Strategic Foresight Session

The Art & Science of
Looking at the Future

Garry Golden
Forward Elements
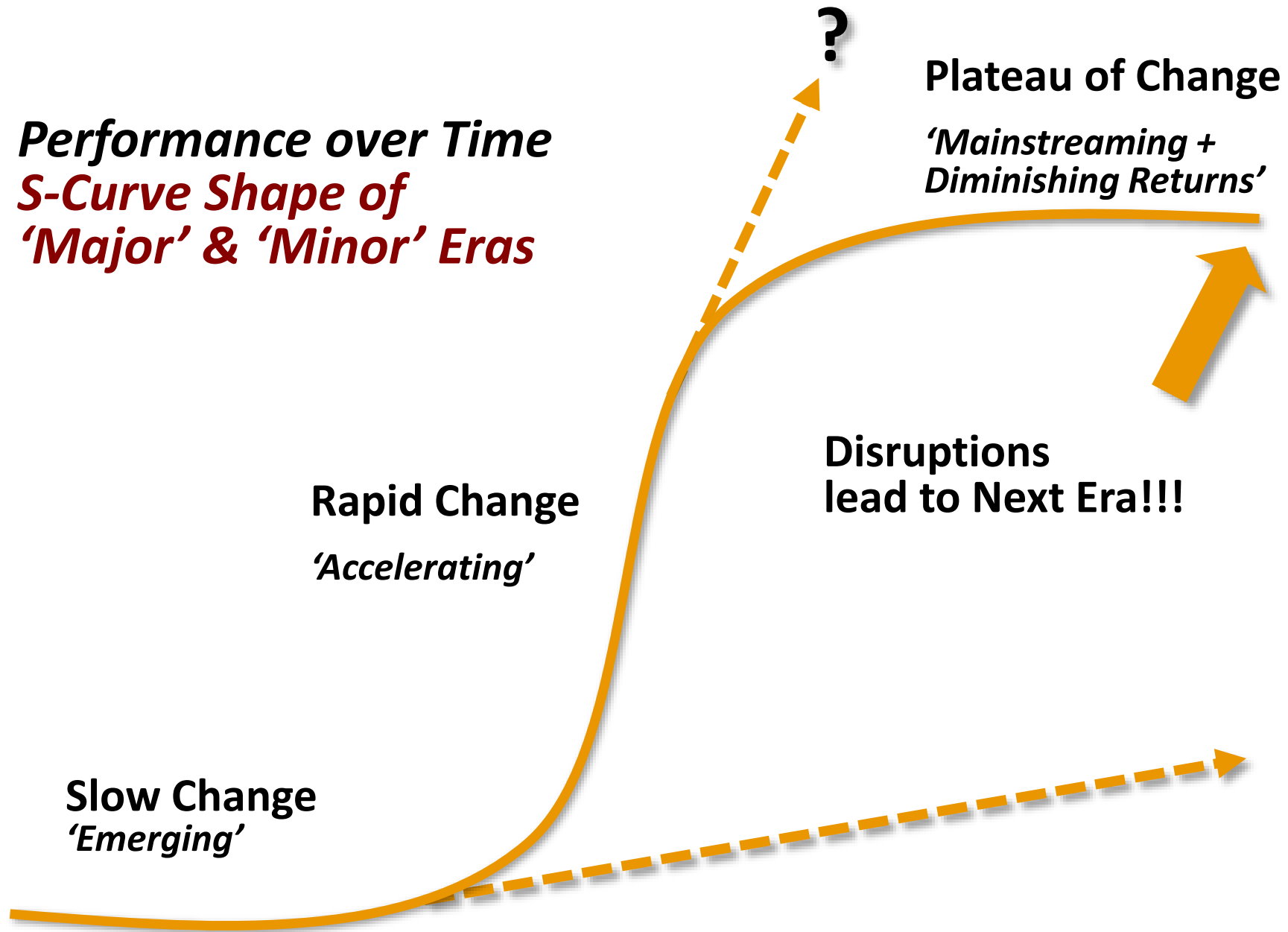**March 27, 2019**

Hindsight

Insight

Foresight

FUTURE

101

... the ability to anticipate and lead change

Foresight = Front end of Innovation & Strategy

Era-based Analysis of Change

Incremental Innovation
within an Era

Transformational Innovation
across a New Eras

Performance over Time
S-Curve Shape of
'Major' & 'Minor' Eras

?

Plateau of Change

*'Mainstreaming +
Diminishing Returns'*

Rapid Change

'Accelerating'

**Disruptions
lead to Next Era!!!**

Slow Change
'Emerging'

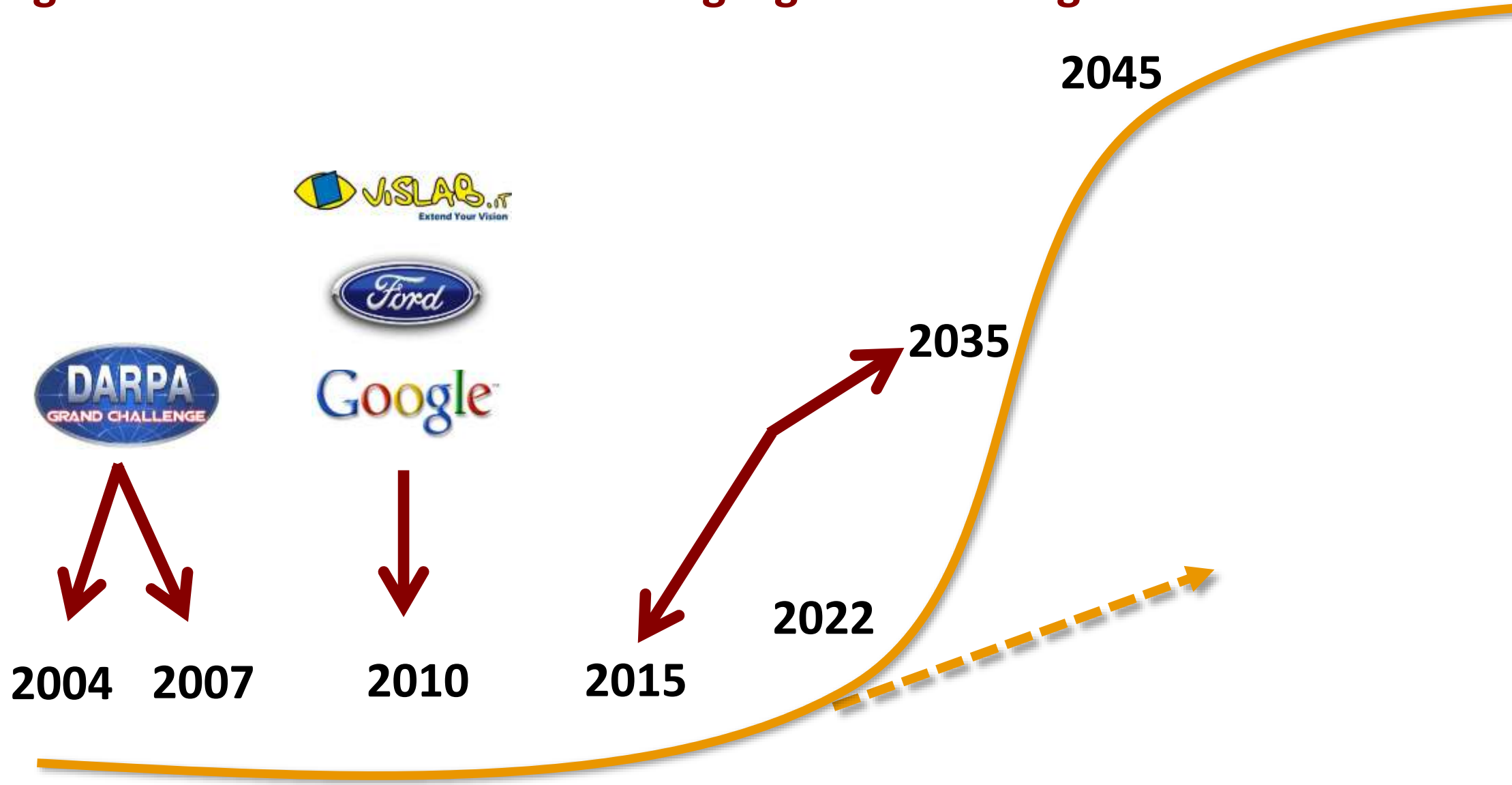# Eras of Mobility

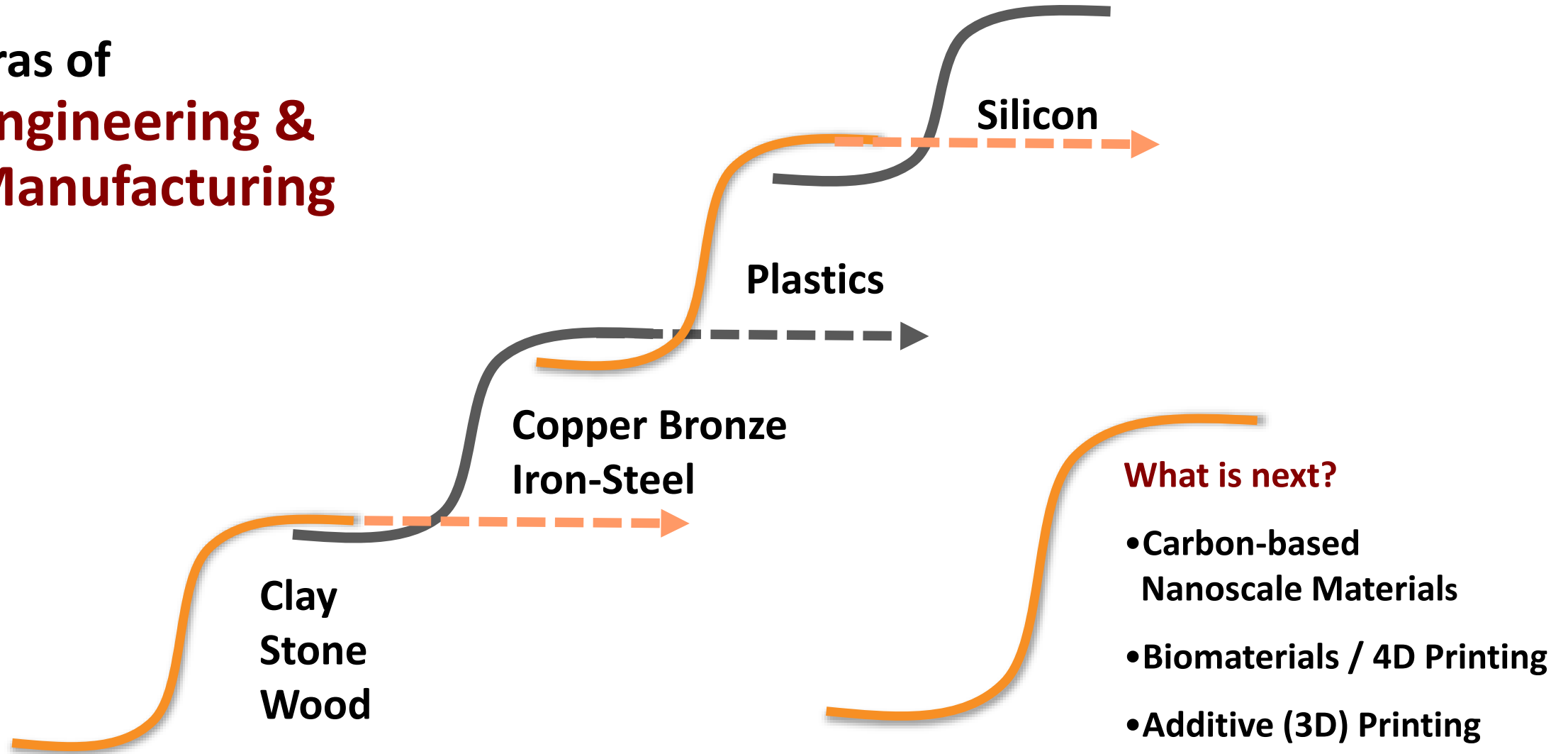

Planes
Rockets

Cars

Rail

Boats

Human / Animals
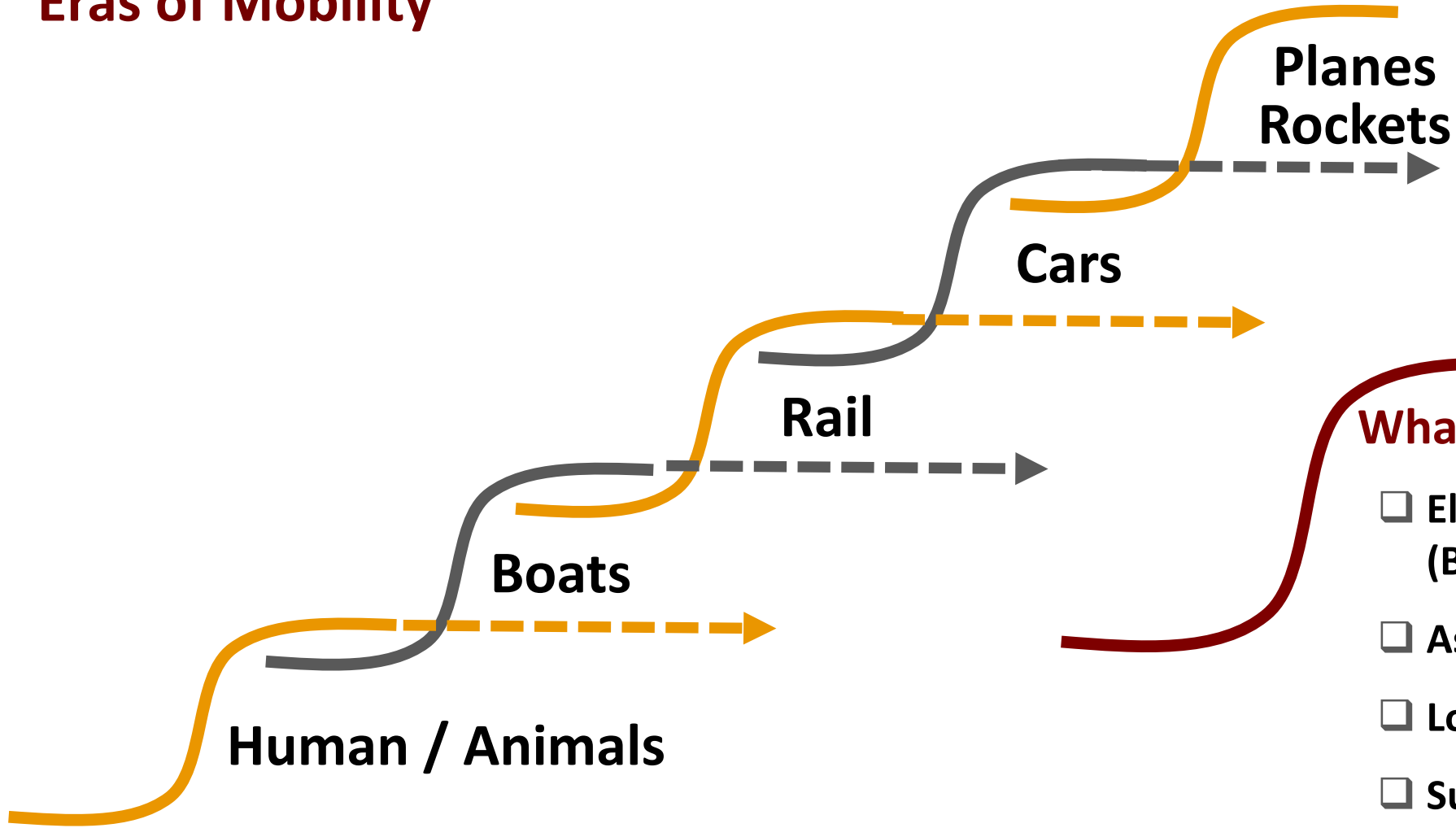
What is next?

- ❑ Electric Vehicles (Battery + Fuel cell)
- ❑ Assistive + Autonomous
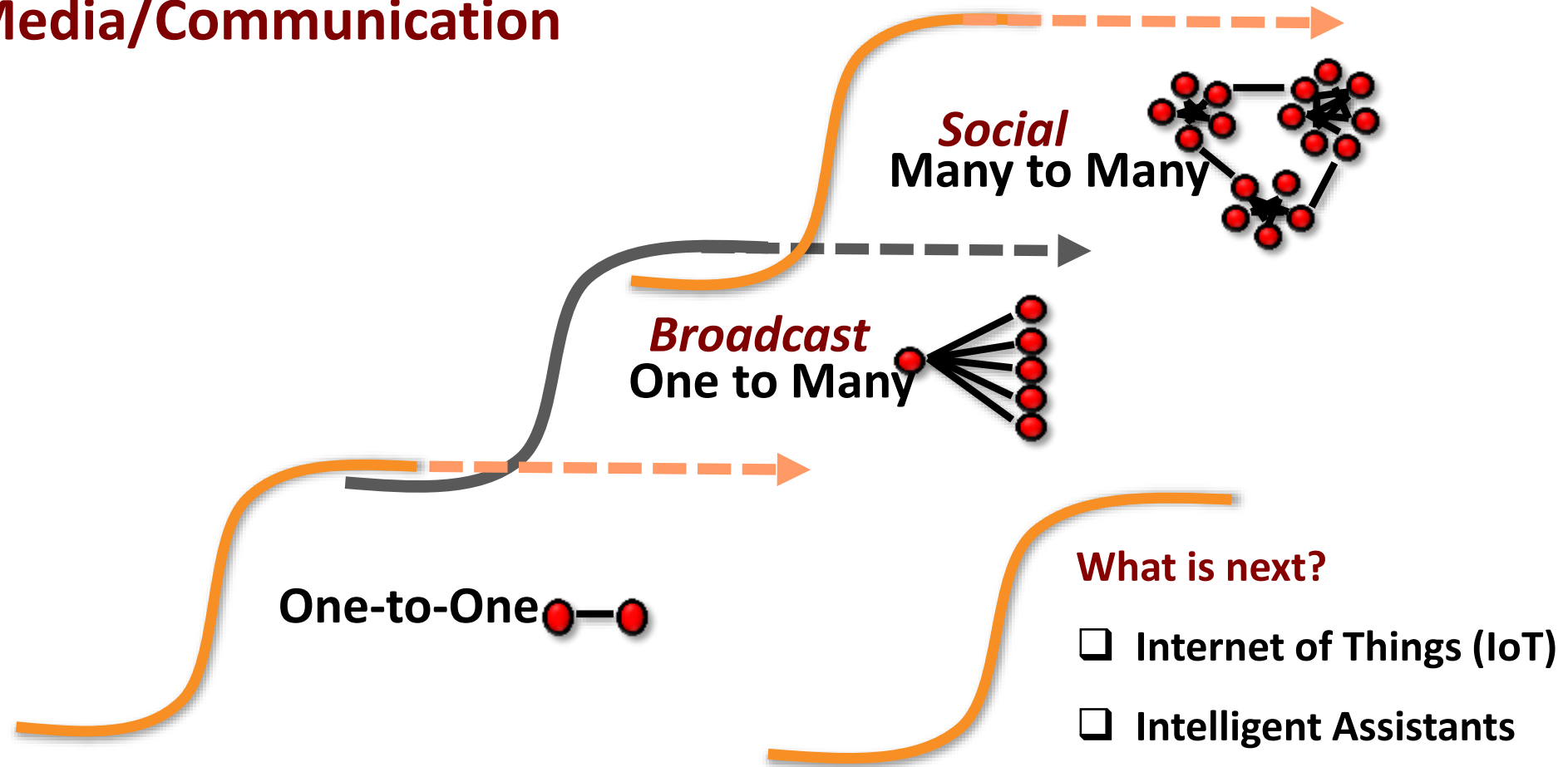- ❑ Low-Volume Production
- ❑ Sub-orbital Space

Tapping Your Inner Futurist: Monitoring Signals of Change
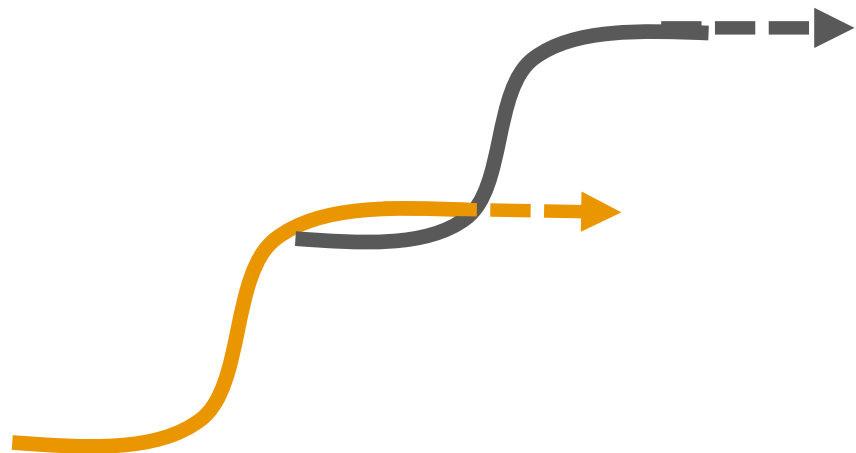
Eras of
Engineering &
Manufacturing

Silicon

Plastics

Copper Bronze
Iron-Steel

Clay
Stone
Wood

What is next?

• **Carbon-based**
  Nanoscale Materials

• **Biomaterials / 4D Printing**

• **Additive (3D) Printing**

Eras of
Media/Communication

Social
Many to Many

Broadcast
One to Many

One-to-One

What is next?

❑ **Internet of Things (IoT)**
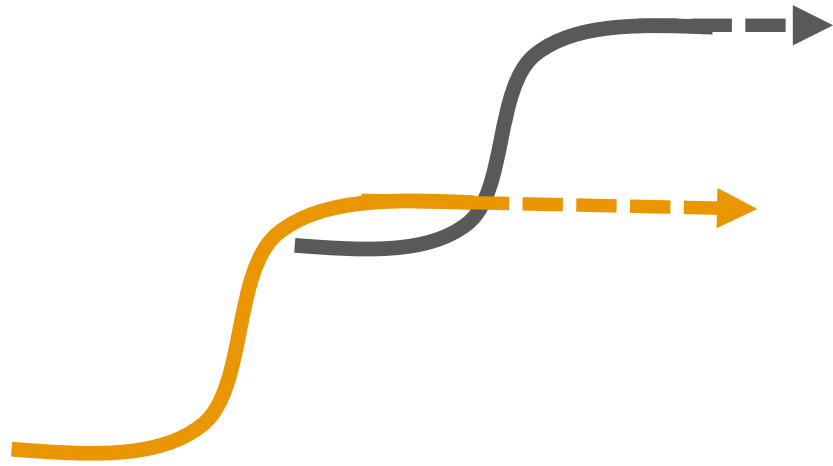
❑ **Intelligent Assistants**

Transportation / Mobility

- ❑ **'Electric' (H2 FCs = EVs)**
  (Role of Clean Fuels)

- ❑ **Autonomous Fleets**

- ❑ **Portable Places**

SURUS Platform

Silent Utility Rover Universal Superstructure
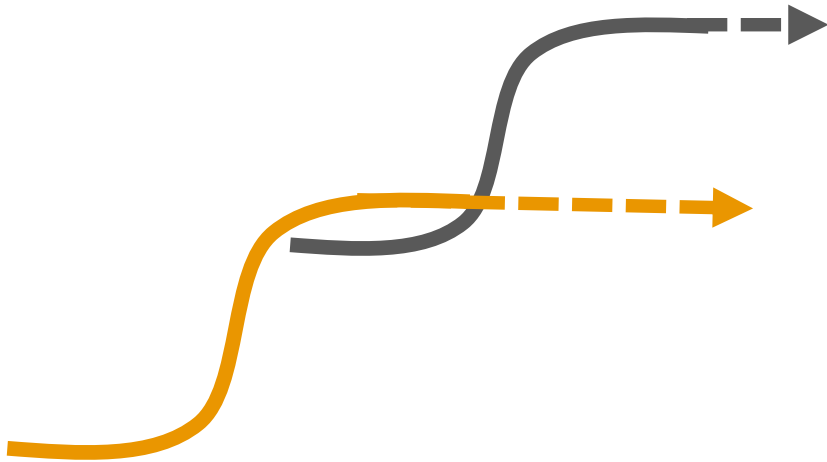(Battery + Hydrogen Fuel Cell 'Electric' Vehicle)

Energy Infrastructure

❏ **Sector Coupling (Gas + Grid + Mobility)**

❏ **Distributed Energy Resources (DERs)**
   Solar, Battery, H2, Fuel Cells

❏ **Fuel Cells**

   MicroCHP; Portable Power

How will societies navigate S-curve transitions for…?

Transportation/Mobility
Convergence – Evs, AVs, TNCs; Empowered Cities

Healthcare / Wellness
Population Health; Outcomes-based Care; Genomics

Agriculture / Farming / Food
Precision Ag; Automation; Urban; Bio-; Small scale farmer

Retail
Online; Hybrid Brick+Mortar; Localization

Education / Learning
Life stage to Lifelong; AI / Augmented

Media / Communication
Authentication/Verification; AI; IoT; Agents/Assistants

Energy
Gas + Grid Convergence; Decentralized Resources (DERs)

Worksheet

Era-based Analysis

Worksheet: Era-bases Analysis of Change		
	Current Era:_____	Emerging Era:_____
Vision & Mission - Who you are; Who you serve & how. **Problems (JTBD) & Solutions** - Customer *jobs to be done*.		

Operational Market Dynamics
- Describe types of conditions.
- Describe types of partners.
- Describe types of acquisitions.
- Regulatory landscape:
  Constraints or protective policies?
 	
Service Cycle
- What do you provide?
- How do you (*go to market*)?
- How fast or slow do clients
  demands change?
- What is considered innovative?		

Minor Eras
- Were there small but significant
  platform transitions within the
  company or industry?
Disruptive Elements
- What elements challenge this era,
  and lead to changes in the company?
- Are there constraints or
  'limits to growth' within this era?		

Worksheet: Era-bases Analysis of Change

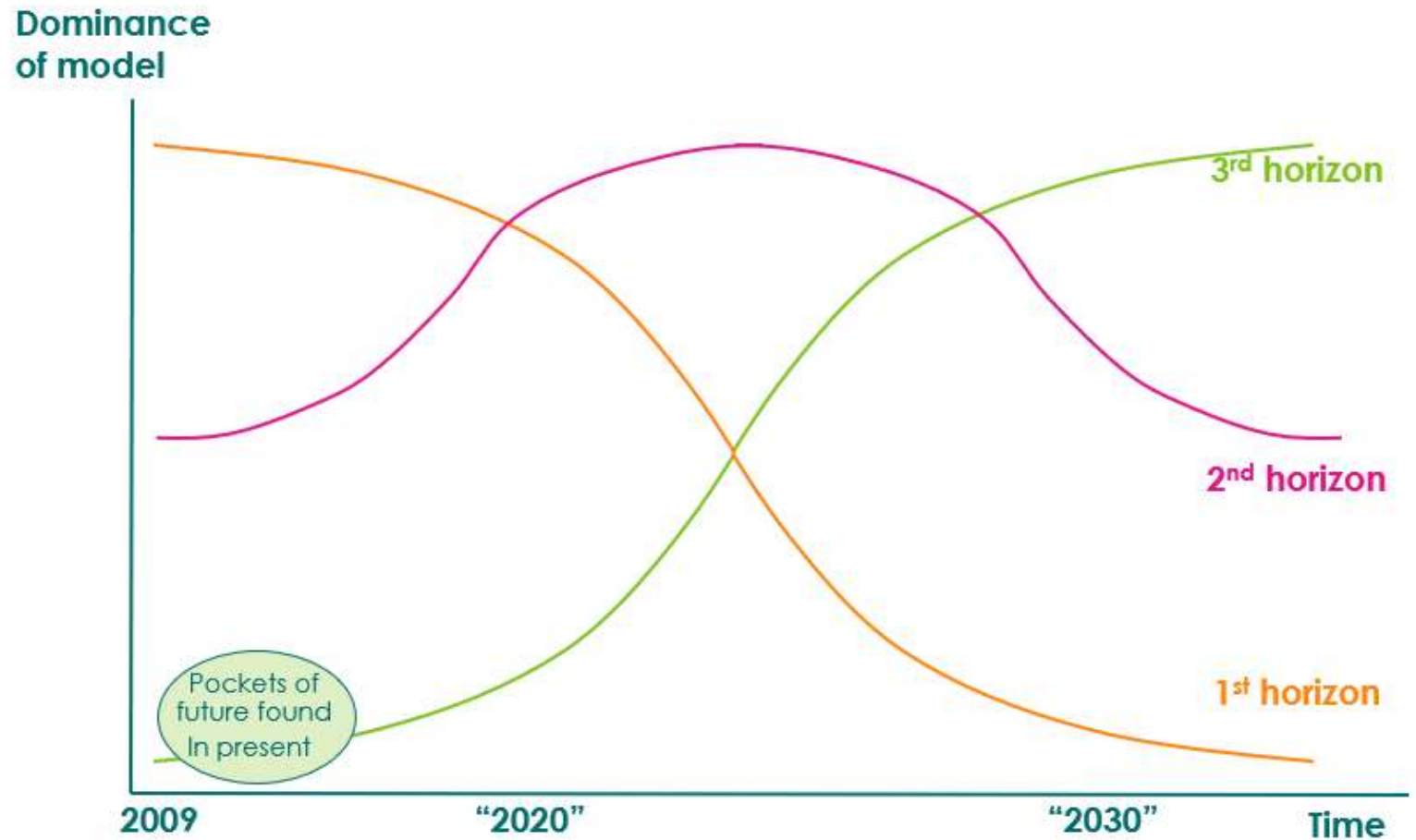|	Current Era:_____	Emerging Era:_____
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Applying Foresight

☐ Work with colleagues in generating PoV on era-based transitions for next decade

☐ **Surface three (3) assumptions** that might be discarded across the *S-curve* era transition

☐ **Identify three (3)** *hunting ground* opportunities for future success or organizational impact

Worksheet: Era-bases Analysis of Change

	Current Era:_____	Emerging Era:_____
Vision & Mission - Who you are; Who you serve & how.		
Problems (JTBD) & Solutions - Customer *jobs to be done*.		
Operational Market Dynamics - Describe types of conditions. - Describe types of partners. - Describe types of acquisitions. - Regulatory landscape: Constraints or protective policies?		
Service Cycle - What do you provide? - How do you (*go to market*)? - How fast or slow do clients demands change? - What is considered innovative?		

Minor Eras
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  'limits to growth' within this era?		

"Three Horizons" Model of Change (Bill Sharpe)

Dominance of model

Pockets of future found In present

3rd horizon

2nd horizon

1st horizon

2009   "2020"   "2030"   Time

Graphic courtesy of Andrew Curry, The Futures Company

Era-based Analysis
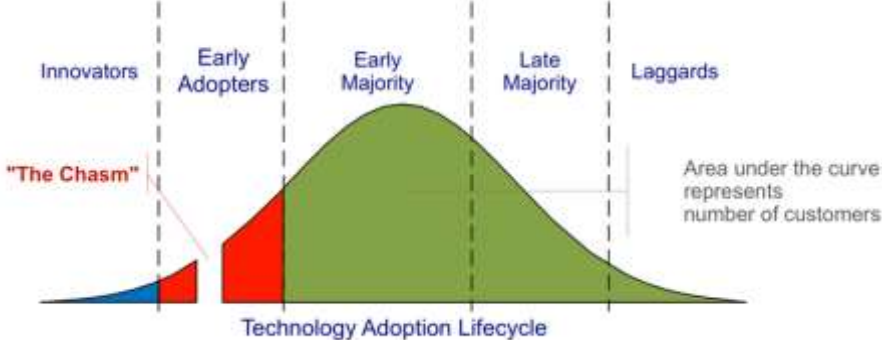
Related Frameworks

Foresight = Second & Third Horizon

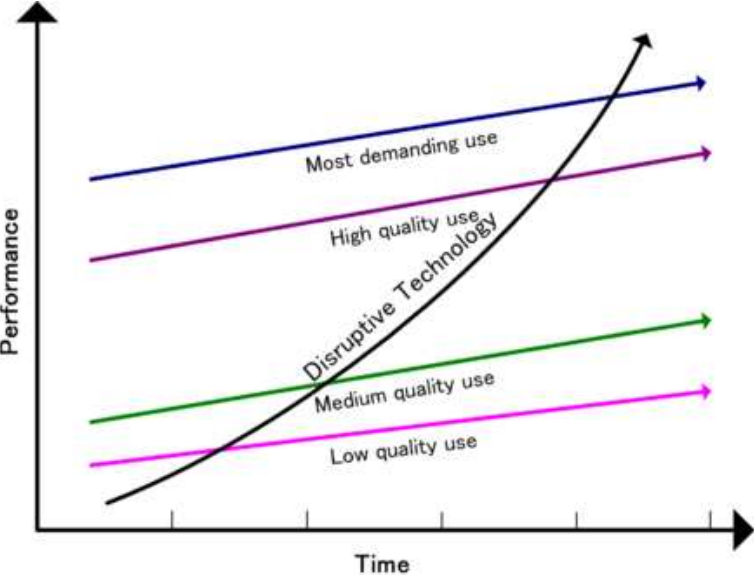# Era-based Analysis: Related Frameworks

Experience Curve
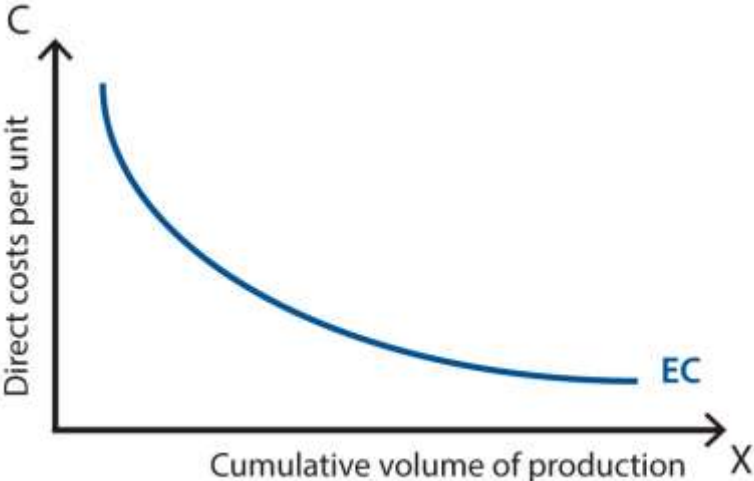
Crossing the Chasm

Low-end Disruption

Gartner Hype Cycle

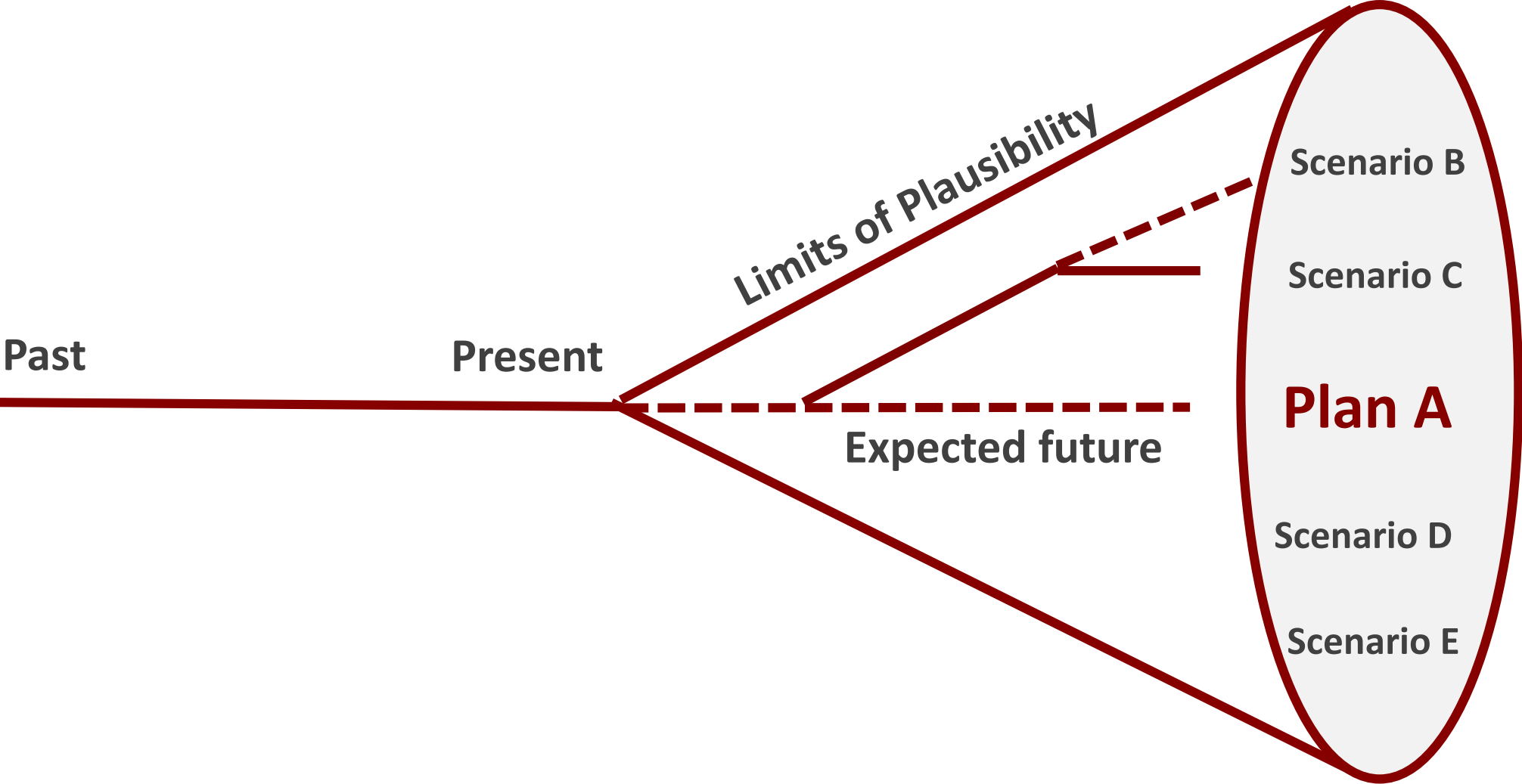# Thinking Like a Futurist?

Slide Sequence Removed
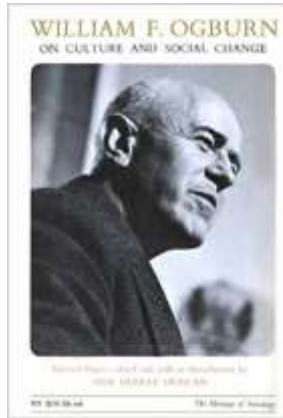
Foresight 101: Cone of Plausibility
Multiple Outcomes, Multiple Time Horizons

Limits of Plausibility

Past

Present

Scenario B

Scenario C

Plan A

Expected future

Scenario D

Scenario E

Every day I make an effort to move toward what I do not understand.
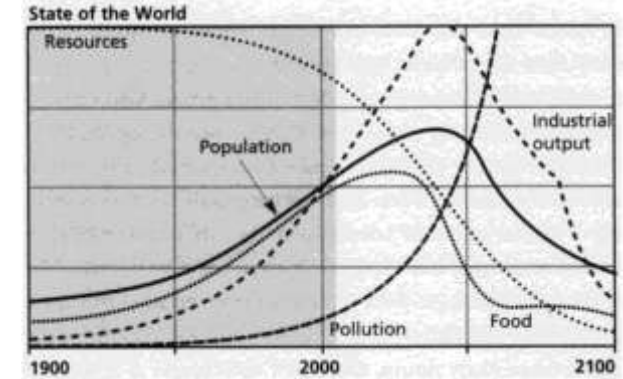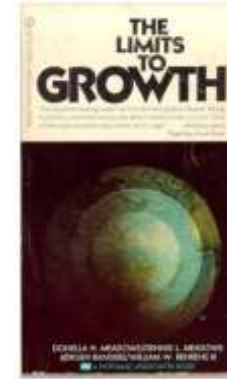
- Cellist, Yo-Yo Ma
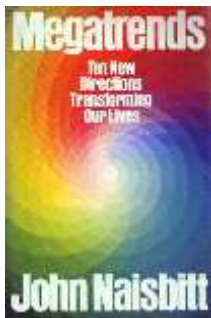
History and Evolution of Foresight
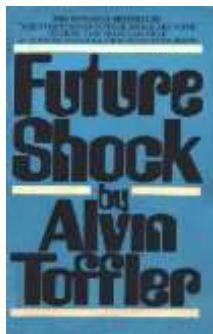
William Ogburn (1930s)
**Social Change
(Society + Technology)**

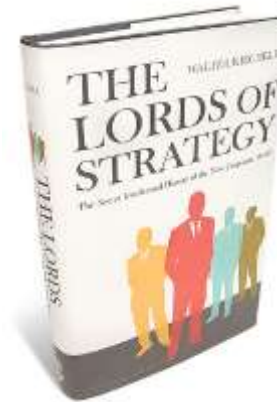Herman Kahn ('50/60s)
RAND / Hudson Institute
Scenario-based Decisions

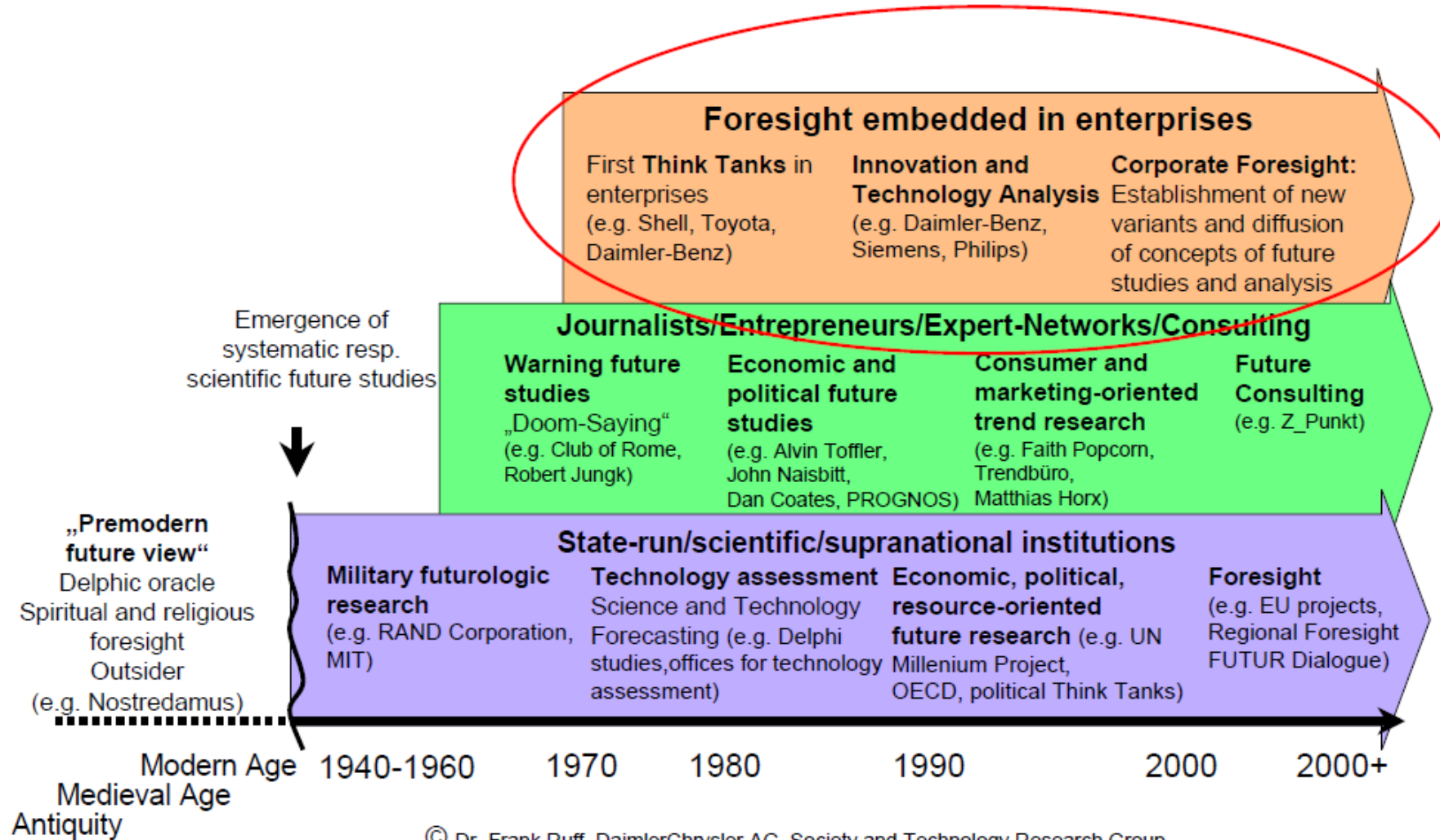Club of Rome / *Limits to Growth* (70s)
Systems-based Simulations

('80-Present)
Rise of Strategy Industry

2010s + Beyond
**Era of Integration,
Inclusivity &
Intervention**

Bringing Foresight In-House

Why Corporate Foresight?
History of Future Studies/Foresight

Foresight embedded in enterprises

First **Think Tanks** in enterprises (e.g. Shell, Toyota, Daimler-Benz)

Innovation and Technology Analysis (e.g. Daimler-Benz, Siemens, Philips)

Corporate Foresight: Establishment of new variants and diffusion of concepts of future studies and analysis

Emergence of systematic resp. scientific future studies

Journalists/Entrepreneurs/Expert-Networks/Consulting

Warning future studies „Doom-Saying" (e.g. Club of Rome, Robert Jungk)

Economic and political future studies (e.g. Alvin Toffler, John Naisbitt, Dan Coates, PROGNOS)

Consumer and marketing-oriented trend research (e.g. Faith Popcorn, Trendbüro, Matthias Horx)

Future Consulting (e.g. Z_Punkt)

„**Premodern future view"** Delphic oracle Spiritual and religious foresight Outsider (e.g. Nostredamus)

State-run/scientific/supranational institutions

Military futurologic research (e.g. RAND Corporation, MIT)

Technology assessment Science and Technology Forecasting (e.g. Delphi studies, offices for technology assessment)

Economic, political, resource-oriented future research (e.g. UN Millenium Project, OECD, political Think Tanks)

Foresight (e.g. EU projects, Regional Foresight FUTUR Dialogue)

Modern Age   1940-1960   1970   1980   1990   2000   2000+
Medieval Age
Antiquity

© Dr. Frank Ruff, DaimlerChrysler AG, Society and Technology Research Group

UNIDO 5 December 2007 / Dr. Frank Ruff

3

Expanding Leadership Capabilities & Leveraging Early Stage Influence
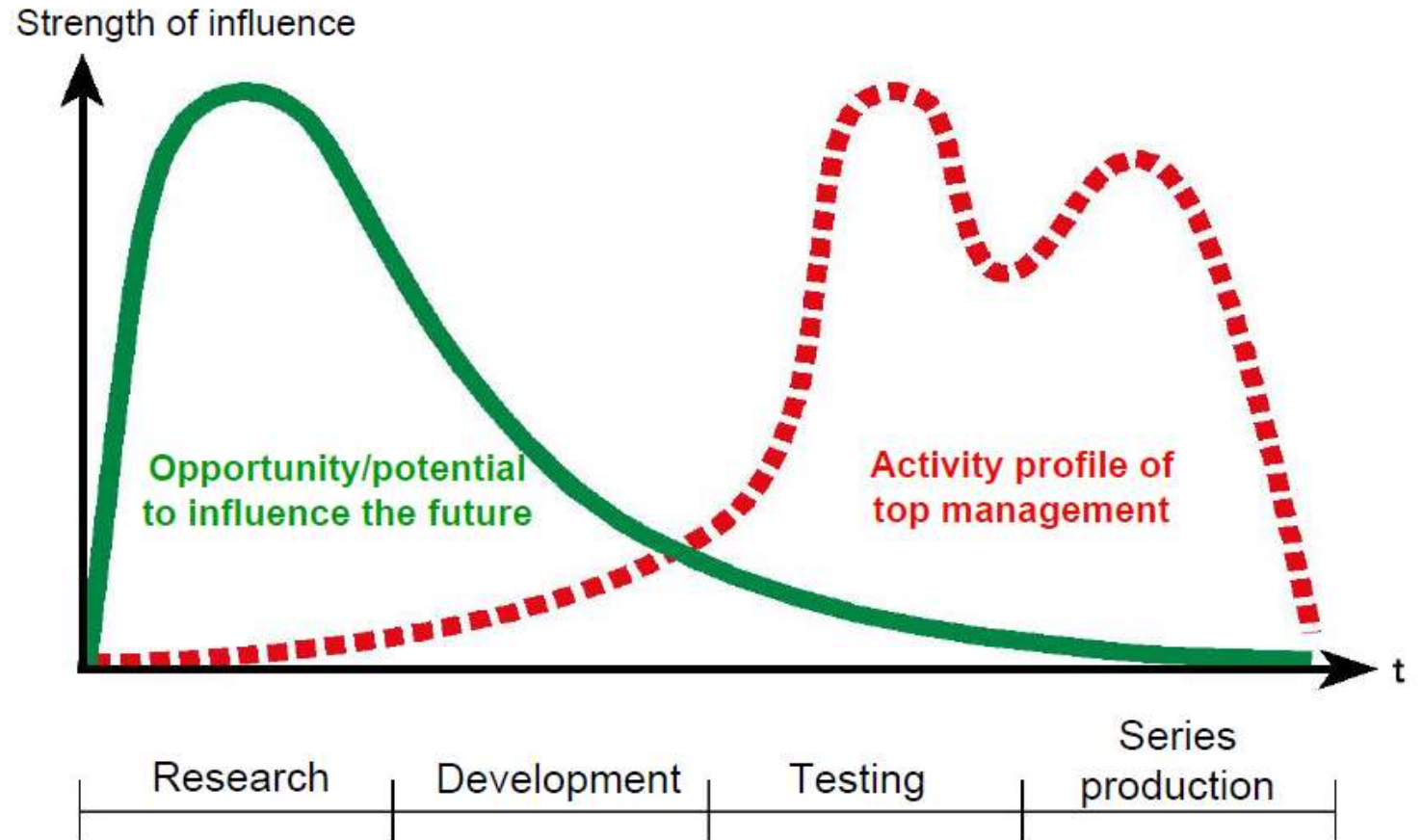
Organizations with Futurists or Foresight Practices
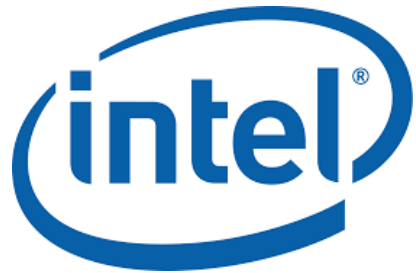
Fundamental Stages + Activities of Foresight

Investigate
**Identifying
& Monitoring Change**

- ❏ Horizon Scanning
- ❏ Emerging Issues Analysis
- ❏ Indicator Analysis
  (Leading vs Lagging)

Imagine
Exploring Implications

- ❏ Forecasts
  (Trend Extrapolation)
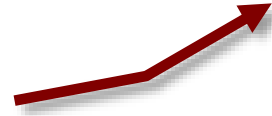- ❏ Scenarios
  (Alternative Assumptions)

Inspire
**Communicating the
Need for Change**

- ❏ Visioning & Backcasting
- ❏ Planning, Goal Setting & Roadmapping
- ❏ Transformation Management

Wendy Schultz/Garry Golden

Foresight 101: Mechanisms of Change

Trends
(Continuities)

Plausible Future

Forecasts

Events
(Discontinuities)
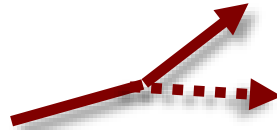
Possible Futures

Scenarios

Choices
(Discontinuities)
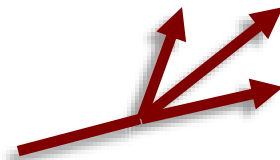
Preferred Future

Visions

Popularized by Peter Bishop

Framework: Four Futures Thinking

Continued Growth

Disciplined Constrained

Transformed

Decline Collapse

Your Task: Develop an Ability to Tell Stories of Our Four Futures

?

?

?

?

Continued Growth

Disciplined Constrained
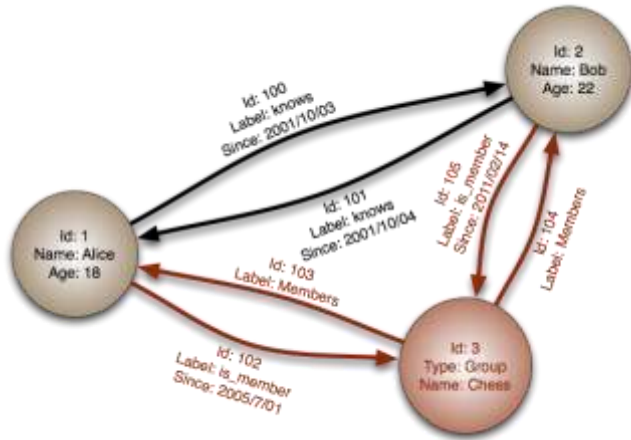
Transformed

Decline Collapse

Questions on Foresight?

Changes Ahead

Experience Graph
Connected Data
& Graph Analytics

Crypto + Blockchain
Trusted Transactions &
Programmable Assets

2020 - 2030

How might data-driven change reshape your organization?

What might be the most valuable type of data in 2030?

In the News

Stanford Business School is piloting a program with **Experience.ai** to capture experience data from learning, project performance and decision processes within case study groups. Stanford's vision is for every student to retain rights to experience data and build a critical personal digital asset for the future.

True

False

Context of the *Creepy Line*

Google

Inevitability of Dealing with the *Creepy vs Compelling Line in..*

Data Driven Innovation

AI   **Design for Behavior Change**

▶   ▶
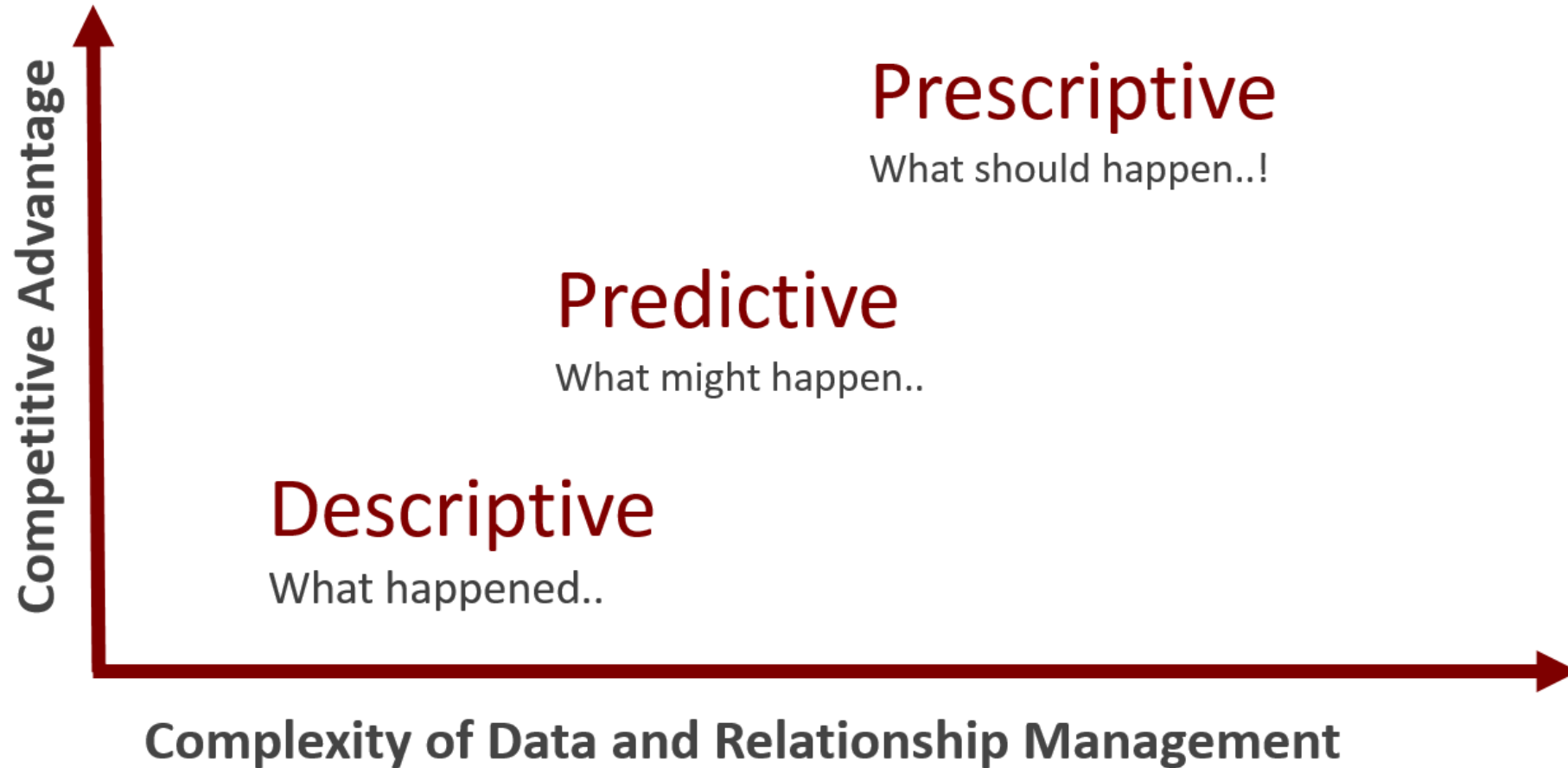
Why Software is Eating the World…

THE WALL STREET JOURNAL.

By MARC ANDREESSEN

August 20, 2011

Really Funny 'Dog'
Slide Sequence Removed

Outcomes-based Value Creation Depends on…

Emergence of Data & Outcomes-driven World

Social Data

Health Data

Device + Infrastructure

"I did this..."

Learning & *Doing* Experience Data

Data isn't truth, but language.
It can help us decide or express the truth, but data never is the truth.
- Deanna Day

Signal of Change from the Learning & Development (L&D) Community

Activity Streams

<Actor, Verb, Object>

"I did this"

3 hours

Course

EXPERIENCE API

"I did this..."

Statements

Seamless Integration into
Manager & Team Tools

300 hours

Real World

Assumption for 2020s:
Experience Data Leaps from L&D into Everyday Life

Scenario: Talent Embraces Experience Capture Analytics

❑ Sarah *read* an article on blockchain for automating compliance

❑ Sarah **opened** an Evernote folder on blockchain solutions

❑ Sarah *watched a* Youtube video introducing the Ethereum blockchain

❑ Sarah *searched* for Ethereum Meetups in NYC

❑ Sarah *attended* the Crypto Compliance conference in NYC

❑ Sarah **created** a List of 'Ethereum Developers' (People) on Twitter

❑ Sarah *interviewed the Head of Blockchain Solutions at JPMorgan*

❑ Sarah *mentored with Joe Lubin co-Founder of Consensys*

❑ Sarah *completed* **a course** on Ethereum's Solidity programming language

❑ Sarah *demonstrated* her pilot Ethereum application at a NYC Meetup

❑ Sarah *taught* a Coursera MOOC on Ethereum for KYC / AML

❑ Sarah was hired as Lead Developer of Blockchain Compliance Solutions at Fidelity

EXPERIENCE API

"I did this…"
Statements

Military: Measuring Performance During Training

"You can't manage what you don't measure."

xAPI is a system specification that lets learning technologies better record, aggregate, and analyze learning performance data, particularly across diverse learning experiences

Jefferson Institute supported the VIKING 18 exercise organizers' delivery of Advanced Distributed Learning (ADL) capabilities into a large scale, multinational collective training event.

VIKING 18 is a 10-day civil-military exercise, held April 2018 in Sweden, and involving more than 2,500 trainees from 50 countries.

Enterprise L&D: Early Adopters Preparing to Scale

xAPI xAPRIL Spotlight:
Volume & Privacy

pwc

Sarah Lindsell
Global Chief Learning Strategist at PwC

Steve Tomlinson
Global Senior Learning Architect at PwC

How did we do it?: Where are we now?

April 2018:

Over 3 million statements so far

Over 110,000 learners who are sending xAPI statements

We are using 1 LRS system which is segmented by data for each country

Last three months increased our total by 1 million statements

Summer 2019:

We will have 250,000+ learners using it and sending xAPI

We will have a global learning analytics community of around 100 people whose role (full/part) is to look at learning data and help transform our learning

Start small and grow...this is a long journey

Outcome: Seeing What People Need vs They Tell You They Need

Clicked
Create
Delete
Downloaded
Launched
Listened
Loggedin
Opened
Paused
Read
Searched
Share
Skipped
Viewed
Watched

Searched verbs

Running training needs analysis in real-time

Using the searched verb we can analyse what people are looking for example:

- Tax legislation
- Tax processes legislation
- Excel macro creation
- Macro creation
- Coaching
- Coaching skills
- Coaching management skills

We can use this data to:

- Highlight need – see what learners want
- Match available learning to need and tag our content – dynamic curation
- Spotting holes in our learning – our gaps
- Global coverage – spotting patterns across countries, trending topics

Case Study: Caterpillar

When trying to help someone learn, the team considers these three vital questions:

1. **Where does the learner want to go?**
2. **What does the learner know?**
3. **How can we develop the individual?**

See how Caterpillar is building a modern ecosystem with xAPI to train, retain, and develop the future workforce.

Understanding LMS/CMS Activity

Expanding Video-based Analytics

Signal: Virtual Reality + ExperienceAPI

CenarioVR + EXPERIENCE API

amazon

float

AQUINAS LEARNING

"I did this…"

Scenario: Computer Vision + ExperienceAPI

**Computer Vision
in the Field**

+ EXPERIENCE API

amazon

The world's first deep learning enabled video camera for developers

AWS DeepLens helps put deep learning in the hands of developers, literally, with a fully programmable video camera, tutorials, code, and pre-trained models designed to expand deep learning skills.

Buy Now   Register your DeepLens

Scenario for 2020s: Early Adopters Embrace Experience Analytics

If we capture experience data...

EXPERIENCE API

"I did this..."
Statements

Assumption to Explore

By 2025, Experience Data Will Become Our Most Valuable Digital Asset

and Controversial

How do we approach regulations?

How do we avoid the creepy line?

How do we make sense of it?

Building a Connected Data Foundation for Innovation

Tables = Past

Graph Thinking = Future

Graph Database = Understanding Relationships + Connections
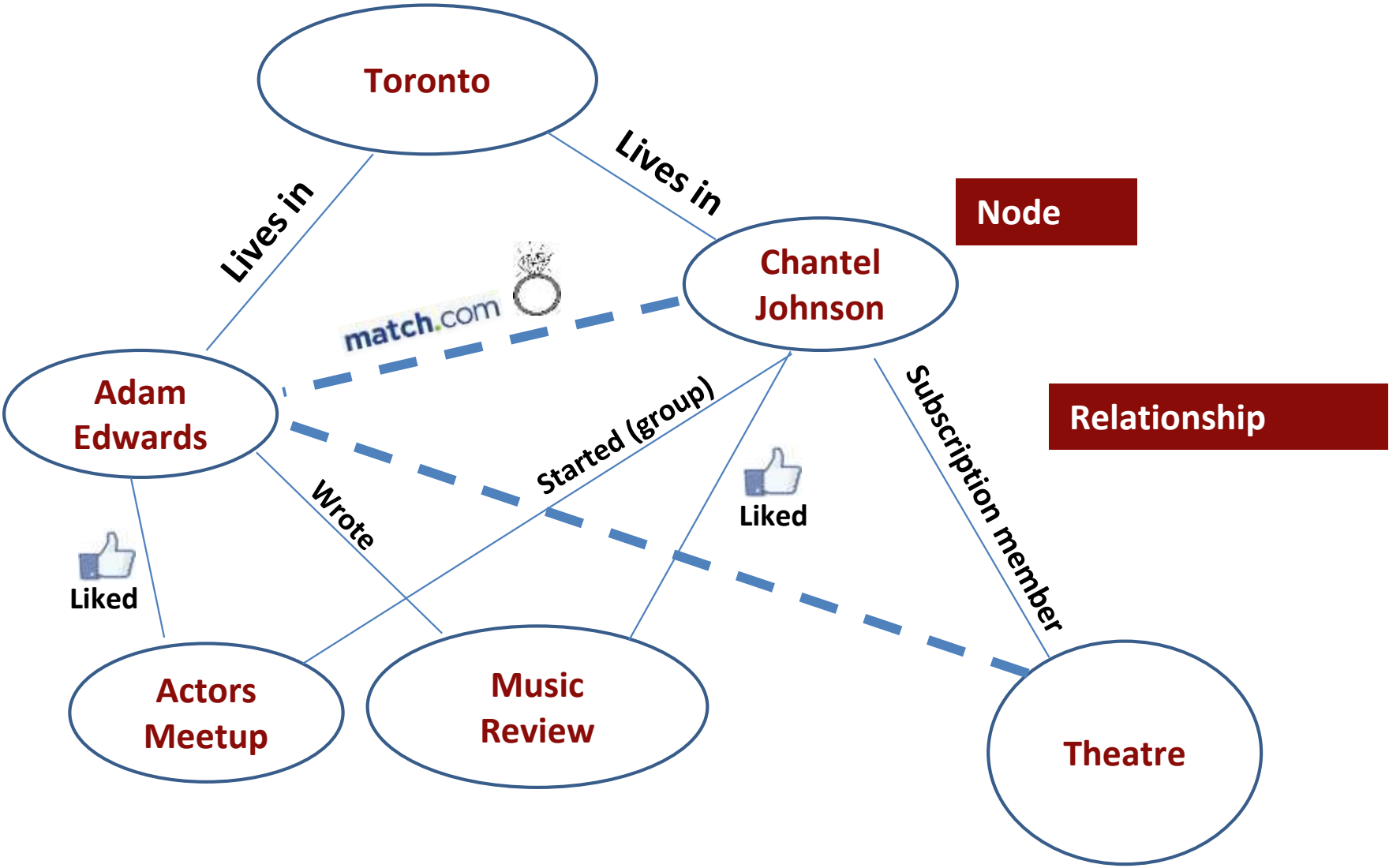
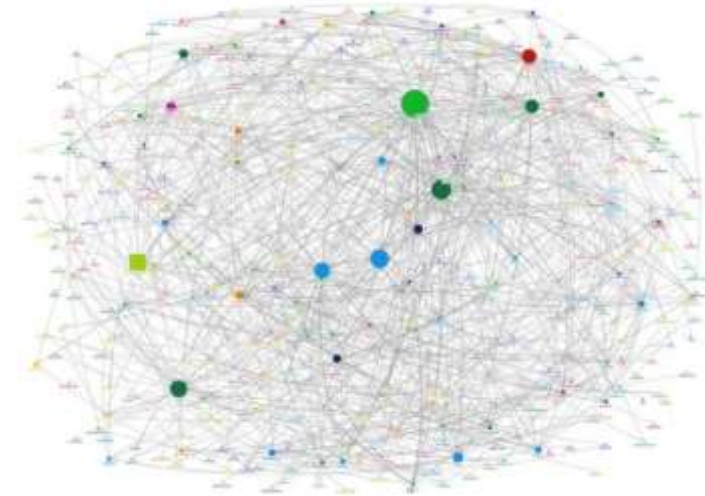# Graph Solutions for Understanding the Journey vs Outcomes
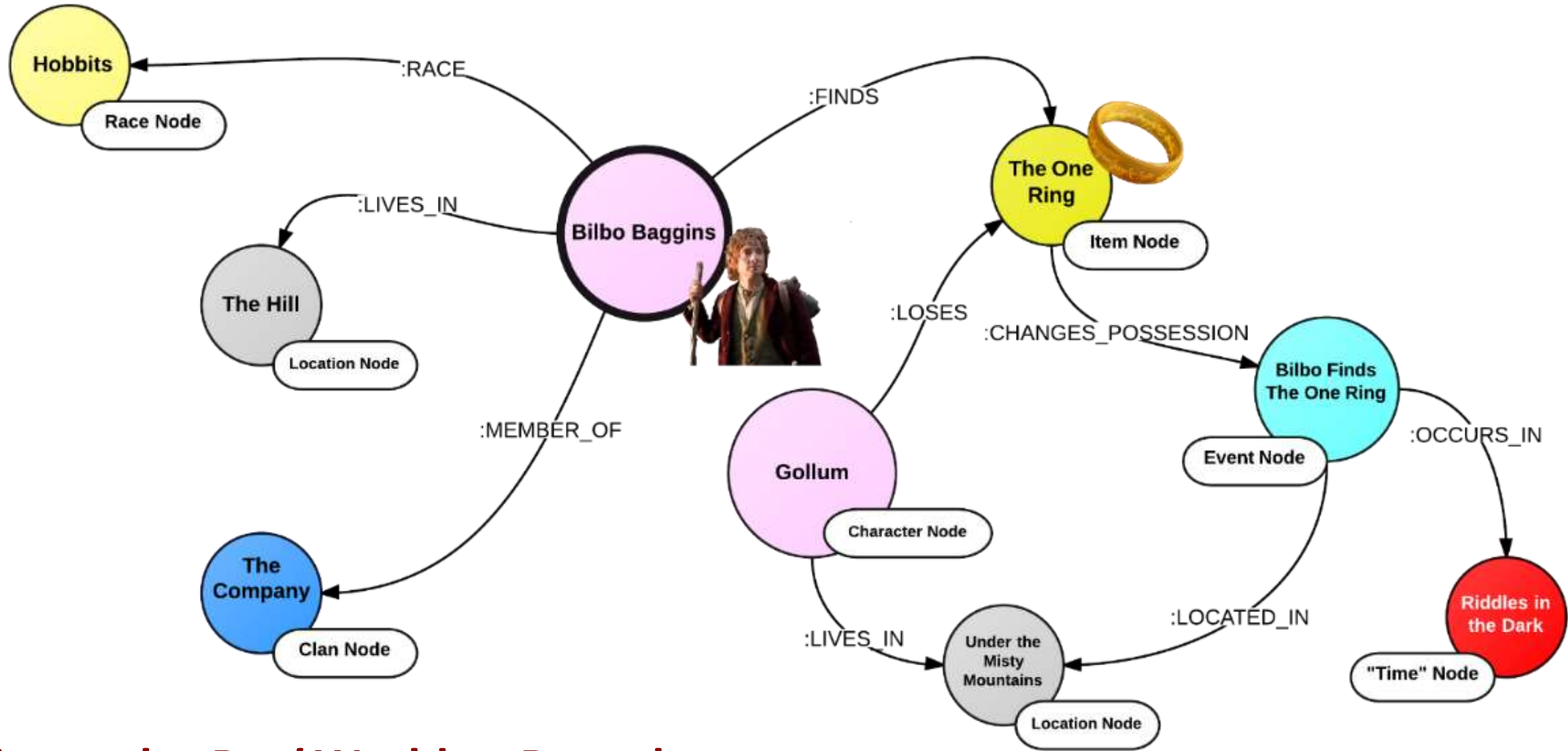
Mirrors the *Real* World to Reveal
Influencer Profiles, Decision Pathways and Recommendations

Scenario 2020s: 'Graphs' Eat the World +
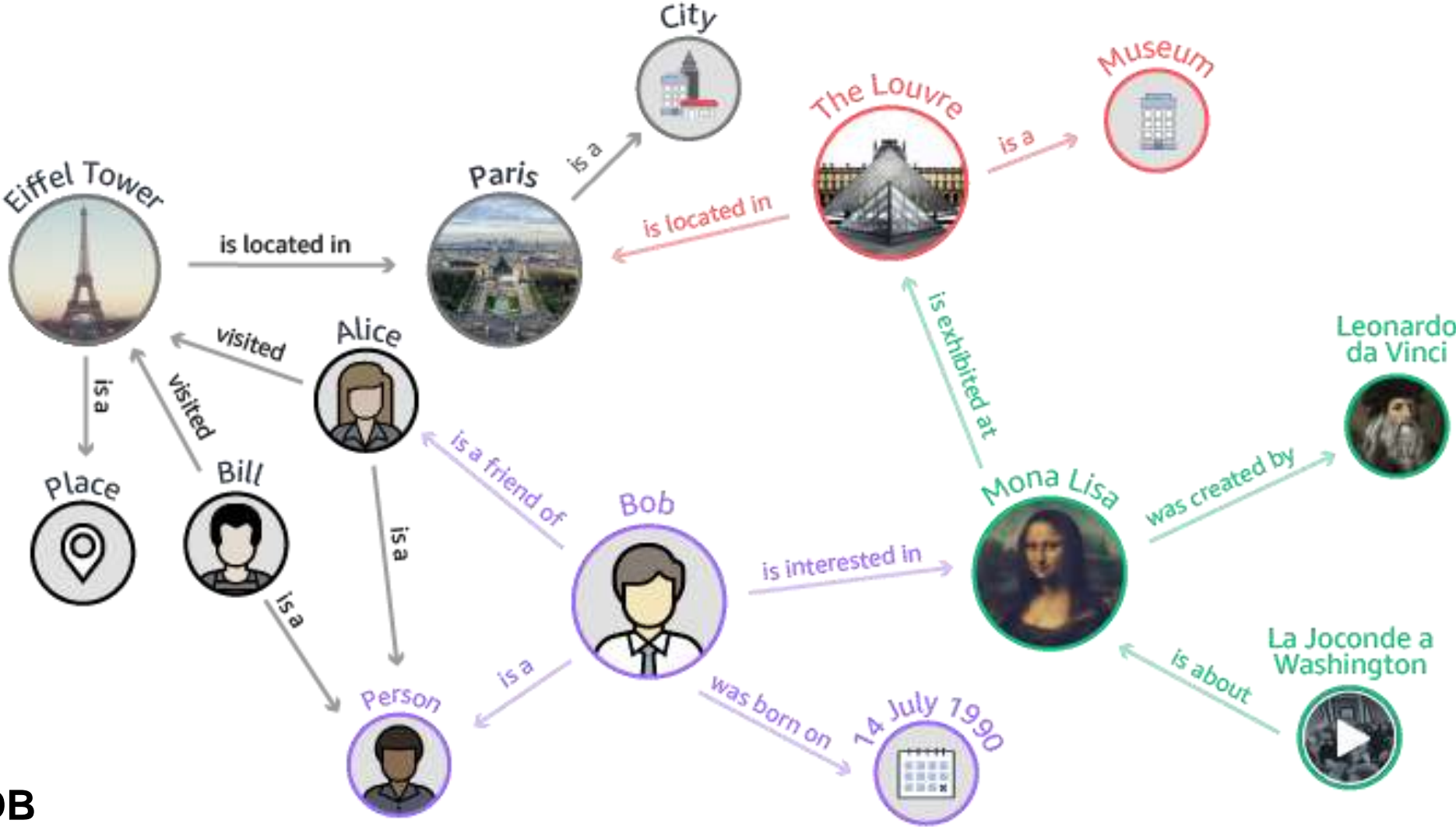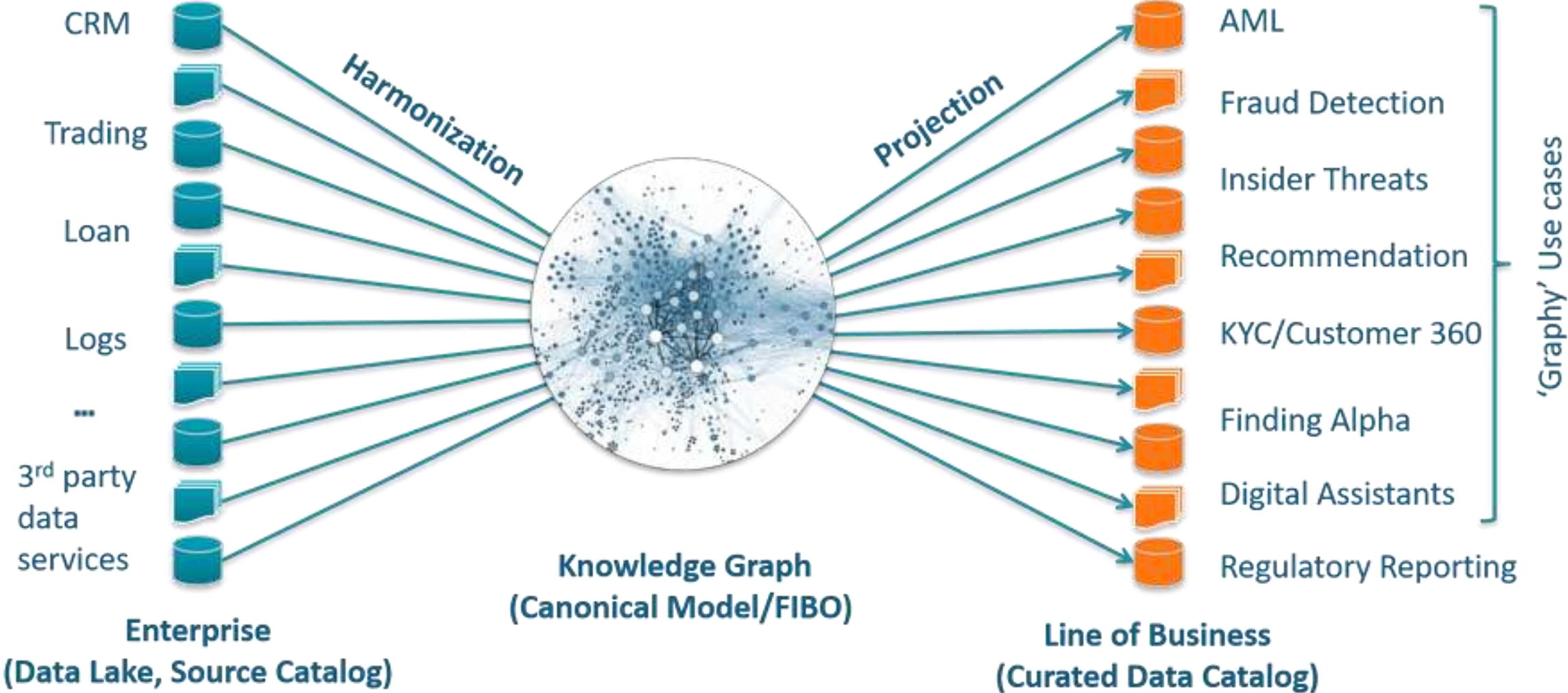### Experience Data Becomes Our Most Valuable Dataset
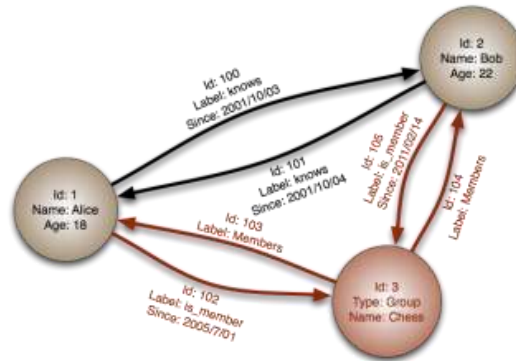
**Era of
Social Graph**

**Era of
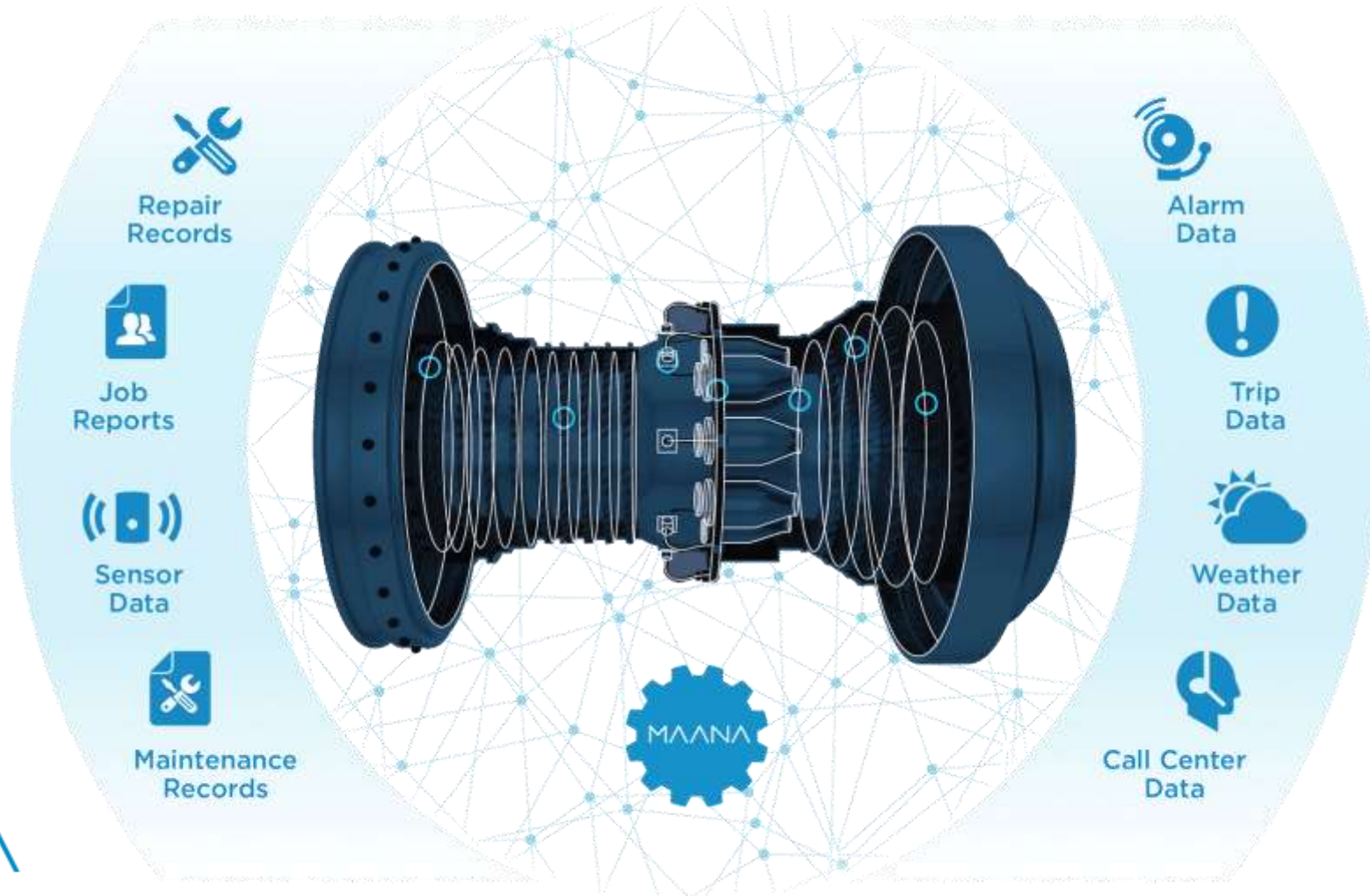Experience Graph**

Mainstreaming Solutions for IT Teams

Neptune Graph DB

Enterprise Knowledge Graphs – Connecting Silos

Enterprise (Data Lake, Source Catalog): CRM, Trading, Loan, Logs, ..., 3rd party data services — **Harmonization** → Knowledge Graph (Canonical Model/FIBO) — **Projection** → Line of Business (Curated Data Catalog): AML, Fraud Detection, Insider Threats, Recommendation, KYC/Customer 360, Finding Alpha, Digital Assistants, Regulatory Reporting — 'Graphy' Use cases
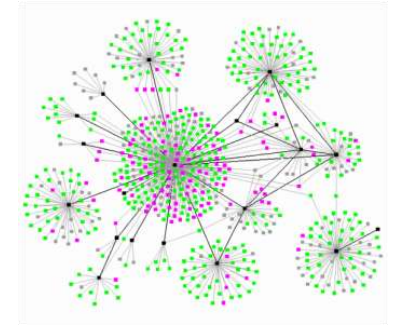
End Game = Connecting Knowledge Graphs & Experience Graphs

Maana Knowledge Graph

How might an *Graph Analytics* be applied…

- ❑ **Knowledge Graphs**
  Organizational Capabilities;
  Protocols & Procedures

- ❑ **Risk Management Graphs**
  Integration of Data Silos;
  Threat Detection/Assessment;
  Security Controls

- ❑ **Automation & AI**
  Preparing Operational Data
  for Machine Readable Age

- ❑ **AI Driving Performance Support**
  Context-based Training,
  Moving to Model of
  Performance Support

Learning Curve

Experience Analytics
Learning Record Stores
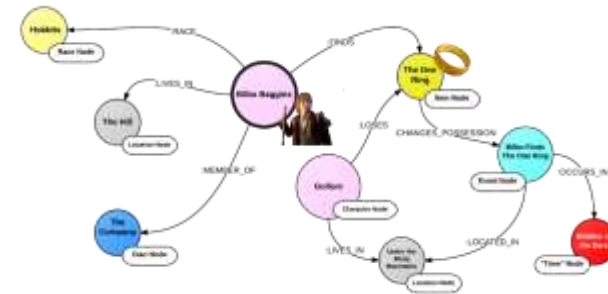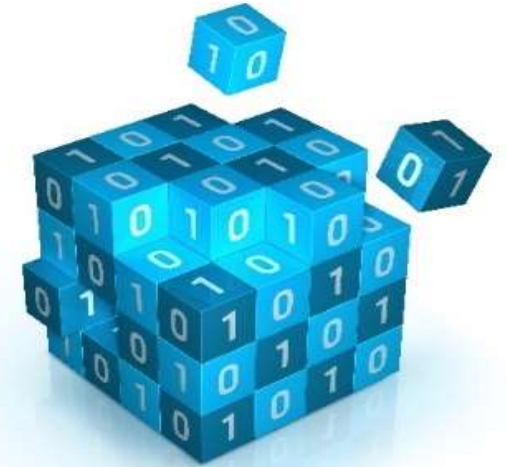
Graph Analytics

**Organizational Opportunities
& Challenges in an Era of
Experience Data-led Changes?**

+ Graph
Analytics

Blockchain,
Smart Contracts
& Tokenization

**Rethinking Societies + Organizational Dynamics
via Trusted Transactions and Programmable Assets**

The Hype and Enthusiam...

World Economic Forum Survey Projects Blockchain 'Tipping Point' by 2023

By 2025, 10% of Global GDP will be orchestrated by blockchain applications.

Remember, It Was Hard to Explain the Internet in 1994

0:13 / 1:26

1994: "Today Show": "What is the Internet, Anyway?"
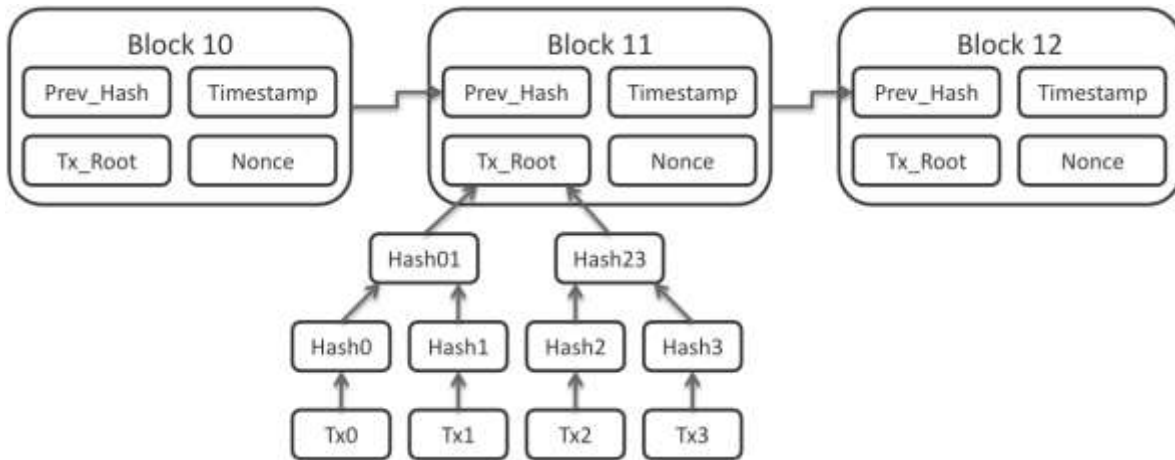
Evolution of the Web

**Internet of
Files**

**Internet of
Social Networks**

**Internet of
Trusted Transactions
(+ Programmable Assets)**

In Records (& Smart Contracts) We Trust

Network Consensus on who did what...

Ledger of Keys & Asset Transactions

A sample of EtherScript

Smart Contracts for Business Process Automation!

T = 0

Development Platforms for Applications

Public

Private

Peer to Peer Transaction Marketplaces

Decentralized exchanges to disrupt* the third-party while opening up service stack
for new value driven services. *Low fees may still apply.*

iTunes without iTunes
Smart Contracts
disperse payments

Uber without Uber
Distributed Ridesharing

ebay w/o ebay
Distributed
Marketplace

*Peer to Peer
Energy Trading*

Disruptors will be trying to build ecosystems to disintermediate *Big Tech*

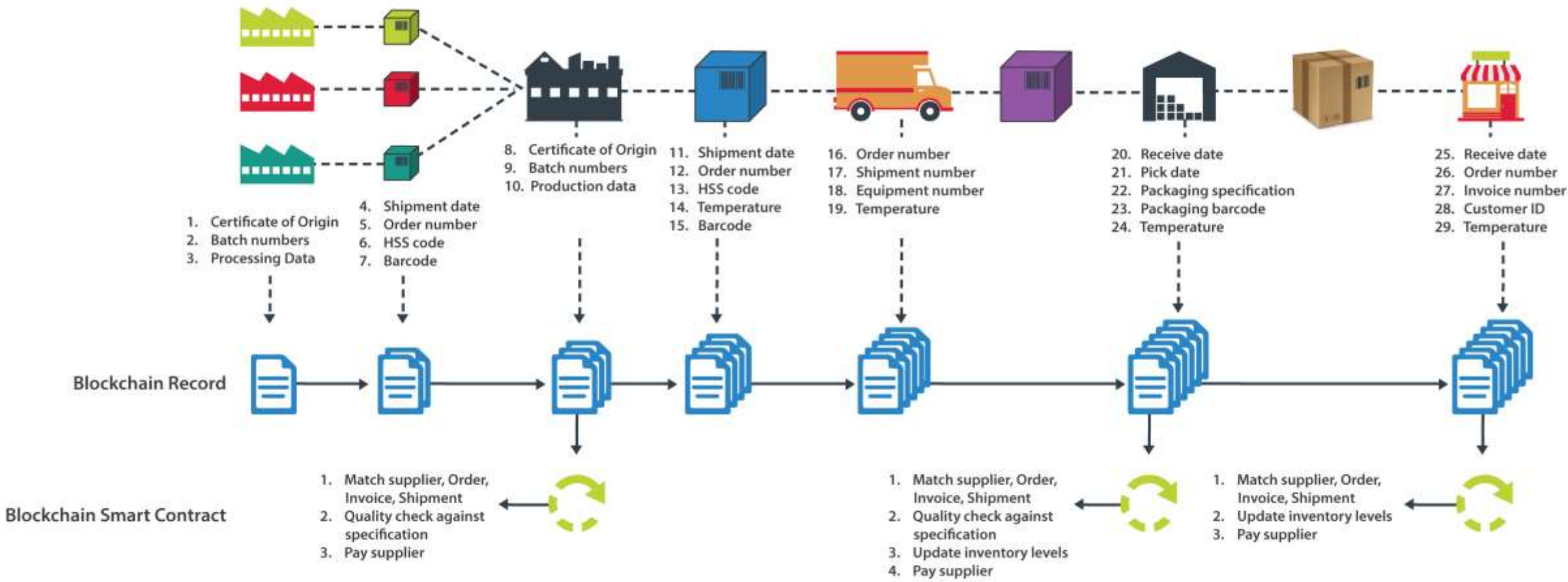# Real Estate Asset Tokenization: Unlocking Access

The first real estate backed token paying out dividends

Leaseum Partners introduces a new model of blockchain based real estate investments that will combine the best of both real estate investment management & blockchain worlds, making it significantly more attractive for investors.

Bespoke dividends paid in Fiat $ € or in Crypto

Tokenizing property will allow real estate assets to be uniquely identified via a digital record that contains information regarding occupancy, physical characteristics, legal status, historical performance, and financial position.

Supply Chain Coordination, Transparency & Settlement

1. Certificate of Origin
2. Batch numbers
3. Processing Data
4. Shipment date
5. Order number
6. HSS code
7. Barcode

8. Certificate of Origin
9. Batch numbers
10. Production data

11. Shipment date
12. Order number
13. HSS code
14. Temperature
15. Barcode

16. Order number
17. Shipment number
18. Equipment number
19. Temperature

20. Receive date
21. Pick date
22. Packaging specification
23. Packaging barcode
24. Temperature

25. Receive date
26. Order number
27. Invoice number
28. Customer ID
29. Temperature

Blockchain Record

Blockchain Smart Contract

1. Match supplier, Order, Invoice, Shipment
2. Quality check against specification
3. Pay supplier

1. Match supplier, Order, Invoice, Shipment
2. Quality check against specification
3. Update inventory levels
4. Pay supplier

1. Match supplier, Order, Invoice, Shipment
2. Update inventory levels
3. Pay supplier

AQURUS

Signals in Healthcare: Clinical Trials (Compliance)

Boehringer Ingelheim (Canada) Ltd. and IBM Canada Announce First of its Kind Collaboration to Integrate Blockchain Technology into Clinical Trials

Blockchain technology has the potential to improve trust, transparency, patient safety and patient empowerment in clinical trials

Blockchain: Legal (Contract) Agreements Framework

Blockchain: Digital Infrastructure as Service

Waves raises $120 million to integrate blockchain into corporate and government digital infrastructure

By East-West Digital News / December 21, 2018

Waves, a Blockchain solutions developer founded by a Russian team and incorporated in Switzerland, has secured $120 million to develop its project Vostok.

Designed for large enterprises and public institutions, this private blockchain platform "lies at the intersection of several disruptive technologies, including blockchain, Big Data, artificial intelligence and the industrial Internet-of-Things," according to Waves founder Alexander (Sasha) Ivanov.

Unlocking Ability for Data Scientists to Deliver Insights

NUMERAI

The stock market is inefficient with respect to new developments in machine learning — only a fraction of the world's data scientists have access to its data. Numerai is changing this.
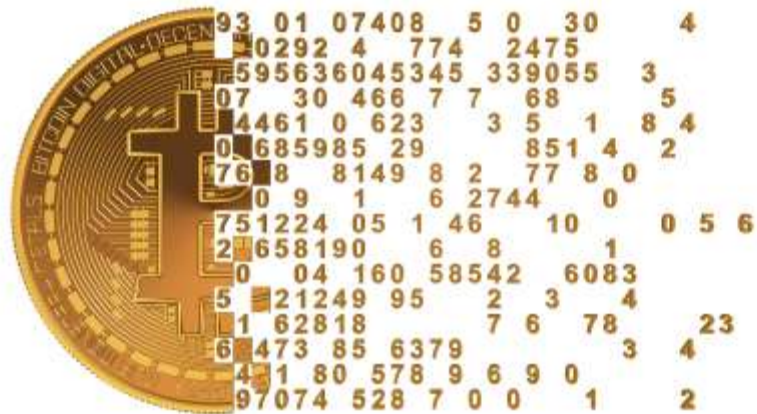
Learn more in Encrypted Data for Efficient Markets

Because Numerai abstracts its financial data, data scientists do not know what the data represents and human biases and

Radical Idea:
We tap 'crowd' to generate insights into operational & strategic decisions

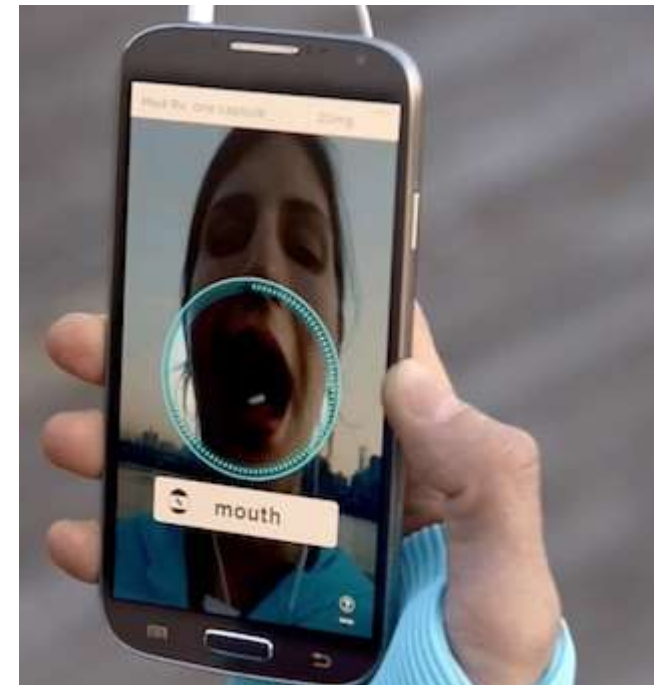# Future: Crypto Currencies Tied to Behavior Change

Incentivized Patients...

Crypto Currencies + Smart Contracts
Automate Incentives for Adherence

Radical Idea:
We create crypto economic incentives to drive performance outcomes

Tipping Points? Keep an Eye on Hardware Solutions

Samsung Unveils Cryptocurrency Wallet, DApps for Galaxy S10 Phone

Token

Sirin Labs' $1,000 cryptocurrency phone arrives this November

When might your organizations embrace crypto hardware solutions?

Society-level Implications: 2020 -2035

**Blockchain,
Smart Contracts
& Tokenization**

❑ Accelerating the Disintermediation of
  Financial Institutions (OECD vs Emerging Economies)
❑ Drive operational efficiencies and integration
❑ Elevate 'peer to peer' culture
❑ Media – Verification & Authentication layer
  (Countering a world of 'deep fakes')
❑ *Unknown Unknowns*

Assumption to Explore (even if it confusing!)

By 2024 *military and government organizations* will begin to use *blockchain* infrastructure for decentralized applications (DApps)
and *smart contracts* to:

- ❑ Reduce operation costs
- ❑ Drive collaboration and operational integration
- ❑ Transform *stakeholder* experiences (Incentive Behavior Change)
- ❑ Confront cybersecurity issues
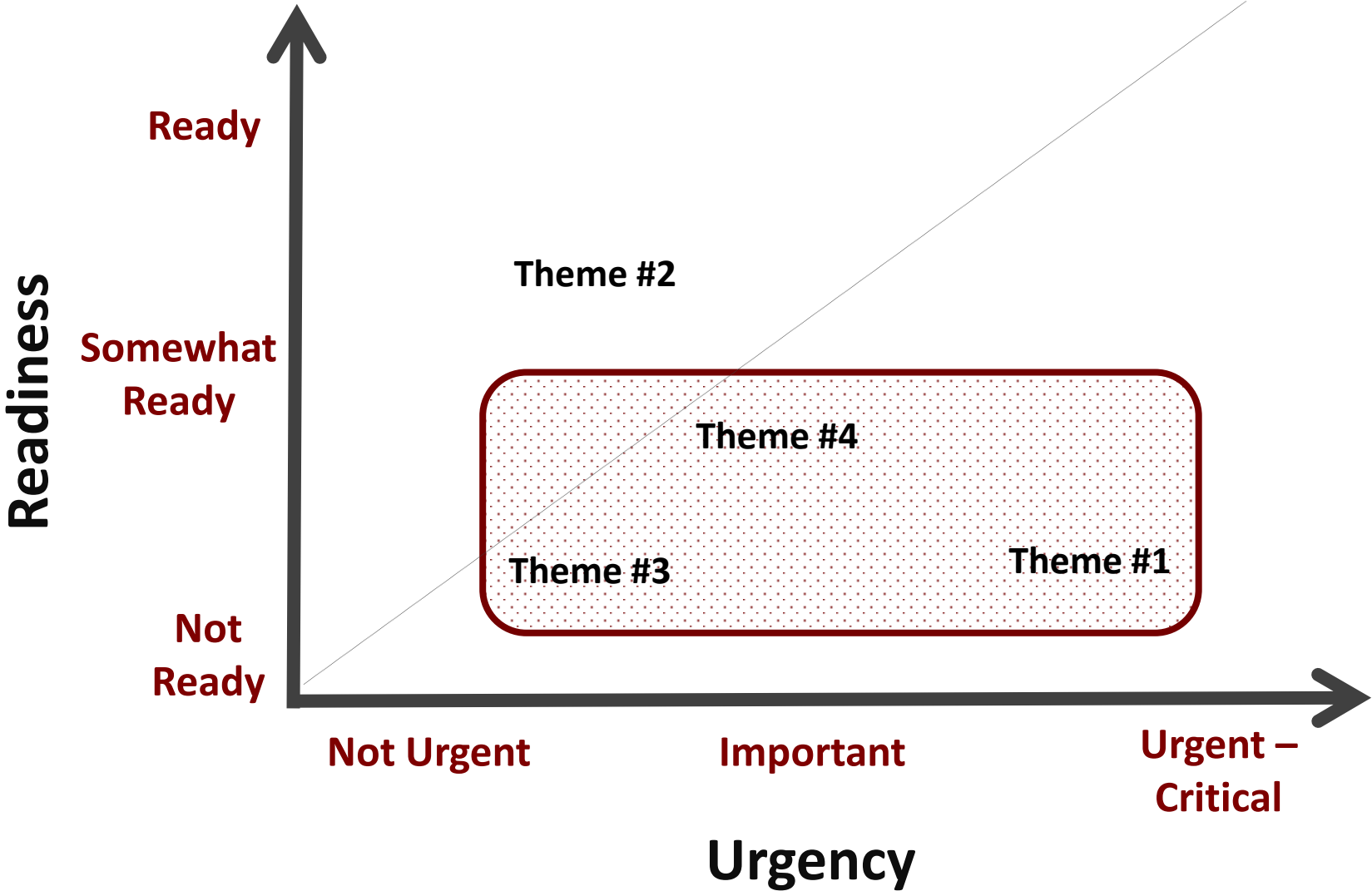- ❑ Integrate into peer-to-peer community marketplaces and data exchanges

End

Next Steps

Take a Pulse Check on Emerging Trends vs Organizational Appetite
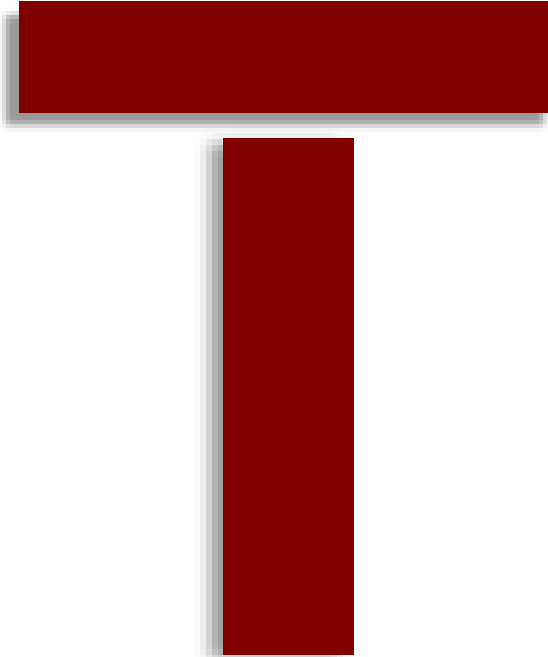
Top Trends/Themes

1)

2)

3)

4)

5)

Readiness

Ready

Somewhat Ready

Not Ready

Theme #2

Theme #4

Theme #3

Theme #1

Not Urgent

Important

Urgent – Critical

Urgency

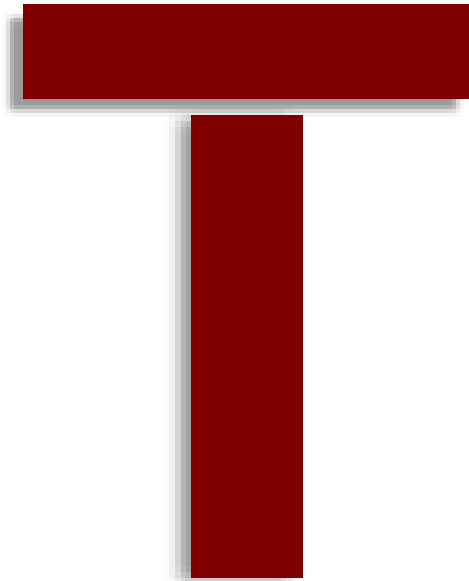# Launch Conversation on Who do we want to be...?

"I" Shaped Person
Success via Specialization

"T" Shaped Person
Success via Integration

What do we want to be as T-Shaped Individuals?

"T" Shaped
Professional Community

Also Trained in ....?

Ethics	Psychology
Behavior Science	Data Science
Cyber Security	Crypto / Blockchain
Aging	Restorative Practice
Systems Thinking	_____
Experience Design	_____
Service Design	_____

In Five Years…

Generate weekly questions that spur conversations about the future of your organization.

In five years

… what is a function, department or role that does not exist today but will deliver our most innovative solution?

… which non-traditional organization becomes our most valued partner?

What is the biggest risk we should take over the next five years to align our organizations to this emerging world?

Garry Golden

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PDF: garrygolden.com/March27
    Two Rs

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