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Technology trends and the role of actuaries

The Israel Association of Actuaries – Tel Aviv December 2016
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Emerging technologies will change everything

Pre-21st-Century Economic Systems				Post-20 th -Century Economic Systems		
Before the Web	Before the Nexus of Forces		After the Nexus of Forces			
Analog	Web	E-Business	Digital Marketing	Digital Business	Autonomous	Programmable
Build relationships that drive business or lower cost	Extend relationships into new markets or geographies	Transform sales channel into a global medium to drive efficiencies	Exploit the nexus to drive greater efficiency	Extend potential customers from people to things	Smart, semiautonomous things become the primary "customer"	Economic transformation via new forms of money, value and interaction
Optimize relationships	Extend relationships	Optimize channels	Optimize interactions	Build new business models	Maximize retention of, and relationships with, things	New economic system
 People	 People  Business	 People  Business	 People  Business	 People  Business  Things	 People  Business  Things	 People  Agents  Things
Emerging technologies	Internet and digital technologies	Automation of business operations	Deeper customer relationships, analytics	Creation of new value and new nonhuman customers	Smart machines and things as customers	Programmable, decentralized, encrypted, distributed ecosystem
ERP, CRM	CRM, Web	EDI, BI, portals	Mobile, big data, social, APIs, Apps	Sensors, 3D printing, smart machines	Robotics, smarter machines, automation	Blockchain, metacoin platforms, autonomic computing

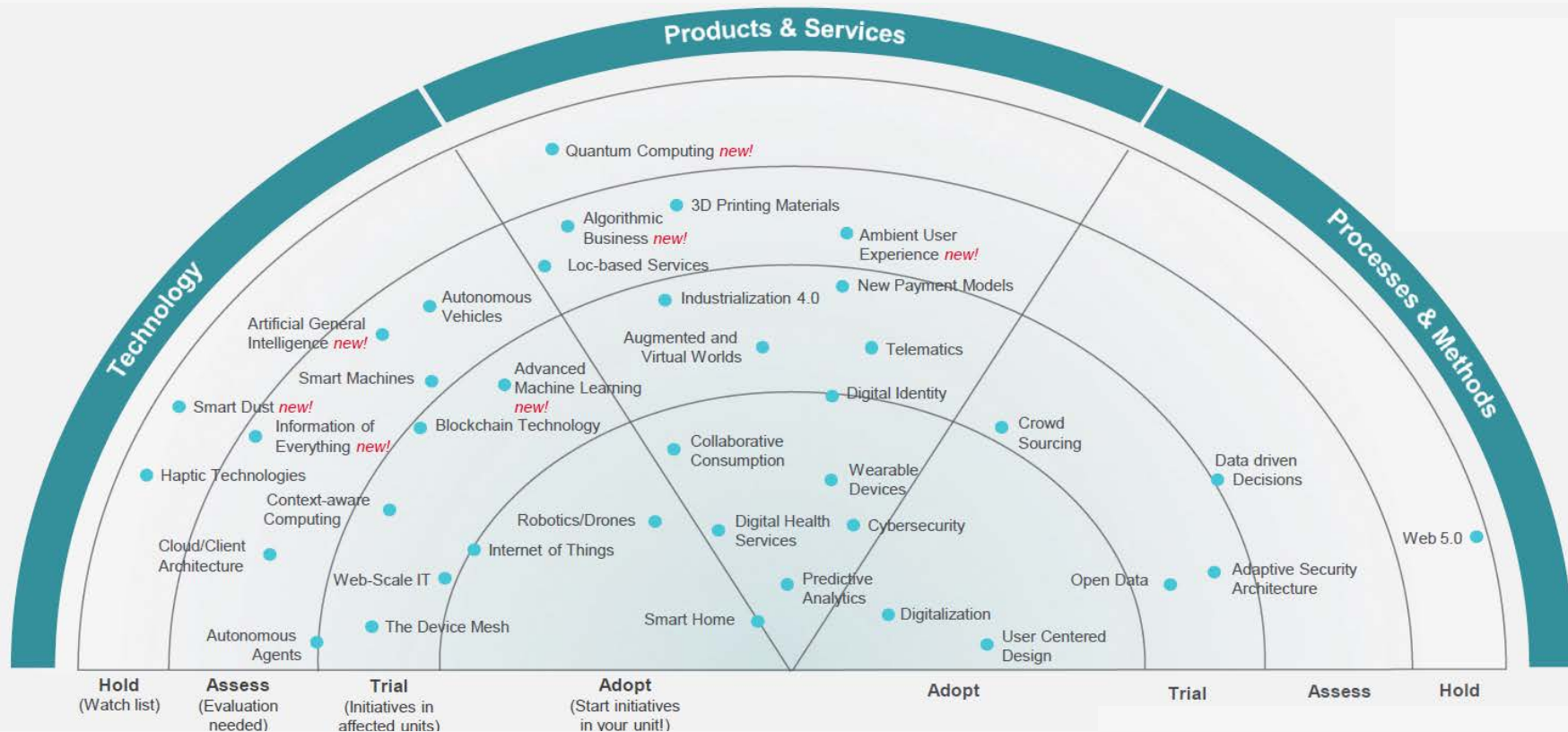
▲ Change of kind ▲ Change of degree

“ With the New Economics of Connections, Value Will Come Significantly Less From Owning and More From Sharing, Providing and Leveraging Critical Capital Assets. ”

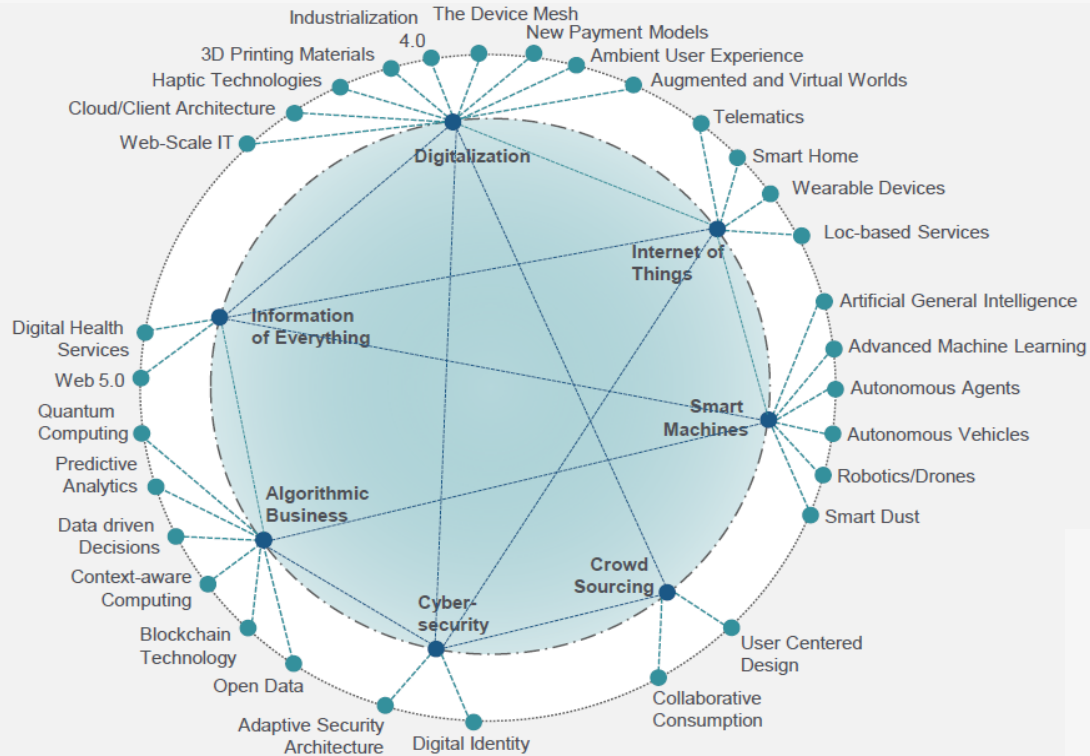
Gartner 2016



IT Trend Radar 2016



Trend Correlation Map



Trend

A trend depicts all kind of future development with an impact on one specific business.

Trends tend to influence and drive each other

Example of a trend: Digitalization

Sub-Trend

A sub-trend specifies one potential form of appearance of a trend.

Example of a sub-trend: 3D Printing Materials

Top 10 Trends 2016

1. Algorithmic Business
2. Blockchain Technology
3. New Payment Models
4. Internet of Things (Industry 4.0)
5. Advanced Machine Learning
6. Smart Home
7. Digital Health Services
8. Information of Everything
9. Autonomous Agents
10. 3D Printing Materials

Description

- Algorithms are the **DNA of software**. They codify the macro steps of how computers already run large parts of the world. Gartner believes that the predominance of algorithms will only **increase in the digital age**, especially with the growth of the Internet of Things.
- The algorithmic business is a company built around smart algorithms. It **needs a new system architecture of information classification and semantics**.
- In the digital future these algorithms are able to work independently and create self-learning systems, working in the background of people.

Related Trends

- Digitalization
- Advanced Machine Learning
- Predictive Analytics

Level of relevance

- Adopt
- Trial
- Assess
- Hold

2016
new!

Examples and Initiatives

External examples

- [Kreditech](#) provides **algorithmic banking** and custom-tailored banking products.
- [Algorithmia](#) launches with more than 800 algorithms on its marketplace
- [Amazon algorithm](#) is the recommendation engine of Amazon, based on "item-to-item" collaborative filtering. It is **rumored** to provide 10% to 15% of additional **revenue** on Amazon.com.



Benefits

- Increase customer loyalty** and revenue based on algorithmic
- Algorithm marketplaces will **disrupt** the analytics ecosystem and likely even the whole software ecosystem
- Fast and independent decisions** by an automatized analytical process.
- Focus on **actionable algorithms and meaning of data** instead of amounts of data.
- Goal: Develop algorithms for a business as a **learning machine**.
- Recommended Reading:** "The Black Box Society: The Secret Algorithms That Control Money and Information." ISBN-13: 978-0674368279. Harvard University Press. 2015.

Description

- Machine based learning is described as the science of getting computers to **act without being explicitly programmed**.
- One of the main goals of Advanced Machine Learning is the **development of algorithms / computer programs that teach themselves**. See: [Algorithmic Business](#)
- Machine Learning uses new data in order to **improve the program and adjusts program actions** according to the recognized patterns in new data.

Related Trends

- Smart Machines
- Autonomous Agents
- Algorithmic Business
- Predictive Analytics


Level of relevance

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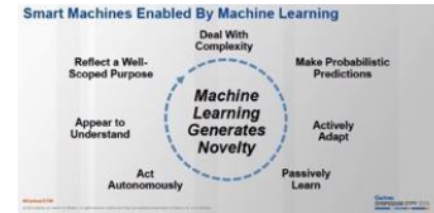
Examples and Initiatives

External examples

- [Narrative Science](#): Artificial-intelligence system [Quill](#) provides storytelling by generating natural language through data analysis. 
- [Wordseye](#) is a first-of-its-kind web and mobile application that lets you literally type a picture (TM) using simple language.
- [Osaro](#) develops automation solutions for computer and robotic systems driven by advanced machine learning software.

Benefits

- Automated data analysis:** Machine learning provides insurers with the capability to **discover patterns and trends about customers and products** derived from large datasets.



- The effectiveness of existing products and services can be increased while the costs are lowered.
- Insurance companies are capable of providing **new personalized / individualized products and services** to its customers.

Description

- Digital Health Services describe the opportunity for **remote monitoring** of health status from the users through advanced smartphones and apps.
- Doctors or health insurance funds have the opportunity to see in **real-time the users' condition**.
- Digital Health Services allow to monitor:
 - Movement activity
 - Heart beat
 - Sleeping activity

Related Trends

- Internet of Things
- Smart Home
- Wearable Devices
- Open Data

Level of relevance

Adopt



Trial

Assess

Hold

Examples and Initiatives

External examples

- [Medtronic](#) launches App-based Remote Monitoring System for Pacemakers.
- [VV-Box](#) is an intelligent storage for pills which reminds you to take your medicine.
- [The e-Celsius Performance](#) pill measures body temperature and can storage up to 80 000 data per pill.
- [Lumify](#) allows exceptional ultrasound from a smart device.



Benefits

In health insurance services Digital Health services contribute to:

- prevention of diseases, regeneration and support in case of chronic diseases
- real-time health records
- simplification of complex business and clinical models
- Patient control and access to health information

Digital health services help to provide an efficient support and more customer centricity, including

- Lower costs through better understanding the customers needs
- Deeper relationships to clients
- Wider range of flexible offers

see also: [Wearable Devices](#)

Other relevant trends

1. Adaptive Security Architecture
2. Ambient User Experience
3. Artificial General Intelligence
4. Augmented and Virtual Worlds
5. Autonomous Vehicles
6. Cloud/Client Architecture
7. Collaborative Consumption
8. Context-aware Computing
9. Crowd Sourcing
1. Cybersecurity
2. Data driven Decisions
3. The Device Mesh
4. Digital Identity
5. Digitalization
6. Haptic Technologies
7. Industrialization 4.0
8. Loc-based Services
9. Open Data
10. Predictive Analytics
11. Quantum Computing
12. Robotics/Drones
13. Smart Dust
14. Smart Machines
15. Telematics
16. User Centered Design
17. Wearable Devices
18. Web 5.0
19. Webscale IT

Description

- Autonomous vehicles are vehicles which can drive themselves **without human supervision or input**.
- In addition to unmanned vehicles autonomous vehicles are not just controlled remotely, but **control themselves or drive through a controlled environment**.
- Vehicles can also operate **semi-autonomously**: taking some control of aspects of their driving, whilst a human driver retains control of others.

Related Trends

- Context-aware Computing
- Internet of Things
- Robotics/Drones

Level of relevance

- Adopt 
- Trial
- Assess
- Hold

Examples and Initiatives

External examples

- [Robottaxis](#) are self-driving cabs that combine self-driving technology with internet-powered services and are currently operating in Japan.
- [Wepods](#) are driver-less mini-busses circulating within the public transport system.
- [John Deere AutoTrac](#): Self-driving system for smart tractors makes use of past harvest data for higher harvesting efficiency.



Benefits

- Higher safety and **minimization of damage** (“Reduce human mistake interaction”).
- Transformation of the **third-party liability risk** is needed.
- Hacking autonomous systems as a major threat and **potential for insurance product development**.
→ see also: [Cybersecurity](#)
- **Considerations**: Insurance not longer necessary, because of the reduction of damage.

Description

- Trends like the increase of remote workers / remote access, Unified Communication and consumerization of IT in the enterprise heighten risks of external IT threats.
- Many enterprises are unsure about the **public cloud** and push for “**private clouds**”. Fraud detection technologies are also advancing quickly, **both** on the enterprise side and end-user side.
- One of the trends on the supplier side is **building security into the network**, a trend which companies like Cisco, Juniper, Microsoft and others are following this approach.

Related Trends

- Adaptive Security Architecture
- Internet of Things
- Cloud

Level of relevance

- Adopt 
- Trial
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- Hold

Examples and Initiatives

External examples

- [Dojo](#) protects the home network an all connected devices against manipulation.
- [Keeze!l](#) offers online privacy to go. It encodes data when using public networks.
- [Terbium labs](#) developed a system to track stolen data: Company data is furnished with digital fingerprints can you can look for on the internet.



Benefits

- Cybersecurity opens **giant business potential** for insurance products.
- As technology changes faster than ever, new threats for cybersecurity evolve. **Cybersecurity insurance** products need to be **revised on a regular basis**.
- Cybersecurity enables a faster detection and remediation of threats through real-time analytics
- For businesses, cyber-insurance has enormous benefits in **simplifying operations and reducing effort**

