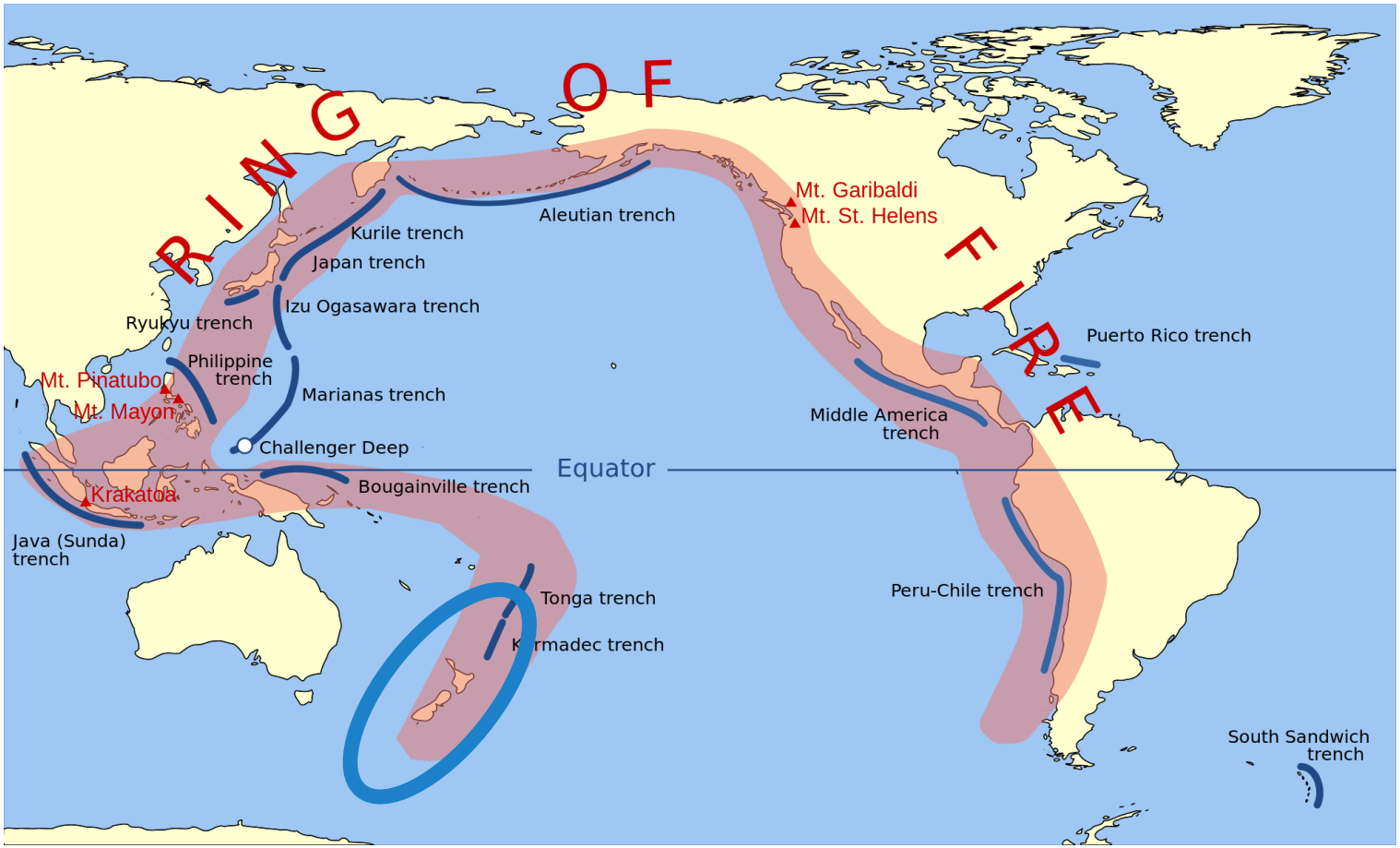
Building on Shifting Ground

Chris Hartshorn, Ph.D.
Chief Research Officer

May 10th, 2016

luxexecutivesummit
Boston, MA · May 9 - 11, 2016

I know a thing or two about moving ground



LES opening keynote traditions

- [x] New Zealand reference
- [ ] Don't antagonize the audience

vs.

Agenda

- Keeping pace with external forces
- Gathering and acting on intelligence
- The new innovation force

Frederick was great, in his day…

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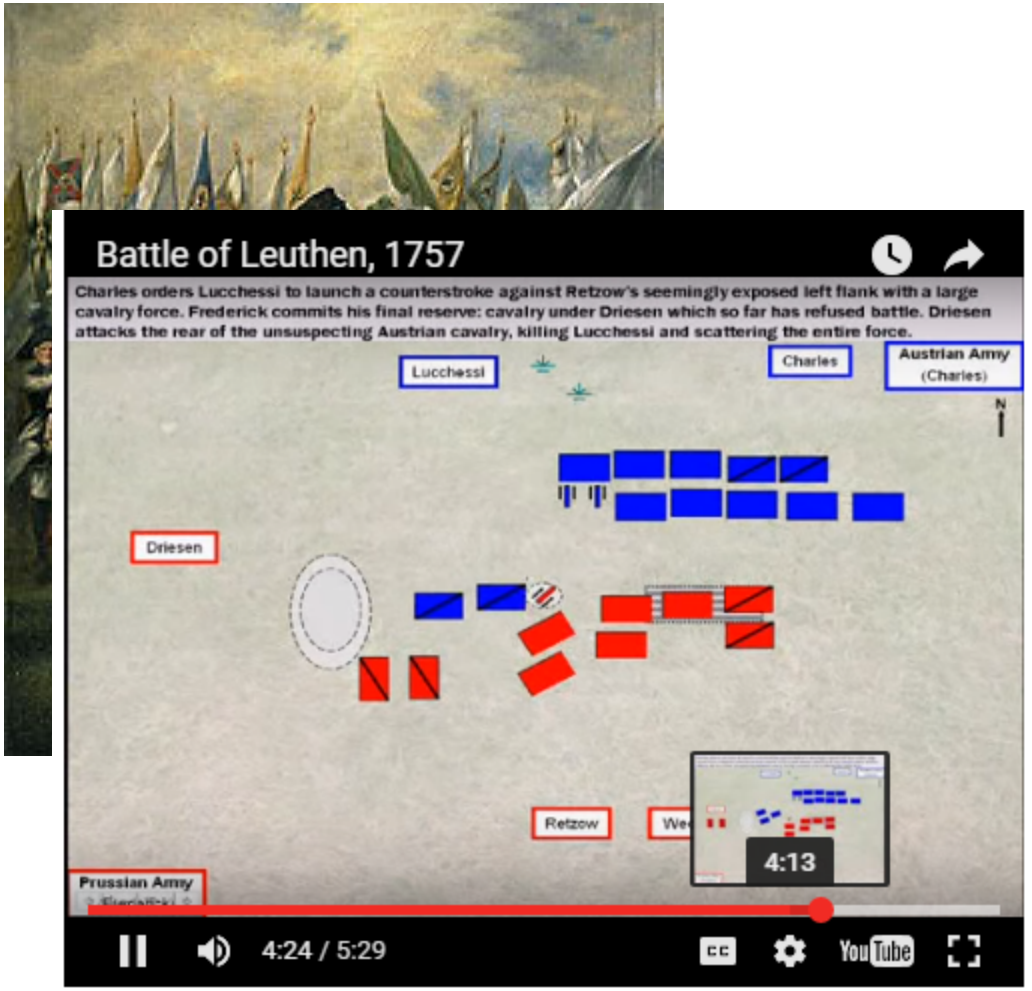
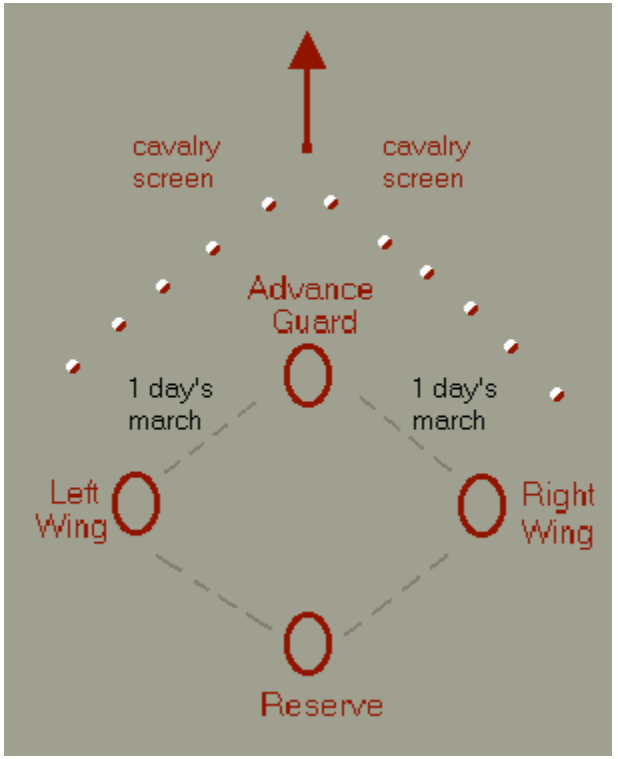
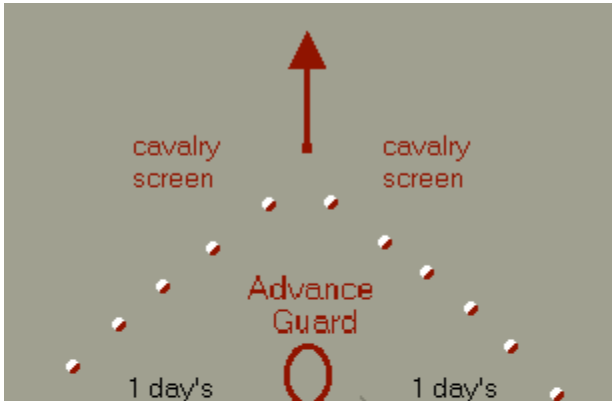


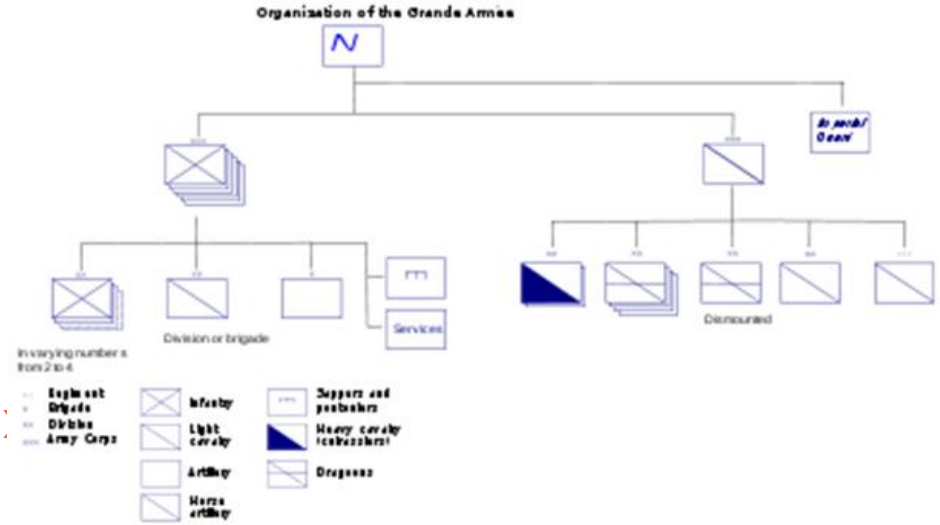
…but times changed



- Napoleonic warfare was characterized by "…its limitless variation and flexibility."

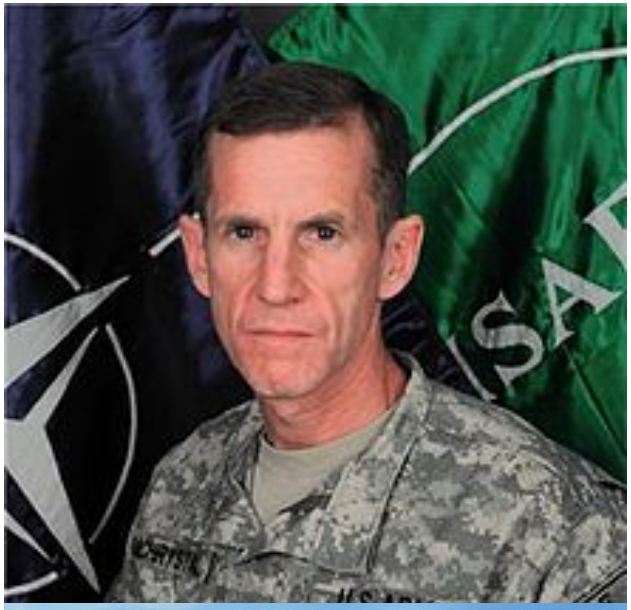
…but times changed





Necessity is the mother of invention…

…but new necessities emerge



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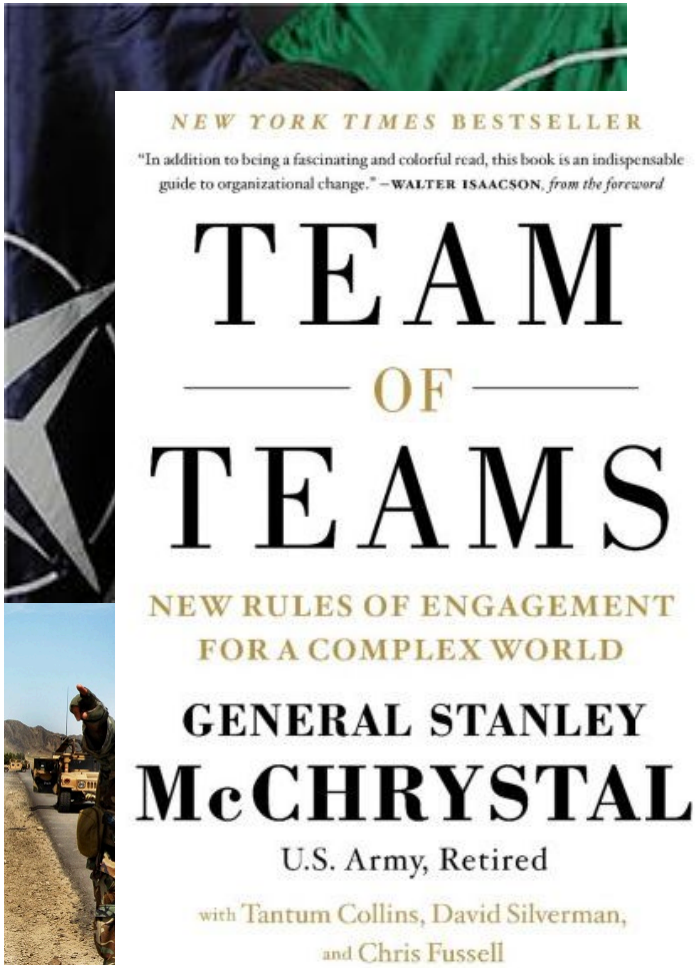
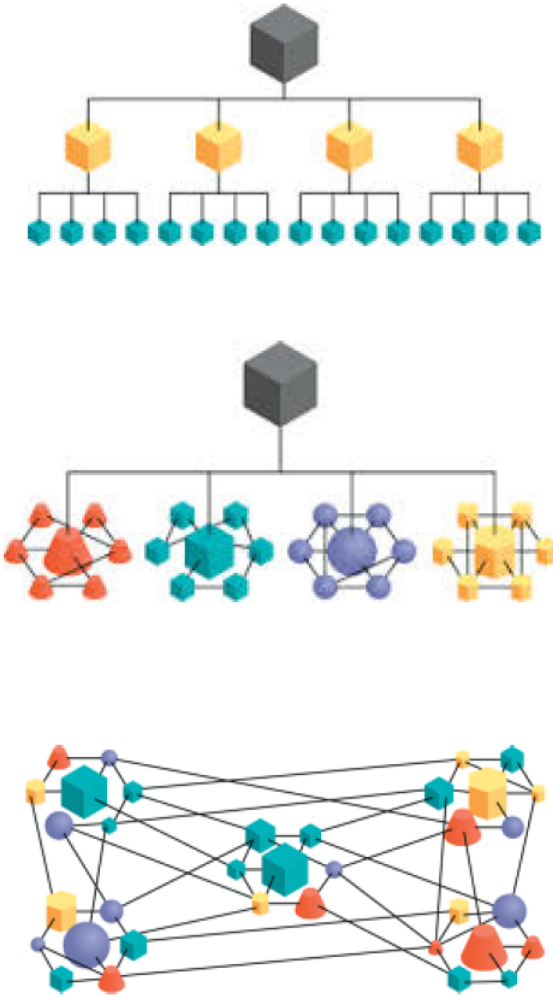




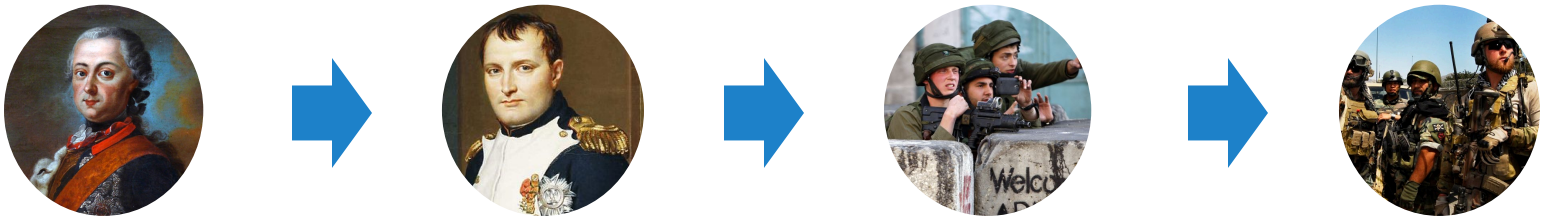
Adapting an old institution to a new reality

- See the theater
  - Knowing when an important broad-based change or trend is reality
- Design for effect
  - Changing the force: products, processes and people

Agenda

- Keeping pace with external forces
- **Gathering and acting on intelligence ("See the Theater")**
- The new innovation force ("Design for Effect")

Before figuring out what will win, figure out what is happening



- See the theater
  - Knowing when an important broad-based change or trend is reality

Seeing the corporate theater: acting on aggregated observation

ecomagination

- "The CEO was surprised to learn how many business units of GE were pursuing environmental initiatives independent of one another."

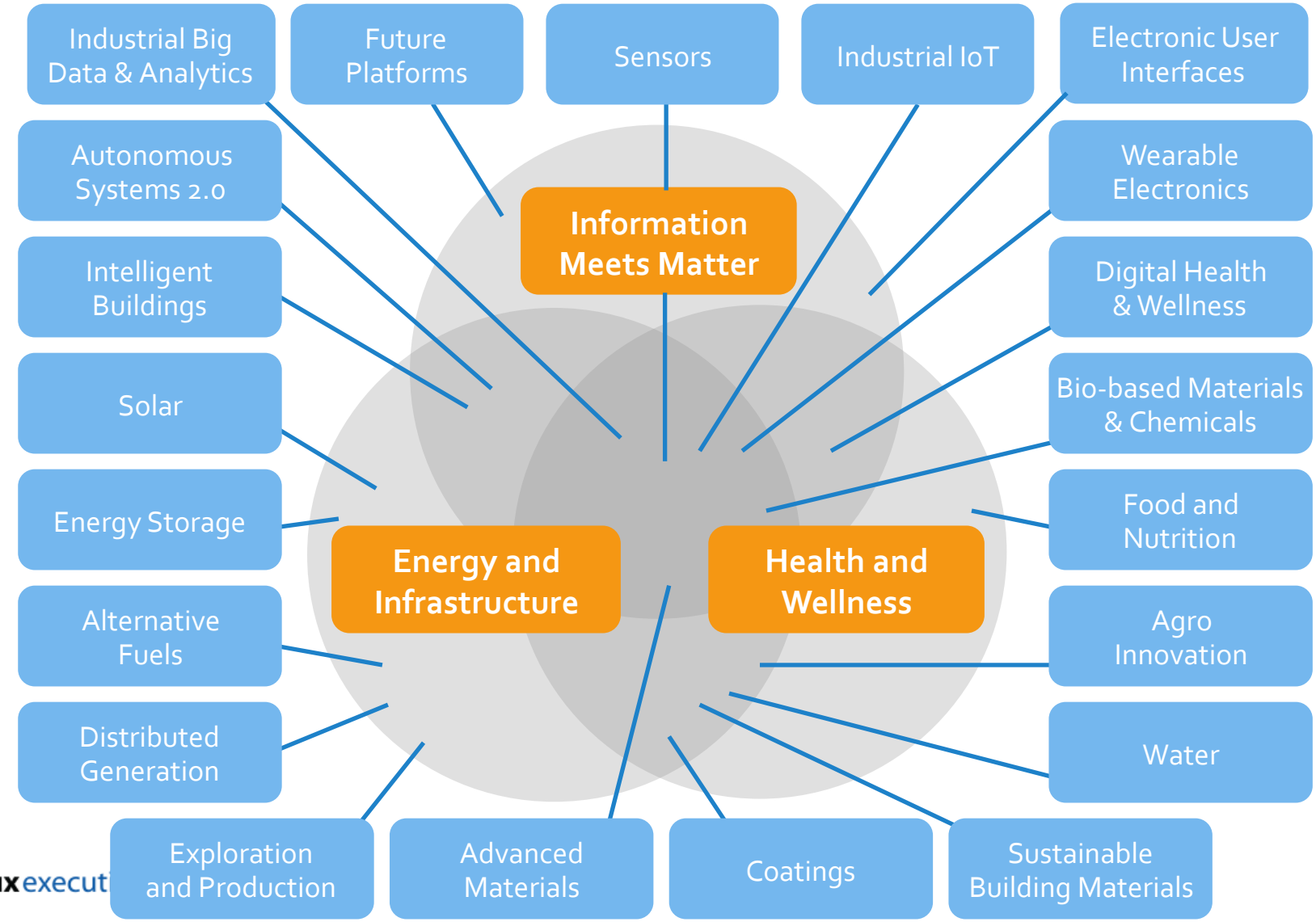
P&G connect + develop℠

- "After studying the performance of a small number of products we'd acquired beyond our own labs, we knew that external connections could produce highly profitable innovations"

IBM

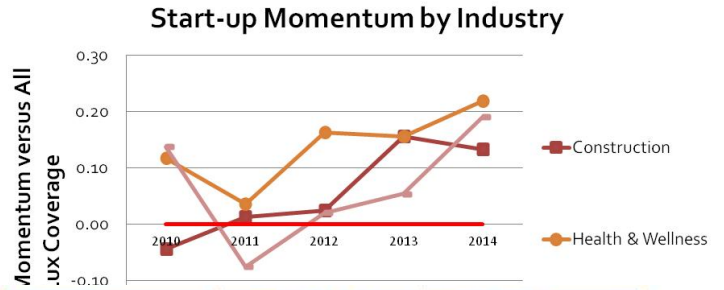
- "…surfaced from observing what was happening in our clients, because what we were seeing for several years before we actually launched Smarter Planet were clients coming to us with these kinds of projects"

How about the Lux theater?

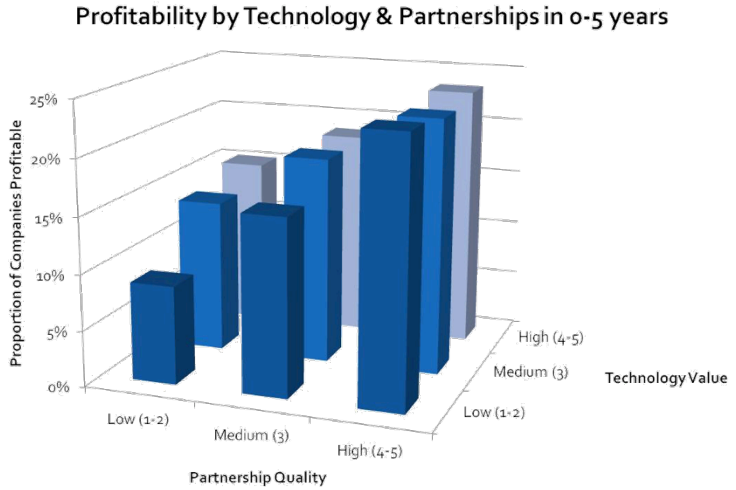


The quantitative approach

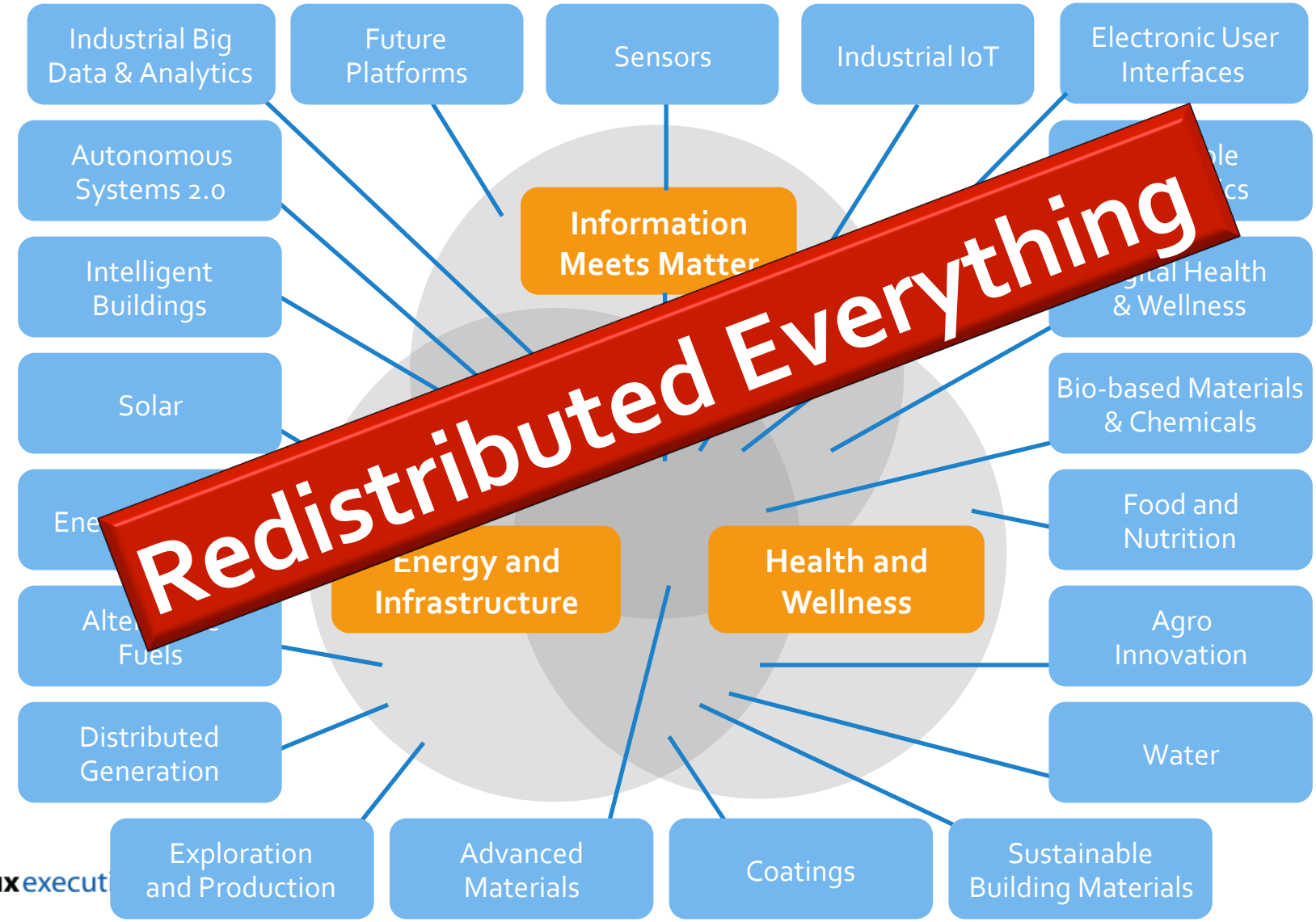
- Markets: Growth Scouting
- Companies: Innovation Hunting
- Execution: Success Factors



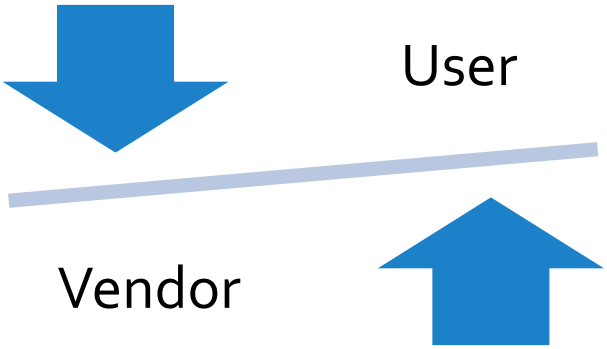
A company with...	...is ___ as likely to be successful as...	...a company with...
A positive Lux Take	4X	A cautionary Lux Take
A positive Lux Take	2X	No Lux Take considered
A strong management team (4-5)	4X	A weak management team (1-2)
Strong momentum (4-5)	2.5X	Weak momentum (1-2)
Strong partnerships (4-5)	2X	Weak partnerships (1-2)
Low barriers to entry (4-5)		



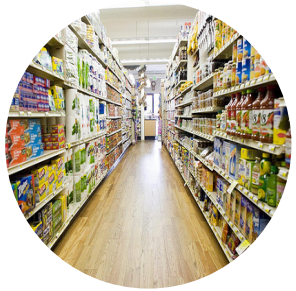
The qualitative view delivers an even bigger demand for change…

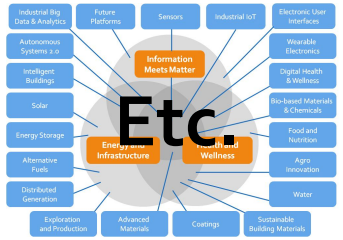


The shifting ground of Redistributed Everything



- More intelligent, integrated solutions emerging that attack…
  - Products vs. Services
  - Hardware vs. Software
  - Fixed Cost vs. Variable Cost
  - CapEx vs. OpEx
  - Scale vs. Custom/Convenience
- …to improve the value of the solution for the user





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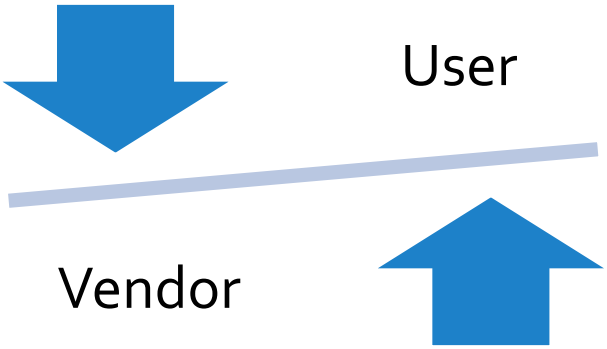

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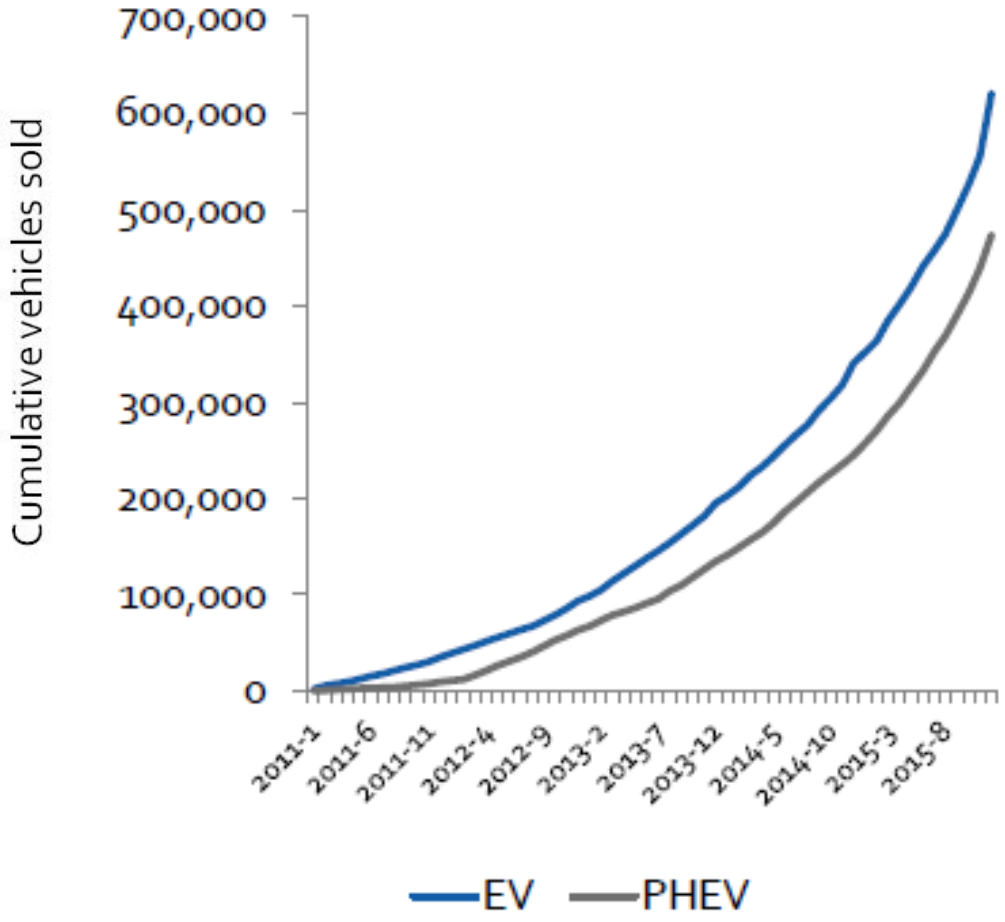
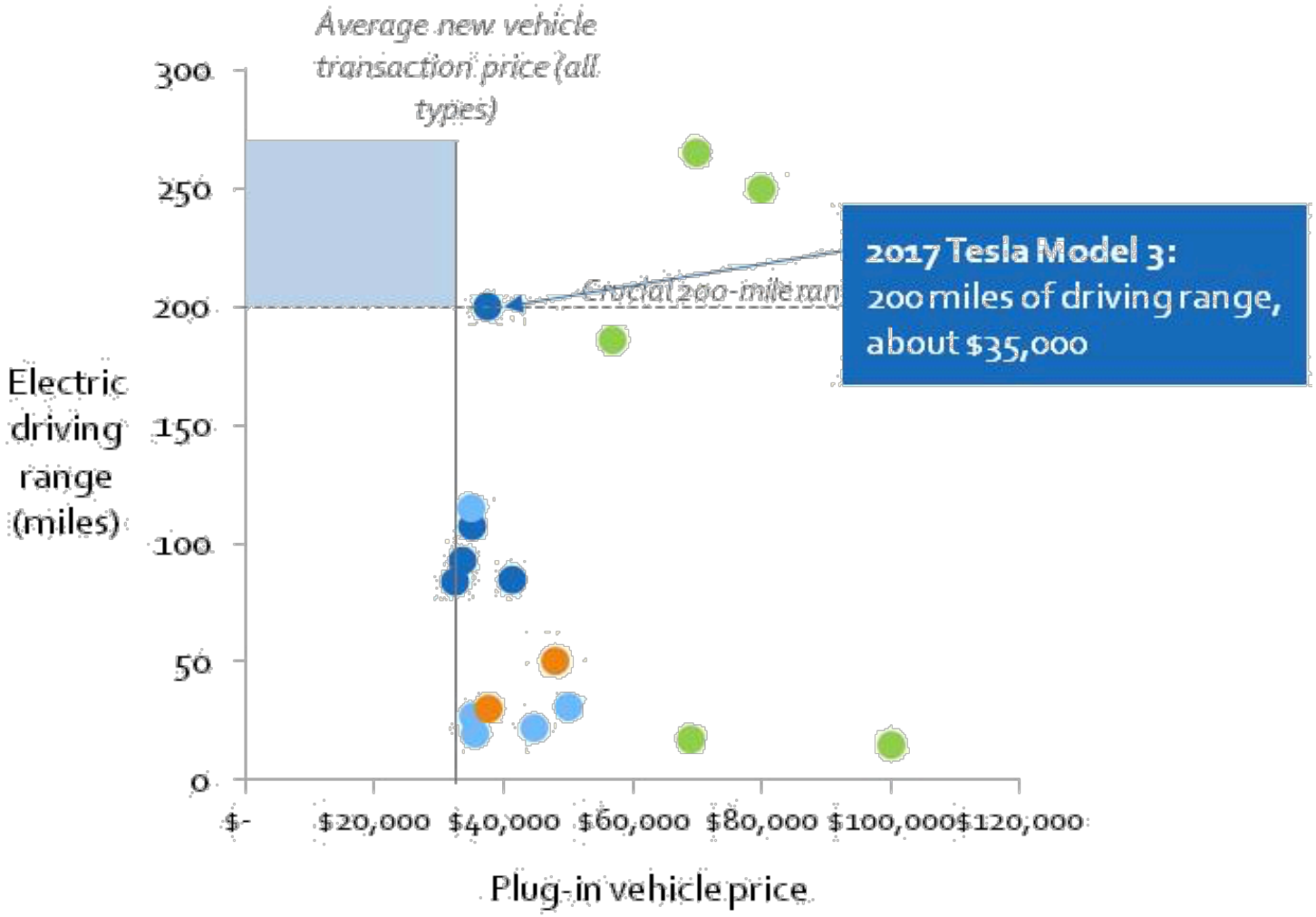
Redistributing Automotive may as well start with what powers it



Critical factors for accelerating EV adoption are lining up



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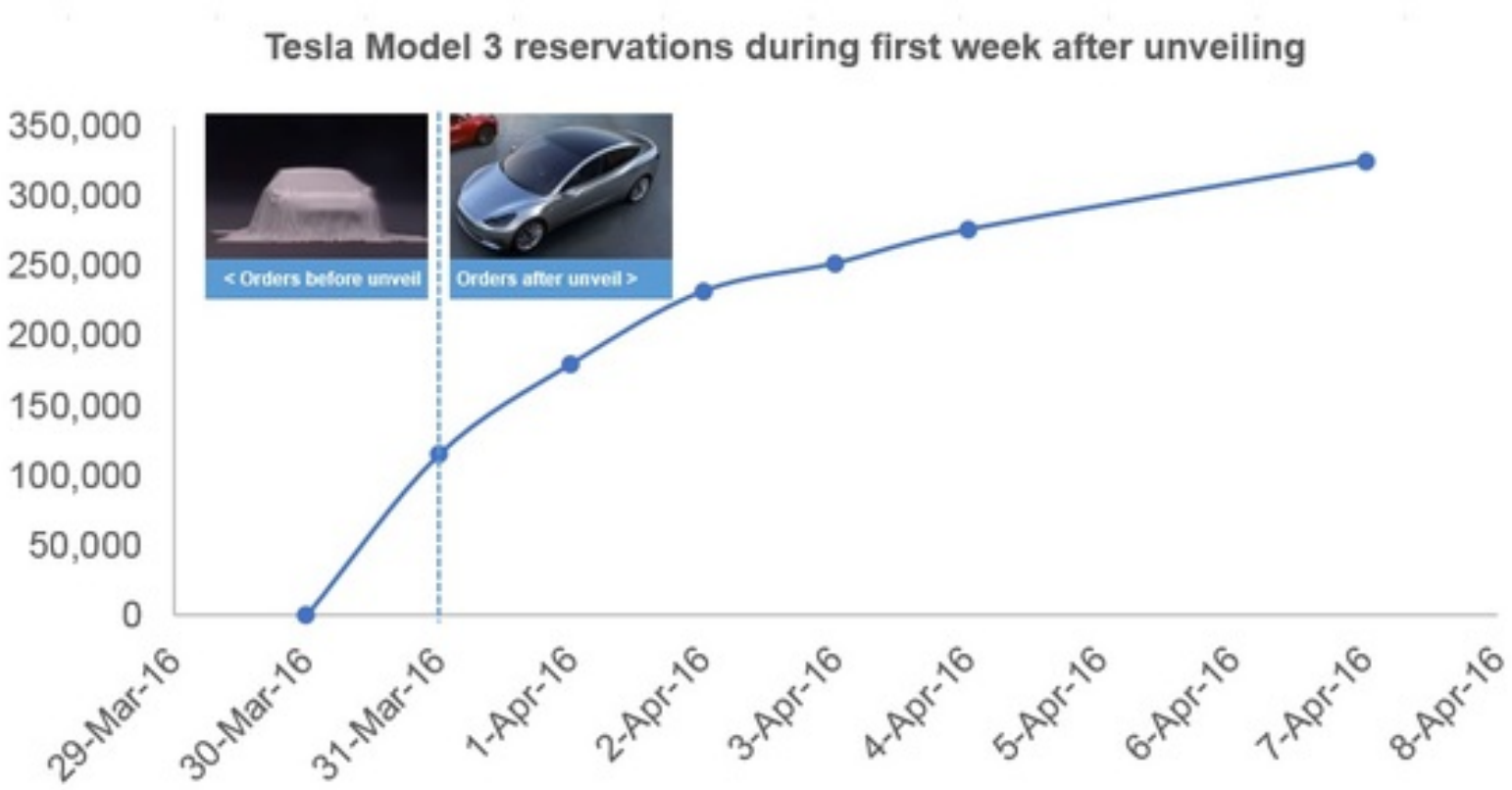

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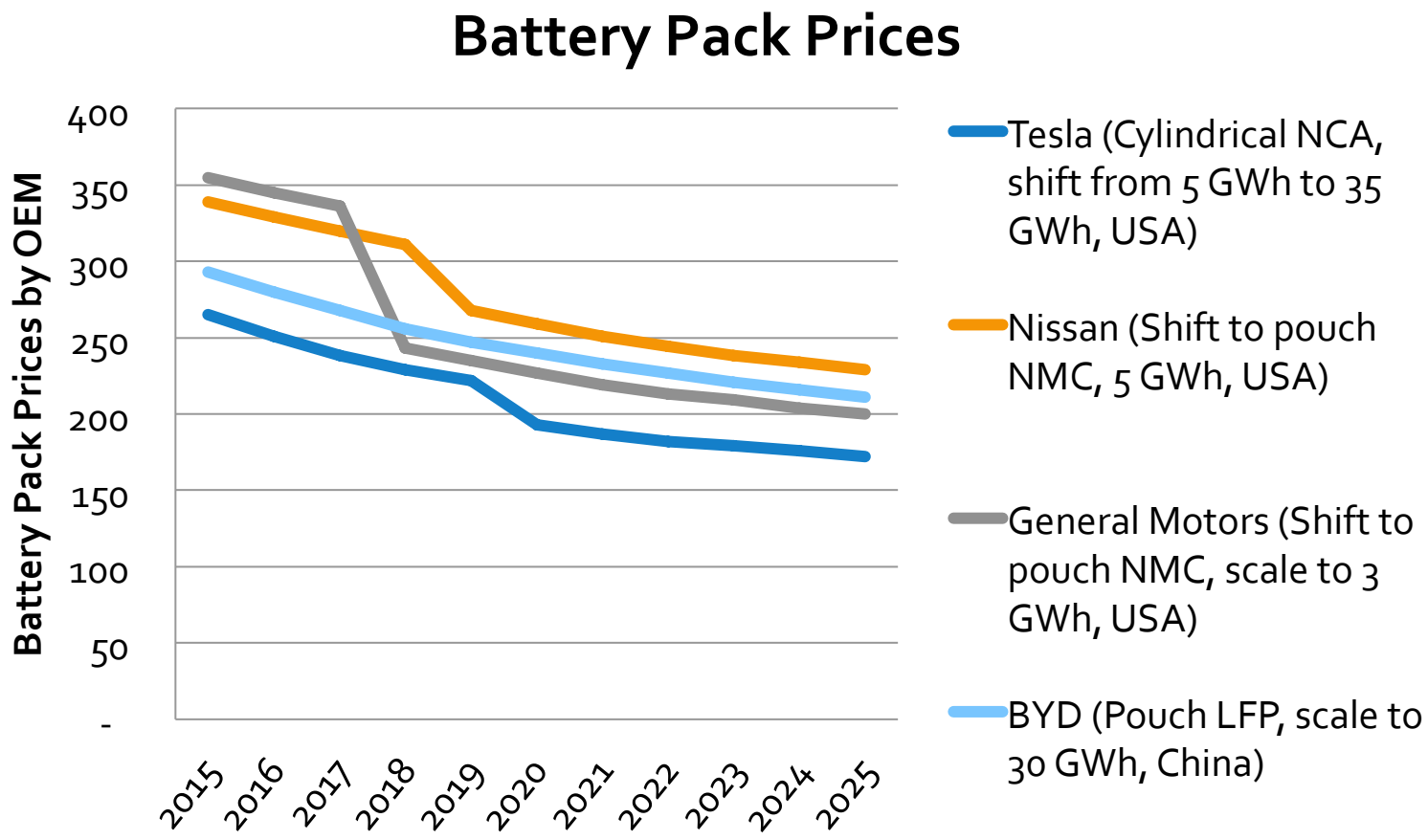
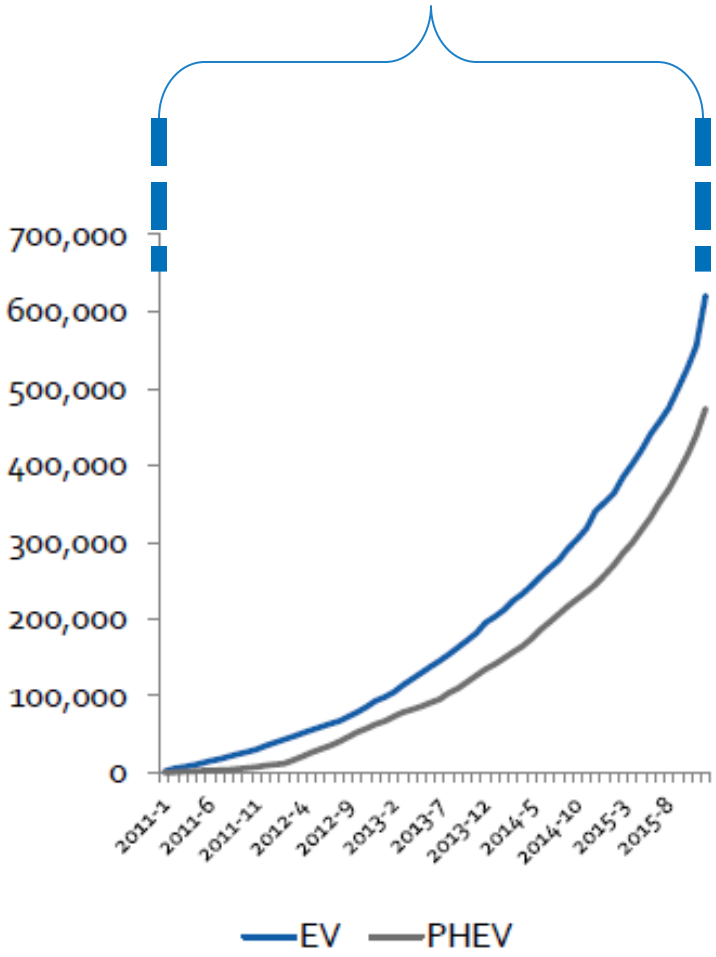
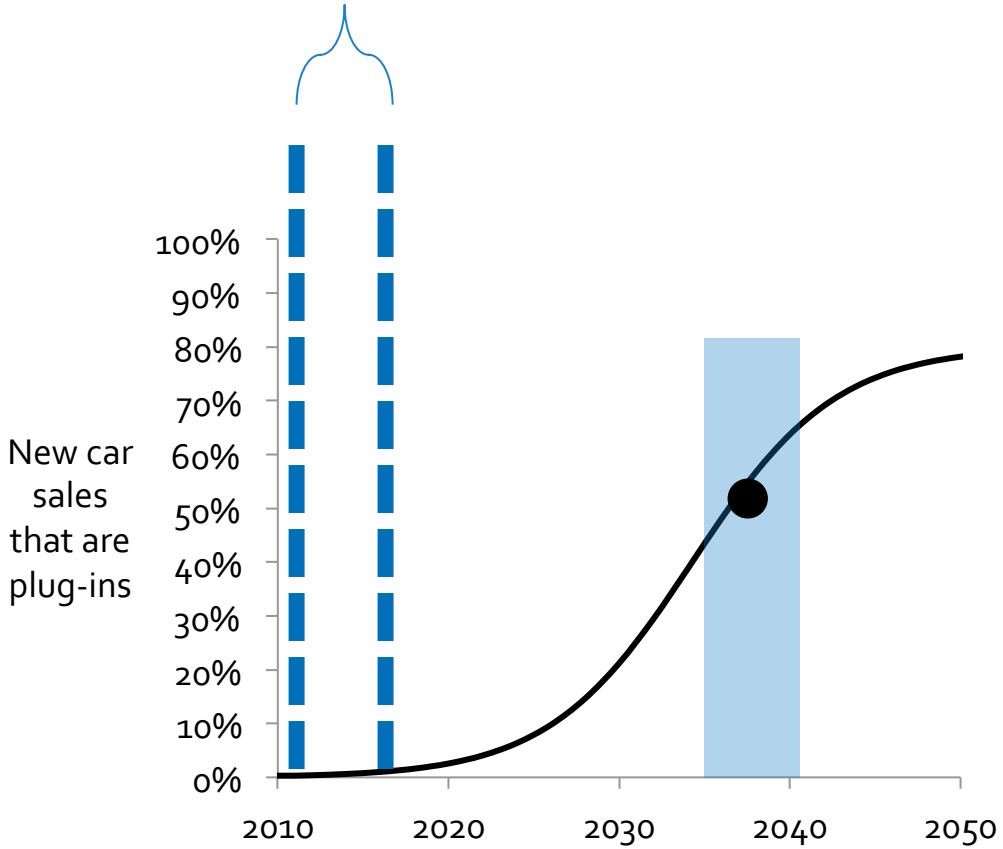
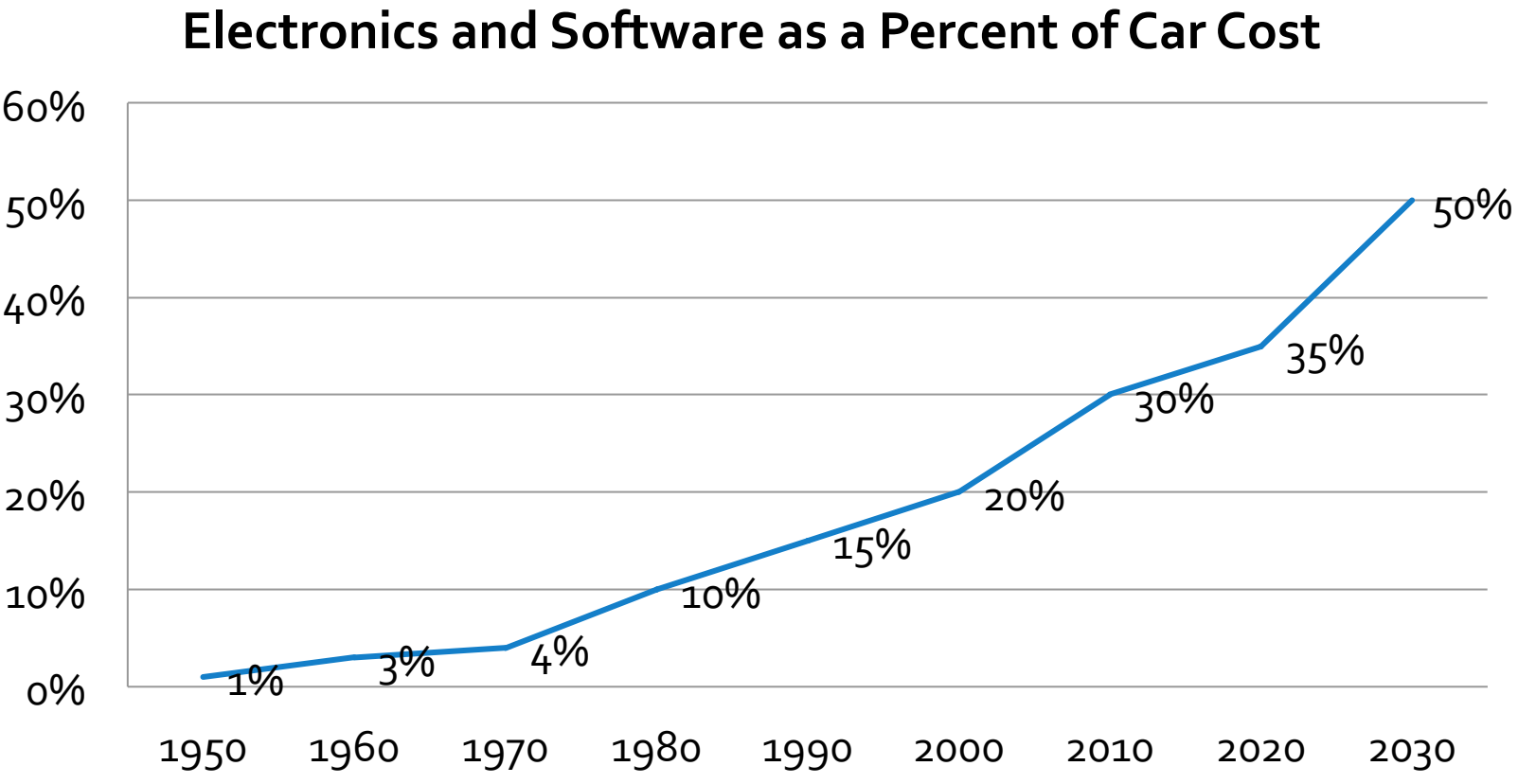


The journey towards electric dominance is just starting but the destination is closer than you think

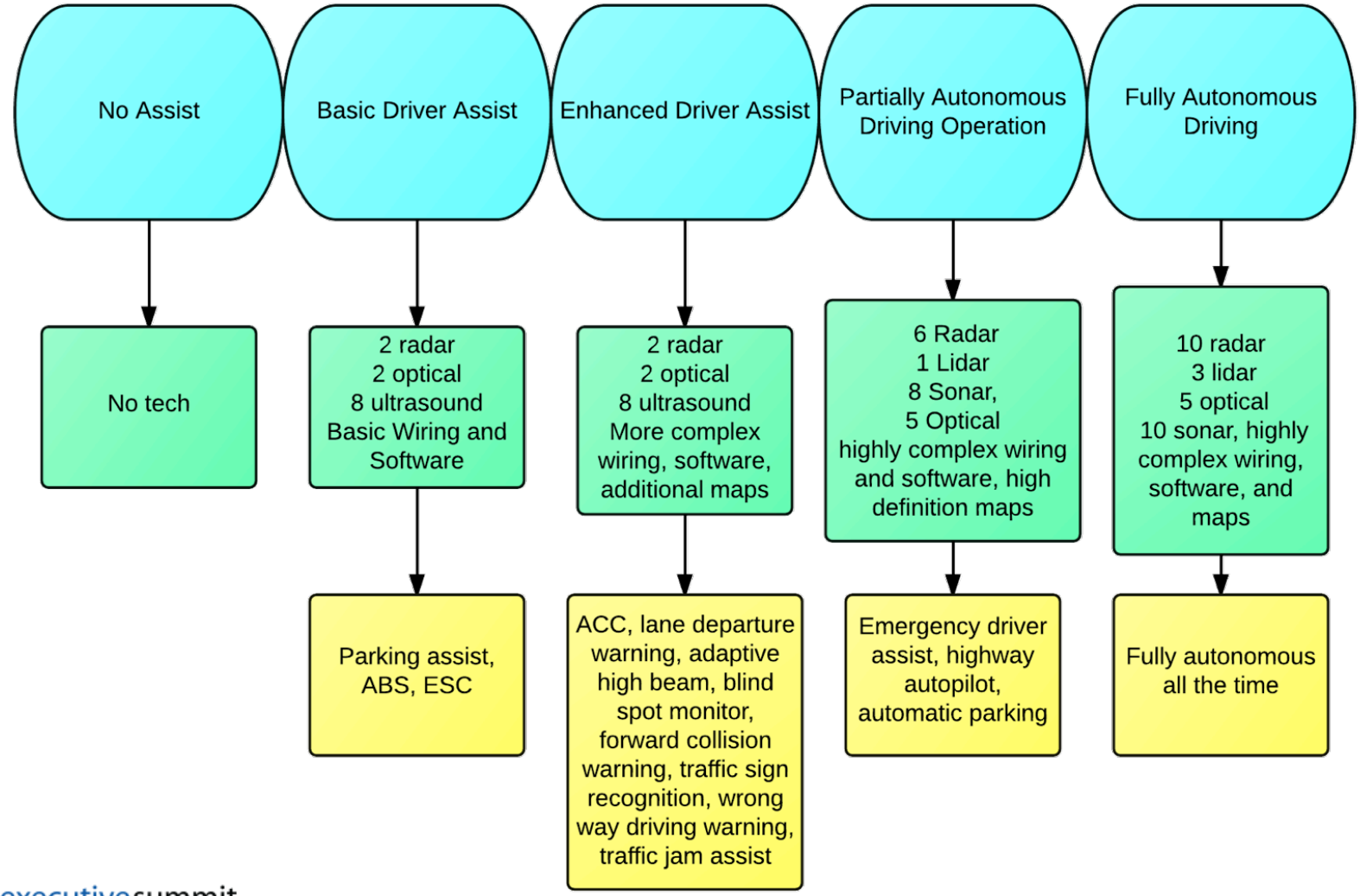




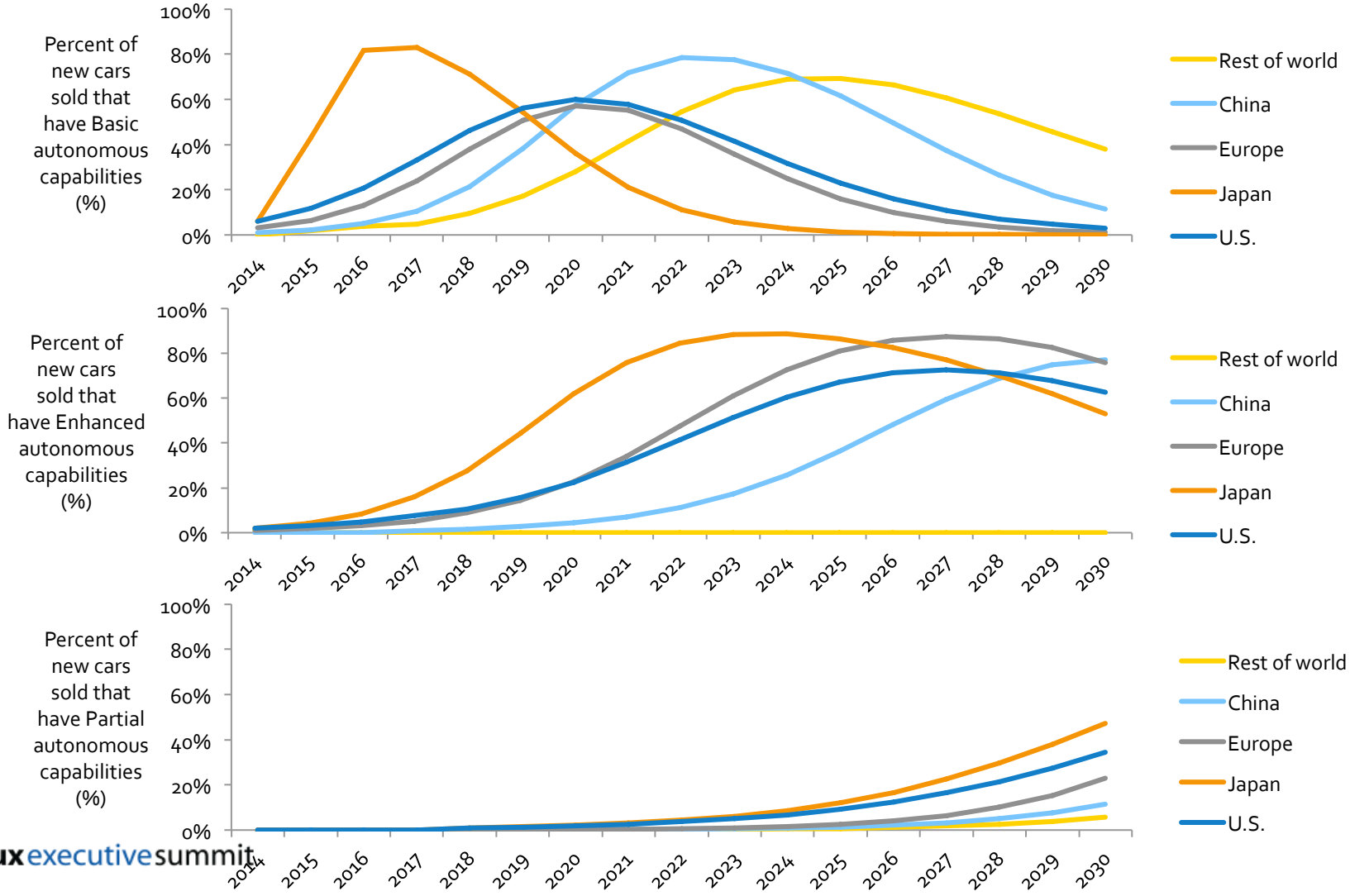
Other aspects of the car started changing much earlier than the power source



The proliferation of autonomous features drives proliferation of sensors



As driver assist levels are superseded by higher autonomy, more cost goes to electronics and IT



Cars that don't crash rewrite automotive material paradigms

- 2015 Mercedes S-Class already offers semi-autonomous driving:
  - Adaptive cruise control up to 200 km/h
  - Self-steering to keep within lane
  - Emergency braking from 70 km/h
- **If cars don't crash, why do we need high strength materials like composites and steel?**

The focus for materials is on maintaining safety, with key additional benefits

Forbes / Security

The Little Black Book of Billionaire Secrets

MAR 21, 2016 @ 02:41 PM 3,188 VIEWS

Thieves Can Crack Open Audi, BMW, Ford Cars With Simple Keyless Fob Hack

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OwnStar car hacker can remotely unlock BMWs, Benz and Chrysler

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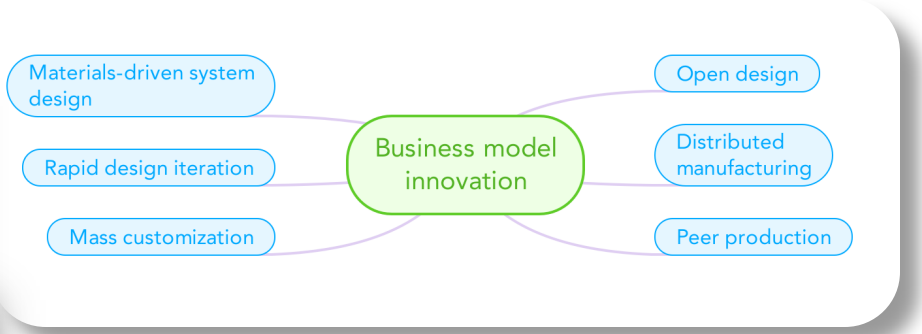
BMW i3 Owners Hack Software to Fit Extra 1/2-Gallon of Gas

September 2, 2015 at 4:38 pm by **Bob Sorokanich**



Redistributed Construction: Wait…this isn't new, is it?

Prefabricated and modular building methods have existed for 100 years already; Advantages are compelling at face value:

- **Cost reduction**: 15 – 30 % on overall building costs
- **Speed of construction**: on-site construction typically 3 to 20 weeks
- **High quality**: more accurate fabrication in controlled environment
- And, more recently:

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This Skills Gap Is Hurting America's Housing Market

COMMENTARY by Chris Terrill APRIL 24, 2016, 9:00 AM EDT

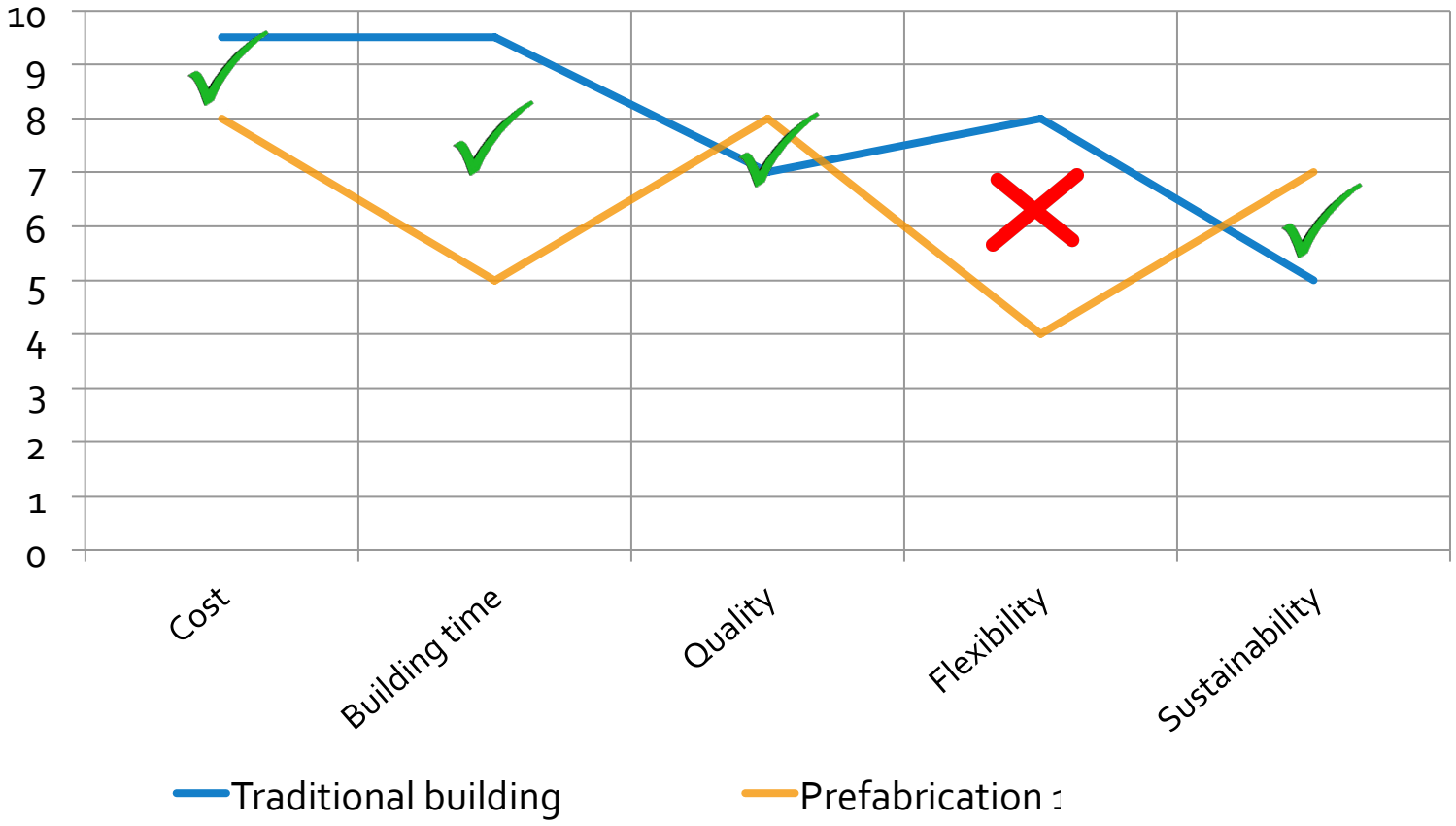
Prefabrication's value is limited by a lack of flexibility and conservative adopter dominance

Only 20% of buildings are prefabricated to date, while modular is niche

- **Lack of customization:** Limited, predictable options being supplied and integrated
- **Integration into existing practices:** Conservative, legacy practices embedded in onsite construction
- **Perceived value proposition:** Quality and cost not consistently great enough to drive change

Prefabrication's value has been limited by a lack of flexibility and conservative adopter dominance

Only 20% of buildings are prefabricated to date, while modular is niche



A lot of activity recently…

Singapore requires the use of prefabrication in its new building code

Nov 2014

"We were able to generate $15 M more in gross revenues on that [modular] project then we would have if we had gone with site-based construction"

July 2015

The National Institute of Building Sciences, the Modular Building Institute and the Associated General Contractors of America hold the first ever offsite construction expo

September 2015

"Lang O'Rourke is revolutionising how we evolve towns and cities within challenging constraints driven by our investment in and development of our design for manufacture and assembly approach"

January 2016

Modulex to invest (approx) $15.7M on modular building construction factory

February 2016

DIRTT's revenue grew 26% to $236 million in 2015 and will be "accelerating investment in innovative new solutions for key industry verticals such as healthcare, education, assisted living and the commercial sector"

March 2016

L&G to launch £55M offsite housing factory in Yorkshire

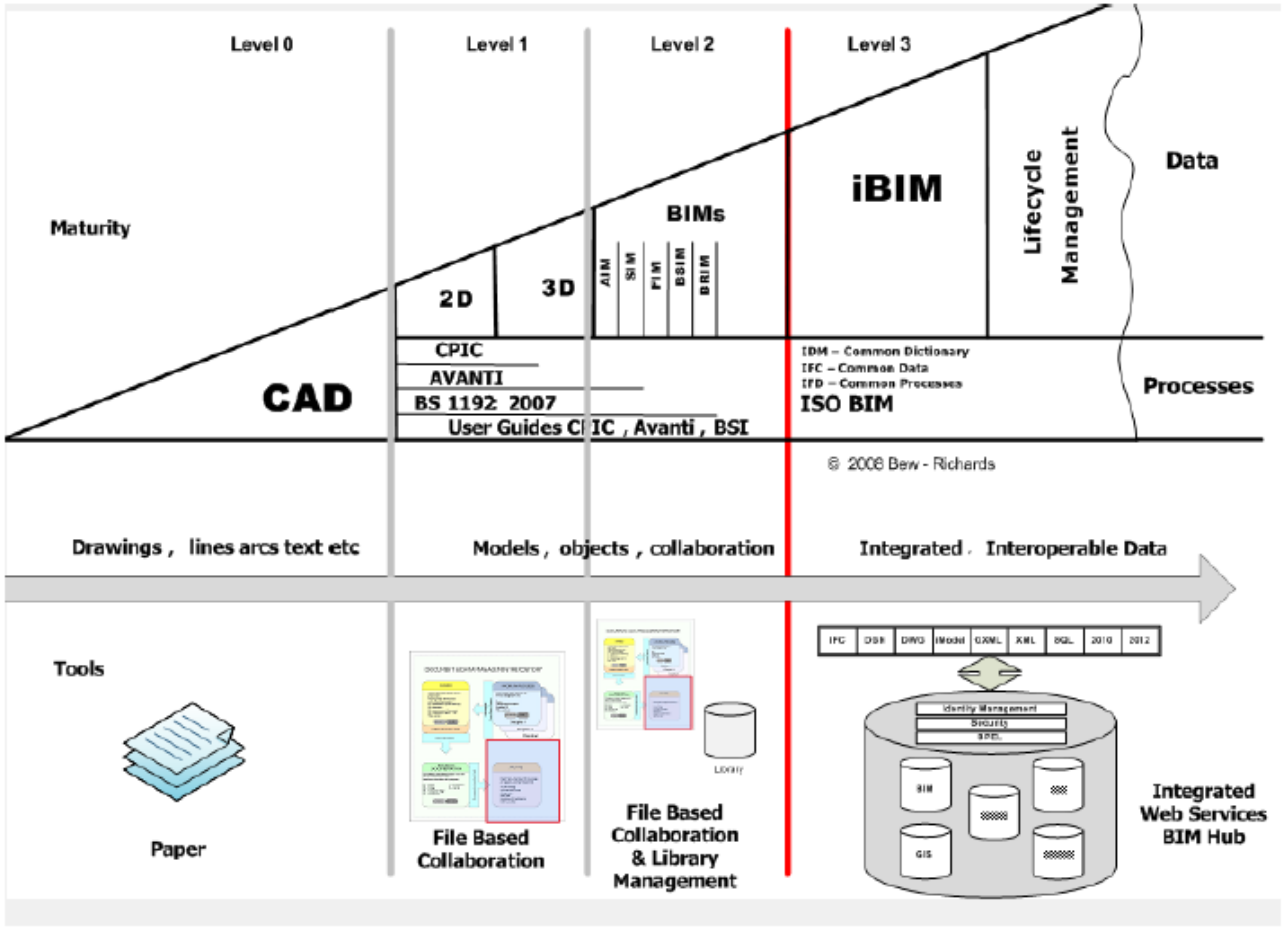
March 2016

Horizon North Logistics announces strategic acquisition and design software development arrangement

May 2016

Prefab quality is improving, and being recognized for it

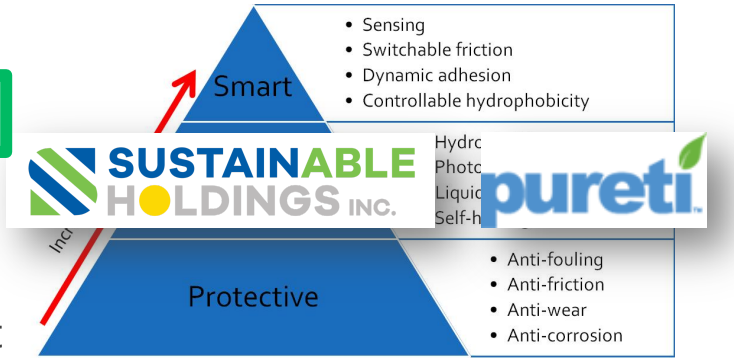
Building information management adoption enables distributed design and construction



Strategy Paper for the Government Construction Client Group
From the BIM Industry Working Group – March 2011

Disruption on the way….

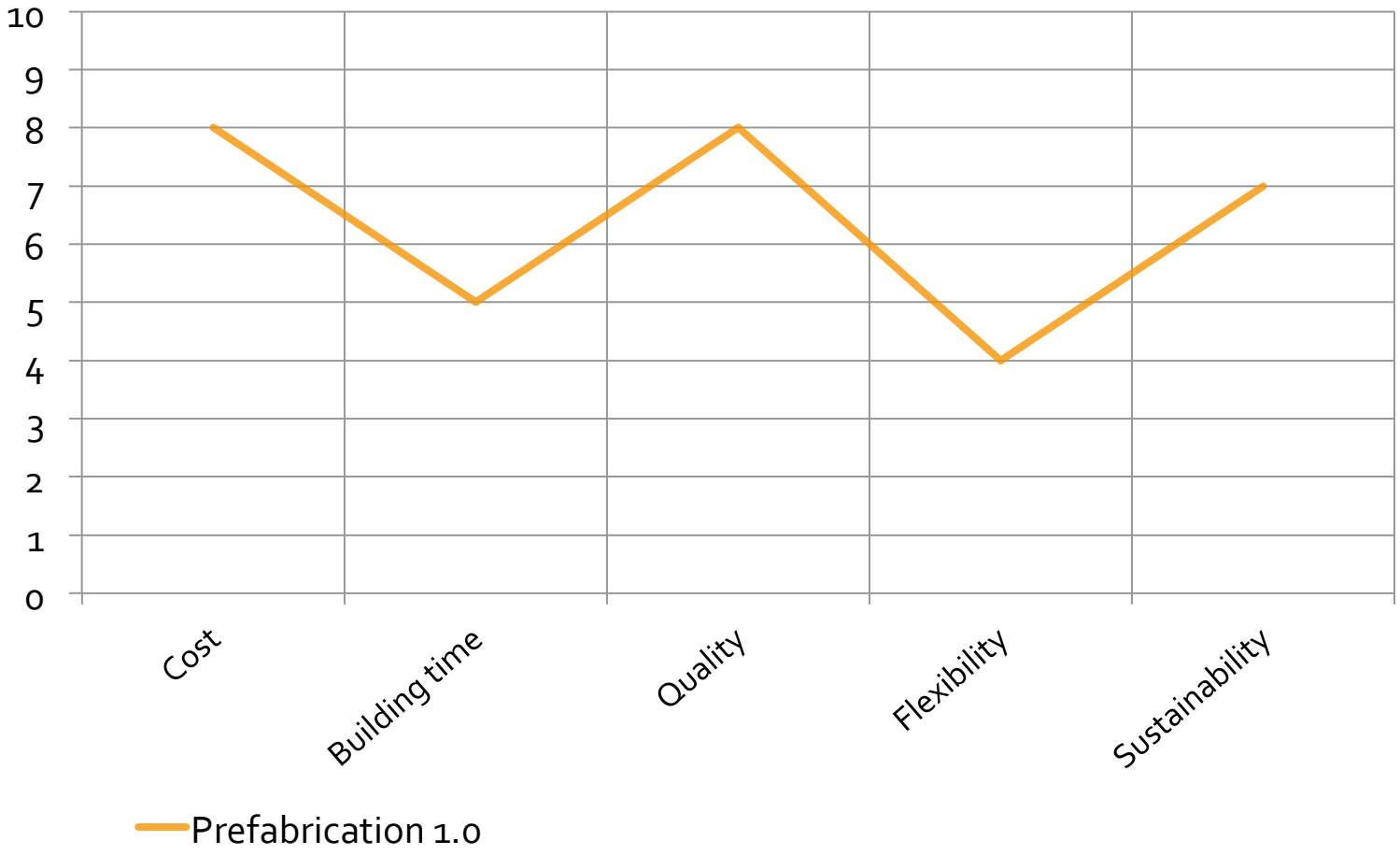
- **Functionality unachievable on-site:**
  - Multifunctional coatings applied with precision
  - Integrated superior insulation concepts
  - Increased biomimetic design optionality
  - Integrated light and solar radiation management



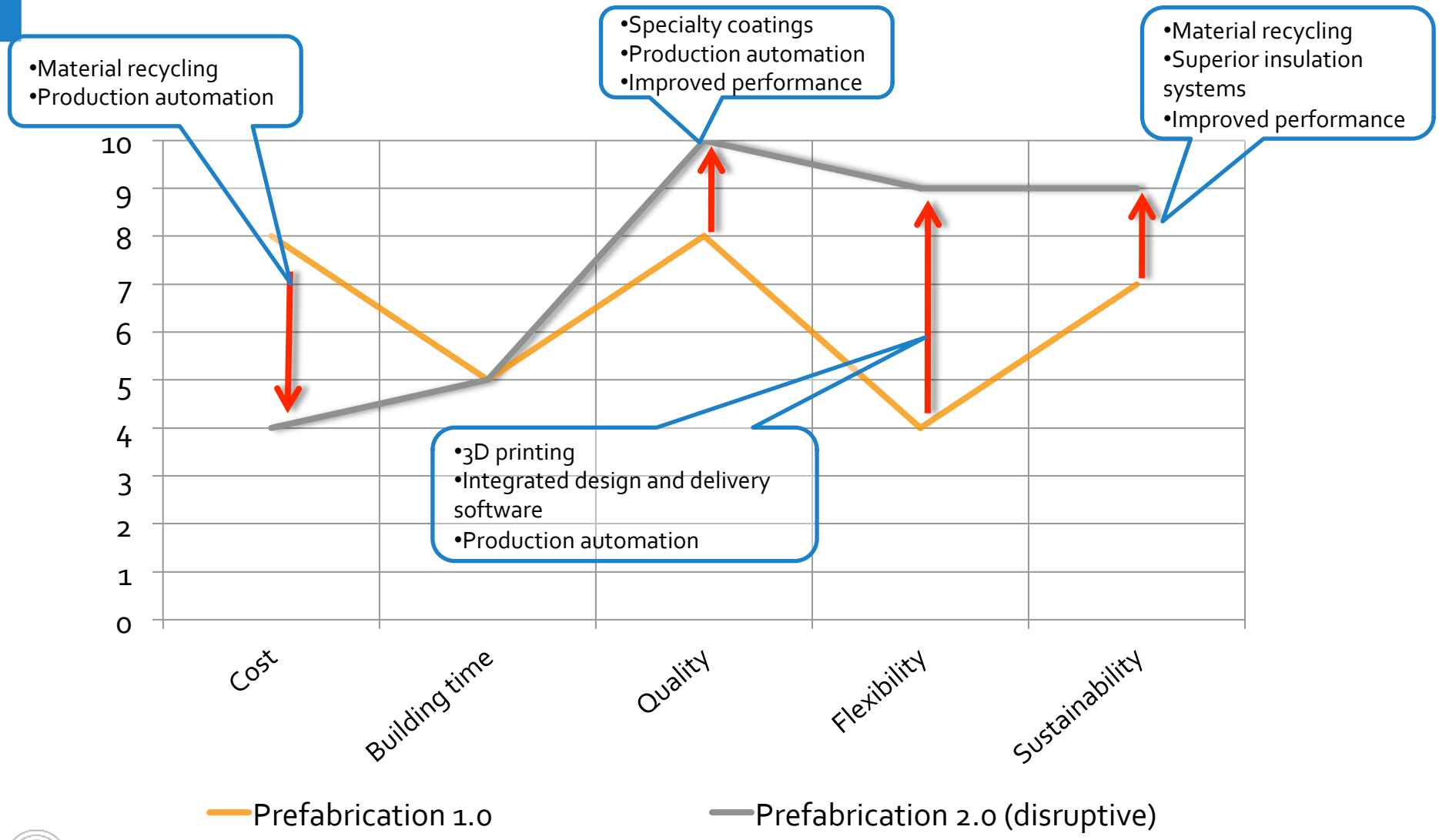
- **Mass customization technology:**
  - Robots entering the fabrication process
  - 3D printing of building components and entire buildings
  - Design and construction integrated in software

- **Easy deconstruction to basic materials:**
  - Easy recycling
  - Eliminating material costs in remodeling
  - New ownership business models

Prefabrication 2.0…and where disruption comes from



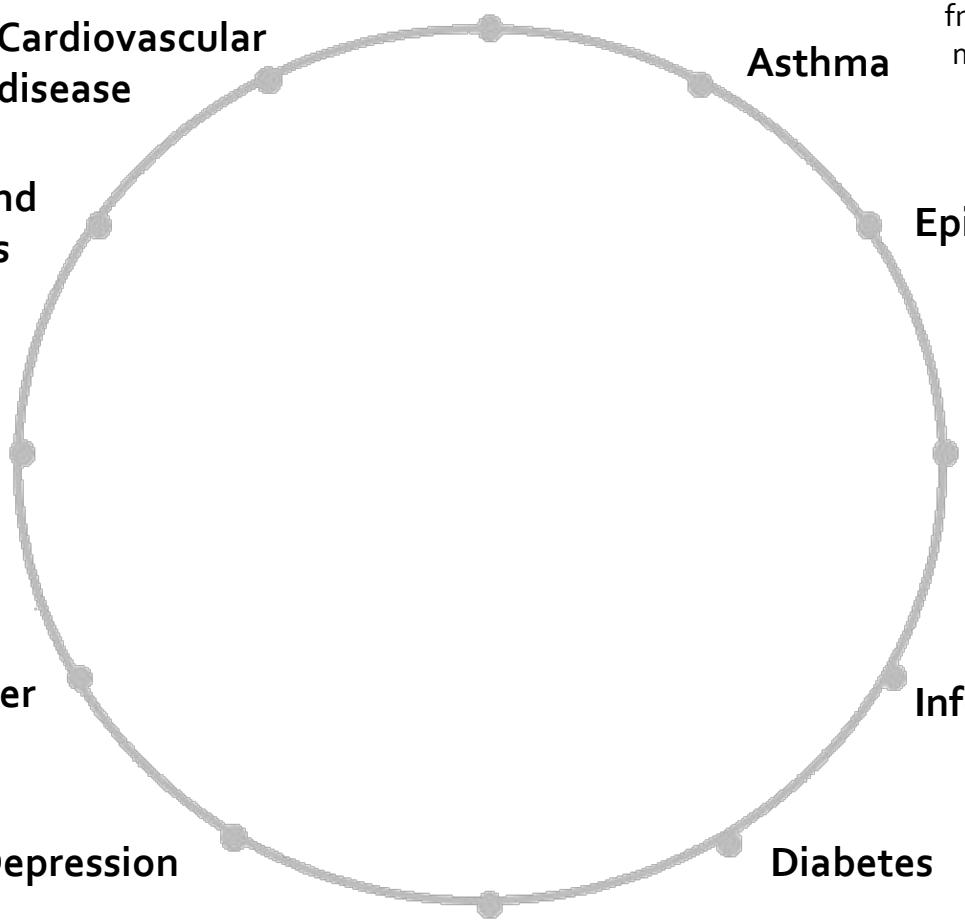
Prefabrication 2.0…and where disruption comes from



Redistributed Healthcare: Redesigning an unsustainable system

The leading global cause of death at **17.3 million deaths/year**. The annual cost of the disease to the EU is €196 billion

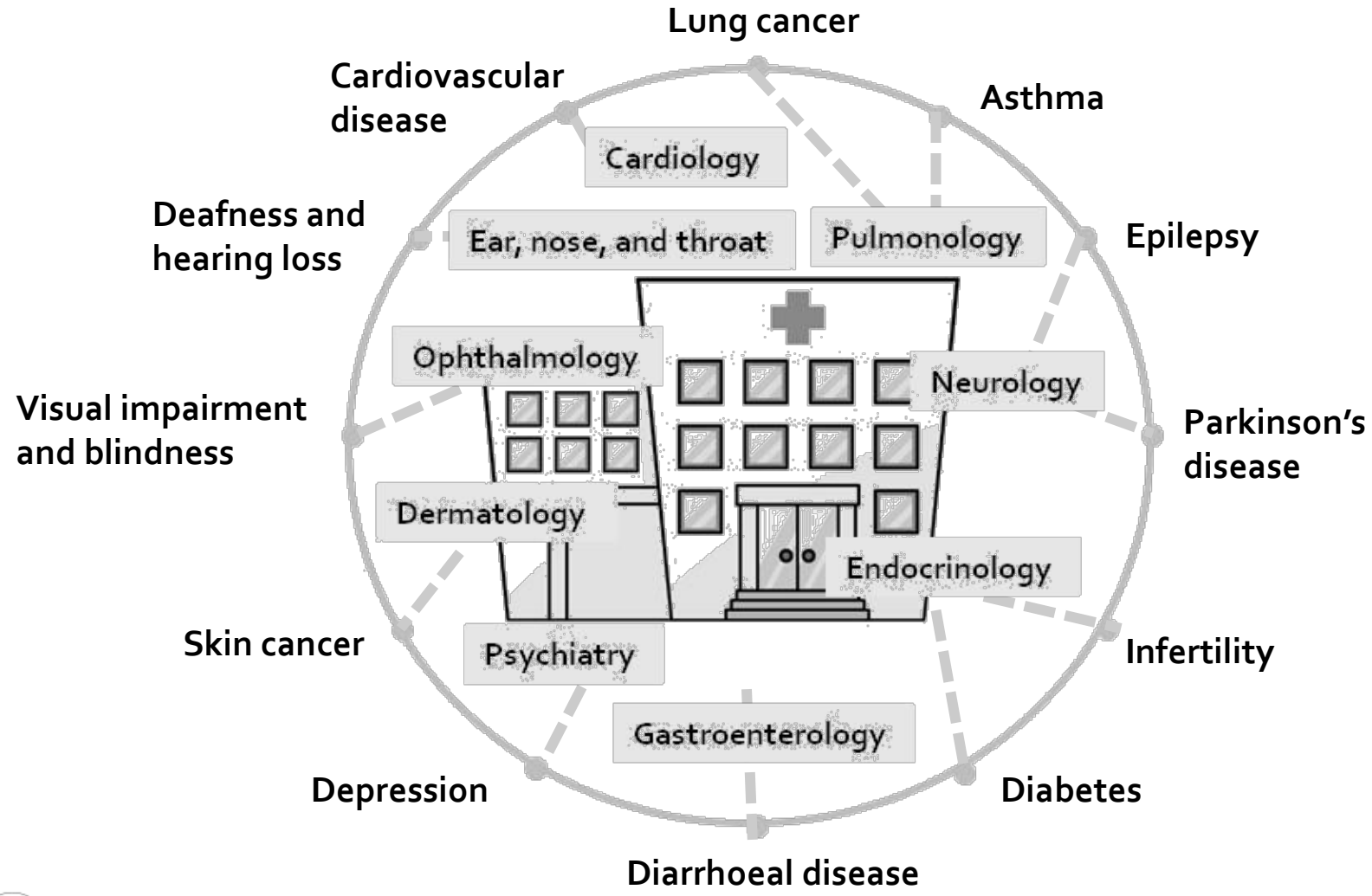
Globally, **235 million people** suffer from asthma. The disease is the most common chronic disease among children



Globally, an **estimated 350 million people** suffer from depression, making it the leading cause of disability worldwide

Globally, **9% of adults aged 18+** years have diabetes. In 2012, 1.5 million deaths were directly caused by the disease

The aggregated, inefficient, unsustainable cost of the current model



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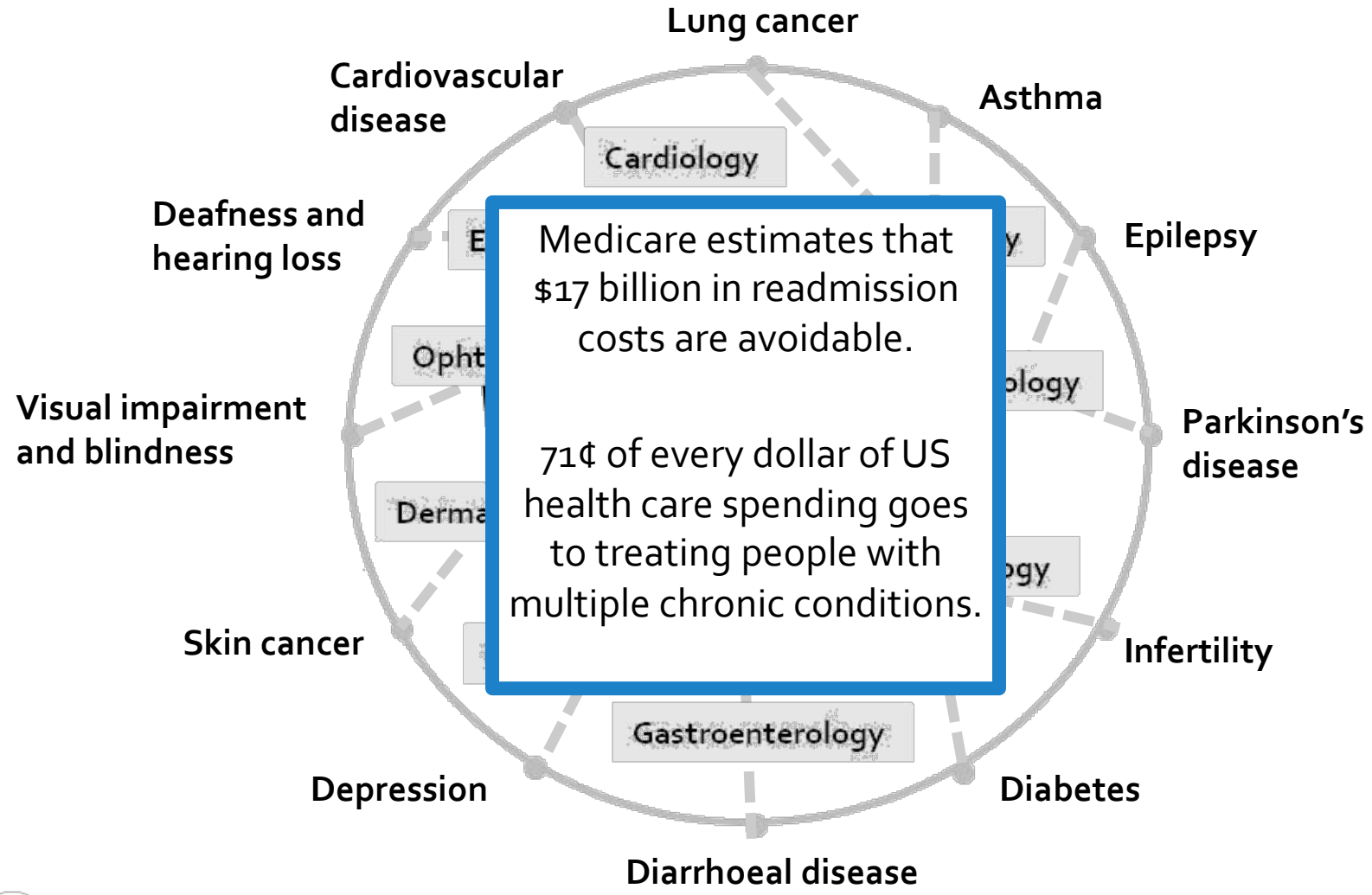
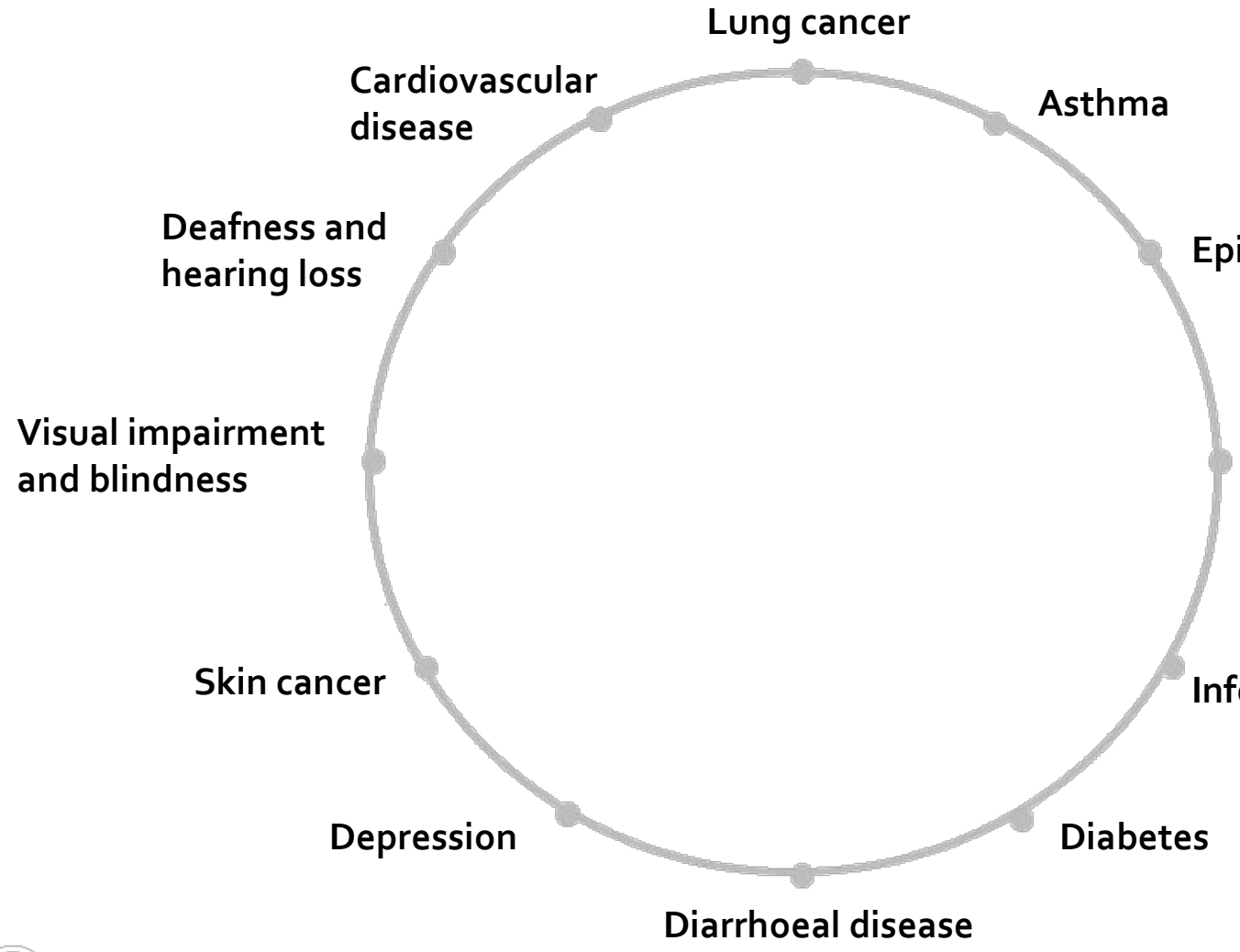


Emerging digital health and wellness solutions are positioned to redefine and redistribute the value



Monitoring

Diagnostics

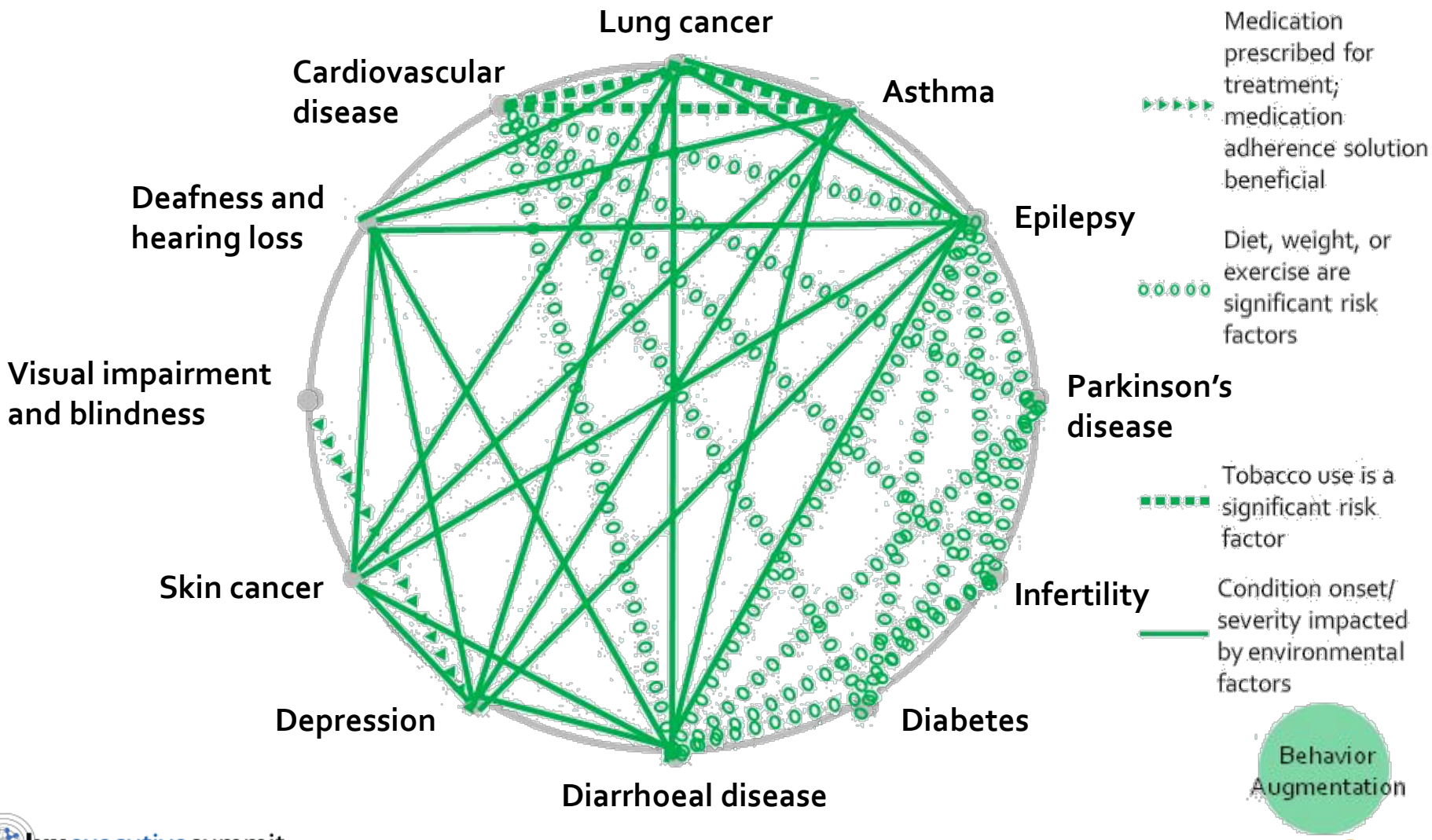
Predictive Analytics

Therapeutics

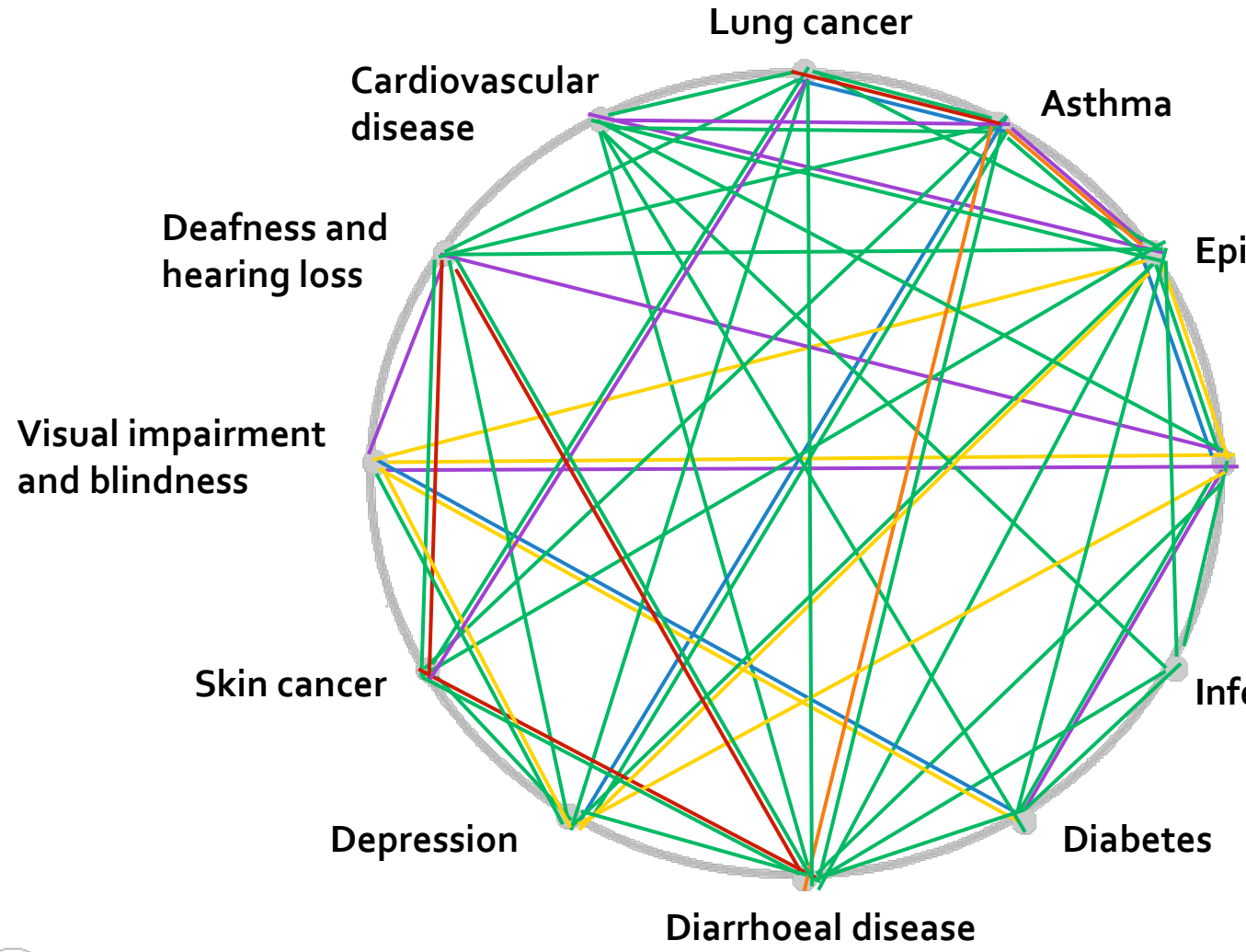
Assistive Technology

Behavior Augmentation

All conditions have behavior augmentation connections to other diseases



Isolating down to 12 major conditions shows the scale of the healthcare opportunity



Monitoring

Diagnostics

Predictive Analytics

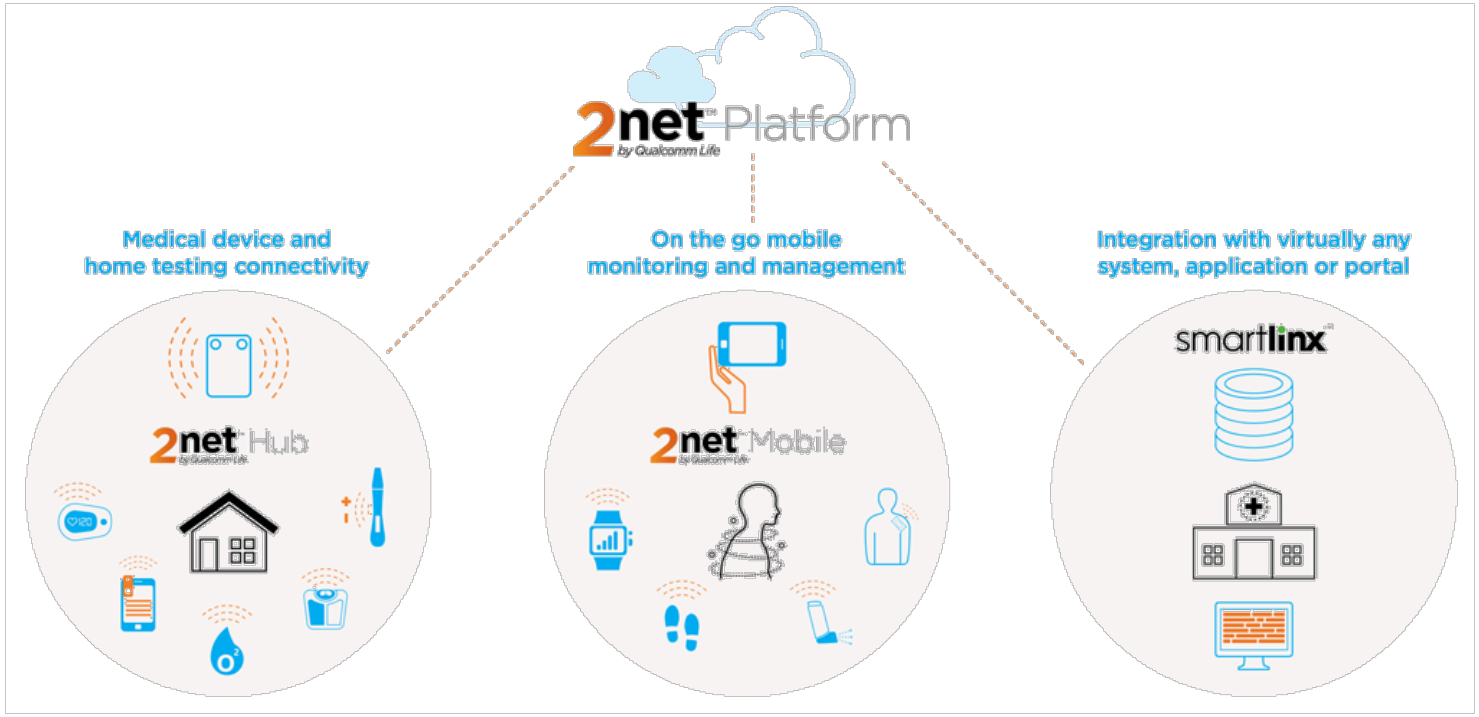
Therapeutics

Assistive Technology

Behavior Augmentation

Redistributing redistributed healthcare

- Vast network of partners positions Qualcomm's 2net platform as a complete solution for many applications, with 82 companies focused on digital health and wellness



- Monitoring
- Diagnostics
- Predictive Analytics
- Therapeutics
- Assistive Technology
- Behavior Augmentation

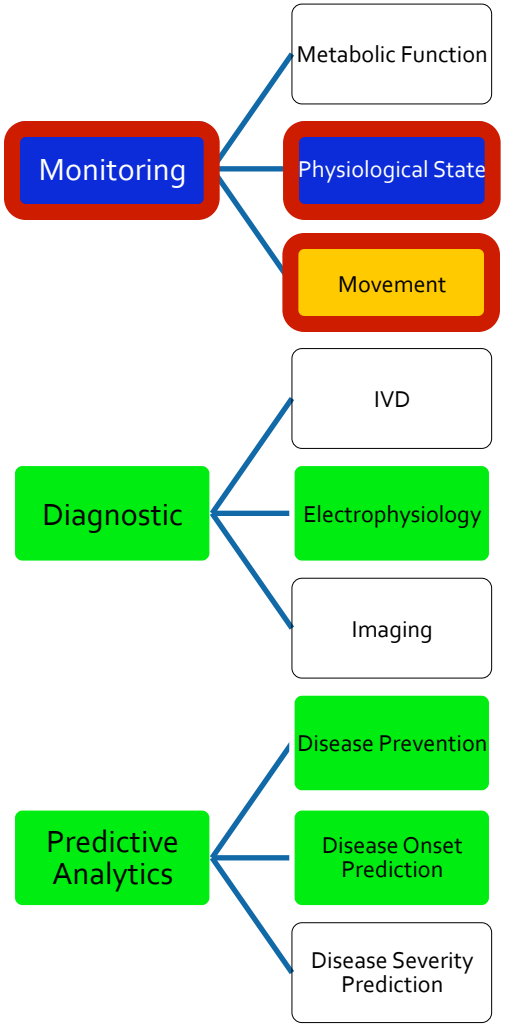
Coverage is not uniformly robust, but the market reach of the ecosystem is broad and leverageable

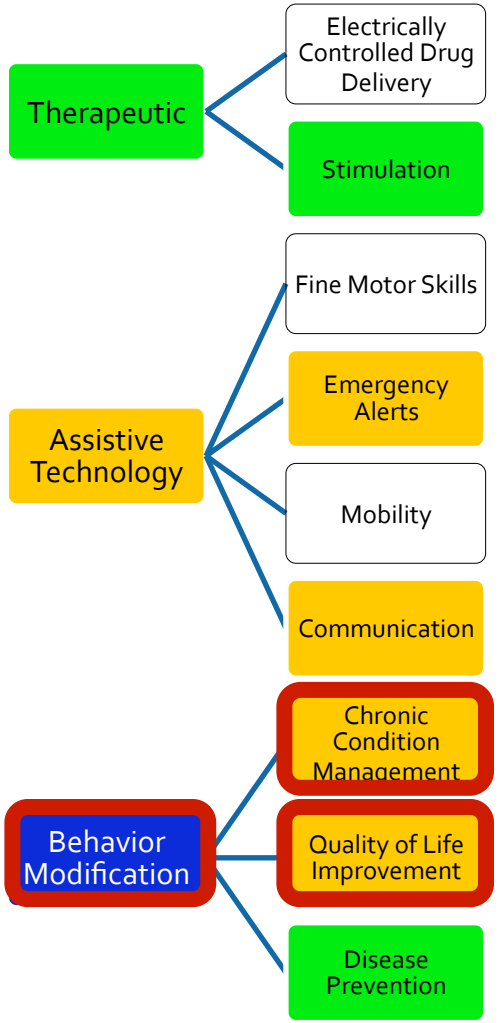
2net™ by Qualcomm Life

Number of solutions

- None
- < 10
- 10-50
- > 50

Withings
Inspire health





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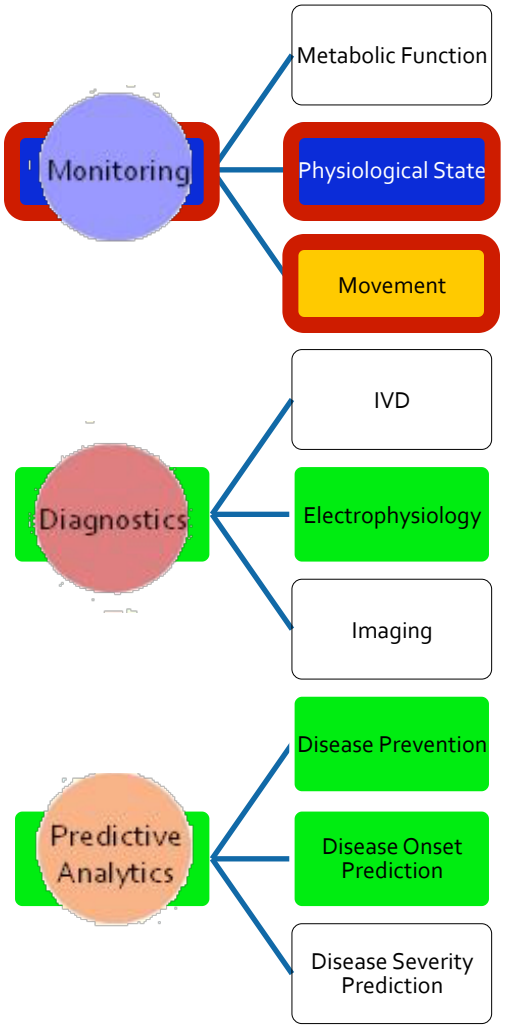
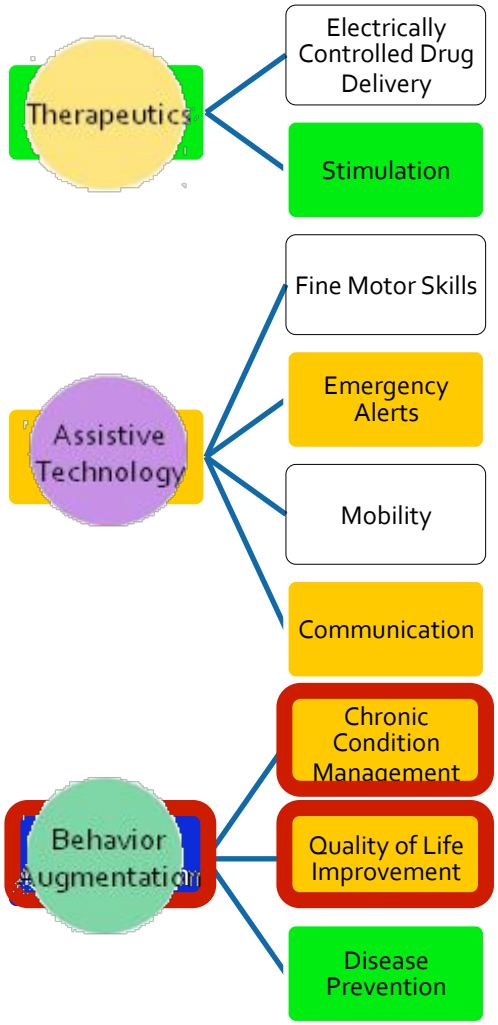




Withings
Inspire health

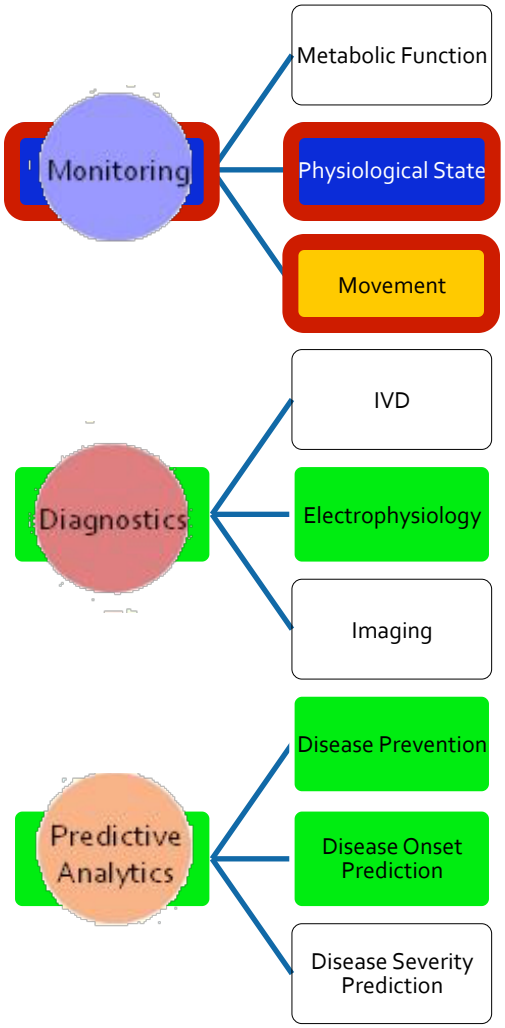
luxexecutivesummit

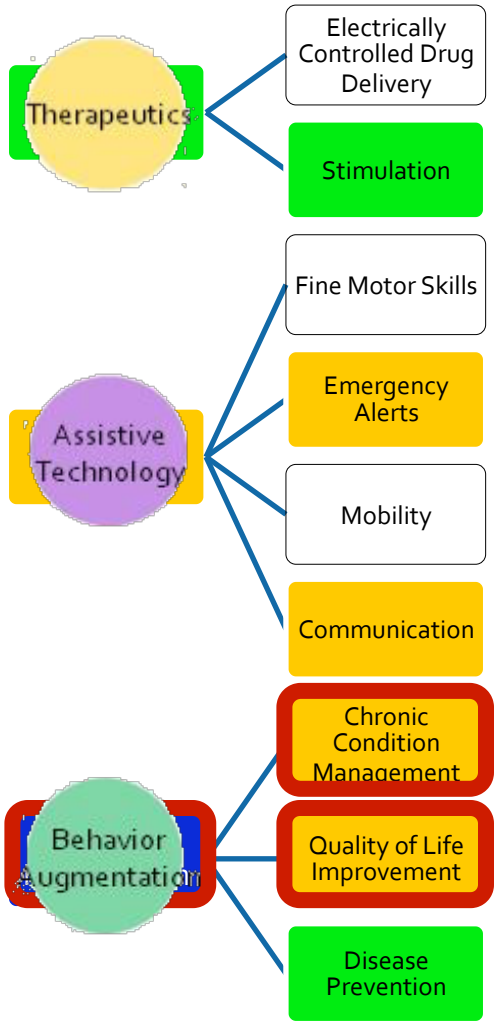
Coverage is not uniformly robust, but the market reach of the ecosystem is broad and leverageable

2net™ by Qualcomm Life

Number of solutions

- None
- < 10
- 10-50
- > 50





NOKIA

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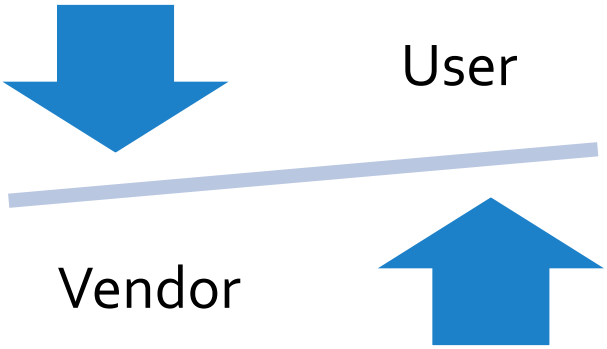
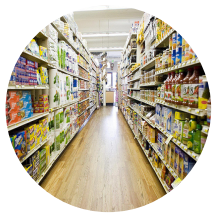
The shifting ground of Redistributed Everything

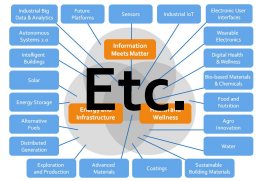


- More intelligent, integrated solutions emerging that attack…
  - Products vs. Services
  - Hardware vs. Software
  - Fixed Cost vs. Variable Cost
  - CapEx vs. OpEx
  - Scale vs. Custom/Convenience
- …to improve the value of the solution for the user

The shifting ground of Redistributed Everything

- Change your perspective
  - "New" business development…
    - …should not look like old business development
  - Existing competencies…
    - …better not define your future competencies
  - Software will eat the world…
    - …no, but it is going to be fat and happy

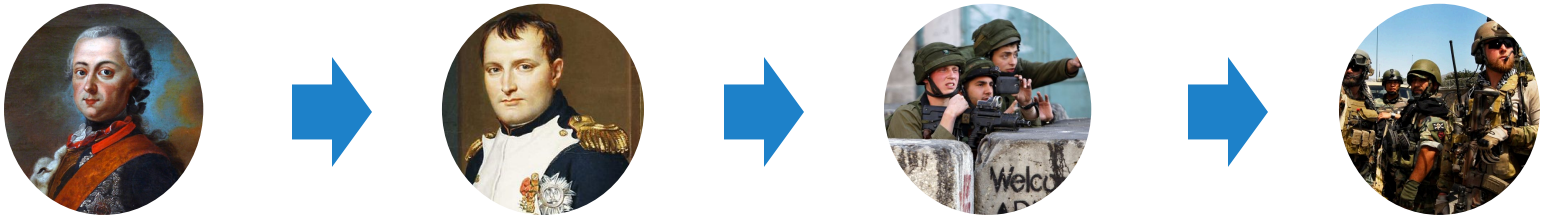




Agenda

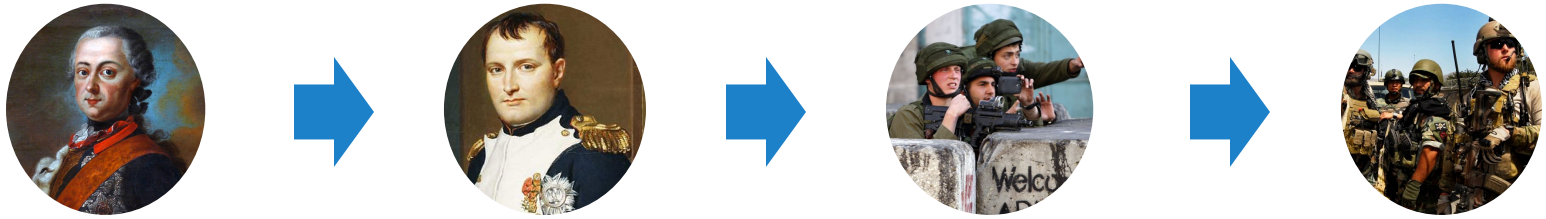
- Keeping pace with external forces
- Gathering and acting on intelligence ("See the Theater")
- The new innovation force ("Design for Effect")

Adapting an old institution to a new reality



- See the theater
  - Knowing when an important broad-based change or trend is reality
- Design for effect
  - Changing the force: products, processes and people

Adapting an old institution to a new *agile*, *intelligent*, *distributed* reality



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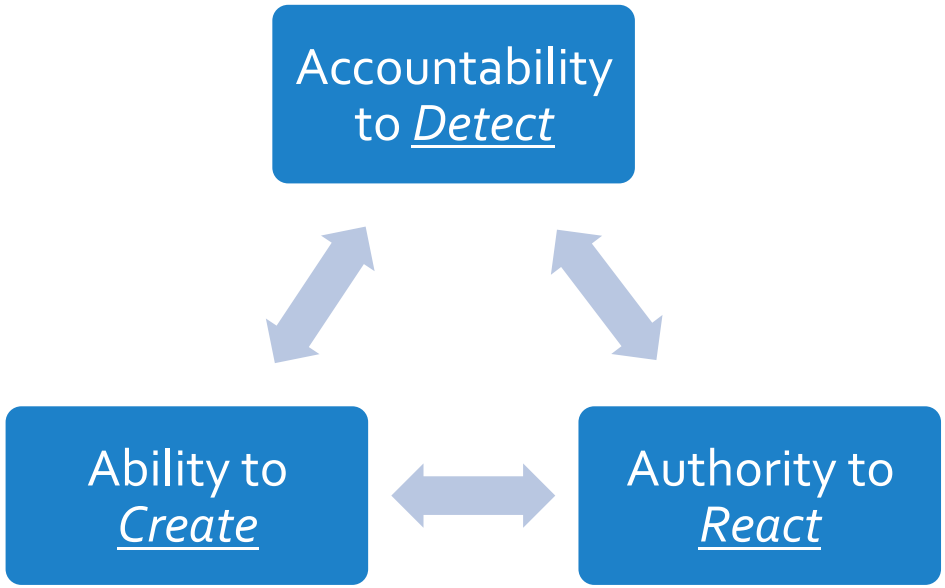

Adapting an old institution to a new *agile*, *intelligent*, *distributed* reality

- More intelligent, integrated solutions emerging that attack…
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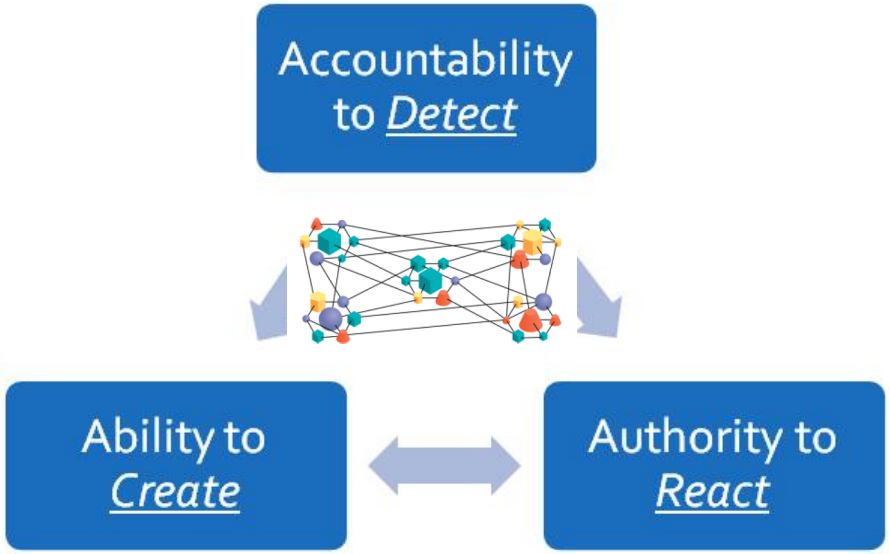
Adapting an old institution to a new *agile*, *intelligent*, *distributed* reality



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The Force

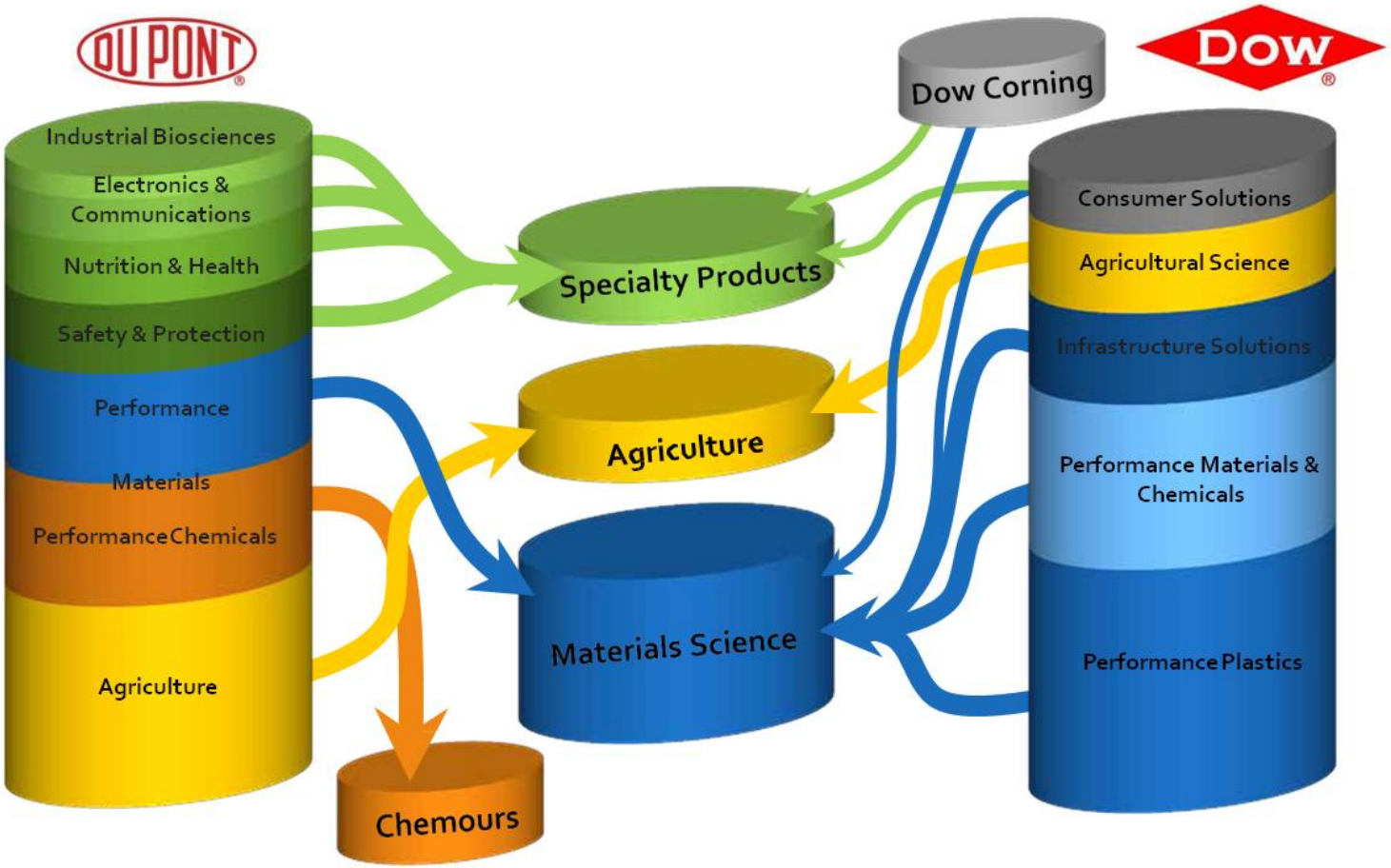
Adapting an old institution to a new *agile*, *intelligent*, *distributed* reality

FORTUNE 500

Adapting an old institution to a new *agile*, *intelligent*, *distributed* reality

Adapting an old institution to a new *agile*, *intelligent*, *distributed* reality

Altered alliances will still have to adapt their batallions



Designing special forces: Product

CREE™

- "Sledgehammer Innovation"
  - Hand-picked teams of the right size
  - Appropriately insulated functionally and spatially from others
  - Empowered to act
  - Ownership of outcome

Designing special forces: Solutions

- Use less fertilizer
  - farmer savings/benefits vary between 50 and 100 EUR/ha
- Increased margin for Yara
- Increased market share in terms of hectares served

Hewlett Packard Enterprise

- Visual remote guidance launched in 2014 to support HPI quality and cost of service
- Broadened to other industries in 2015
- Revenue generating with 40 total customers, including those in pilot testing

Designing special forces: Competencies

- Preparing for the new innovation battle
  - Head of Digital Transformation Strategy
  - Director, Digital Innovation Organization
  - Director, Open Innovation, New Business & Digital Disruption
  - VP Digital Transformation
  - Team Lead Digital Workplace Business Services
  - General Manager, Digital Enterprise Realization
  - General Manager of IT Innovation
  - Digital Factory Business Development
  - Head of the Digital Office
  - Senior Vice President, Project Leader 4.0

TOTAL
bp
SOLVAY
BASF We create chemistry
AkzoNobel
AIR LIQUIDE
victrex
Tereos

“The greatest and noblest pleasure which men can have in this world is to discover new truths; and the next is to shake off old prejudices”

- Frederick the Great

"One must change one's tactics every 10 years if one wishes to maintain one's superiority”

- Napoleon … in 1806

Thank you

luxresearch

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