Hype Cycle: Emerging Technologies

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Key Issues

1. Understanding Gartner's Hype Cycle Methodology
2. The Emerging Technologies Hype Cycle 2016
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1. Understanding Gartner's Hype Cycle Methodology

2. The Emerging Technologies Hype Cycle 2016
The Gartner Hype Cycle canvases over 109 technology and innovation areas to depict technology maturity and future potential.
Explaining the Hype Cycle Stages

**Innovation Trigger**
- A new trend starts to be highlighted in the press

**Peak of Inflated Expectations**
- The trend is hyped to be a main driving force for change

**Trough of Disillusionment**
- The trend technology failed to achieve unrealistic hyped expectations

**Slope of Enlightenment**
- An understanding of the real and relative impact of the trend is building

**Plateau of Productivity**
- The trend is established as a driver for change in institutional memory and action
Questions the Hype Cycle Exposes

- **Adopting too early?**
- **Giving up too soon?**
- **Adopting too late?**
- **Hanging on too long?**

**Time**

- Innovation Trigger
- Peak of Inflated Expectations
- Trough of Disillusionment
- Slope of Enlightenment
- Plateau of Productivity
- Swamp of Diminishing Returns
- Cliff of Obsolescence

**Expectations**
Key Issues

1. Understanding Gartner's Hype Cycle Methodology

2. The Emerging Technologies Hype Cycle 2016
Distills **must-know** emerging technologies and trends from more than **2,000** technologies that show promise of **transformational** competitive advantage over the next five to ten years.
Three Distinct Trends Emerge

1. **Transparently Immersive Experiences**
   - Human Augmentation
   - 4D Printing
   - Brain-Computer Interface
   - Connected Home
   - Nanotube Electronics
   - Augmented Reality
   - Virtual Reality
   - Volumetric Displays
   - Gesture Control Devices
   - Affective Computing

2. **Perceptual Smart Machine Age**
   - Smart Dust
   - Machine Learning
   - Virtual Personal Assistants
   - Cognitive Expert Advisors
   - Smart Data Discovery
   - Smart Workspace
   - Conversational User Interfaces
   - Smart Robots
   - Commercial UAVs (Drones)
   - Autonomous Vehicles
   - Natural-Language Q&A
   - Personal Analytics
   - Enterprise Taxonomy and Ontology Management
   - Data Broker PaaS (dbrPaaS)
   - Context Brokering

3. **Platform Revolution**
   - Neuromorphic Hardware
   - Quantum Computing
   - Blockchain
   - IoT Platform
   - Software-Defined Security
   - Software-Defined Anything (SDx)

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Trend 1: Transparenly Immersive Experiences

Technology has and will continue to become more human-centric to the point where it will introduce transparency between people, businesses and things. This relationship will become much more entwined as the evolution of technology becomes more adaptive, contextual and fluid within the workplace, at home, and interacting with businesses and other people.

Critical technologies to be considered include: 4D Printing, Brain-Computer Interface, Human Augmentation, Volumetric Displays, Affective Computing, Connected Home, Nanotube Electronics, Augmented Reality, Virtual Reality and Gesture Control Devices.
Human Augmentation

Leading Indicators
- Today bionic exoskeletal suits are in development that allow people to walk again along with specific areas like hands or legs.
- Scientific community backing of synthesis of the human genome that will make body-hacking viable.
- Early stage senses augmentation technology commercially available such as language recognition hearing devices or contact lens that enhance or augment reality seamlessly.
- Nano-medicine not only becoming viable but companies like Google are creating a "Nanoparticle Platform" that shifts healthcare from reactive to proactive and cumulative.

Business Impacts
- Human augmentation will complement robotics in areas, such as: construction, military, emergency services and space travel
- Physical and mental performance-based incentives may require new considerations and risk analysis to determine for anomalies in performance and achievements
- Considerations to employees whom have personal preferences or religious restrictions on augmenting themselves
- Substantial gains and risk reduction in medical fields where some 90% of new drugs fail in human clinical trials based on safety and effectiveness.

Examples
- Exoskeleton Helping Paralyzed Individuals Walk
- Robo-Glove

Additional Examples Include:
- Superhuman vision through contact lenses
- Tattoos that control your phone
- On demand printing of replacement bone and skin
- Smart cancer seeking pills
- Contact lens that detects diabetes
- Electronic organs for medical testing
Trend 2: Perceptual Smart Machine Age

Smart machine technologies will be the most disruptive class of technologies over the next 10 years due to radical computational power, near-endless amounts of data, and unprecedented advances in deep neural networks that will enable organizations with smart machine technologies to harness data in order to adapt to new situations and solve problems that no one has never encountered previously.

Enterprises that are seeking leverage in this theme should consider the following technologies: Smart Dust, Machine Learning, Virtual Personal Assistants, Cognitive Expert Advisors, Smart Data Discovery, Smart Workspace, Conversational User Interfaces, Smart Robots, Commercial UAVs (Drones), Autonomous Vehicles, Natural-Language Question Answering, Personal Analytics, Enterprise Taxonomy and Ontology Management, Data Broker PaaS (dbrPaaS) and Context Brokering.
Virtual Personal Assistants (VPAs)

Leading Indicators

- Unobtrusive and narrow-purpose VPAs (such as personal financial advisors, health and wellness coaches).
- VPAs are becoming centerpieces of cross-platform platforms (such as Microsoft’s Cortana Intelligence Suite).
- General-purpose VPAs (such as Siri, Google Now, Alexa and Cortana) have room to grow and evolve.
- VPAs act on behalf of both consumer and business users, but more enterprise-oriented VPAs (such as Openstream's EVA).

Business Impacts

- VPAs have the potential to transform the nature of work and structure of the workplace.
- Recognize that privacy, security and innovation are at odds, but encourage experimentation with guardrails. Imposing too many controls too soon could eliminate the opportunity to outflank competition.
- Carefully measure the impact of VPAs on people’s behavior and performance. Use an ever-evolving set of metrics, identified by observation and crowdsourcing.

Examples

- Self-coding voice assistant
- Amy the digital assistant who schedules your meetings

Additional Examples Include:

- Humanizing and family friendly assistants like Jibo or Amazon Alexa
- IPSoft introducing Amelia as the first digital employee
- AI powered personal assistant for scheduling meetings
Leading Indicators

- Continued advancements in sensors, positioning, imaging, guidance, artificial intelligence (AI), mapping and communications technologies, combined with advanced software and cloud computing, are gaining in precision to bring the autonomous vehicle closer to reality.
- During 2016, GM invested $500 million in Lyft for autonomous vehicle development and acquired Cruise Automation. In 2015, Delphi Automotive acquired Ottomatika, and Uber hired key members of the Carnegie Mellon robotics team to work on its autonomous vehicle project.

Business Impacts

- Complexity and cost challenges remain high, which is impacting reliability and affordability requirements.
- Legal and ethical considerations, such as liability and driver-related aspects.
- Consumer education is critical to ensure that demand meets expectations once autonomous vehicle technology is ready for broad deployment.

Additional Examples Include:

- Mercedes-Benz's semiautonomous bus
- Ford targets 2021 for autonomous ride sharing
- Self-driving tractors get themselves to work
- Korea is piloting autonomous vehicles on college campus
- IBM Watson drives 3D-printed autonomous bus around Washington DC
- NASA plans to send an autonomous submarine to explore Titan's oceans
Trend 3: Platform Revolution

Emerging technologies are revolutionizing our concepts of how we define and use platforms. The shift from technical infrastructure to ecosystem-enabling platforms is laying the foundations for entirely new business models that are forming the bridge between humans and technology. Within these dynamic ecosystems, organizations must proactively understand and redefine their strategy to create platform-based business models, and to exploit internal and external algorithms in order to generate value.

Key platform-enabling technologies to track include: Neuromorphic Hardware, Quantum Computing, Blockchain, IoT Platform, Software-Defined Security and Software-Defined Anything (SDx).
## Benefit and Adoption

### Benefit

<table>
<thead>
<tr>
<th>Benefit Type</th>
<th>Years to Mainstream Adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformational</td>
<td>2 to 5 years</td>
</tr>
<tr>
<td>High</td>
<td>5 to 10 years</td>
</tr>
<tr>
<td>Moderate</td>
<td>More than 10 years</td>
</tr>
<tr>
<td>Low</td>
<td>As of July 2016</td>
</tr>
</tbody>
</table>

### Years to Mainstream Adoption

#### Less than 2 years
- Machine Learning
- Cognitive Expert Advisors
- Conversational User Interfaces
- IoT Platform
- Micro Data Centers
- Nanotube Electronics
- Personal Analytics
- Smart Data Discovery
- Smart Workspace
- Software-Defined Security
- Virtual Personal Assistants

#### 2 to 5 years
- Blockchain
- Autonomous Vehicles
- General-Purpose
- Machine Intelligence
- Human Augmentation
- Neuromorphic Hardware
- Smart Dust

#### 5 to 10 years
- Natural-Language Question Answering
- Software-Defined Anything (SDx)
- 802.11ax
- Augmented Reality
- Connected Home
- Context Brokering
- Data Broker PaaS (dbrPaaS)
- Smart Robots

#### More than 10 years
- Affective Computing
- Gesture Control Devices
- Virtual Reality
- Brain-Computer Interface
- Enterprise Taxonomy and Ontology Management
- Volumetric Displays

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As of July 2016
Recommendations

✓ Create a 3 to 5 person tiger team over 1 week to identify just 3 technologies or trends from the emerging trends Hype Cycle that will be most impactful to your organization.

✓ Use the "My Hype Cycle Toolkit" as a tool to understand how emerging technologies and trends from across all Hype Cycles apply to you.

✓ Build in trend scanning, analysis, and ideation into your strategic planning, program management, and governance practices.
Recommended Gartner Research

- **Hype Cycle for Emerging Technologies, 2016**
  Mike J. Walker, Betsy Burton and Michele Cantara (G00299893)

- **Hype Cycle for Cloud Computing, 2016**
  Ed Anderson and David Mitchell Smith (G00290906)

- **Hype Cycle for the Internet of Things, 2016**
  Alfonso Velosa and Others (G00290227)

- **Hype Cycle for Business Intelligence and Analytics, 2016**
  Kurt Schlegel (G00290879)

- **Hype Cycle for Cloud Security, 2016**
  Jay Heiser (G00290073)

- **Hype Cycle for Information Infrastructure, 2016**
  Donald Feinberg and Adam M. Ronthal (G00304182)

For more information, stop by Gartner Research Zone.
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Recommended Gartner Research

  Gregg Kreizman (G00289523)

- Hype Cycle for Storage Technologies, 2016
  Pushan Rinnen and Julia Palmer (G00302826)

- Hype Cycle for Enterprise Architecture, 2016
  Betsy Burton, Brian Burke and Marcus Blosch (G00290774)

- Hype Cycle for Smart Machines, 2016
  Kenneth F. Brant and Tom Austin (G00290496)

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