Artificial Intelligence
ITU initiatives
The Summit is THE leading UN platform for global and inclusive dialogue on AI

Hosted by the ITU in partnership with sister UN agencies, XPRIZE Foundation & ACM
Connect AI innovators with problem owners, to identify practical applications of AI to accelerate progress towards the UN Sustainable Development Goals.

Ensure trusted, safe and inclusive development of AI technologies and equitable access to their benefits.
2019 SUMMIT IN NUMBERS

- 2300+ Participants registered
- 40% Women Participants
- 80+ Sessions
- 275+ Developing Countries
- 90+ Countries
- 37 UN Partners
- 15 Stages
- 375+ Speakers
- 50+ Exhibitors
2019 BREAKTHROUGH TEAMS
The heart of the Summit...

- SDG4 Education
- SDG3 Good Health and Well Being
- SDG10 Human dignity
- SDG7 Scaling AI for Good
- AI for Space
ITU / WHO Focus Group on Artificial Intelligence for Health

**Topic areas:**
- Cardiovascular disease risk prediction (TG-Cardio)
- Dermatology (TG-Derma)
- Falls among the elderly (TG-Falls)
- Histopathology (TG-Histo)
- Neuro-cognitive diseases (TG-Cogni)
- Outbreak detection (TG-Outbreaks) New
- Ophthalmology (TG-Ophthamo)
- Psychiatry (TG-Psy)
- Radiotherapy (TG-Radiotherapy)
- Snakebite and snake identification (TG-Snake)
- Symptom assessment (TG-Symptom)
- Tuberculosis (TG-TB)
- Volumetric chest computed tomography (TG-DiagnosticCT)

**Key current output documents:**
- FG-AI4H Whitepaper
- E-102: Updated call for proposals: use cases, benchmarking, and data
- D-103: Updated FG-AI4H data acceptance and handling policy
- C-104: Thematic classification scheme
Artificial Intelligence for Health (A4IH) offers substantial improvements for public and clinical health, e.g. early detection, diagnosis and risk identification, treatment decision support, self-management, improved outcomes, …

For world-wide adoption, need evaluation standards on effective AI for Health

Focus Group AI for Health (FG-AI4H) created July 2018; open platform

FG-AI4H goals: standardized framework for benchmarking and evaluation of AI solutions
AI for Health Use Case in Histopathology: Diagnostic Support for Breast Cancer Treatment

- Tumor infiltrating lymphocytes (TILs) are implicated in eliminating tumor cells
- Quantification of TILs relevant for patient prognosis estimation and therapy selection
- Replace “eye-ballling” by pathologist with Machine Learning method for TIL quantification
- Focus Group: specify process on data generation and evaluate accuracy of Machine Learning method

Unified architecture for machine learning in 5G and future networks processed and approved by SG13 on 1 of July “Architectural framework for machine learning in future networks including IMT-2020"

ITU's ML-Aware Network Architecture: Bringing Intelligence to Verticals
March 2019
Upcoming: Machine learning in 5G and future networks: use cases and basic requirements
Upcoming: Framework for data handling to enable Machine Learning in future networks including IMT 2020
Upcoming: Method for evaluating mobile network intelligence level

Source: https://www.itu.int/en/ITU-T/focusgroups/ml5g/Pages/default.aspx
Assessing the economic impact of Artificial Intelligence

Contributed by the McKinsey Global Institute (MGI), the economic and business research arm of McKinsey & Company, this paper offers a framework for thinking about how to model the economic impact of AI.
AI has large potential to contribute to global economic activity.

The pattern of adoption and full absorption may be relatively rapid—at the high end of what has been observed with other technologies.

The economic impact may emerge gradually and be visible only over time.

A key challenge is that adoption of AI could widen gaps between countries, companies, and workers.
More countries are taking measures to advance AI (examples - mid 2018)

- **China.** The government is prioritizing AI, including its promotion in, for instance, its 13th Five-Year Plan (which runs from 2016 to 2020), its Internet Plus and AI plans from 2016 to 2018, and a “new generation AI plan.” China has stated that it aims to create a domestic AI market of 1 trillion renminbi ($150 billion) by 2020 and become a world-leading AI center by 2030.³ The private sector is pushing actively for AI, too. Three of China’s internet giants—Alibaba, Baidu, and Tencent—as well as iFlytek, a voice recognition specialist, have joined a “national team” to develop AI in in areas such as autonomous vehicles, smart cities, and medical imaging.

- **Europe.** European Union (EU) member states have announced their intention to collaborate on AI more actively across borders to ensure that Europe is competitive in these technologies and that they can tackle their social, economic, ethical, and legal ramifications together.² The EU has called for $24 billion to be invested in AI research by 2020.³ A number of European countries have also been driving national initiatives. The French government has announced an initiative to double the number of people studying and researching AI projects, set new boundaries for data sharing, and invest $1.85 billion to fund research and startups.⁴ The United Kingdom has published a comprehensive plan to strengthen the core foundation of AI in an “artificial intelligence sector deal” and has stated its aim to lead in the field of AI ethics.⁵

- **Asia (outside China).** The government of South Korea set up a Presidential Fourth Industrial Revolution Committee in 2017 and announced that it would invest $2 billion by 2022 to strengthen its capabilities in AI R&D.⁶ Singapore has launched an AI Singapore national initiative to enhance AI capabilities by forming a partnership of government institutions.⁷

- **Canada.** International research institute CIFAR is leading the government’s Pan-Canadian Artificial Intelligence Strategy with three new AI institutes: the Alberta Intelligence Institute in Edmonton, the Vector Institute in Toronto, and MILA in Montreal; these three cities are Canada’s major AI centers.⁸
**Economic prosperity**
- Lift output and productivity in areas such as agriculture, food production, and other logistics (Goal 2)
- Improve current signaling on tracks through applications of smart sensor technology and advanced analytics (Goal 9)

**Social equity**
- All students have access to high quality education whatever the student’s inherited circumstances (Goal 4)
- Developing objective and efficient ways to identify and respond to gender bias, discrimination, and violence (Goal 5)
- Monitor users’ financial vitals to improve their financial condition (Goal 10)

**Environmental protection**
- Improve the efficient management of natural resources and the accountability of harmful activities by using AI (Goal 6)
- Intersection of AI with climate science is assisting researchers to better identify, understand, and predict atmospheric processes (Goal 13)

**International cooperation**
- AI for Good Summit solidifies the UN-wide commitment to partnership and cooperation to scale up AI-enabled innovative solutions to advance the SDGs (Goal 17)
Exhibit 3. The economic impact of AI can build up at an accelerating pace

Value-added gains of economic output
Cumulative boost vs. today, %

NOTE: Numbers are simulated figures to provide directional perspectives rather than forecasts.
SOURCE: McKinsey Global Institute analysis
### Production channels

- **Augmentation**
  - AI will likely also redefine many existing occupations, augmenting human capabilities and making workers more productive.

- **Substitution**
  - The 2017 research conducted by MGI on the impact of automation on work suggests that roughly half of the time spent on various tasks could theoretically be automated by adopting existing technology. The picture could, of course, change depending on technological progress.

- **Product and service innovation and extension**
  - Investment in AI beyond what is needed strictly for labor substitution can produce additional economic output by expanding firms’ portfolios, increasing channels for products and services, developing new business models, or some combination of the three.

- **Economic gains from increased global flows**
  - AI can contribute to digital flows in two ways. The first is by facilitating more efficient cross-border commerce.

  - making improved and expanded use of cross-border data in flows other than commerce, which can enhance the performance of AI solutions and, in turn, can improve the productivity of local activities, especially services.

- **Wealth creation and reinvestment**
  - Higher productivity of economies, the increased output from efficiency gains and innovations can be passed to workers in the form of wages and to entrepreneurs and firms in the form of profits. The generation of wealth induced by AI could create spillover effects that boost economic growth.

### External dimensions

- **Transition and implementation costs**
  - e.g. Companies are likely to incur cost restructuring their organizations, companies might need to pay associated costs such as severance, cover the cost of systems, their integration, and associated project and consulting fees, companies also need to build capabilities.

- **Negative externalities**
  - AI could induce major negative distributional externalities affecting workers among others.
AI’s net economic impact - seven dimensions
Automation of labor could add up to about 11 percent or around $9 trillion to global GDP by 2030.

Innovation in products and services could deliver up to about 7 percent or around $6 trillion of potential GDP by 2030.

Negative externalities and transition costs could reduce the gross GDP impact by about nine percentage points, or around $7 trillion.

Box 5. Catalysts for the creation of new jobs

McKinsey Global Institute has modeled some potential sources of demand for new labor that could spur job creation to 2030, even net of automation. It calculated the full-time-equivalent jobs that could be created both directly and indirectly for more than 800 existing occupations. For trendline and step-up scenarios, six catalysts that can create demand for work were considered:

1. **Rising incomes and consumption.** As their incomes rise, consumers spend more, and this can create additional employment in segments including consumer durables, leisure, financial and telecommunication services, housing, healthcare, and education—not only in countries where these consumers live but also to those to which these economies export.

2. **Aging populations.** Patterns of spending change as people age, with the share spent on healthcare and other personal services rising significantly. This is likely to create substantial demand for occupations from healthcare professionals to home-care and personal-care professionals (while reducing demand for occupations associated with children and the young such as pediatricians and primary-school teachers).

3. **Development and deployment of technology.** Total spending on technology could increase by more than 50 percent from 2015 to 2030, likely increasing employment among, for instance, computer scientists, engineers, and IT administrators.

4. **Investment in infrastructure and buildings.** As developing economies continue to urbanize and there is demand in all economies for building maintenance and, where incomes are rising, for higher-quality buildings, demand for associated professionals such as architects and engineers, as well as lower-skilled construction workers and machinery operators will increase.

5. **Investment in renewable energy, energy efficiency, and climate adaptation.** Investment designed to meet policy goals on the environment, including energy efficiency, could create new demand for workers in occupations from manufacturing to construction.

6. **Marketization of previously unpaid domestic work.** If more countries around the world succeed in raising women’s labor-force participation, there is large potential to marketize the high share of unpaid care work women carry out in the home such as cooking, childcare, and cleaning, creating new employment.

Those six trends together could lead to the creation of 555 million to 890 million new jobs globally.
Micro Drivers: Digitization and Competitive Pressure
i) AI investment,
ii) AI research activities,
iii) Potential productivity boost from AI and automation,
iv) Digital absorption,
v) Innovation foundation,
vi) Human capital,
vii) Connectedness, and
viii) Labor-market structure and flexibility
### Readiness for AI

#### Table: Readiness for AI

<table>
<thead>
<tr>
<th>Country</th>
<th>R&amp;D Investment</th>
<th>AI-related Policies</th>
<th>Data Sources</th>
<th>Enablement</th>
<th>Innovation</th>
<th>Human Capital</th>
<th>Current Industry</th>
<th>Labor Market</th>
<th>Total Score</th>
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</thead>
<tbody>
<tr>
<td>China</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
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<tr>
<td>United States</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>9</td>
</tr>
</tbody>
</table>

**Notes:**

1. For the threshold, we calculated a global average and then measured standard deviation. If countries are generally one standard deviation above the average, we categorized them as "above" and one standard deviation below average as "below"; we categorized the rest as being "within." For certain dimensions where values for leading countries are far higher than the average, we lowered the thresholds to show relative differences clearly.

2. VE = venture capital; PE = private equity; M&A = mergers and acquisitions.

3. PISA = Programme for International Student Assessment; IDEO = IDEO; STM = science, technology, and math; GHC = Global Human Capital Index; WEF = World Economic Forum.

4. GTI = Global Talent Competitiveness Index.

5. The score is calculated based on a weighted average of each area that can have a different degree of impact on GDP growth partner.  

**Source:** World Bank; IDEO; Global Innovation Index 2017; World Investment Report 2018; McKinsey Global Institute.
Gap between country groups is significant and may grow further.
Sector analysis

Exhibit 12. Sector analysis indicates that AI relies on a proceeding digital wave

Exhibit 13. AI absorption curves can vary by sector, leading to different levels of economic impact

SOURCE: McKinsey Digital Survey; McKinsey Global Institute analysis
Sector analysis

Exhibit 14. The potential value of AI by sector

- Retail: $0.4-0.8
- Transport and logistics: $0.4-0.5
- Travel: $0.3-0.4
- Consumer packaged goods: $0.2-0.3
- Public and social sector: $0.2-0.3
- Automotive and assembly: $0.2-0.3
- Healthcare systems and services: $0.2-0.3
- Banking: $0.2-0.3
- Advanced electronics/semiconductors: $0.2-0.3
- Basic materials: $0.2-0.3
- High tech: $0.2-0.3
- Oil and gas: $0.2-0.3
- Insurance: $0.1-0.2
- Agriculture: $0.1-0.2
- Chemicals: $0.1-0.3
- Media and entertainment: $0.1-0.2
- Telecommunications: $0.1-0.3
- Pharmaceuticals and medical products: $0.1-0.2
- Aerospace and defense: <0.1

Exhibit 15. AI in retail adds the most value in pricing and promotion, and other marketing and sales areas

- Marketing and sales: 0.3-0.5
- Pricing and promotion: 0.1-0.2
- Customer service management: <0.1
- Customer acquisition and generation: <0.1
- Task automation: 0.2-0.2
- Inventory and parts optimization: <0.05
- Next product to buy: <0.05
- Marketing budget allocation: <0.05
- Workplace productivity and efficiency: <0.05
- Analytics-driven accounting and IT: <0.05
- Product feature optimization: <0.05
- Product development: <0.05
- Strategy and corporate finance: <0.05

NOTE: Artificial intelligence here includes neural networks only. Figures may not sum to 100% because of rounding.

SOURCE: McKinsey Global Institute analysis
Sector analysis

Exhibit 16. AI in healthcare adds the most value in workplace productivity and efficiency

Exhibit 17. AI in telecoms adds the most value by increasing the acquisition and retention of customers, and more efficient and productive service delivery
Sector analysis
Sector analysis

Exhibit 20. AI adoption and absorption can change the employment mix and distribution of wages

<table>
<thead>
<tr>
<th>Employment mix</th>
<th>% of workforce</th>
<th>SIMULATION</th>
<th>2017</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetitive job profiles</td>
<td>Nondigital</td>
<td>43</td>
<td>2</td>
<td>52</td>
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<tr>
<td></td>
<td>Digital</td>
<td>4</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Nonrepetitive job profiles</td>
<td>Nondigital</td>
<td>11</td>
<td>15</td>
<td>12</td>
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<tr>
<td></td>
<td>Digital</td>
<td>42</td>
<td>49</td>
<td>53</td>
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</table>

NOTE: Numbers are simulated figures to provide directional perspectives rather than forecasts. Figures may not sum to 100% because of rounding.

SOURCE: McKinsey Global Institute analysis

Exhibit 21. AI adoption and absorption can affect employment in five key ways

<table>
<thead>
<tr>
<th>Impact on employment by 2020, cumulative</th>
<th>% change, FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor displaced due to AI</td>
<td>-18</td>
</tr>
<tr>
<td>Labor gains from augmentation</td>
<td>5</td>
</tr>
<tr>
<td>Labor gains from innovation and reassignment</td>
<td>-10</td>
</tr>
<tr>
<td>Labor gains from realignment</td>
<td>1</td>
</tr>
<tr>
<td>Labor gains from global flows</td>
<td>1</td>
</tr>
<tr>
<td>Not affected employment</td>
<td>1</td>
</tr>
</tbody>
</table>

NOTE: Numbers are simulated figures to provide directional perspectives rather than forecasts. Figures may not sum to 100% because of rounding.

SOURCE: McKinsey Global Institute analysis
Thank You

https://www.itu.int/en/journal/001/Pages/default.aspx