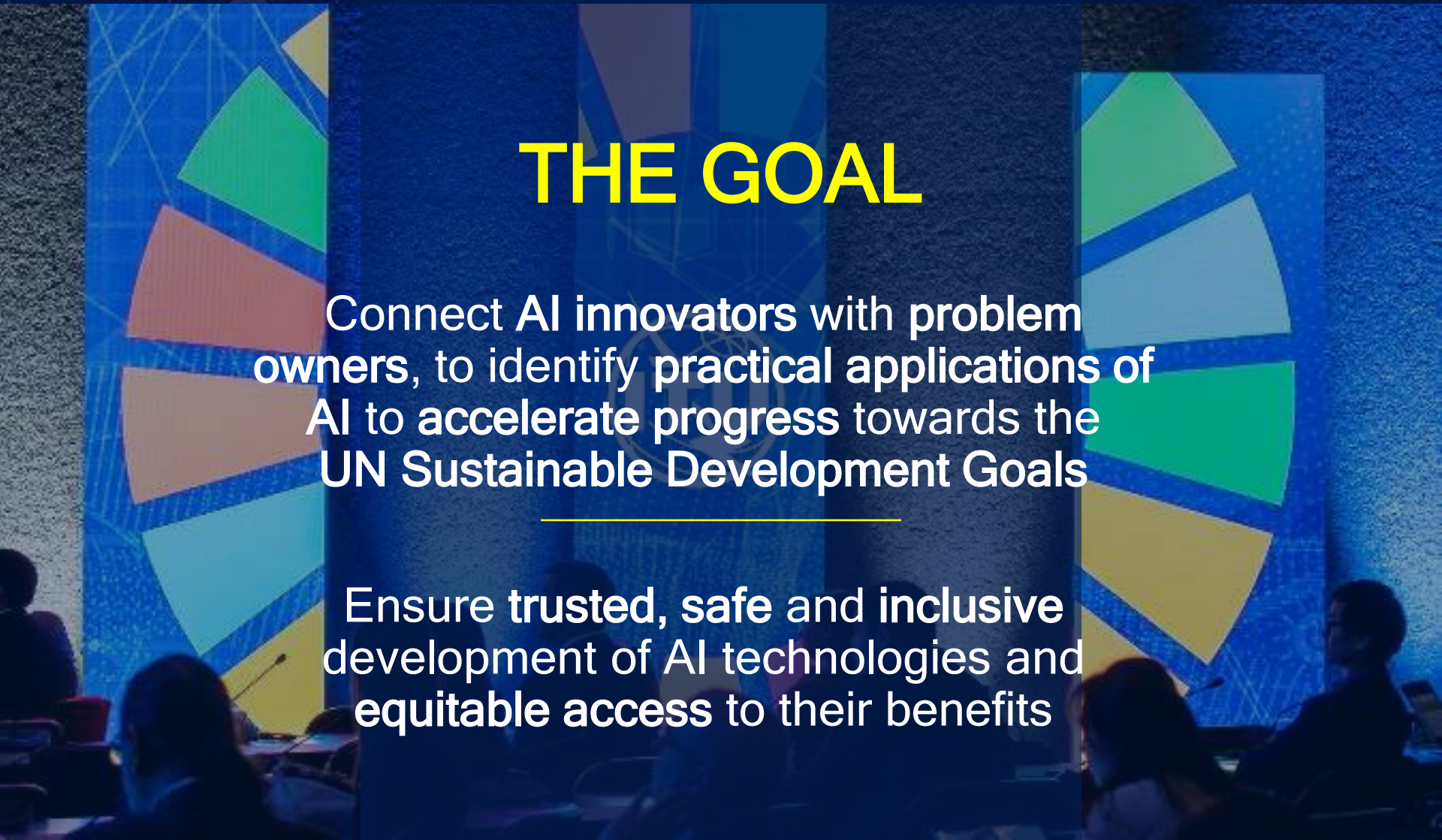
Artificial Intelligence
ITU initiatives

THE SUMMIT

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


THE GOAL
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
90+
Countries
275+
Developing Countries
37
UN Partners
15
Stages
375+
Speakers
50+
Exhibitors
ITU

2019 BREAKTHROUGH TEAMS

The heart of the Summit...

SDG4 Education

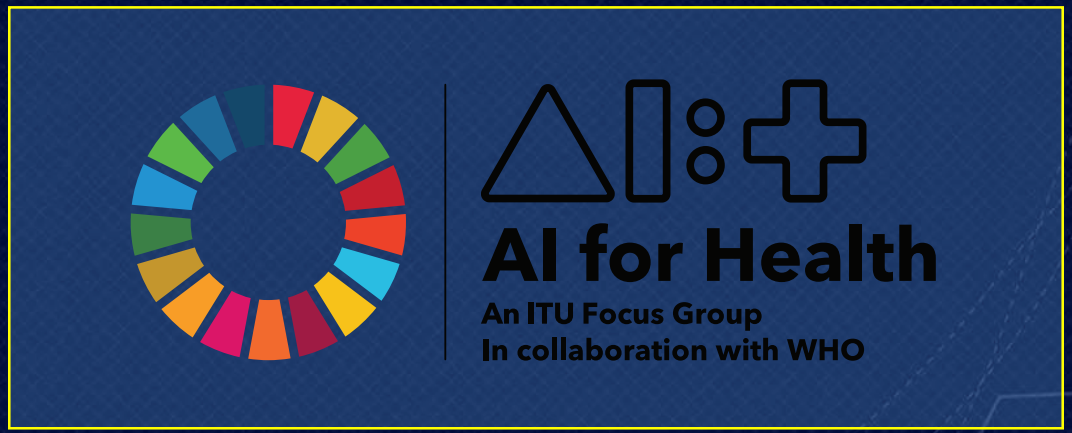
SDG3 Good Health and Well Being

SDG10 Human dignity

SDG7 Scaling AI for Good

AI for Space

ITU / WHO Focus Group on Artificial Intelligence for Health



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-Ophthalmo)
- 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

ITU/WHO Focus Group AI for Health

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, …

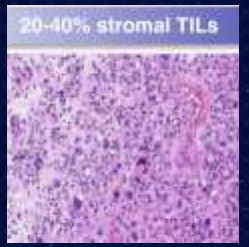
For world-wide adoption, need evaluation standards on effective AI for Health

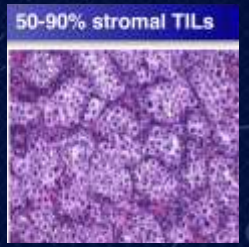
Focus Group AI for Health (FG-AI4H) created July 2018; open platform

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-balling” by pathologist with Machine Learning method for TIL quantification
- Focus Group: specify process on data generation and evaluate accuracy of Machine Learning method





Source: Hendry, S., Salgado, R., Gevaert, T., Russell, P. A., John, T., Thapa, B., ... & Sanders, M. (2017). Assessing Tumor-Infiltrating Lymphocytes in Solid Tumors: A Practical Review for Pathologists and Proposal for a Standardized Method from the International Immuno-Oncology Biomarkers Working Group Part 2 (...). Advances in anatomic pathology, 24(6), 311-335.

ITU-T Focus Group on Machine Learning for 5G

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

5

Computer vision, natural language, virtual assistants, robotic process automation, and advanced machine learning

AI categories

- **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.[1] 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]

AI and SDG

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).

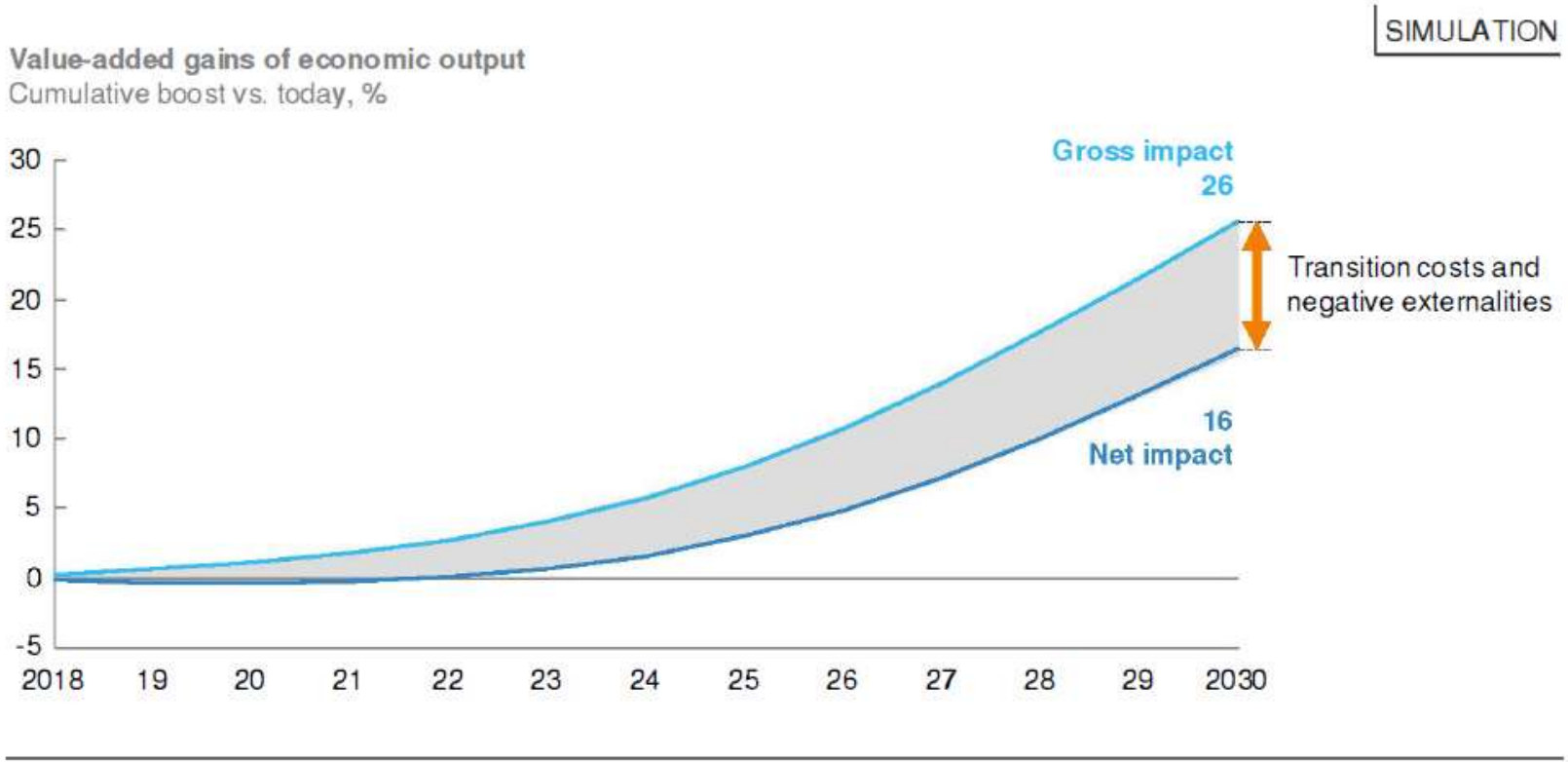
Environmental protection

- 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, under-stand, 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



NOTE: Numbers are simulated figures to provide directional perspectives rather than forecasts.

SOURCE: McKinsey Global Institute analysis

7 possible channels of AI impact

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

External dimensions

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.

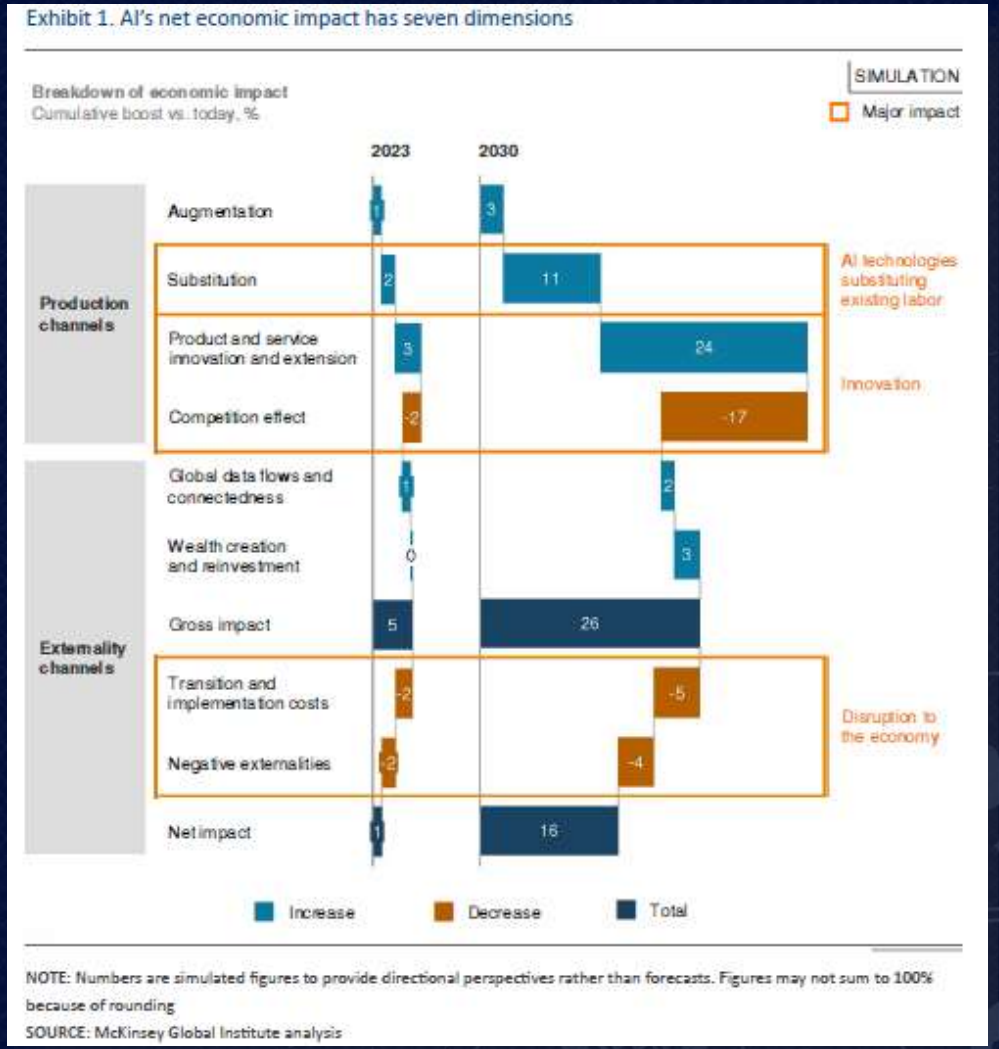
Transition and implementation costs

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

MGI has modeled some potential sources of demand for new labor that could spur job creation to 2030, even net of automation.[1] 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.[2]

These six trends together could lead to the creation of 555 million to 890 million new jobs globally.

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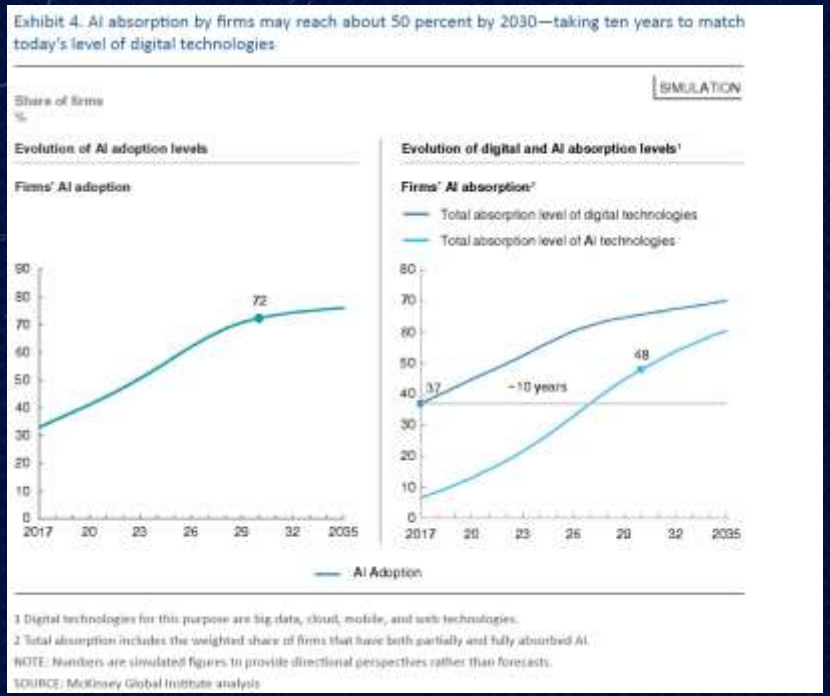
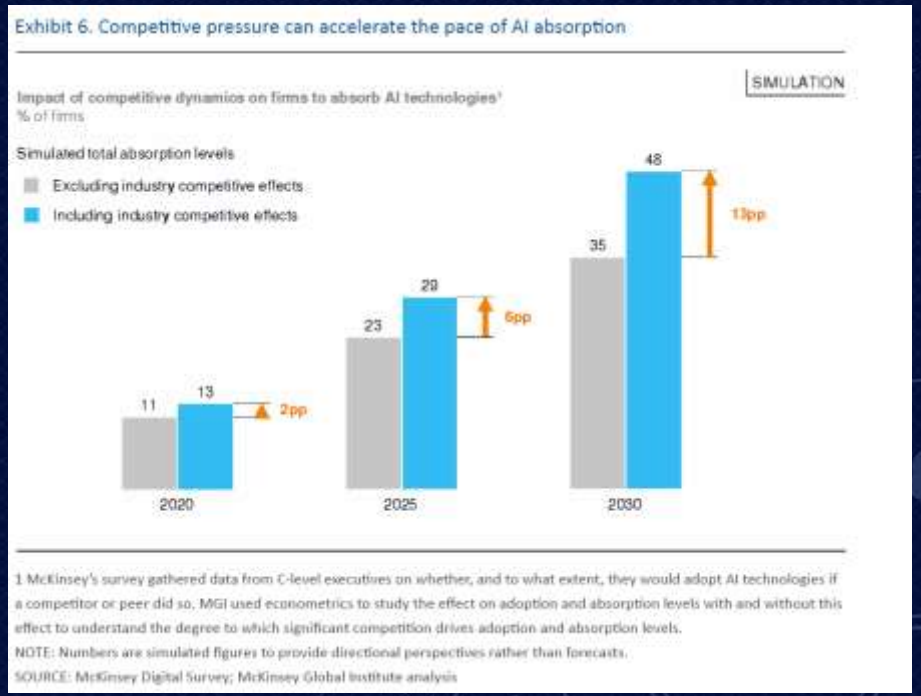
[1] *Jobs lost, jobs gained: Workforce transitions in a time of automation*, McKinsey Global Institute, December 2017.

[2] Around three-quarters of unpaid care work globally is undertaken by women. See *The power of parity: How advancing women's equality can add $12 trillion to global growth*, McKinsey Global Institute, September 2015.

Micro Drivers: Digitization and Competitive Pressure

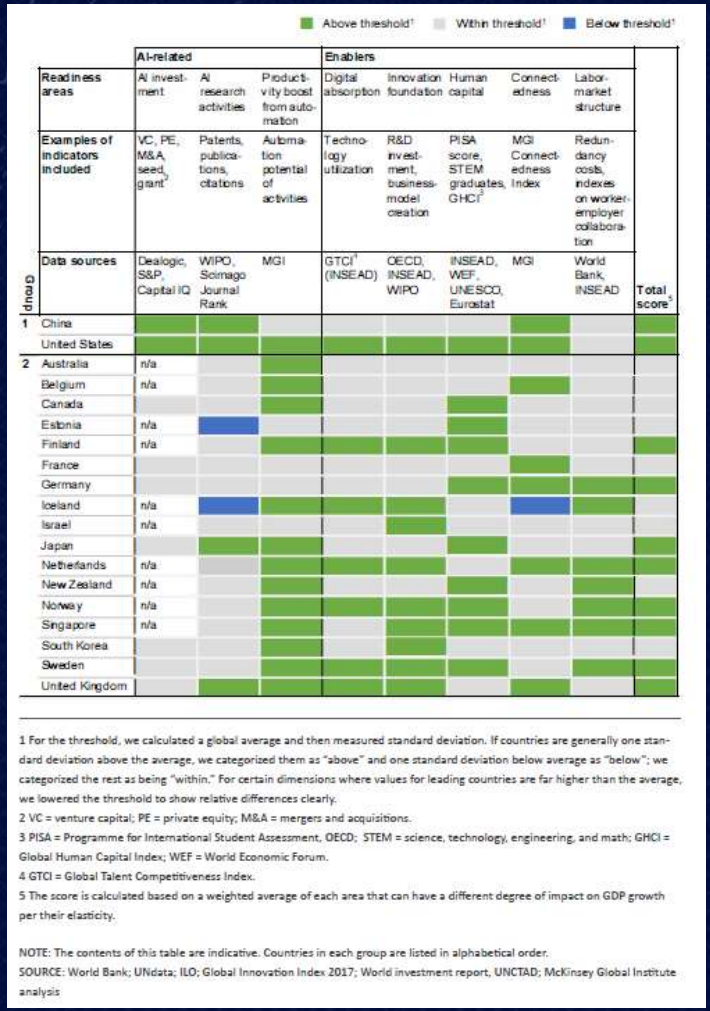




Macro Drivers

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



Above threshold[1] Within threshold[1] Below threshold[1]

Group		AI-related			Enablers					Total score[5]
	Readiness areas	AI investment	AI research activities	Productivity boost from automation	Digital absorption	Innovation foundation	Human capital	Connectedness	Labor-market structure	
	Examples of indicators included	VC, PE, M&A, seed, grant[2]	Patents, publications, citations	Automation potential of activities	Technology utilization	R&D investment, business-model creation	PISA score, STEM graduates, GHCI[3]	MGI Connectedness Index	Redundancy costs, indexes on worker-employer collaboration	
	Data sources	Dealogic, S&P, Capital IQ	WIPO, Scimago Journal Rank	MGI	GTCI[4] (INSEAD)	OECD, INSEAD, WIPO	INSEAD, WEF, UNESCO, Eurostat	MGI	World Bank, INSEAD	
1	China									
	United States									
2	Australia	n/a								
	Belgium	n/a								
	Canada									
	Estonia	n/a								
	Finland	n/a								
	France									
	Germany									
	Iceland	n/a								
	Israel	n/a								
	Japan									
	Netherlands	n/a								
	New Zealand	n/a								
	Norway	n/a								
	Singapore	n/a								
	South Korea									
	Sweden									
	United Kingdom									

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 threshold to show relative differences clearly.

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

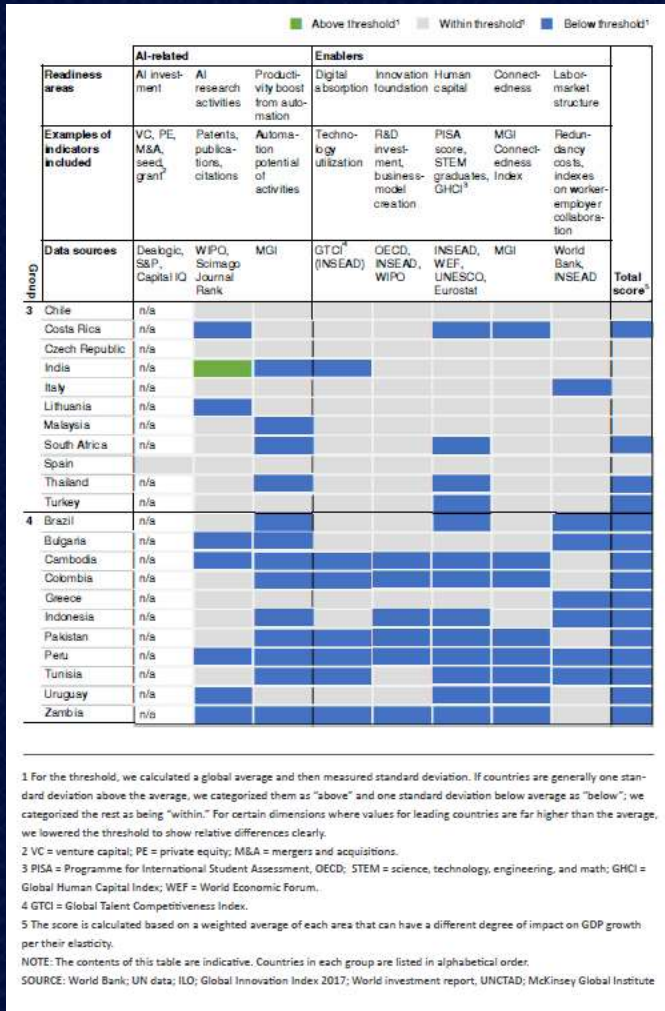
3 PISA = Programme for International Student Assessment, OECD; STEM = science, technology, engineering, and math; GHCI = Global Human Capital Index; WEF = World Economic Forum.

4 GTCI = 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 per their elasticity.

NOTE: The contents of this table are indicative. Countries in each group are listed in alphabetical order.

SOURCE: World Bank; UNdata; ILO; Global Innovation Index 2017; World investment report, UNCTAD; McKinsey Global Institute analysis



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	Data sources	Dealogic, S&P, Capital IQ	WIPO, Scimago Journal Rank	MGI	GTCI[4] (INSEAD)	OECD, INSEAD, WIPO	INSEAD, WEF, UNESCO, Eurostat	MGI	World Bank, INSEAD	
3	Chile	n/a								
	Costa Rica	n/a								
	Czech Republic	n/a								
	India	n/a								
	Italy	n/a								
	Lithuania	n/a								
	Malaysia	n/a								
	South Africa	n/a								
	Spain									
	Thailand	n/a								
	Turkey	n/a								
4	Brazil	n/a								
	Bulgaria	n/a								
	Cambodia	n/a								
	Colombia	n/a								
	Greece	n/a								
	Indonesia	n/a								
	Pakistan	n/a								
	Peru	n/a								
	Tunisia	n/a								
	Uruguay	n/a								
	Zambia	n/a								

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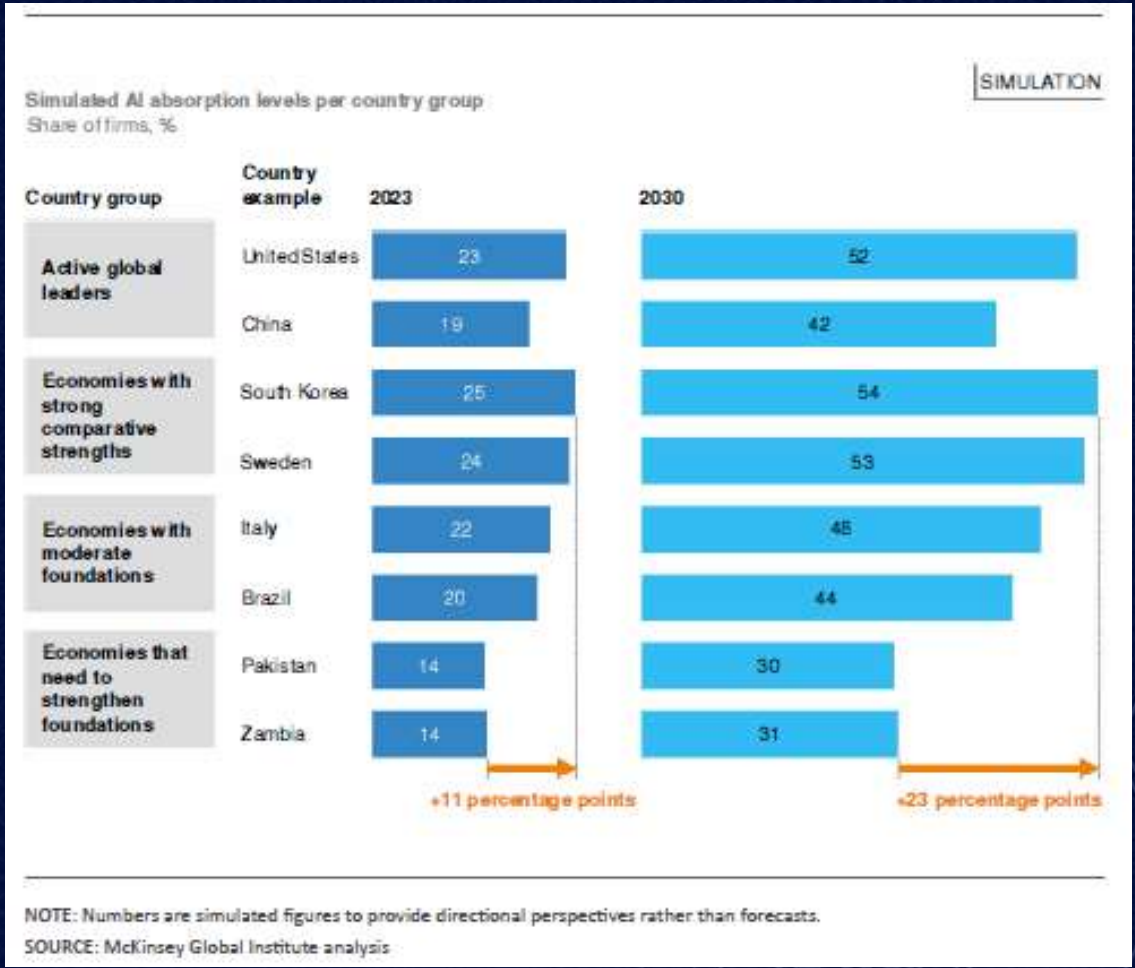
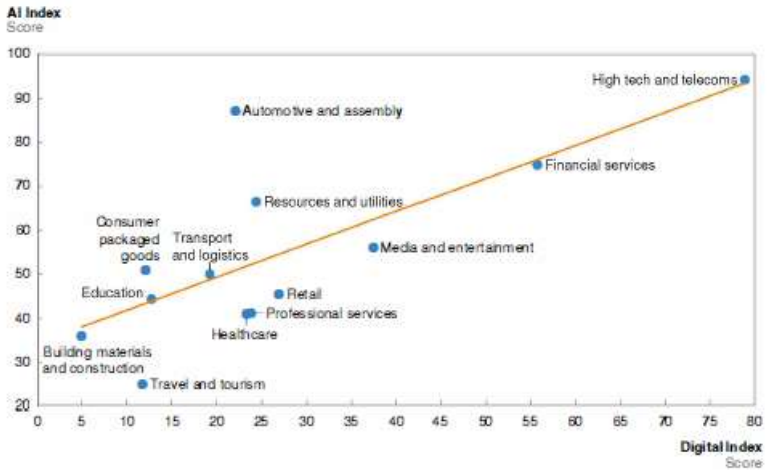
SOURCE: World Bank; UN data; ILO; Global Innovation Index 2017; World investment report, UNCTAD; McKinsey Global Institute

Gap between country groups is significant and may grow further



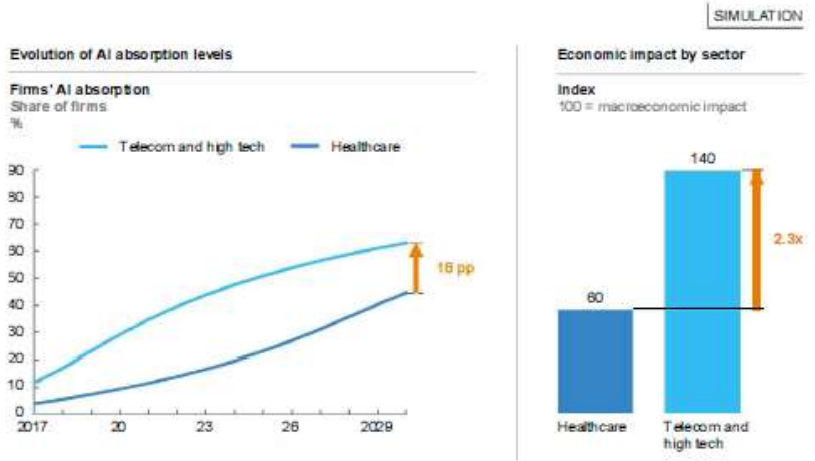
Sector analysis

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



SOURCE: McKinsey Digital Survey; McKinsey Global Institute analysis

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

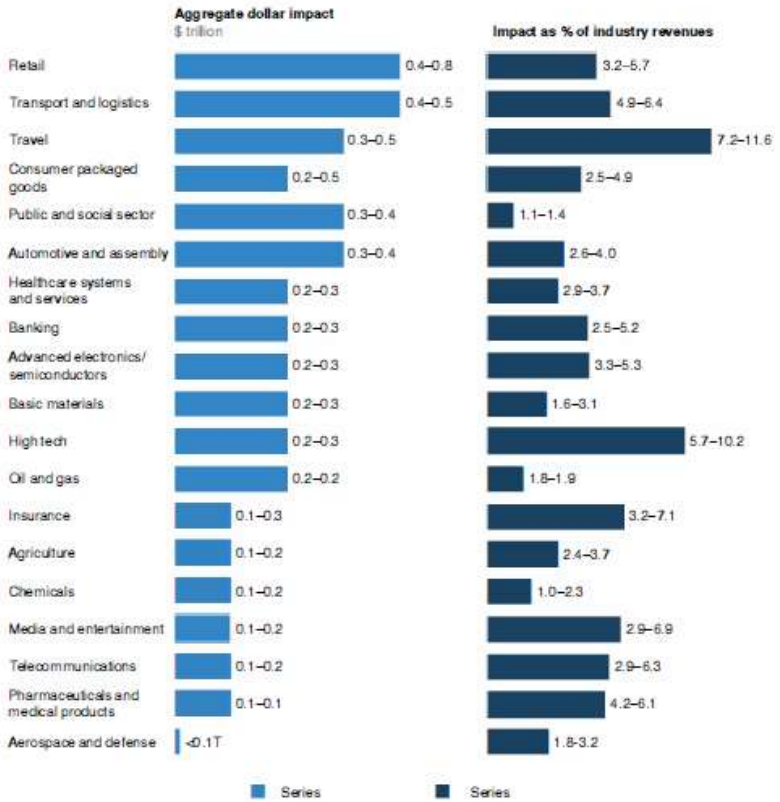


NOTE: Numbers are simulated figures to provide directional perspectives rather than forecasts.

SOURCE: McKinsey Digital Survey; McKinsey Global Institute analysis

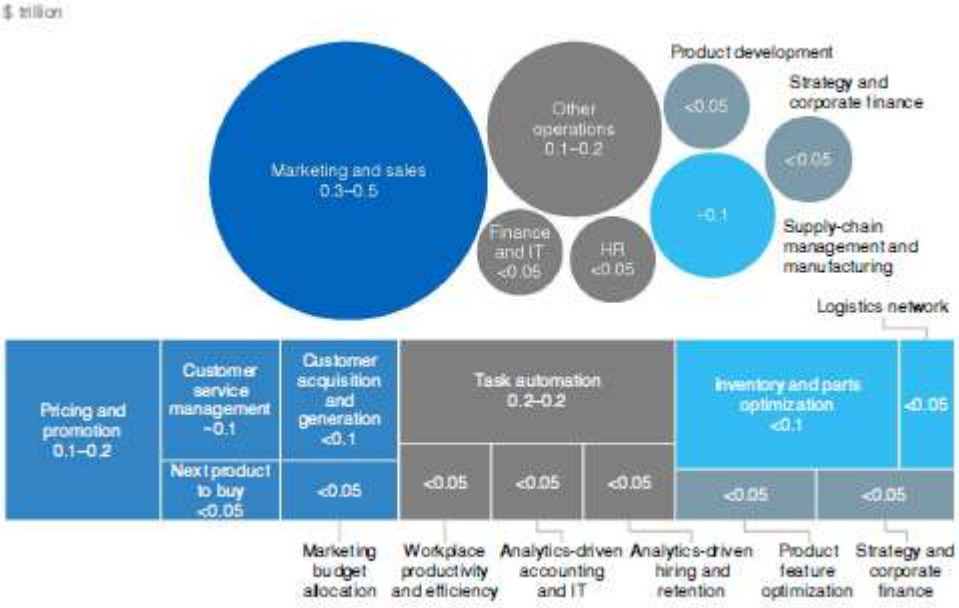
Sector analysis

Exhibit 14. The potential value of AI by sector



NOTE: Artificial Intelligence here includes neural networks only. Figures may not sum to 100% because of rounding.
SOURCE: McKinsey Global Institute analysis

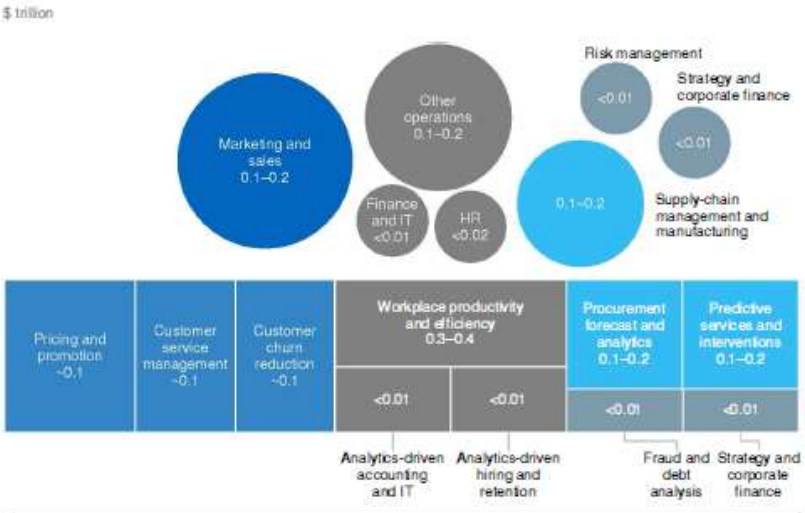
Exhibit 15. AI in retail adds the most value in pricing and promotion, and other marketing and sales areas



SOURCE: McKinsey Global Institute analysis

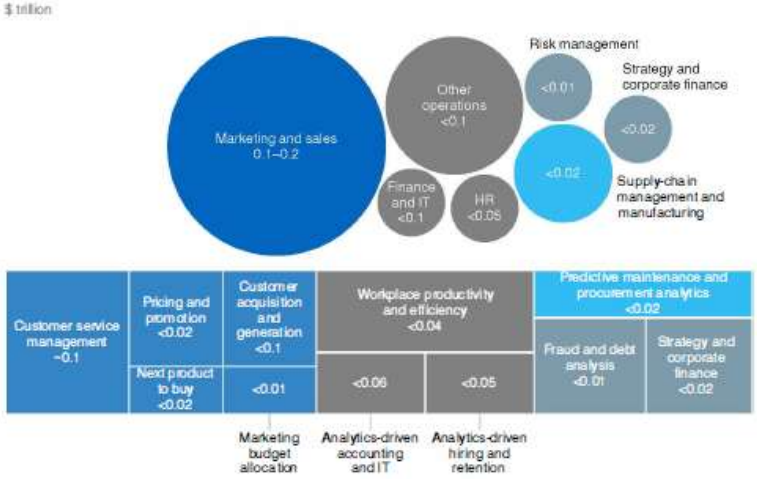
Sector analysis

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



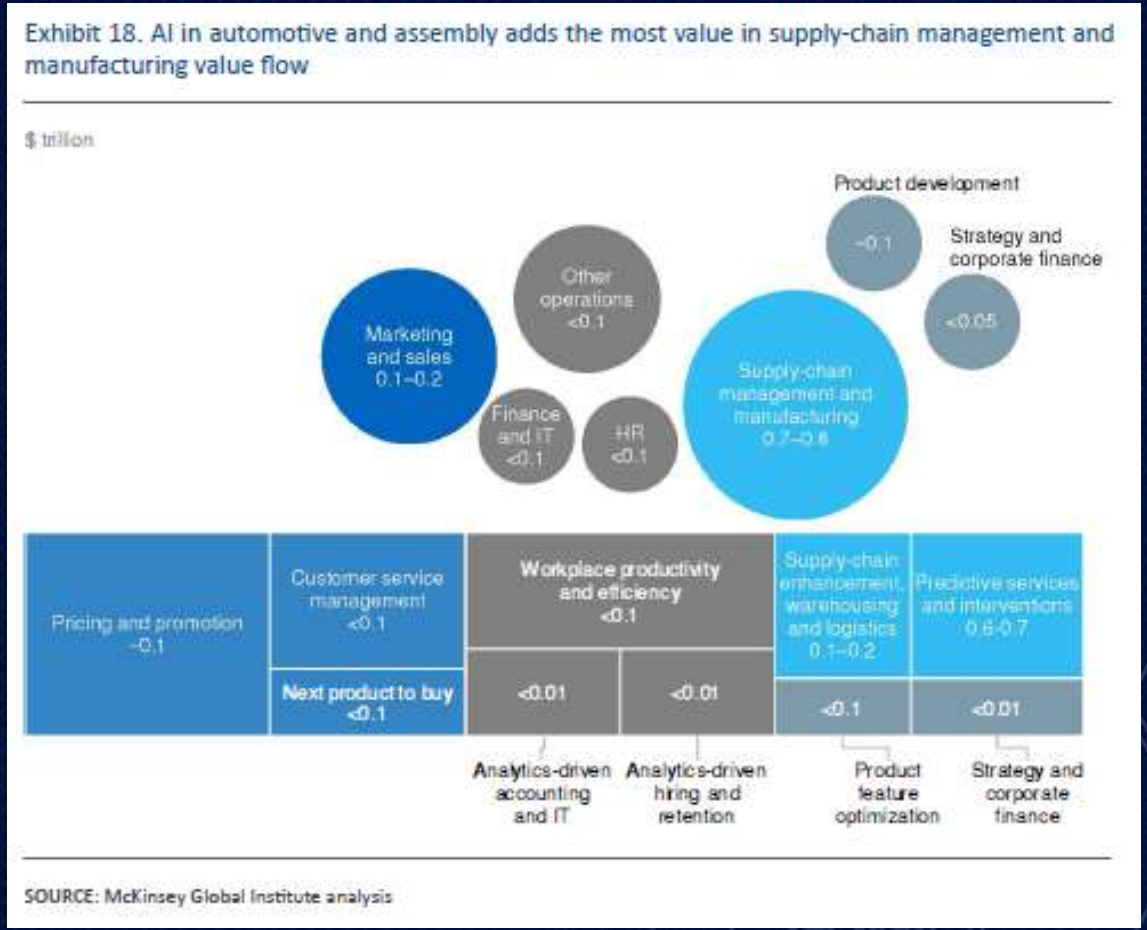
SOURCE: McKinsey Global Institute analysis

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



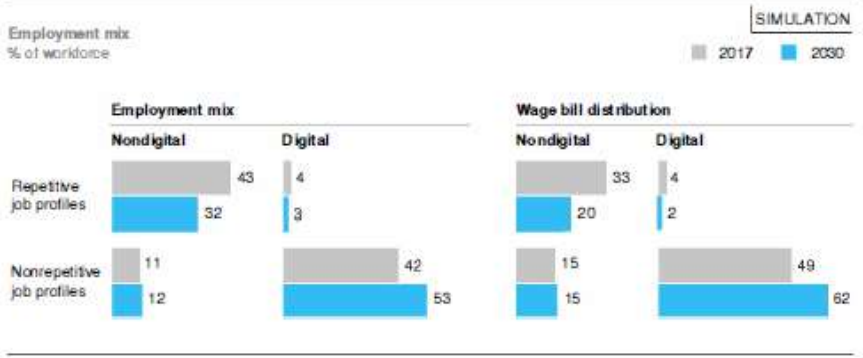
SOURCE: McKinsey Global Institute analysis

Sector analysis



Sector analysis

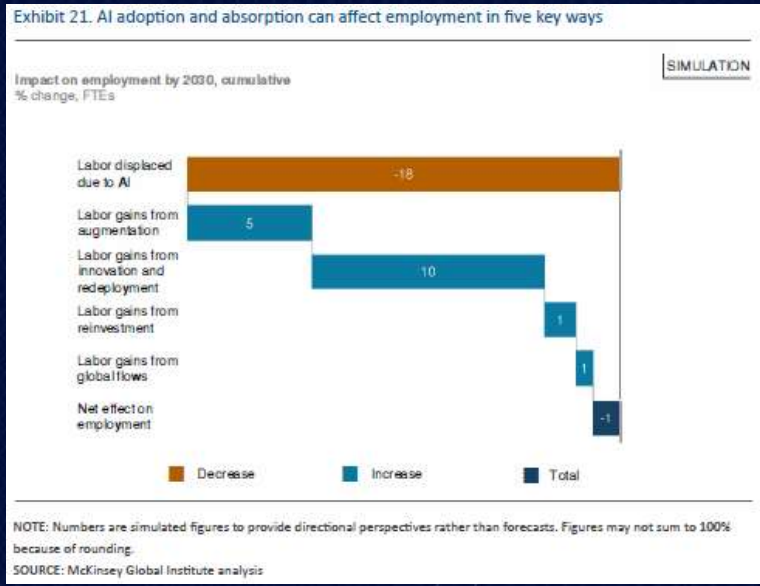
Exhibit 20. AI adoption and absorption can change the employment mix and distribution of wages



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



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SOURCE: McKinsey Global Institute analysis

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Thank You