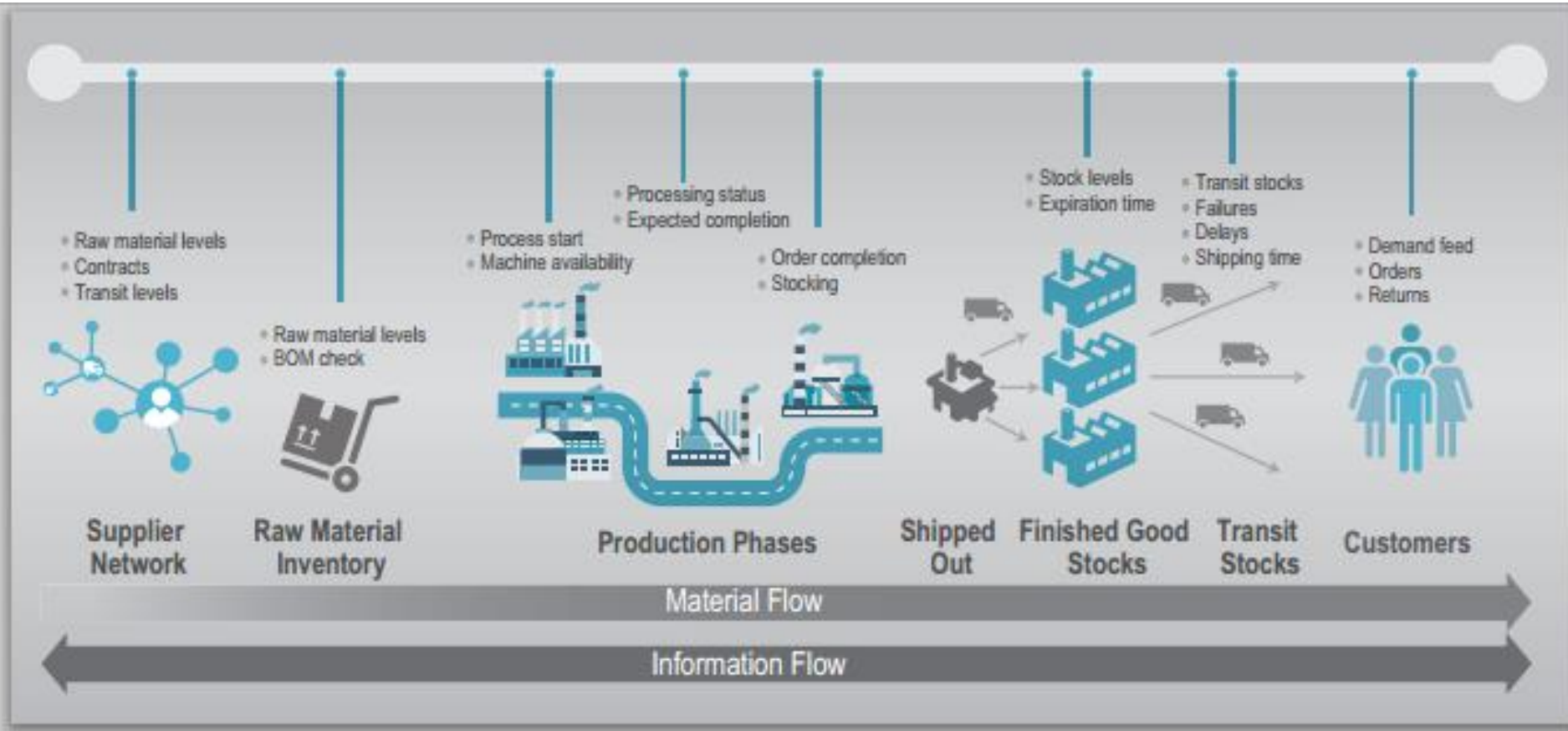
- **Model 2:** Prayon offers **Advisory Services**
- Greenhouses equipped with sensors, microchips
 - Measure relevant data (Temperature, humidity, lighting, fertilizer and water flow, ...)
- Data uploaded in the “Cloud”
- Data analyzed by Prayon experts
 - Recommend fertilizers to farmers based on greenhouse characteristics
 - Develop new, “personalized” fertilizers, adapted to specific greenhouses
- **Revenues for Models 1, 2?**
- Basic subscription fees
 - Simple greenhouse data reporting
- Additional fees for premium services
 - Greenhouse monitoring, controlling
 - Advisory and recommendation services

IoT Applications – Precision Farming

- IoT + farming convergence = *precision farming*
- Several initiatives worldwide
- Libelium
 - Manage Spanish vineyards (Rias Baixas region)
 - 20% fertilizer reduction; 15% growth improvement
- Ola Smarts
 - Automated irrigation systems; reduce water wastage
- 365FarmNet EU Consortium
 - CLAAS KGaA, AMAZONE H. Dreyer GmbH (agri manufacturers)
 - KWS SAAT AG (seed producer)
 - EU's global navigation satellite system
 - Online Marketplace for farming information
 - Farmers purchase GPS, diagnostic, crop, fertilizer data
 - Data used for generating crop plans



Smart Supply Chains



IoT Enablers



Value Chain



Benefits



Social Media Networks

Social Media – Agri/Pharmaco-Vigilance

- Prayon exploiting social media networks for *agri-vigilance*
- *Agri-vigilance?*
- Pharmco-vigilance analogy
 - Activities, procedures pharma companies
 - Detect, assess, prevent *Adverse Drug Reactions (ADR)*
- ADR, pharmaco-vigilance high priority for pharma companies
 - Social: well-being of patients
 - Economic: ADR financial burden on health services
 - Brand/reputation management: ADR among largest cause of mortality in some countries; bad publicity for pharma companies
 - Regulatory pressures

Social Media – Pharmaco-Vigilance

- Netizens engaging on drugs, health, therapeutic issues
- Online medium: blogs, forums, Facebook pages, Twitter, ...
- Reporting of ADR
 - Medwatch: <https://www.accessdata.fda.gov/scripts/medwatch/>
 - YellowCardScheme: <https://yellowcard.mhra.gov.uk/the-yellow-card-scheme/>
 - MedEffect: <http://www.hc-sc.gc.ca/dhp-mps/medeff/index-eng.php>



CroydonGeorge > derek76 • 9 months ago

★2 Thanks for uploading this article; most interesting.

I'm becoming more inclined to think that AF is something that doctors and cardiologists struggle to treat. It seems that a "suck it and see" approach is the best we can hope for.

Some of the drugs, such as Bisoprolol (beta blocker) cause much worse side effects than AF. I've been on Tildiem300, Digoxin, Bisoprolol, Ramipril (for BP) and I doubt if any of them do me any good. I've had AF for over 7 years and am now reconciled to the fact that it will keep bothering me whatever drug is tried. Warfarin is the only medication that I trust to stop the chance of a blood clot and thus a stroke. I do NOT like having to keep adjusting the dosage but will put up with that; the rest of the drugs is another matter. I've recently stopped bothering with statins; this is something that only benefits the drug dealers, err ...pharmaceutical companies in my view.

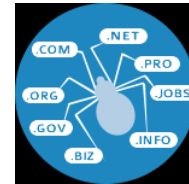
Social Media – Pharmaco-Vigilance (cont)

- Social media networks evolving into huge, valuable ADR repository
- Pharma companies mining social networks for ADR information
- Lack of proactive pharmaco-vigilance
 - Recall of drugs
 - Damaged reputation
 - Loss of market shares
 - Collapse
 - (Pfizer's Bextra drug; Merck's Vioxx)

Social Media – Agri-Vigilance Architecture



“phosphate fertilizer contaminated plants with fungi”



Web Crawler



PRAYON



“phosphate fertilizer contaminated plants with fungi”



Natural Language Processing (NLP)

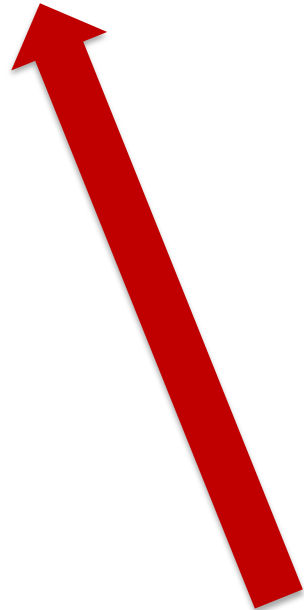


Information Nuggets:

contaminate(phosphate, plant, fungi)



QA
Product Dev.
R&D
Marketing



Better quality products



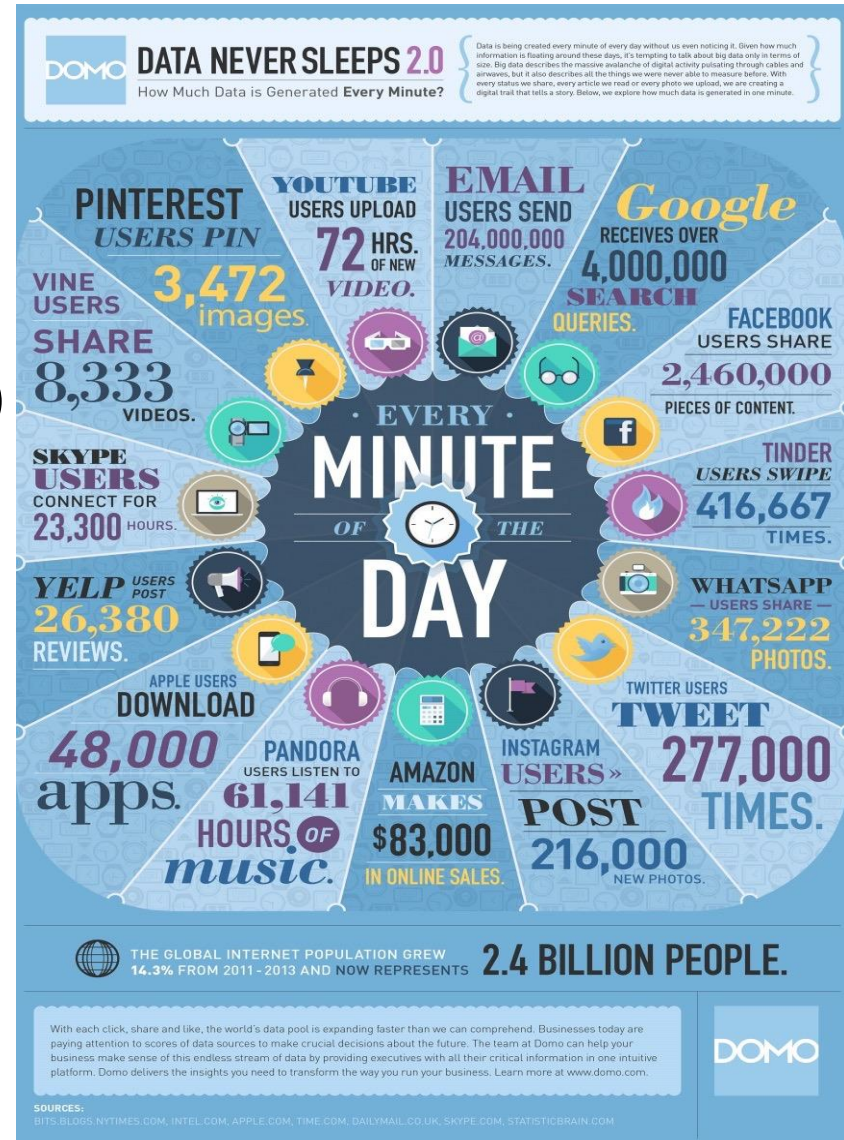
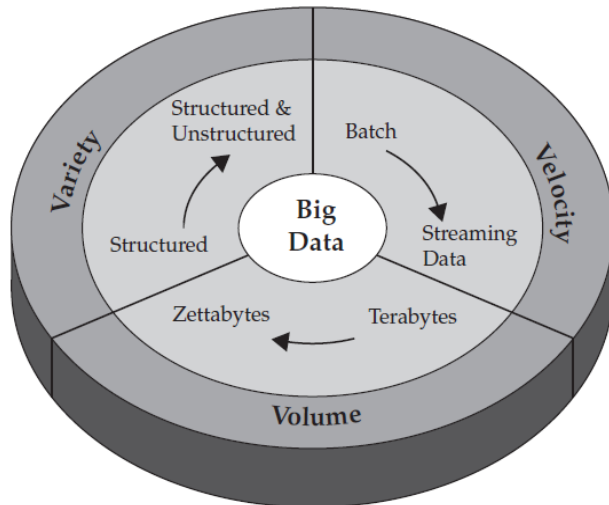
Social Media – Agri-Vigilance (cont)

- Proactive agri-vigilance
 - Costs less than regulatory fines (if any)
 - Improve product quality (fertilizers, food additives)
 - Alleviate safety issues
 - Conveys sense of responsibility; higher trust
 - Better equipped to handle future issues

Big Data & Analytics

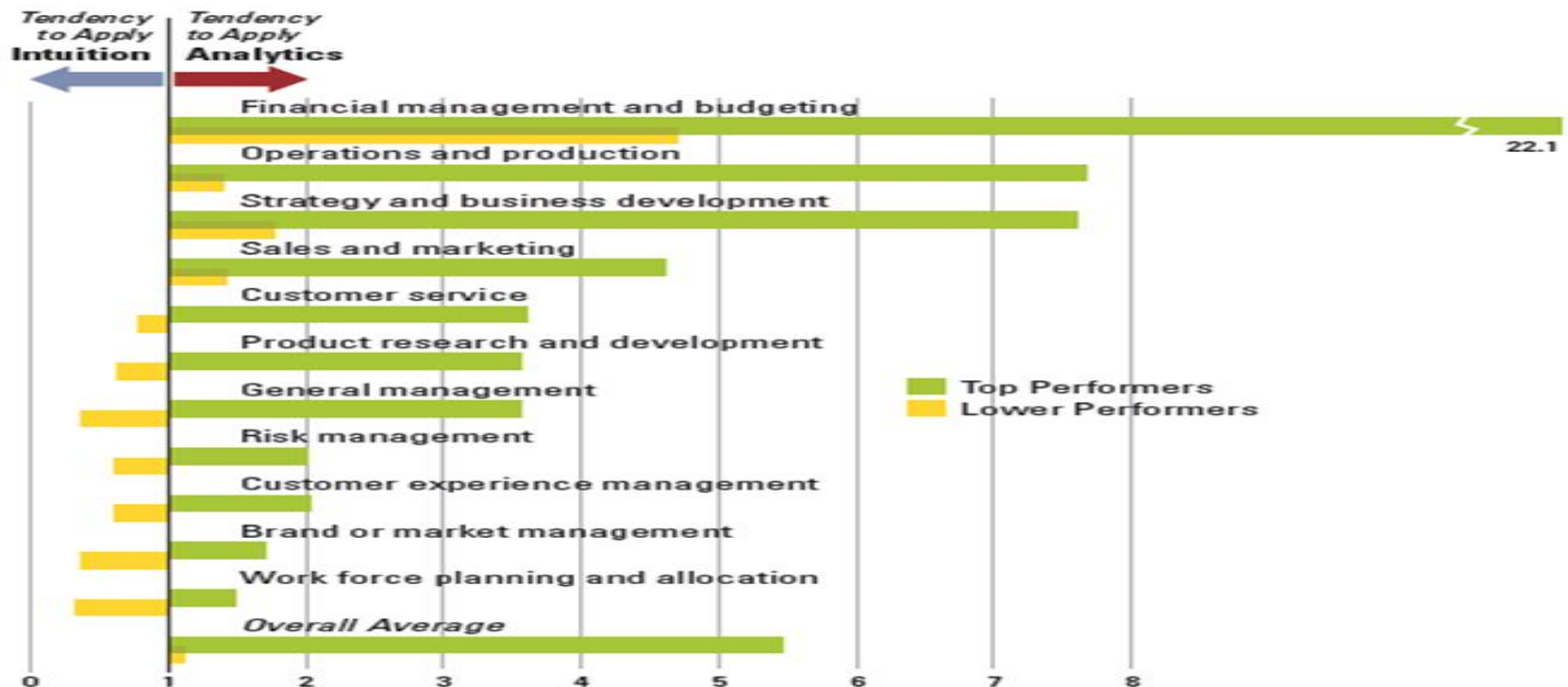
- Smart devices (IoT), social networks
 - Huge data Volumes,
 - High Velocity
 - High Variety
 - (Sensors: numeric, Social networks: text)

- 3Vs: Big Data



Big Data & Analytics (cont)

- Big data no inherent value, dormant asset
- Analytics to maximize data asset utility, value
 - Discover meaningful nuggets from data repositories
 - Insights to augment BI, support data-driven decision-making
- Data trumps intuition
 - Top-Performers 5 times more likely to employ analytics (MIT Report)



Rise and Fall of Business Models

- Previous slides: Digital tech (IoT, social media) applications → Operational perspective
- Subsequent slides: Strategic perspective
- Digital technology
 1. Threat



2. Opportunity



Digitalization Threat

- Music, offline print (newspapers) classic examples
- Case of HMV: Leading music store (1990s-early 2000s)
- Business Model: Bulk sales CDs, DVDs, games
 - More sales → more profits → more physical shops (“brick-and-mortar”)
 - 300 stores worldwide, £1 billion valuation



- Failure to recognize digital music threat
 - Available immediately
 - Streamed anywhere (mobile phones)
 - Can be shared
 - Much lower (even 0) distribution costs

• *“I don't ever see them (online retailers, downloadable music) as being a real threat. Downloadable music is just a fad ...”* S.Knott, ex-MD

- Overtaken by technology
- Last store closed down in 2014



Digitalization Opportunity

- New market entrants
- Business Model based on digital tech



- Characteristics
 - Valued at > \$10 billion
 - No real operating income
 - Smaller than established players (Uber vs. transport companies, AirBnB vs hotel chains)
 - Core strength in digital disruption

Digitalization Opportunity - Uber

- Transport business?
- Strictly speaking...no
 - No cabs, drivers ownership
- Intermediary
 - Matches driver/car to customer
 - Receives commission
- Business model more akin to tech company
 - Not transport company



dreamstime.com

Digitalization Opportunity – Uber (cont)

Uber strategy

- Identified opportunity
 - Customer frustration with cabs
 - Customers willing to pay premium prices
- Realized “technological incompetence” of existing players
- Realized smartphones, apps ubiquity
- Exploited digital tech
 - Challenge transportation industry



Digitalization Lessons Learnt

- Dominant market players vulnerable to digitalization
 - Feeling of invincibility, arrogance, ignore digital tech
 - Lack of investment in digital tech, initiatives
- Scaling is less important than before
 - Digital news, music easy replication
- Common behavior to digital tech threat
 - Ignore tech, hope of hype fading away
 - Find flaws, reasons to resist adoption
 - Attempt synergies between digital tech and existing products...
 - But often too late!

Conclusion

- Digital disruption, 4th Industrial revolution happening **NOW**
- New business models
- Obsolescence of established business models
- Avoid **dominant-player behavior**
 - Feeling of invincibility, arrogance
 - Ignore tech, hope of hype fading away
 - Find flaws, reasons to resist adoption
 - Attempt synergies between digital tech and existing products...
 - But often too late!

“Today, your cell phone has more computer power than all of NASA back in 1969, when it placed two astronauts on the moon. Video games, which consume enormous amounts of computer power to simulate 3-D situations, use more computer power than mainframe computers of the previous decade. The Sony PlayStation of today, which costs \$300, has the power of a military supercomputer of 1997, which cost millions of dollars.”

Michio Kaku, *The Future of the Mind: The Scientific Quest to Understand, Enhance, and Empower the Mind*

Thank You

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INDUSTRY CHALLENGE

Potential benefits of digitalization

GLOBALIZATION

- Ability to adjust more quickly and accurately to manufacturing and supply chain issues
- Real-time access to subject matter experts across the enterprise
- Optimized supply chain
- Integration of transactions (production, distribution, customers)

STRICTER REGULATORY ENVIRONMENT

- Excel in safety
- Environmental compliance and monitoring improvements across the enterprise
- Track and trace capability
- Document management and access

MAJOR STRUCTURAL SHIFTS IN INDUSTRY SEGMENTS

- Ability to redirect strategy and capital allocation across business units and product lines with agility
- Increased M&A, joint venture and divestiture activity
- Greater focus on margin, customer innovation and market differentiation in non-commodity
- Improved efficiency and productivity in commodity

CUSTOMER INTIMACY/ CONNECTIONS

- Predictive analytics capability
- Optimized inventory management
- Improved downstream insights
- New product development and services insights
- Customer sentiment awareness capability

CAPITAL PROJECTS AND OPERATIONS

- Leverage expertise across multiple projects and geographies
- Analytics for equipment failure prevention
- Allow more centralization of design and monitoring functions
- Operational capability maturity analysis and improvement

VOLATILITY

- Incorporate trading and risk in core business
- Manage inventories
- Understanding changing customer needs
- Policy shifts
- Major event monitoring

Digital transformation can turn industry challenges into real business value

IoT Eliminating Checkpoints/Bottlenecks

