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Future Trends Series - GR:REEN Project

Title of the report

Disruptive Technologies: Advances that will Transform Life, Business, and the Global Economy

Area

Science and technology

Reporter

McKinsey Global Institute (MGI)

Type of the Reporter

Private Organisation

Periodically updated?

No

First issued year

2013

Latest update

/

Official website

<http://www.mckinsey.com/insights/mgi>

Language available

English

Short summary

Since the Industrial Revolution of the late 18th and early 19th centuries, technology has had a unique role in powering growth and transforming economies. Technology represents new ways of doing things and – once mastered – creates lasting change, which businesses and cultures do not “unlearn”; adopted technology becomes embodied in capital, whether physical or human, and it allows economies to create more value with less input. At the same time, technology often alters the way people live and work, rearrange value pools, lead to entirely new products and disrupts, supplanting older ways of doing things and rendering old skills and organizational approaches irrelevant.

These economically disruptive technologies are the main focus of MGI’s report. It sets out to identify which of these technologies – selected according to the criteria of speed, range of impact and potential scale of economic value - could have massive, economically disruptive impact between now and 2025. The report also sought to understand how these technologies could change our world and how leaders of businesses and other institutions should respond.

The aim of the paper is to use a structured analysis to sort through the technologies with the potential to transform and disrupt in the next decade or two, and to assess potential impact based on what it is known today, and put these promising technologies in a useful perspective.

Key trends

- **Twelve potentially economically disruptive technologies.** Mobile internet, automation of knowledge work, the internet of things, cloud technology, advanced robotics, autonomous and near-autonomous vehicles, next-generation genomics, energy storage, 3D printing, advanced materials, advanced oil and gas exploration and recovery, and renewable energy.
- **Estimated potential economic impact in 2025 across sized applications.** Even if the sizing is not comprehensive, the collective potential for the selected technologies and applications is huge: taken together and netting out potential overlaps, it has been forecasted that they have the potential to drive direct economic impact on the order of \$14 trillion to \$33 trillion per year in 2025.
- **Common traits among economically disruptive technologies.**
 - Most of the selected technologies are directly enabled, or enhanced, by information technology, which therefore has a pervasive character.
 - Combinations of technologies could multiply the impact.
 - Consumers could be delivered major benefits from these technologies, particularly in the long run.
 - The nature of work will change, and millions of people will require new skills.
 - Technology impact differs between advanced and developing economies.
 - Benefits of technologies may not be evenly distributed. The link between hype and potential is not clear.
 - Scientific discovery and innovation will keep on developing, but they won't eliminate technologies' risk margin.

Suggestions

- **Actions for business leaders.** As disruptive technologies continue to evolve and play out, it will be up to all these actors to maximize their opportunities while dealing with the challenges. Business leaders need to be on the winning sides of these changes: they can do so by being the early adopters or innovators or by turning a disruptive threat into an opportunity. The first step is for leaders to invest in their own technology knowledge. Top leaders need to know what technologies can do and how to bend it to their strategic goals: they cannot wait until technologies are fully baked to think about how they will work for – or against – them.
- **Actions for companies.** Companies will need to find ways to get the workforce they need, by engaging with policy makers and their community to shape secondary and tertiary education and by investing in talent development and training. Sometimes companies will need to disrupt their own business models before a rival or a new competitor does it for them.
- **Actions for policy makers.** Policy makers could benefit from an informed and comprehensive view of how they can help their economies benefit from new technologies. They should encourage development of the technologies that are most relevant to their economies.

Methodology

Survey, research from secondary sources and modelling

Reference to other trends reports? If yes, which reports?

- ASDReports, The aluminium market analysis, financials and forecasting 2012–2017, May 2012.
- Christensen, Clayton, Scott Anthony, and Erik Roth, Seeing what's next: Using theories of innovation to predict industry change, Harvard Business School Press, 2004.
- Energy Resources Conservation Board, Alberta's energy reserves 2007 and supply/demand outlook 2008–2017, 2008.
- Gantz, John, and David Reinsel, The digital universe in 2020: Big data, bigger digital shadows, and biggest growth in the Far East, International Data Corporation (IDC) analyst report, December 2012.
- McKinsey & Company, Online and upcoming: The Internet's impact on aspiring countries, January 2012.
- Varian, Hal, "The value of the Internet now and in the future," The Economist, March 10, 2013.