➢Transformative Context
➢Disruptive Technologies
➢The Future of Business
➢Future of Work Skills & Management Challenges

The Future of Business

- ➤ **60 Chapters**

- ➤ **62 Contributors from 21 countries**

- ➤ **Critical insights into a rapidly changing world**

- ➤ **Project completed in 19 weeks**

- ➤ **Bringing "exponential thinking" to publishing**

- ➤ **www.fastfuturepublishing.com**
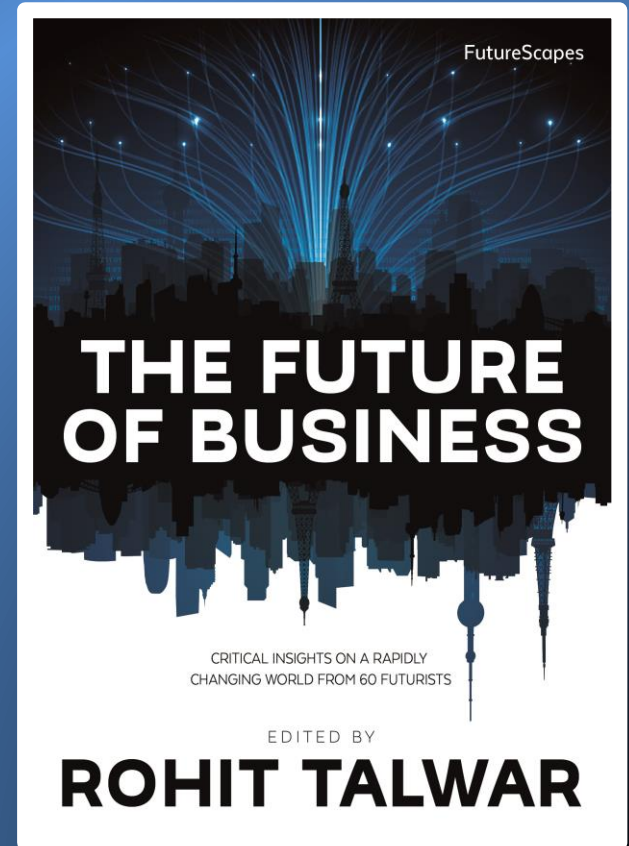
FutureScapes

THE FUTURE OF BUSINESS

CRITICAL INSIGHTS ON A RAPIDLY CHANGING WORLD FROM 60 FUTURISTS

EDITED BY

ROHIT TALWAR

The Future of Business

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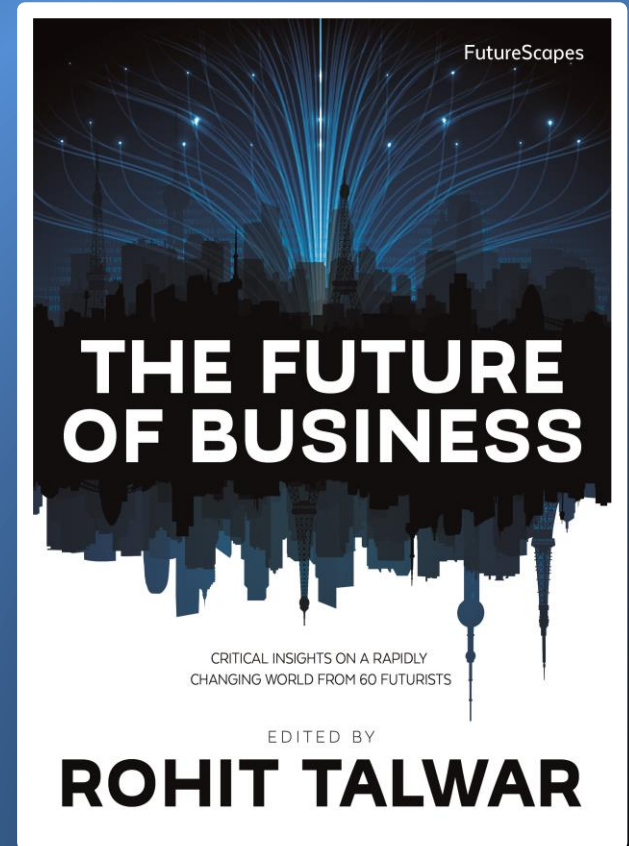
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publishing

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Exponential Organisations

Moore's Law – exponentiality in the physical world as well as in computing

'Future Proofed' Organisations Work on 3 Horizons in Parallel

1-12 Months

Operational Excellence

1-3 Years

Search for Growth

4-10+ Years

Creating the Future

10 Key Disruptions Shaping the Global Business Environment, Driving Change, Creating Opportunity

1. **Shift from Physical to Digital Mindsets**
2. **Exponential Science and Technology Developments – e.g. Internet of Things, Big Data, Artificial Intelligence and Robotics**
3. **Linear Versus Exponential Business Thinking**
4. **Human Versus Machine**
5. **Potential for Major Shifts in Employment Patterns**
6. **'Financial Stress' Driving New Economic Thinking**
7. **Migration from Central Control to Distributed - Digital Currencies, Blockchain and CryptoContracts**
8. **New Industries are Emerging**
9. **Desire for Trust and Transparency**
10. **Social Structures and Political Governance Models at the Crossroads**

Disruptive Technologies

A Possibility Explosion from Exponential Science and Technology Developments

3D / 4D Printing

Nanotechnology / Atomically Precise Manufacturing

Artificial Intelligence / Conscious Technology

New Computing Architectures

Food Chain Transformation

Hyperconnected Internet of Humanity

Energy Innovation

Robotics / Drones

Immersivity / Mixed Reality Living

Brain Uploading

Healthcare Transformation

Human Augmentation

Synthetic Biology

Blockchain Technology

What's Next in ICT? We can Anticipate at Least 60% of the Technology Timeline
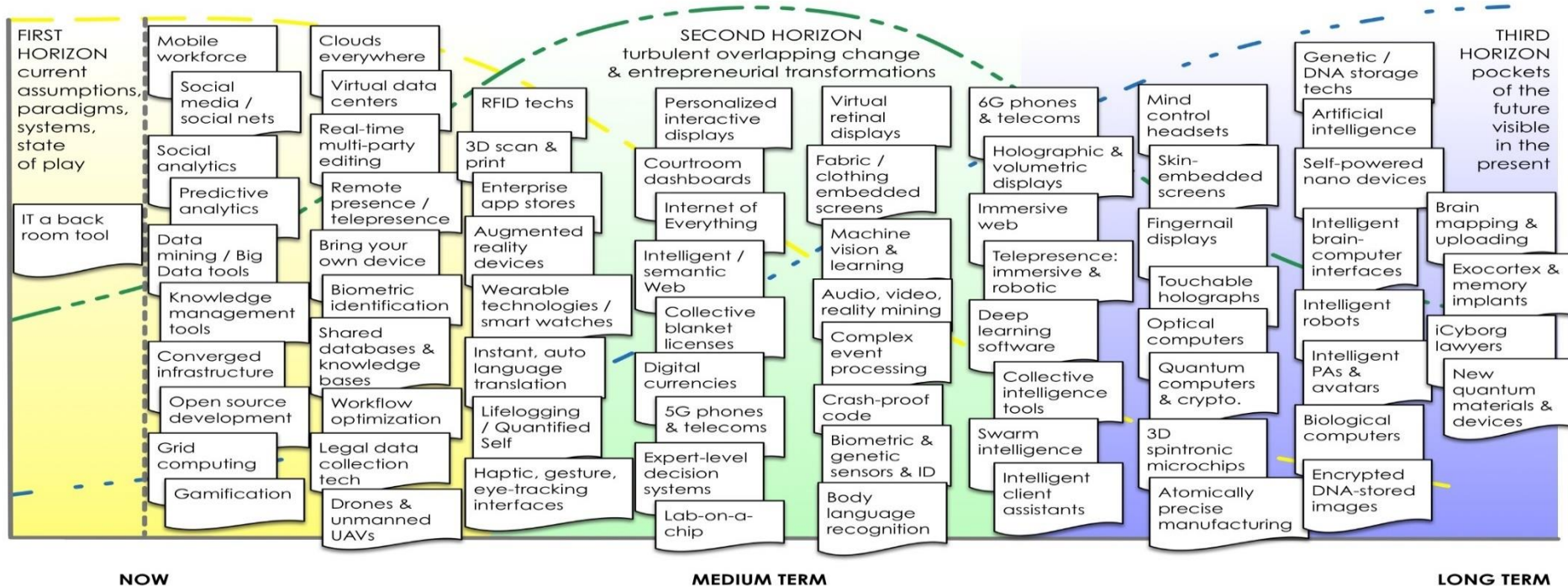

FIRST HORIZON current assumptions, paradigms, systems, state of play

IT a back room tool

Mobile workforce
Social media / social nets
Social analytics
Predictive analytics
Data mining / Big Data tools
Knowledge management tools
Converged infrastructure
Open source development
Grid computing
Gamification

Clouds everywhere
Virtual data centers
Real-time multi-party editing
Remote presence / telepresence
Bring your own device
Biometric identification
Shared databases & knowledge bases
Workflow optimization
Legal data collection tech
Drones & unmanned UAVs

RFID techs
3D scan & print
Enterprise app stores
Augmented reality devices
Wearable technologies / smart watches
Instant, auto language translation
Lifelogging / Quantified Self
Haptic, gesture, eye-tracking interfaces

SECOND HORIZON turbulent overlapping change & entrepreneurial transformations

Personalized interactive displays
Courtroom dashboards
Internet of Everything
Intelligent / semantic Web
Collective blanket licenses
Digital currencies
5G phones & telecoms
Expert-level decision systems
Lab-on-a-chip

Virtual retinal displays
Fabric / clothing embedded screens
Machine vision & learning
Audio, video, reality mining
Complex event processing
Crash-proof code
Biometric & genetic sensors & ID
Body language recognition

6G phones & telecoms
Holographic & volumetric displays
Immersive web
Telepresence: immersive & robotic
Deep learning software
Collective intelligence tools
Swarm intelligence
Intelligent client assistants

Mind control headsets
Skin-embedded screens
Fingernail displays
Touchable holographs
Optical computers
Quantum computers & crypto.
3D spintronic microchips
Atomically precise manufacturing

Genetic / DNA storage techs
Artificial intelligence
Self-powered nano devices
Intelligent brain-computer interfaces
Intelligent robots
Intelligent PAs & avatars
Biological computers
Encrypted DNA-stored images

THIRD HORIZON pockets of the future visible in the present

Brain mapping & uploading
Exocortex & memory implants
iCyborg lawyers
New quantum materials & devices

NOW   MEDIUM TERM   LONG TERM

It is Key to Understand the Core Trends…

'Magic' and Science are Blurring

Mapping and Uploading the Human Brain

Cognitive, Genetic, Physical and Electronic Enhancement of the Human Body

Understanding the Transformative Role of IT

Customer Centric 'Hive Mind'

Talent: Develop and Leverage Staff

Innovate to Differentiate

Re-engineer Processes

Our Technologies are Evolving & Merging

...Wearable...

FROM HEAD TO TOE WEARABLE TECHNOLOGY

SHIRT
Conductive thread means a computer is literally built into the fabric of the shirt, providing the processing power for all the other wearable gadgets.

WRISTBAND
A sensor that tracks movement to determine the number of steps taken through the day – 10,000 is ideal – and how much sleep the wearer gets at night.

TROUSERS
Also made with conductive thread, the trousers take the energy generated by movement and use it to power the other gadgets.

GLASSES
Overlays navigation directions and information about points of interest directly on to the wearer's field of vision.

WRISTWATCH
Vibrates when a message arrives and displays it on the watch face. Tells the time too.

HAND
Embedded under the skin is a chip containing medical records, passport data and credit records. Information is transferred by waving the hand over a suitable scanner.

SHOES
GPS chip provides directions using LED lights in each shoe: the left shoe indicates direction, while the right shows distance.

GRAPHIC: JOHN BRADLEY

...Embedded...

…Augmented and Immersive…

... Hyperconnected to a Multi-Sensory 'Internet of Humanity'…

Driverless Cars / Autonomous Vehicles

The Blockchain & Digital Currencies

Strati – First 3D Printed Car (Local Motors)

4D Printed Products

Objects that reshape themselves or self-assemble over time.

Artificial Intelligence

Artificial intelligence (AI) is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans. E.g. Speech recognition, visual perception, learning, reasoning, inference, strategising, planning, intuition, decision-making, language translation.

Machines that learn will be more like us ... but better(?)

Robots are Entering the Workforce

Brain-Computer Interface (BCI)

A brain–computer interface is a direct communication pathway between an enhanced or wired brain and an external device. BCIs are often directed at researching, mapping, assisting, augmenting, or repairing human cognitive or sensory-motor functions

The Future of Business

Case Studies: When Business Ignores the Signals

- ➤ **Kodak** ignored new market entrants and were over confident in its brand. Market share declined rapidly.
- ➤ Digital camera developed in 1975, but was dropped.
- ➤ 2013 emerged from Chapter 11 Bankruptcy Protection - now Print Systems, Enterprise Inkjet Systems, Micro 3D Printing and Packaging, Software and Solutions, Film.

- ➤ In 2000 **Netflix** proposed partnership to Blockbuster - Netflix would run Blockbuster's brand online, Blockbuster promote Netflix in stores.
- ➤ Netflix advantages: no retail locations, lower costs, greater variety.
- ➤ Blockbuster unable / unwilling to alter business model.
- ➤ Blockbuster went bankrupt in 2010 and Netflix is now a $28 billion dollar company.

Information and Communications Technology

- ➢ **Mobile Internet - Devices, Services, Infrastructure, Commerce**
- ➢ **Next Generation Intelligent, Personalised Internet**
- ➢ **Cloud Based Applications, Infrastructure, Services**
- ➢ **Internet of Things / Internet of Everything / Internet of Humanity**
- ➢ **Big Data, Data Mining and the Automation of Knowledge**
- ➢ **AI and Deep Learning**
- ➢ **Blockchain Systems and Distributed Autonomous Organisations**

Production and Construction Systems & Technologies

- ➢ **Advanced Robotics / Drones**
- ➢ **3D/4D Printing and Advanced Materials**
- ➢ **Genomics and Synthetic Biology**
- ➢ **Biomimcry Applied to Product Design and Engineered Systems**
- ➢ **Rapid / Green / Sustainable Construction**

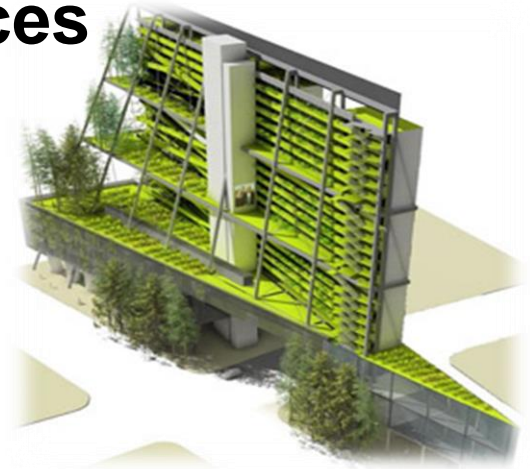# Citizen Services & Domestic Infrastructure

- ➤ **Healthcare and Caring**
- ➤ **Smart Homes**
- ➤ **Human Enhancement**
- ➤ **Autonomous & Self Drive Vehicles**
- ➤ **Education**
- ➤ **Environmentally Friendly Technologies**

New Societal Infrastructure & Services

- ➤ **Food & New Methods of Production**
- ➤ **Economy & New Economic Models**
- ➤ **Smart Cities**
- ➤ **Transport**
- ➤ **E-government**

Industry Transformation

➢ **Global Infrastructure - Roads, Transport, Energy, Water**

➢ **Automation of Professional Services - E.g. Accounting, Legal, Consultancy, and Architecture**

➢ **Financial Services Technologies**
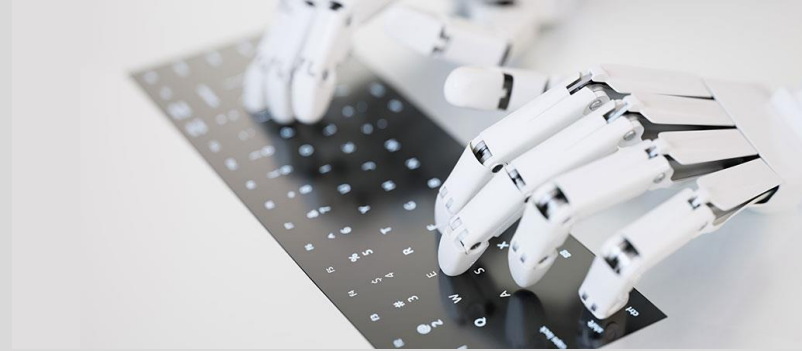
Energy & Environment

➢ **Renewable Energy**

➢ **Advanced Oil / Gas Extraction**

➢ **Climate Change & Environmental Protection**

Tomorrow's Growth Sectors

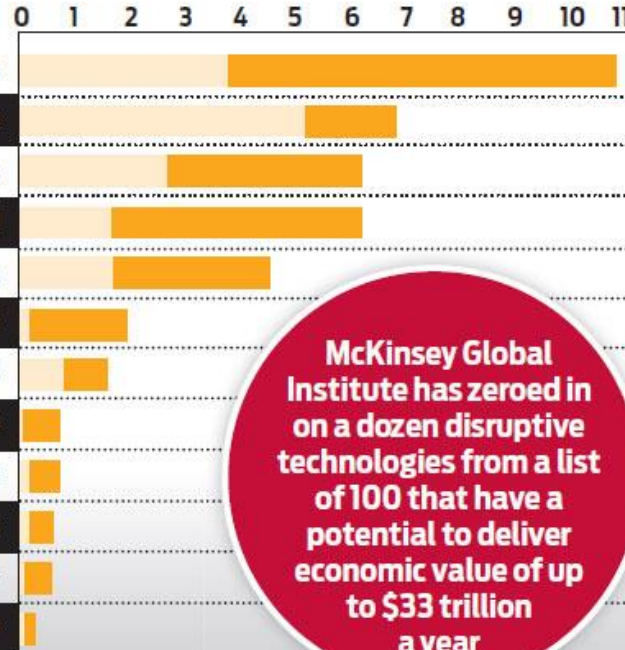## 12 disruptive technologies that can make an impact by 2025

$100 trillion

Size of global economic output estimated in 2025

Technology	0 1 2 3 4 5 6 7 8 9 10 11
Mobile Internet	(bar from ~4 to ~11)
Automation of knowledge work	(bar from ~5 to ~7)
Internet of Things	(bar from ~2 to ~6)
Cloud	(bar from ~2 to ~6)
Advanced robotics	(bar from ~1 to ~5)
Autonomous and near-autonomous vehicles	(bar ~0 to ~1)
Next-generation genomics	(bar ~1 to ~2)
Energy storage	(bar ~0 to ~1)
3-D printing	(bar ~0 to ~0.5)
Advanced materials	(bar ~0 to ~0.5)
Advanced oil and gas exploration and recovery	(bar ~0 to ~0.5)
Renewable energy	(bar ~0 to ~0.5)

McKinsey Global Institute has zeroed in on a dozen disruptive technologies from a list of 100 that have a potential to deliver economic value of up to $33 trillion a year
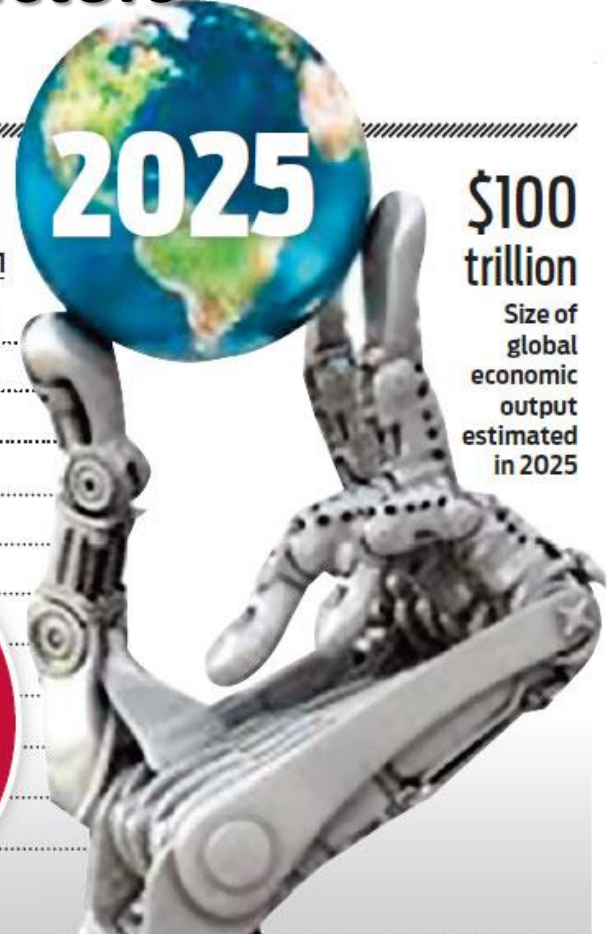
Case Studies: When Business Disrupts Markets

- ➢ **UBER** founded as a transportation company that utilized licensed taxi drivers for ridesharing services.

- ➢ Integrate a mobile application to connect passengers with drivers of vehicles for hire within a specified geographical area.

- ➢ Uber is disrupting the market for taxi cabs and transportation in general.

- ➢ More customer oriented experience including track their vehicle as it is in route to them and new payment options.

- ➢ The future: driverless cars, delivery, on-demand urban air transportation,

- ➢ **Airbnb** offers user-friendly site for discovering and booking accommodation.

- ➢ Curated listings more than "renting a spare room" - about discovering cool/quirky/creative properties.

- ➢ Rentals generally 30-80% lower than available hotels. Free to list - AirBnB charges 3% fee to process payments. Guests pay the service fee to AirBnB. Low entry barrier.

- ➢ Potential to transform the traditional model of a accommodation / space rental.

Rapid Execution e.g. Superfast Construction
Ark Hotel - Dongting Lake - China

79 HOURS · 182 HOURS · 360 HOURS

Pursuit of Exponential Growth

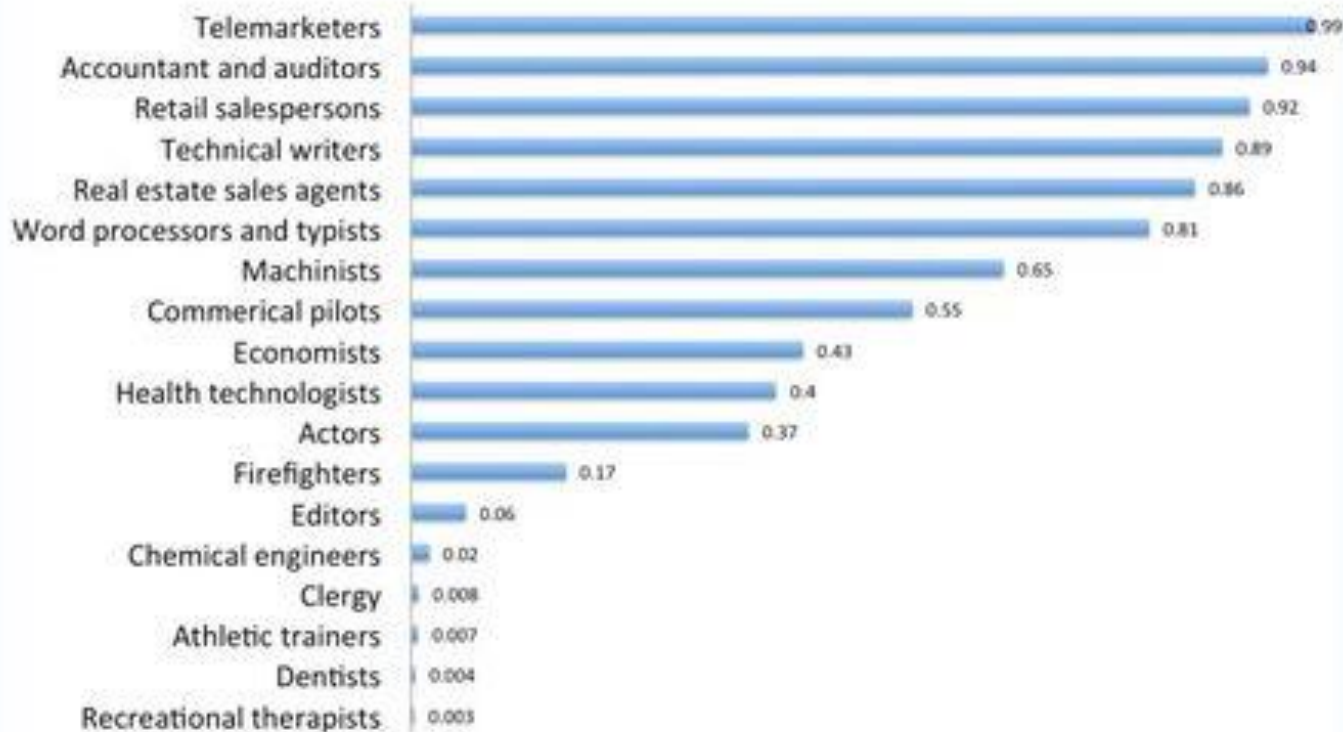|	
AirBnB Hotels	90x more listings per employee
GitHub Software	109x more repositories per employee
Local Motors Automotive	1000x cheaper to develop a new car model 5-22x faster to manufacture a car
Quirky Consumer Goods	10x faster product development (29 vs 300 days)
Google Ventures Investments	2.5x more investments in early stage start-ups 10x faster through design process
Valve Gaming	30x more market cap per employee
Tesla Automotive	30x more market cap per employee
Tangerine (formerly ING Direct Canada) Banking	7x more customers per employee 4x more deposits per customer

Exponential Market Cap Improvement

	Age (yrs)	2011 valuation	2016 valuation	Increase
Haier	31	$19 billion	$60 billion (2014)	3x
Valve	19	$1.5 billion	$4.5 billion (2014)	3x
Google	18	$150 billion	$533.4 billion	3.6x
Uber	8	$2 billion	$62.5 billion	31x
AirBnB	7	$2 billion	$25.5 billion	12.8x
Gifthub	7	$ 500 million (est.)	$2 billion	4x
Waze	7	$ 25 million	$1.15 billion (sold to Google in 2013)	46x
Qirky	6	$ 50 million	Closed	40x at peak
Snapchat	4	0	$16 billion	16,000x +

Future Skills and Management Challenges

Probability Robots Will Take Your Job In Next 20 Years, 1=Certain

Job	Probability
Telemarketers	0.99
Accountant and auditors	0.94
Retail salespersons	0.92
Technical writers	0.89
Real estate sales agents	0.86
Word processors and typists	0.81
Machinists	0.65
Commerical pilots	0.55
Economists	0.43
Health technologists	0.4
Actors	0.37
Firefighters	0.17
Editors	0.06
Chemical engineers	0.02
Clergy	0.008
Athletic trainers	0.007
Dentists	0.004
Recreational therapists	0.003

The Future Jobs Landscape –
The economic impact of robotic advances & AI

48% - robots & digital agents will displace significant numbers of blue- and white collar workers

Increases in income inequality, significant numbers of unemployable people, breakdowns in the social order.

Will networked, automated, AI and robotic devices have displaced more jobs than they have created by 2025?

52% - technology will not displace more jobs than it creates. Lost jobs offset by ingenuity creating new occupations, & industries.

Current social structures (e.g. Education) not preparing people for the skills needed in the future job market.

Opportunity to reassess society's relationship to employment?
Give time for leisure, self-improvement, or time with loved ones?

Source: Pew Research (2014)

The Future Jobs Landscape –
Which jobs are most vulnerable?

➢ **47% of workers in USA had jobs at high risk of potential automation**
  - ➢ **Transport and logistics (taxi and delivery drivers)**
  - ➢ **Sales and services (cashiers, counter and rental clerks, telemarketers and accountants)**
  - ➢ **Office support (receptionists and security guards)**
➢ **35% of the workforce for UK, 49% Japan**

"The impact of automation this time around is broader-based: not every industry was affected two centuries ago, but every industry uses computers today."

Source: The Economist (2016) Carl Benedikt Frey & Michael Osborne 2013 study - Probability of computerization for 702 occupations

The Future Jobs Landscape –
Automation of the global economy

- ➢ **54 countries representing 95% of global GDP, 2,000+ work activities**
- ➢ **The proportion of jobs that can be fully automated by adapting currently demonstrated technology is less than 5%**
  - ➢ **although for middle-skill categories could rise to 20%**
- ➢ **60% of all jobs have at least 30% activities technically automatable, based on current technologies**
- ➢ **Automation technologies could affect 49% of the world economy - 1.1 billion employees and $12.7 trillion in wages.**
- ➢ **China, India, Japan, and USA—account for more than half of these totals.**
- ➢ **Two+ decades before automation reaches 50% of all of today's work activities**

The Future Jobs Landscape –
Job Creation

➢ Knowledge-enabled jobs become possible as machines embed intelligence and knowledge

➢ Accessible to less skilled workers

➢ Google India - Internet Saathi (Friends of the Internet) program in which rural women are trained to use the Internet

➢ They become local agents providing Internet enabled services e.g. distributors for telecom products (phones, SIM cards, and data packs), field data collectors for research agencies, financial services agents, and para-technicians helping local people access government services

Source: McKinsey Global Institute report (2016)

The Future Jobs Landscape –
An increasingly dynamic jobs landscape

➢ 65% of children entering primary school today will work in job types that don't yet exist
➢ 3.5 x as many jobs lost to disruptive labour market changes 2015–2020 than created
➢ Losses in routine white collar office functions, gains in Computer, Mathematical, Architecture, Engineering related fields
➢ Job categories and functions that they expect to become critically important by 2020:
  ➢ data analysts – leveraging big data and AI
  ➢ specialized sales representatives - commercializing and articulating propositions
  ➢ senior managers and leaders - to steer companies through the upcoming change and disruption

Source: WEF The Future of Jobs (2016)

The Future Jobs Landscape –
An increasingly dynamic jobs landscape

"**By 2020, more than a third of the desired core skill sets of most occupations will be comprised of skills that are not yet considered crucial to the job today. Social skills — such as persuasion, emotional intelligence and teaching others—will be in higher demand across industries than narrow technical skills, such as programming or equipment operation and control.**"

Source: WEF The Future of Jobs (2016)
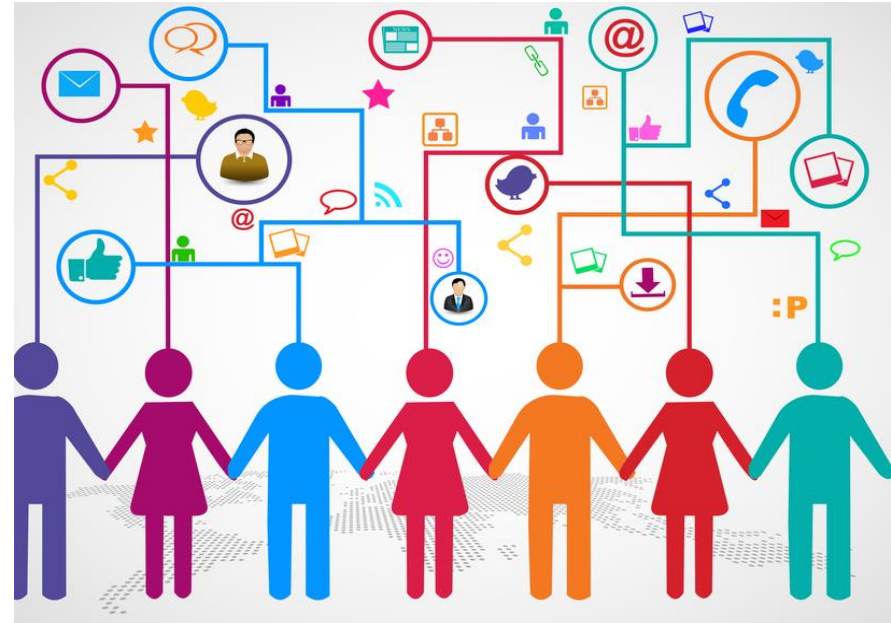
21ˢᵗ Century Survival Skills

- Foresight
- Curiosity
- Sense making
- Accelerated learning
- Tolerance of uncertainty
- Scenario thinking
- Coping with complexity
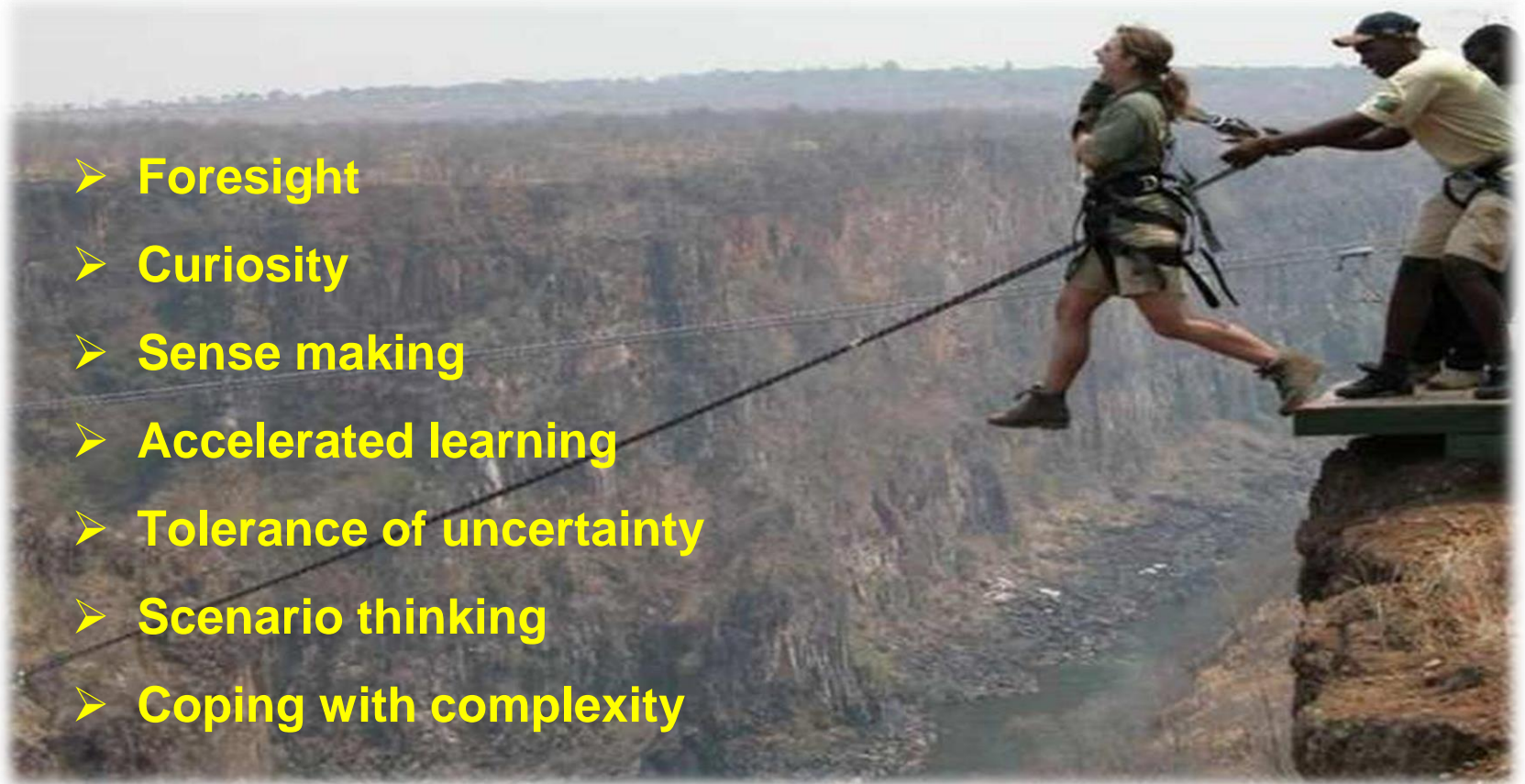
Future Work Skills 2020

While all six drivers are important in shaping the landscape in which each skill emerges, the color-coding and placement here indicate which drivers have particular relevance to the development of each of the skills.
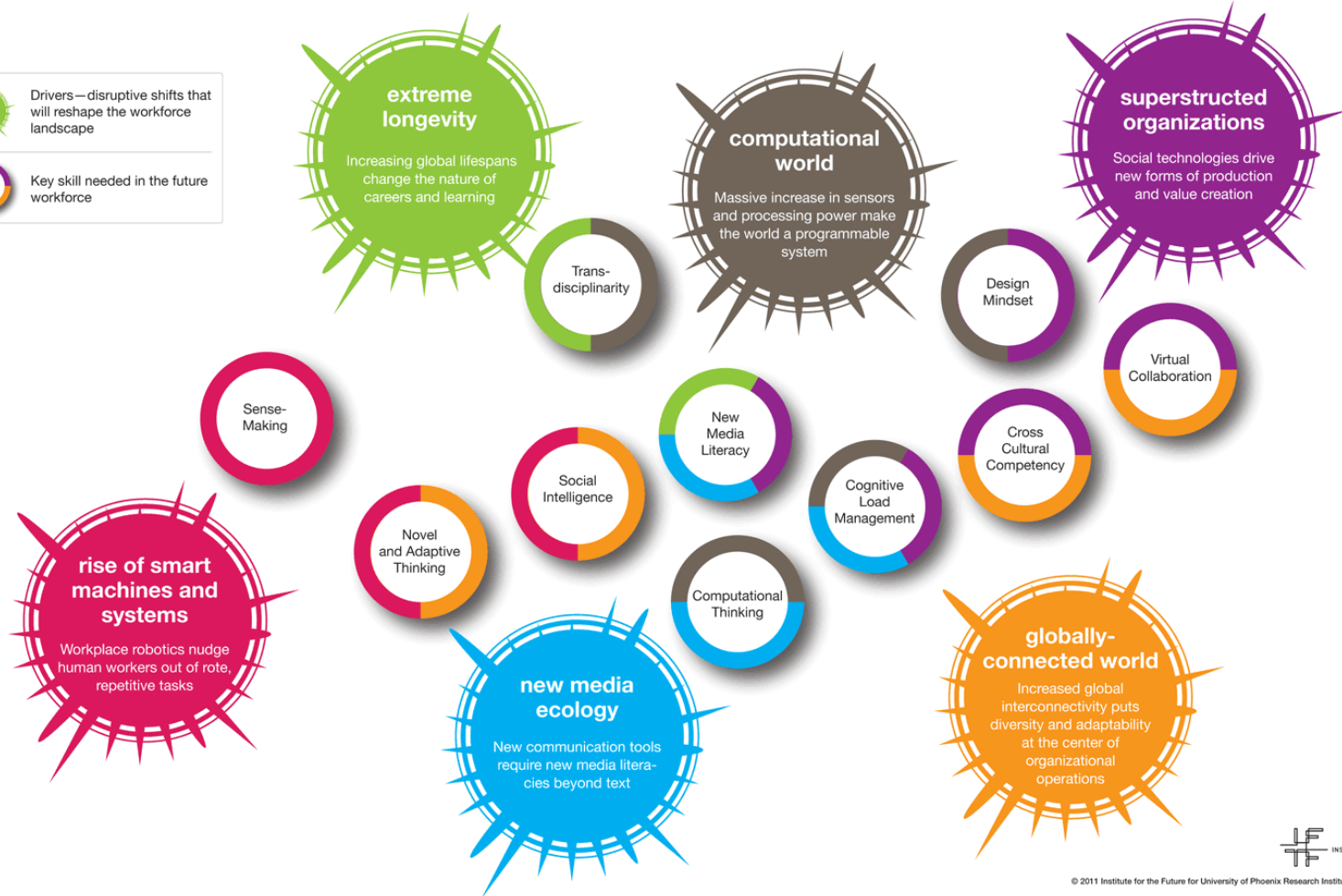
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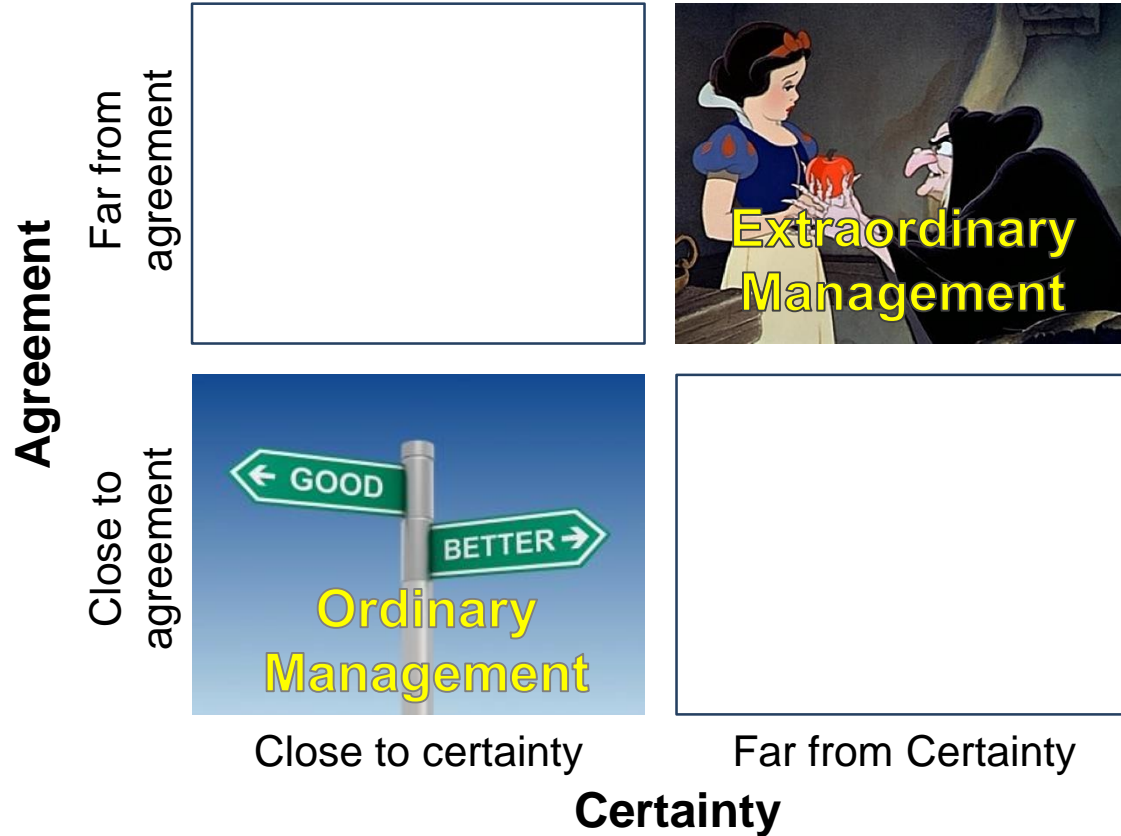Drivers—disruptive shifts that will reshape the workforce landscape

Key skill needed in the future workforce

extreme longevity
Increasing global lifespans change the nature of careers and learning

computational world
Massive increase in sensors and processing power make the world a programmable system

superstructed organizations
Social technologies drive new forms of production and value creation

Trans-disciplinarity

Design Mindset

Virtual Collaboration

Sense-Making

New Media Literacy

Cross Cultural Competency

Social Intelligence

Cognitive Load Management

Novel and Adaptive Thinking

rise of smart machines and systems
Workplace robotics nudge human workers out of rote, repetitive tasks

Computational Thinking

new media ecology
New communication tools require new media literacies beyond text

globally-connected world
Increased global interconnectivity puts diversity and adaptability at the center of organizational operations

INSTITUTE FOR THE FUTURE

Characteristics of collaboration based upon the nature and clarity of the goals

Nature of Goals

Collective goals

Individual goals

COORDINATION

CO-CREATION

COMPETITION

COOPERATION

Clear & predictable

Uncharted & uncertain

Clarity of Goals

The management style required when working in uncertain situations can be challenging

Agreement

Far from agreement

Close to agreement

Close to certainty

Far from Certainty

Certainty

Extraordinary Management

Ordinary Management

What We Do

- Publishing - books about the future

- Research - tailored programmes and studies

- Consultancy – strategy reviews, deep dives and capability development to build exponential organisations

- Inspiration – speaking and leadership events

- Education - future focused leadership development and executive coaching

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steve@fastfuturepublishing.com
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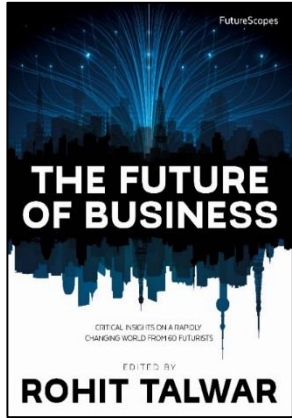
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June 2015
19 Weeks
62 contributors
60 Chapters
Top 5% of
Business Books

Technology vs. Humanity
September 2016
12 Weeks
Amazon
Bestseller
Within 2 Weeks
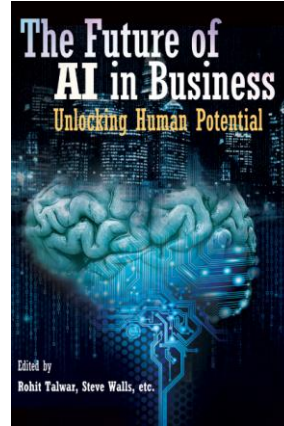
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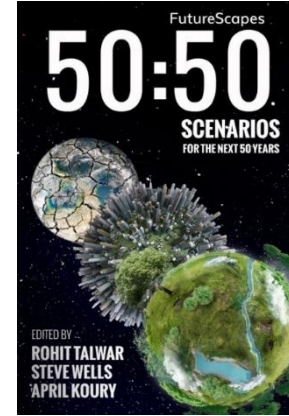
50:50 Scenarios
June 2017
50 Chapters
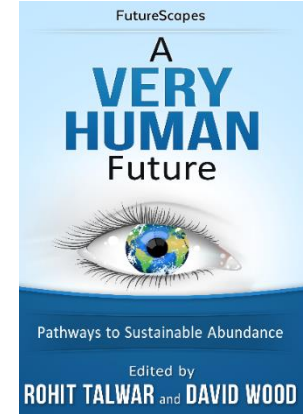
A Very Human Future
November 2017
25 Chapters

Contact: Steve Wells on +44 (0)7887 625310
steve@fastfuturepublishing.com
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