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Jobs lost, jobs gained: Workforce transitions in a time of automation

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To assess the technical potential of automation, we structure our analysis around 2,000 distinct work activities.
Three categories of work activities have significantly higher technical automation potential

<table>
<thead>
<tr>
<th>Time spent in all US occupations</th>
<th>Manage(^1)</th>
<th>Expertise(^2)</th>
<th>Interface(^3)</th>
<th>Unpredictable physical(^4)</th>
<th>Collect data</th>
<th>Process data</th>
<th>Predictable physical(^5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>9</td>
<td>18</td>
<td>20</td>
<td>26</td>
<td>64</td>
<td>69</td>
<td>81</td>
</tr>
<tr>
<td>Total wages in US, 2014 $ billion</td>
<td>596</td>
<td>1,190</td>
<td>896</td>
<td>504</td>
<td>1,030</td>
<td>931</td>
<td>766</td>
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<tr>
<th>Most susceptible activities</th>
<th>51% of total working hours</th>
<th>$2.7 trillion in wages</th>
</tr>
</thead>
</table>

1 Managing and developing people.
2 Applying expertise to decision making, planning, and creative tasks.
3 Interfacing with stakeholders.
4 Performing physical activities and operating machinery in unpredictable environments.
5 Performing physical activities and operating machinery in predictable environments.

NOTE: Numbers may not sum due to rounding.

Automation will be a global force, but adoption will take decades and there is significant uncertainty on timing

Time spent on current work activities¹

1 Forty-six countries used in this calculation, representing about 80% of global labor force.

SOURCE: McKinsey Global Institute analysis
By 2030, in the midpoint adoption scenario, automation could replace as high as 19–52% (in the earliest adoption scenario) and as low as 0–3% (in the latest adoption scenario) of current work in a set of focus countries.

Projected impact on total employment in midpoint automation scenario, 2016–30
% of FTE hours with potential to be automated, midpoint scenario (range of automation scenarios, latest to earliest)

NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute analysis
Rising consumer incomes are the largest source of job creation among our seven catalysts

Potential jobs created from seven catalysts of labor demand, midpoint automation, 2016–30

Million FTEs, ranged low–high

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**Trendline scenario**

- Rising incomes: 300–365
- Aging health care: 50–85
- Technology spending: 20–50
- Investment: real estate construction: 10–50
- Investment: infrastructure: 10–30
- Energy transitions and efficiency: 0–10
- Trendline scenario total: 390–590

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**Incremental job creation from step-up scenario**

- Added investment: real estate construction: 75–130
- Added investment: infrastructure: 40–70
- Added investment: energy transitions and efficiency: 0–10
- Marketization of unpaid work: 50–90
- Step-up scenario total: 165–300

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1 Some occupational data projected into 2016 baseline from latest available 2014 data.

SOURCE: McKinsey Global Institute analysis
Jobs lost, jobs gained: Automation, new job creation, and change in labor supply, 2016–30

Range of automation scenarios and additional labor demand from seven catalysts

1 Historical analysis suggests that we could expect 8–9% of 2030 labor supply will be in “new jobs,” which is additional to labor demand we have estimated.

NOTE: We identified seven catalysts of labor demand globally: rising incomes, health-care spending, investment in technology, buildings, infrastructure, and energy, and the marketization of unpaid work. We compared the number of jobs to be replaced by automation with the number of jobs created by our seven catalysts as well as change in labor force, between 2016 and 2030. Some occupational data projected into 2016 baseline from latest available 2014 data. Not to scale.

SOURCE: McKinsey Global Institute analysis
In the modeled U.S. scenarios, current high wage occupations see the most growth and middle wage occupations decline the most.

Percentage change in wage percentile group, 2016–30

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</thead>
<tbody>
<tr>
<td>Trendline</td>
<td>-7</td>
<td>0</td>
<td>-3</td>
<td>-7</td>
<td>-12</td>
<td>-16</td>
<td>-19</td>
<td>-21</td>
<td>-9</td>
<td>-12</td>
</tr>
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</table>

% of total FTE, 2016

<table>
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<tr>
<th>11</th>
<th>9</th>
<th>10</th>
<th>10</th>
<th>11</th>
<th>9</th>
<th>10</th>
<th>10</th>
<th>10</th>
<th>10</th>
<th>10</th>
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Average wage, 2016 ($)

| 20,414 | 23,969 | 26,755 | 30,092 | 33,902 | 39,354 | 47,389 | 56,104 | 67,963 | 105,511 |

1 Numerator: net change; denominator: 2030 scaled FTE in the given wage percentile bucket. Some occupational data projected into 2016 baseline from latest available 2014 data.

SOURCE: McKinsey Global Institute analysis
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