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IT Standards for Environmental, Social, and Governance Sustainability

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IT Standards for Environmental, Social, and Governance Sustainability

Introduction

Technology has a formidable role to play in sustainability transformation— beginning with the IT function and technology infrastructure, expanding to enable and innovate enterprise-level sustainability, and ultimately, scaling to industry-level impact.

This presentation makes the case that IT is the critical path to sustainability in environmental, social and governance (ESG) impacts. We highlight the challenges, including technology's carbon and e-waste footprints and the rapidly evolving areas of sustainable AI, socially responsible innovation and the "Future of Work."

We explore the levers of impact available to all IT leaders willing to leave the sidelines and make a difference. We outline essential goals with IT-tailored ESG Impact Models. And we present for the first time nearly ***100 IT-tailored quantitative and qualitative ESG standards*** – topics, metrics and KPIs – that IT can choose from to guide its sustainability journey.

SustainableIT, a CIO/CTO-led nonprofit, is here to help jumpstart, accelerate and scale IT-led sustainability transformation. We hope this overview is informative and that the IT standards introduced will be useful in the journey to a sustainable operations.

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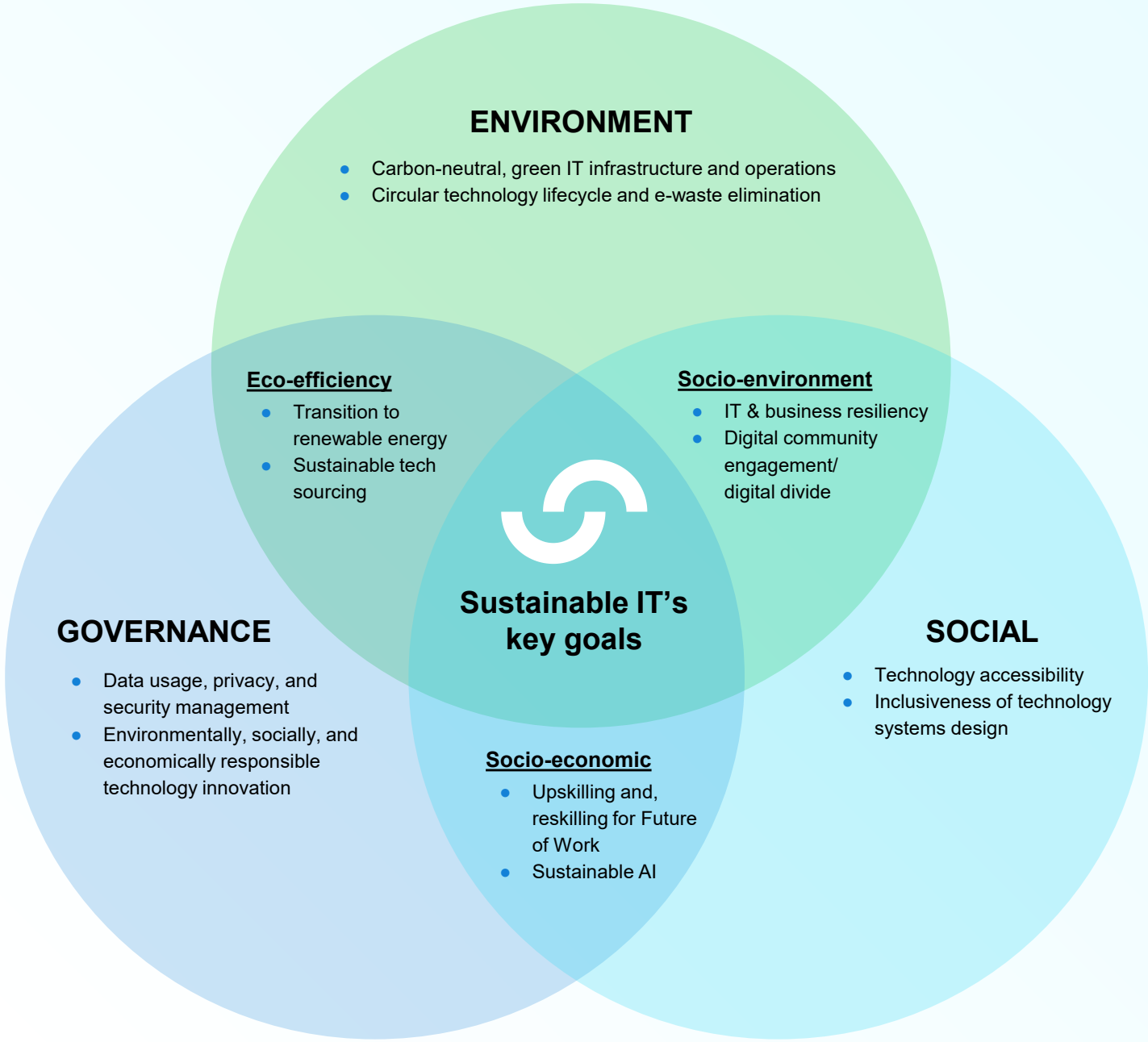
The Case for Sustainable IT

Definitions, benefits, and why CIOs should lead

What is IT Sustainability

The strategic leadership of enterprise technology to minimize negative and maximize positive impacts on the environment, society and governance (ESG). Key IT sustainability targets across the ESG pillars are shown at right.



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Sustainability Benefits Span Financial to Reputational

From 2013 to 2020), companies with consistently high ESG performance achieved **2.6x higher total shareholder return** than mid-level ESG performers. And companies with high sustainability maturity were more likely to see brand image, CSAT and tax savings improvements

IT financial value

- Cost optimization (efficiency and productivity from structural transformation)
- Cost savings from lower IT energy use
- Cost sayings from longer hardware/device lifecycles

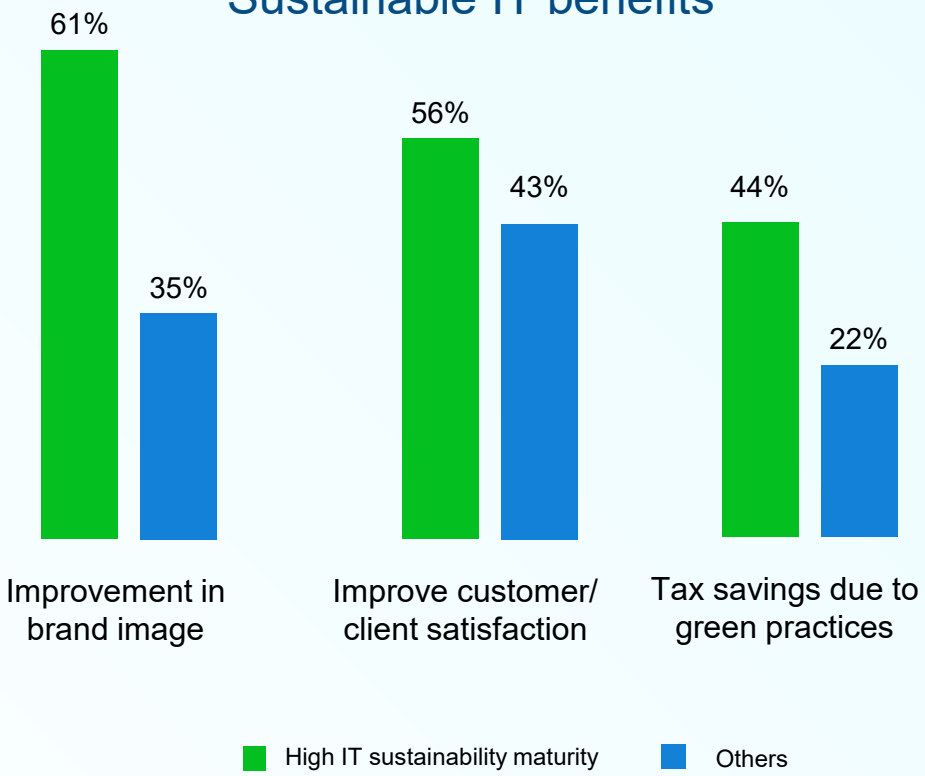
Business financial value

- Cost savings from lower business energy use (green buildings, active energy management, transportation efficiencies, etc.)
- Appeal to “ESG investors”
- Readiness for regulatory mandates for disclosure and business partner requirements

Non-financial value

- Brand perception
- Appeal to younger demographic (employees and customers)
- Greater workforce loyalty

Sustainable IT benefits



Sources: Accenture analysis, Capgemini Research Institute

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Why CIOs Should Lead

IT can play a key role in developing strategic plans to meet sustainability goals, measuring performance, monitoring risks, and responding to disclosure requirements.

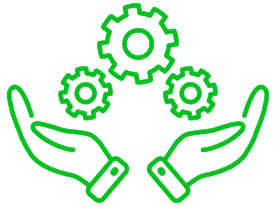
As Leaders of Digital Transformation, CIOs/CTOs Have Right Strategies, Tools and Relationships

Sustainability strategies already among IT's responsibilities

- Automation of labor-intensive processes
- Migration to cloud
- Consolidation, simplification, deactivation
- Hybrid/remote worker enablement
- Technology innovation process, facilities (e.g., lab) & partner connections

Data stewardship has traditionally been an IT role

- System usage and performance metrics
- Data sourcing, smart capture, integration and virtualization
- AI for smart data capture, decision support, anomaly detection



IT has the relevant relationships

- Digital business transformation – guiding enterprisewide infrastructure and process modernization and the attendant change leadership
- Monitoring, measuring, and compliance reporting
- Vendor performance assessment and certification (outsourcers, hyperscalers)
- Strategic relationships with every business unit/function (BRMs & Business Partners)

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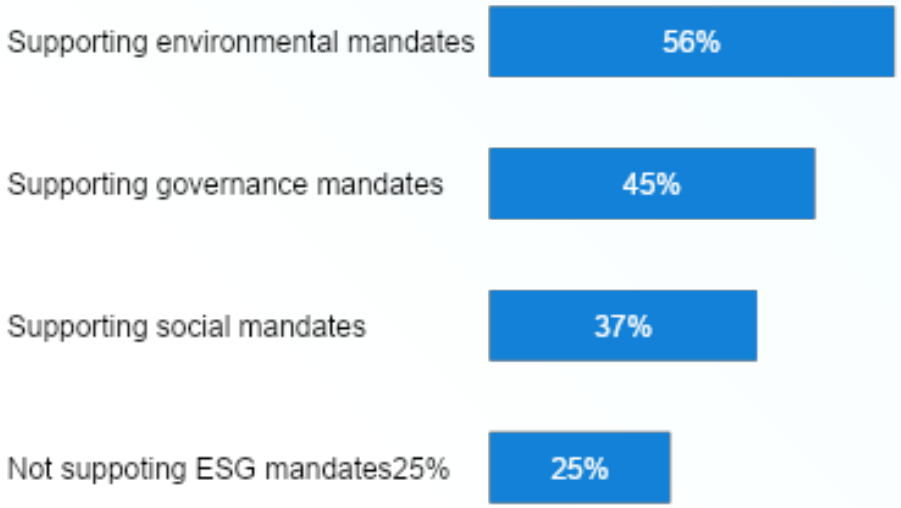
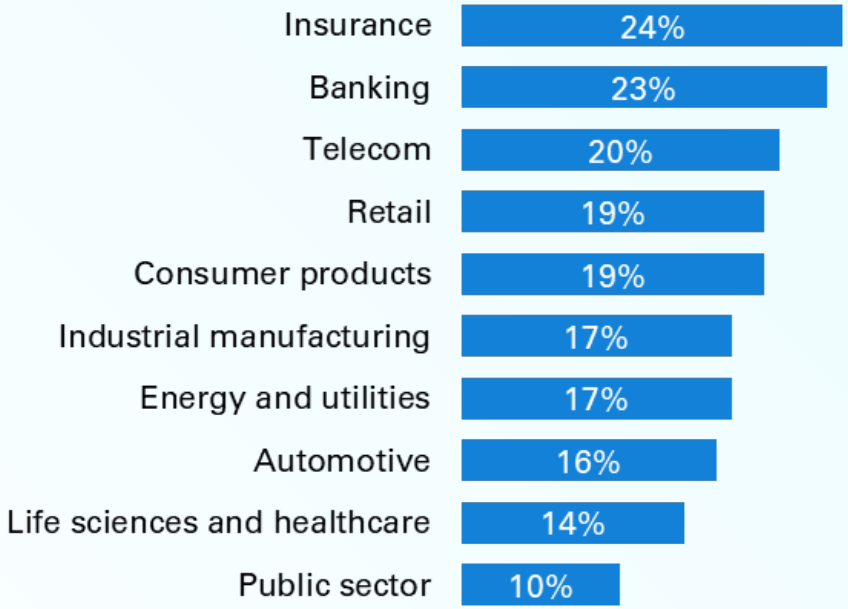
One in Four IT Organizations are Not Supporting Any ESG Mandates; Across 11 Industries, Only 18% Have Sustainable IT Strategies

IT's anticipated involvement in ESG initiatives in 2023



Companies with sustainable IT strategies (with well-defined goals and target timelines) by industry



Source: Info-Tech "Tech Trends 2023;" Capgemini Research Institute

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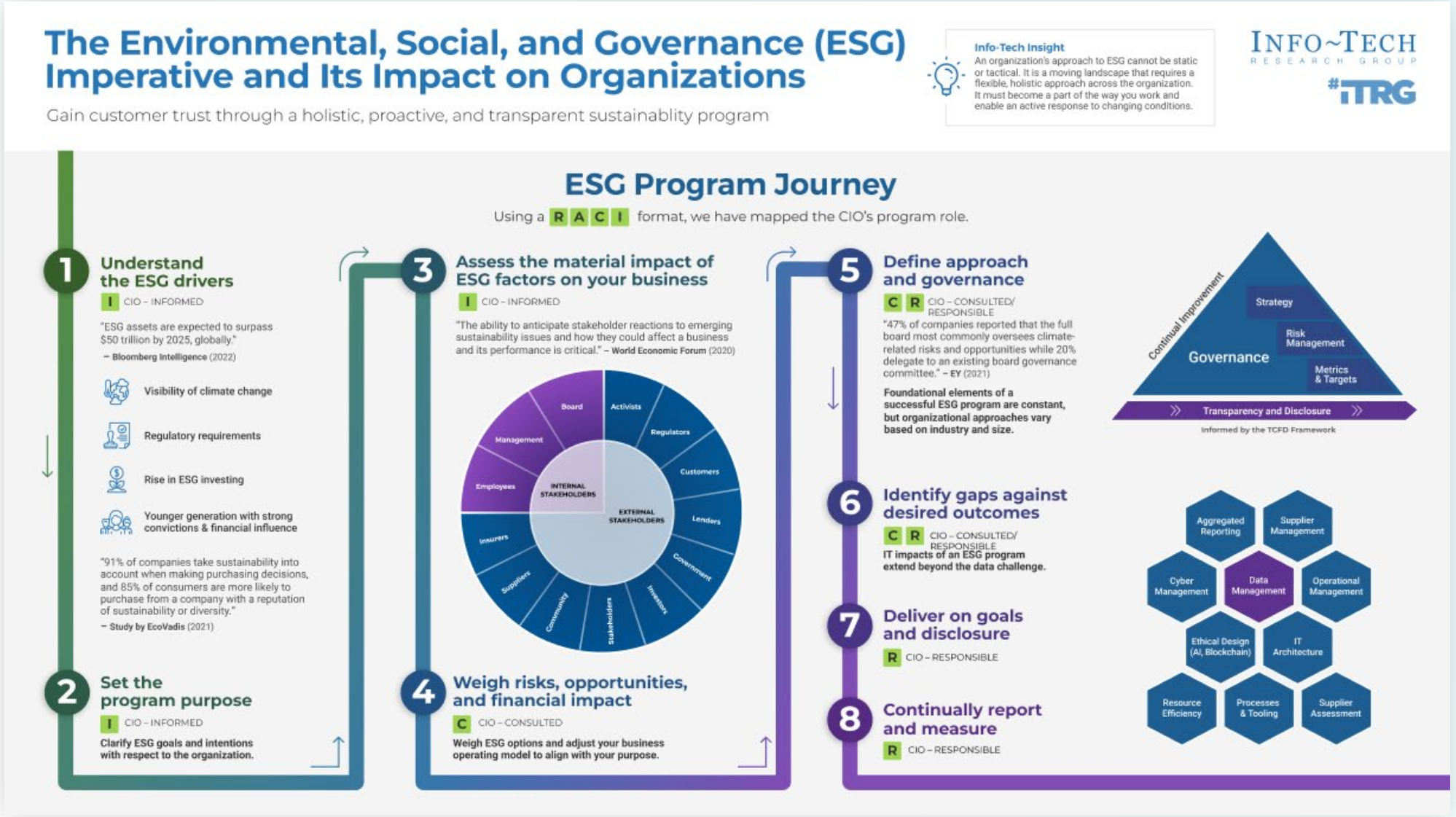
The Role of Standards and Regulations

ESG sustainability is a Journey



Source: Info-Tech "The ESG Imperative and Its Impact on Organizations." Used by permission.

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Why IT Needs Standards

For IT, the Sustainability Journey Starts With Standards

What are ESG sustainability standards?

ESG standards are sets of measurable topics that provide a consistent way of describing or "disclosing" a company's sustainability current state to regulatory bodies and shareholders.

Do standards set target quantities, e.g., 90% of phones to be recycled?

No, ESG standards typically do not provide numeric goals or quantities that companies should aspire to reach. Those must be determined by companies individually, usually based on benchmarks, industry commitments, or levels set by governing institutions.

What's special about SustainableIT's standards?

Our IT ESG standards are tailored by CIOs for maximum relevance to enterprise IT organizations. They adapt existing standards while adding new ones to address gaps in established general standards bodies such as Global Reporting Initiative (GRI), or Sustainability Accounting Standards Board (SASB).

The SustainableIT standards are meant to empower IT leaders with a uniform foundation on which to build an action plan for sustainability in their functions, enterprises, and industries.

How do IT organizations use SustainableIT's standards?

IT leaders should select from the lists any environmental, social and governance high-level topics they wish to include on their transformation agendas. They then can drill down into each topic to choose metrics, standard units of measure, and descriptions for use in baselining, tracking, and reporting/disclosing. (See page 45 for more how-to details.)

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Where to Begin Measuring

Pick Your Priorities

Although the scope and granularity of sustainability standards may seem overwhelming, it is possible to start with just a few goals and organizational steps. Most teams start with environmental initiatives. See next page for materiality matrix to further refine your priorities.

Governance

- Develop and communicate vision for a sustainable IT operating model. Align to existing enterprise sustainability vision.
- Define sustainability responsibility in IT -- executive sponsor, team leads, data and measurement team, and key business stakeholders.
- Conduct a materiality assessment (see next page).

Energy and emissions

- Begin monitoring energy consumption of major IT assets, and type of energy (renewable, coal, etc.).
- Develop or accelerate server migration plan to low-carbon intensity cloud.

IT hardware circularity

- Assess current hardware disposal methods; initiate or expand IT asset disposition to reduce landfill.
- Assess impact of prolonging IT hardware lifecycle on IT asset classes (servers, laptops, etc.).

Vendor management

- Communicate sustainability vision and plans to key vendors. Ask hyperscalers for existing sustainability data for your Scope 1 and 2 emissions.

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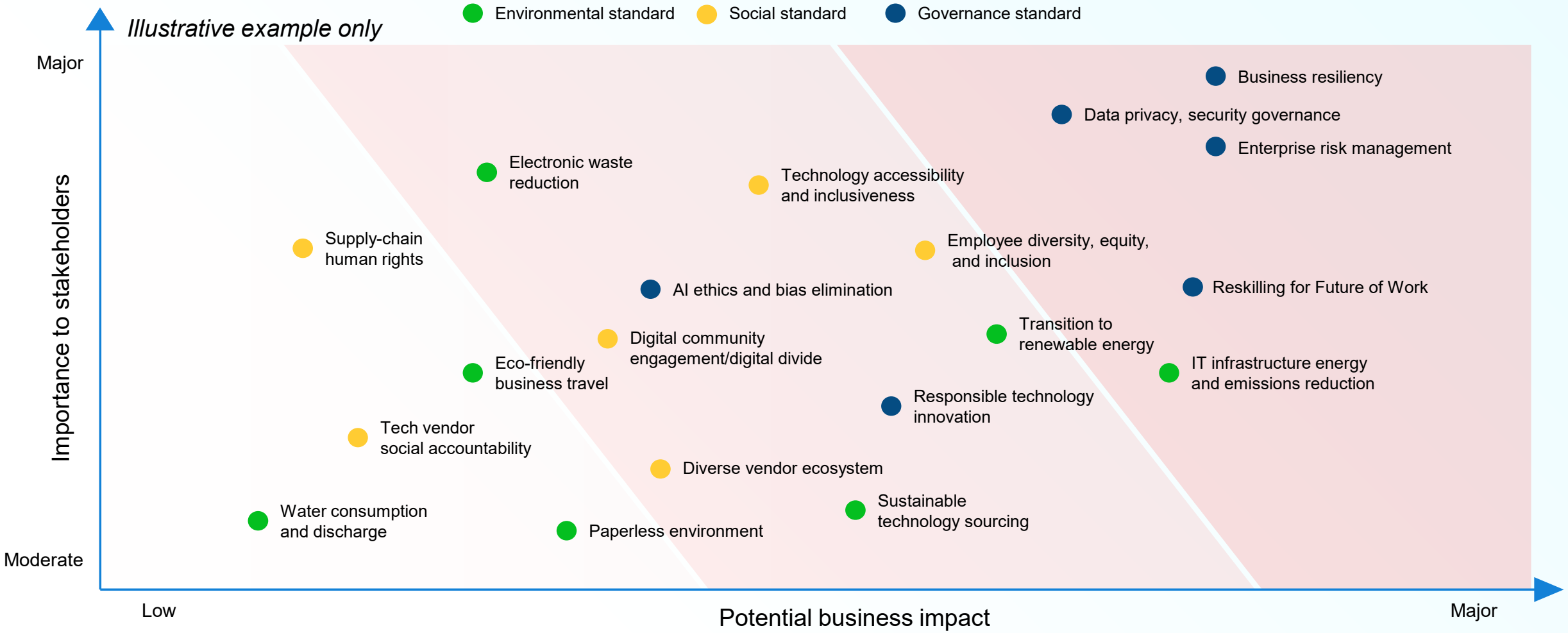
Prioritize Standards That Have Highest “Materiality” – Importance to IT/Business Stakeholders and Potential Business Impact

Further refine priorities based on standards in which IT can have a major, visible and rapid impact



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Adopted and Proposed Sustainability Reporting Regulations are Motivating Action

IT should align reporting standards and data with compliance requirements

- **Supply Chain Act – Germany**
- **Corporate Supply Chain Due Diligence Directive (CSDDD) – EU**
- **Corporate Sustainability Reporting Directive (CSRD)* - EU**
- **SEC Task Force on Climate-Related Financial Disclosures (TCFD) – US**
- **Modern Slavery Act – UK**
- **UNESCO Ethics of Artificial Intelligence – UNESCO member states**

*Will apply by 2029 to non-EU organizations that generate a net turnover of more than 150 million euros in the EU for each of the last two consecutive financial years at the consolidated level (or, if not applicable, at the individual level), and gave at least one subsidiary or branch in the EU that is itself within the scope of the CSRD (i.e., subsidiaries that satisfy the criteria set out above, or branches that generated a net turnover of more than 40 million euros in the preceding financial year).

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EU Corporate Sustainability Reporting Directive (CSRD) Disclosure Topics

Environment

Climate change
Climate change adaptation
Climate change mitigation
Energy

Pollution
Pollution of air
Pollution of water
Pollution of soil
Pollution of living organisms
Pollution of food resources

Water
Water consumption
Water use

Biodiversity
Drivers of biodiversity loss
Impacts on the state of species
Impacts on the extent and condition of ecosystems
Impacts and dependencies on ecosystem services

Circular economy
Resource inflows
Resource outflows related to products and services
Waste

Social

Own workforce and workers in the value chain
Secure employment
Working time
Adequate wages
Social dialogue
Health and safety
Gender equality and equal pay
Trainings
Skills Diversity
Child labor
Forced labor
Privacy
Adequate housing

Affected communities
Adequate housing
Water and sanitation
Privacy
Adequate housing
Adequate food
Water and sanitation
Land-related impacts
Security-related impacts
Freedom of expression & assembly
Cultural rights

Consumers and end users
Privacy
Freedom of expression
Health and safety
Security of a person
Protection of children
Non-discrimination
Responsible marketing practices

Governance

Business conduct
Corporate culture and business conduct policies
Management of relationships with suppliers
Payment practices
Prevention and detection of corruption or bribery
Political influence and lobbying activities

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CSRD Environmental Sustainability Disclosure Metrics

IT = Related SustainableIT reporting standards

Climate Change Mitigation

- IT • Energy consumption and energy mix (renewable/nonrenewable)
- Energy intensity per net sales
- IT • GHG emissions (Total + Scope 1, 2 and 3) Includes CO2, CH4, N2O, HFCs, PFCs, SF6, NF3 emissions
- GHG intensity per net sales
- GHG removal method & storage in own operations or value chain
- Internal CO_2 price (if available)

Pollution of air, water, soil

- IT • Pollutants from production processes, procurement, facilities, products/services
  - Emissions of air pollutants caused
  - Emissions into water bodies
  - Emissions of inorganic pollutants
  - Emissions of ozone-depleting substances
  - Microplastics produced or used
- IT • Disclosure of changes over time, measurement methods, and the overall process

Biodiversity

- Impact on the state of species
- Impact on extent and conditions of ecosystem
- Resources allocated to biodiversity actions

Circular economy

- Resource inflows
  - Total weight of products and materials used (In tons or kg)
  - Weight (absolute and percentage) of renewable input materials
  - IT • Weight (absolute and percentage) of reused or recycled input
- Resource outflows
  - IT • Weight (absolute and percentage) of materials derived from production process developed according to closed-loop principles (i. Durability; ii. Reusability; iii. Repairability; iv. Disassembly; v. Remanufacturing or refurbishment; vi. Recycling; vii. Return through the biological cycle)
  - Weight (absolute and percentage) of materials that, even if they do not meet the requirements above, are intended to improve/enable the circular economy for customers

Climate Change Adaptation

- Potential financial impact of material physical risks
- Potential financial impact of material transition risks
- Potential financial impacts of climate-related opportunities
- Taxonomy disclosure requirement: Share of sales, capital expenditures (CapEx") and operating expenditures ("OpEx") in assets to be classified as sustainable

Water consumption

- IT • Total water consumption in m3 (total)
- IT • Total water consumption in m3 in areas with significant water risk, including areas of high water stress
- IT • Total amount of recycled water in m3
- Total amount of stored water and changes in storage in m3
- Water intensity: total water consumption in m3 per net revenue
- Disclosure of overall process

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CSRD Social & Governance Sustainability Disclosure Metrics

IT = Related SustainableIT reporting standards

Own workforce

- Characteristics of the undertaking's employees
  - IT FTE employees by gender and country (>50 employees per site)
  - IT Full-time employed, part-time employed and employees without guaranteed hours per gender and country
  - Employee fluctuation absolute and relative
- Characteristics of non-employee workers in the undertaking's own workforce
  - Number of nonemployed workers
- Collective bargaining coverage and social dialogue
  - Proportion of employees employed under a collective bargaining agreement
- Diversity indicators
  - IT Gender distribution in absolute and relative terms in top management
  - IT Distribution of age groups among employees: < 30 years, 30-50; >50
  - Adequate wages
  - Proportion of fellow employees receiving less than the appropriate wage; broken down into own employees and non-employee workers
- IT Persons with disabilities
  - Percentage of employees with disabilities (if legally permitted)
  - Proportion of employees with disabilities per gender
- Training and skills development indicators
  - IT Percentage of employees participating in regular performance and career development meetings per employee category and gender
  - IT Number of training hours per employee and per employee category and gender
- IT Health and safety indicators
  - Percentage of employees affected by the health and safety management system according to legal requirements or standards
  - Number of fatalities as a result of work-related injuries or illnesses
  - Number of occupational accidents
  - Number of work-related illnesses
  - Number of days lost due to work-related injuries, illnesses, and fatalities
- Work-life balance indicators
  - Percentage of employees eligible to take family-related leave
  - Percentage of employees who took family-related leave per gender
- Compensation indicators (pay gap and total compensation)
  - IT Male-female pay gap: Difference between average gross hourly earnings of male and female workers; expressed as a % of the average gross hourly earnings of male workers
  - Ratio of the annual total compensation of the highest paid individual to the median annual total compensation of all employees (other than the highest paid individual)
- Incidents, complaints and severe human rights impacts and incidents
  - Total number of incidents of discrimination reported during the reporting period
  - Number of complaints submitted through channels for own employees to raise concerns
  - Total amount of material fines, penalties and damages paid as a result of violations of social and human rights factors

Workers in the value chain

- Quantitative KPIs to come

Affected communities

- Quantitative KPIs to come

Consumers and end users

- Quantitative KPIs to come

Business Conduct

- Confirmed cases of corruption or bribery in the reporting year
  - Amount of fines in connection with corruption or bribery
- Political influence and lobbying
  - Amount of political donations and contributions in kind
- Payment practices
  - Average invoice payment time in days
  - Number of outstanding legal disputes relating to late payments

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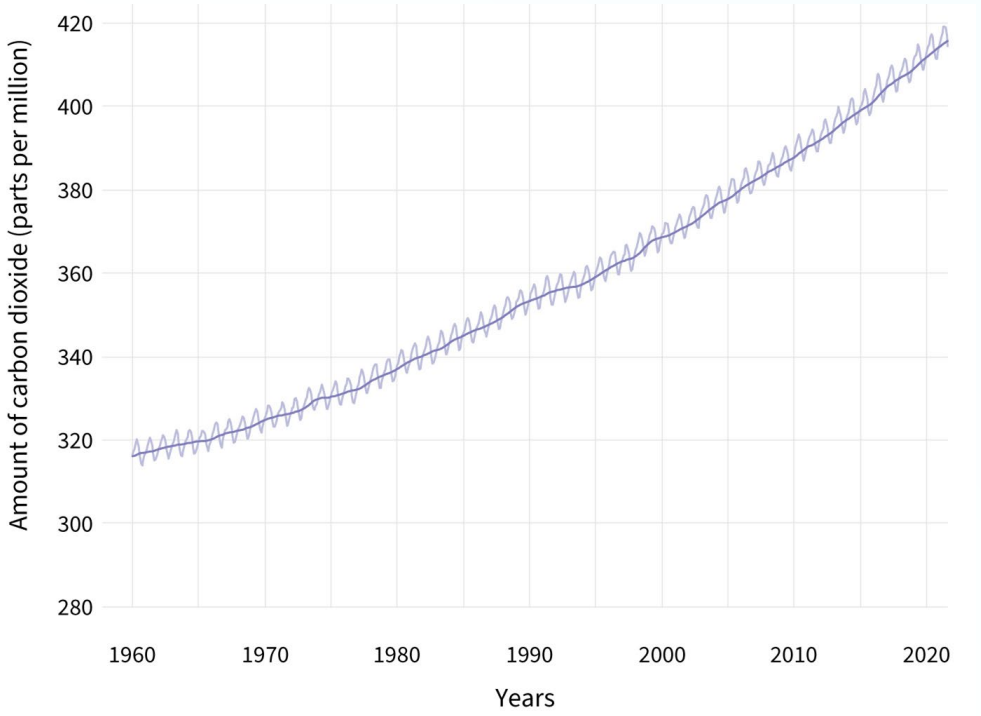
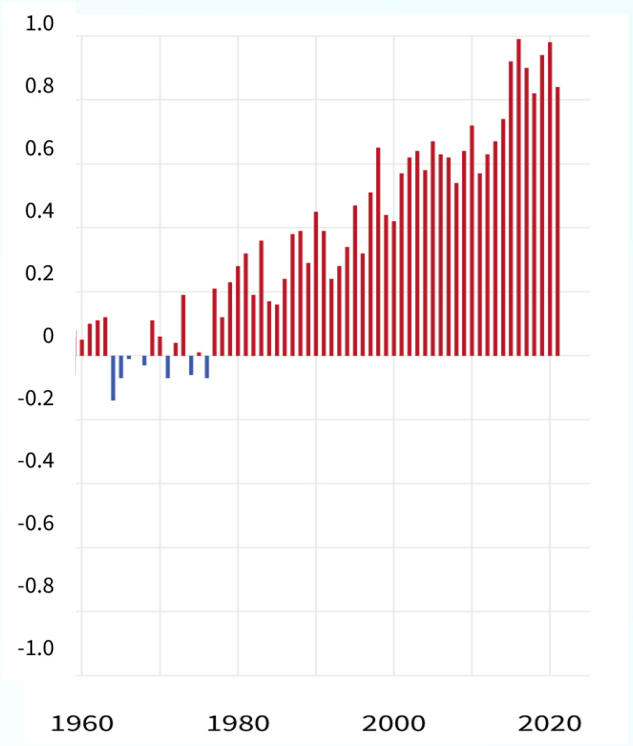
IT’s Environmental Impact, Levers, and Standards

Environmental Challenges: Carbon Levels, Temperatures Rising in Tandem

Atmospheric CO_2 1960-2021



Yearly surface temperature difference compared to 20th Century average



Source: Climate Change – Atmospheric Carbon Dioxide, Climate Change – Global Temperature, NOAA Climate.gov

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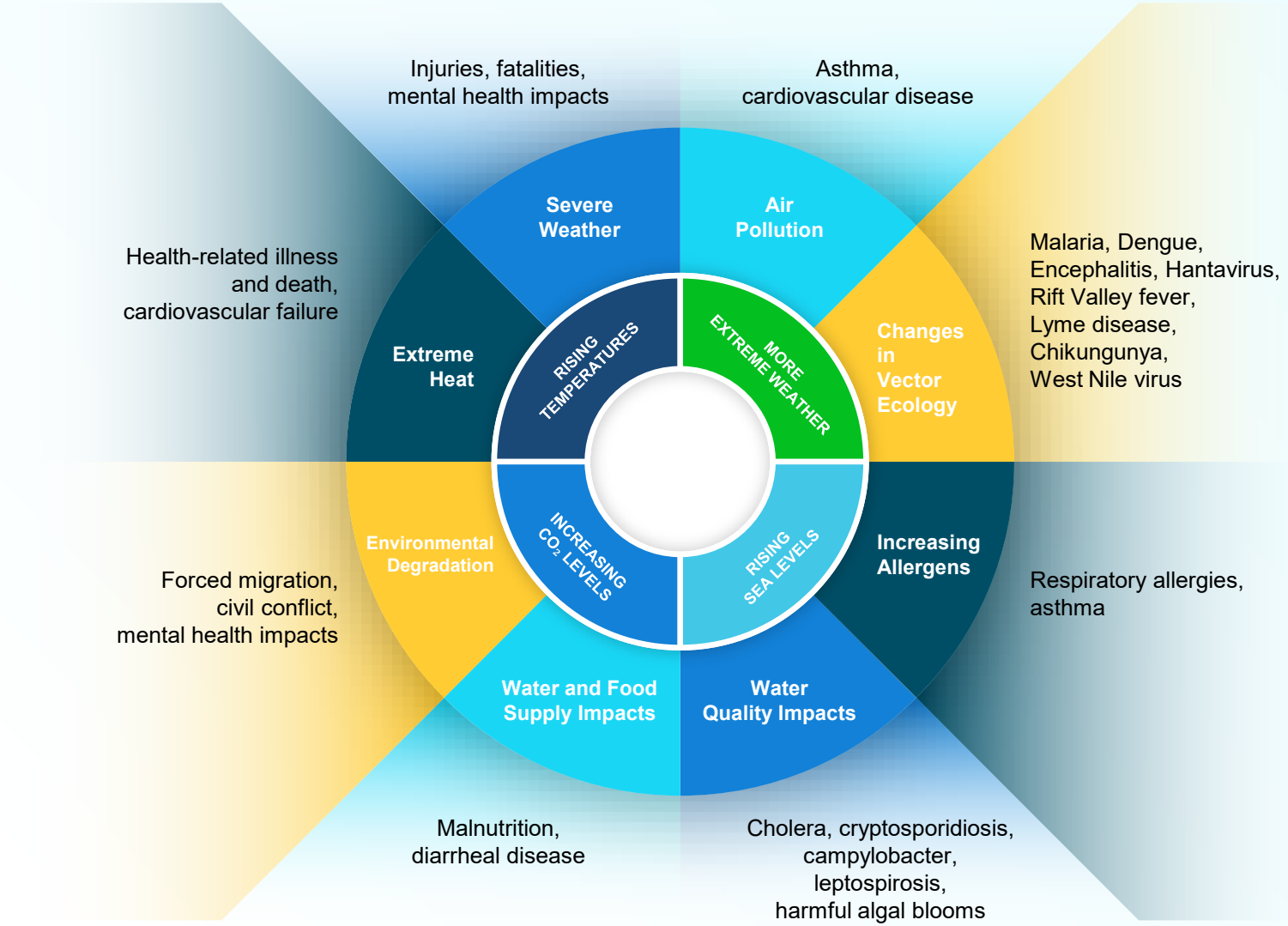
Impacts on Health

Rising GHG, Temperatures Part of Cycle Degrading Human Health, Increasing Mortality



Source: U.S. Centers for Disease Control and Prevention, 2022

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Systemic Change—Only Winning Scenario

Current Emissions Improvement Scenarios Fall Short of Target Needs

"To get on track to limiting global warming to 1.5°C, we would need to cut 45% off current greenhouse gas emissions by 2030. ***A stepwise approach is no longer an option. We need system-wide transformation."***

– Inger Andersen, Executive Director, United Nations Environment Programme
Emissions Gap Report, UN Environment Programme, October 2022

Scenario	Projected 2030 emissions (billion metric tons CO_2e)*	Emissions needed to achieve 2030 warming limit targets (billion metric tons CO_2e)		
		Below 2.0°C	Below 1.8°C	Below 1.5°C
Fully implemented NDCs**	55	40	34	32

*Figures are medians; percentages differ due to rounding.
**Nationally Determined Contributions (NDCs) were required by signatory nations under the Paris Agreement, specifying their intended unconditional climate actions to reduce emissions and adapt to the impacts of climate change.

Source: *2022 Emissions Gap Report*, UN Environment Program, October 2022

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Understanding the Three Scopes of Emissions

Emissions Types Attributable to Business Operations—Scope 2, 3 Emissions Generally Greater

Scope 1

Direct emissions from owned assets

- Facilities
- Equipment
- Vehicles
- Onsite landfills

Scope 2

Direct emissions from purchased energy

- Electricity
- Heating
- Cooling

Scope 3

Indirect emissions from third-parties, leased assets

- Transportation and distribution
- Waste
- Energy and fuel usage, travel

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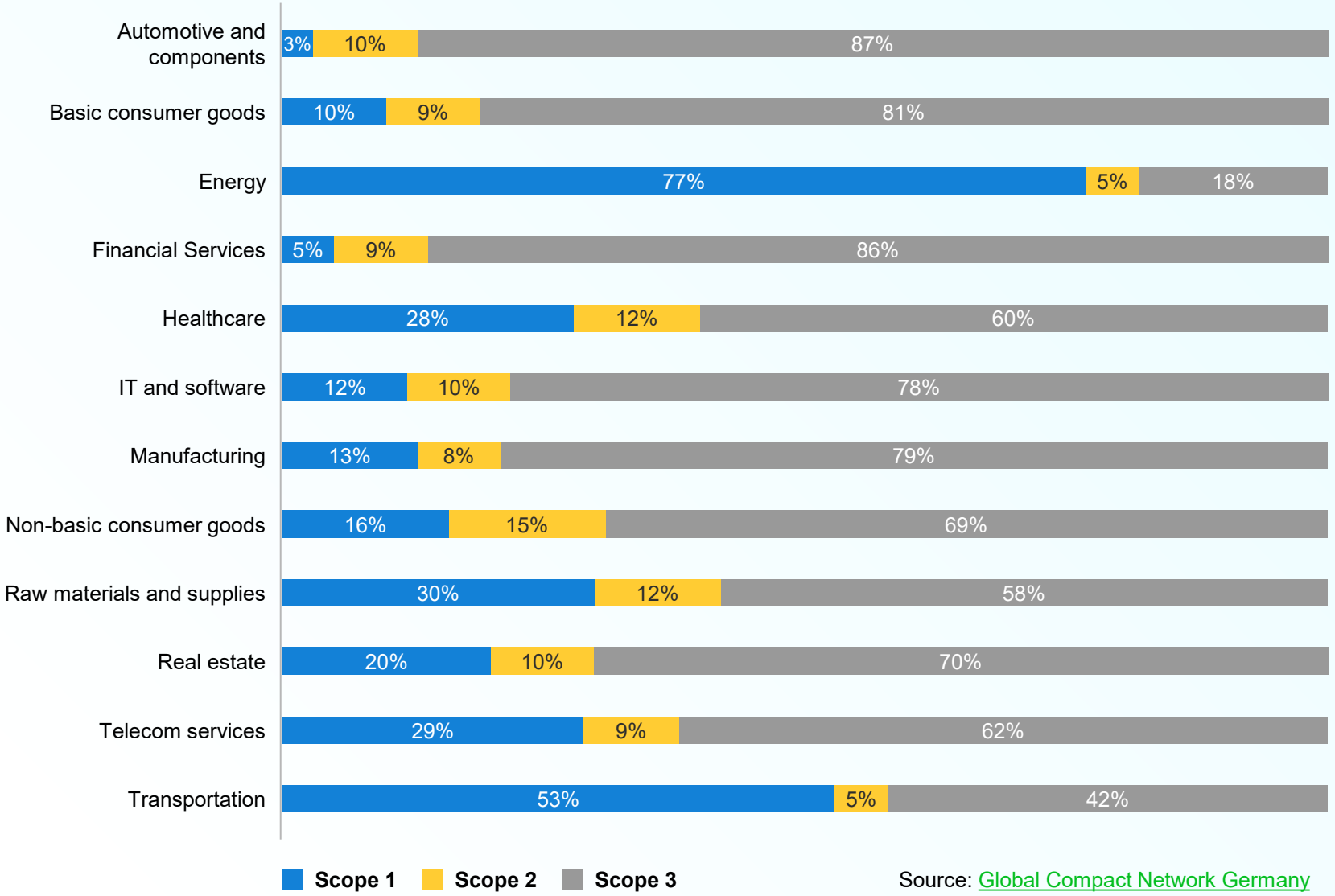
Emissions by Industry

Scope 3 Emissions Dominant in Most Industries, Requiring Inter-Company Cooperation to Drive Change



Source: Global Compact Network Germany

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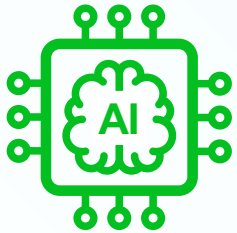
Environmental Impacts

IT's Share of Carbon Has Grown 2.5X Since 2007

IT's Scope 2 and 3 GHG emissions are equivalent to the United Kingdom total annual emissions and half that produced by the aviation industry.
Training a single AI model emits as much as 5 average cars over their lifetimes.

Data centers consumed 220-320 TWh (trillion watt hours) in 2021. Roughly 7% of what the entire US consumes annually.



Training the chatbot GPT-3 is estimated to have taken as much electricity as 120 US homes would consume in a year, and equates to 502 tons of carbon emissions.
Google AI burns 2.3 terawatt hours annually, as much electricity as all the homes in a city the size of Atlanta.

57 Mts (megatons or 1 million metric tons) of e-waste was generated in 2021, heavier than the entire Great Wall of China. By 2030, e-waste will reach 74 Mts. In 2019, only 17% of e-waste was known to be recycled.

Sources: Journal of Cleaner Production, MIT Technology Review, *The Green IT Revolution*, McKinsey & Company 2022, International Energy Agency,Bloomberg; WEEEForum's,The Global E-Waste Partnership

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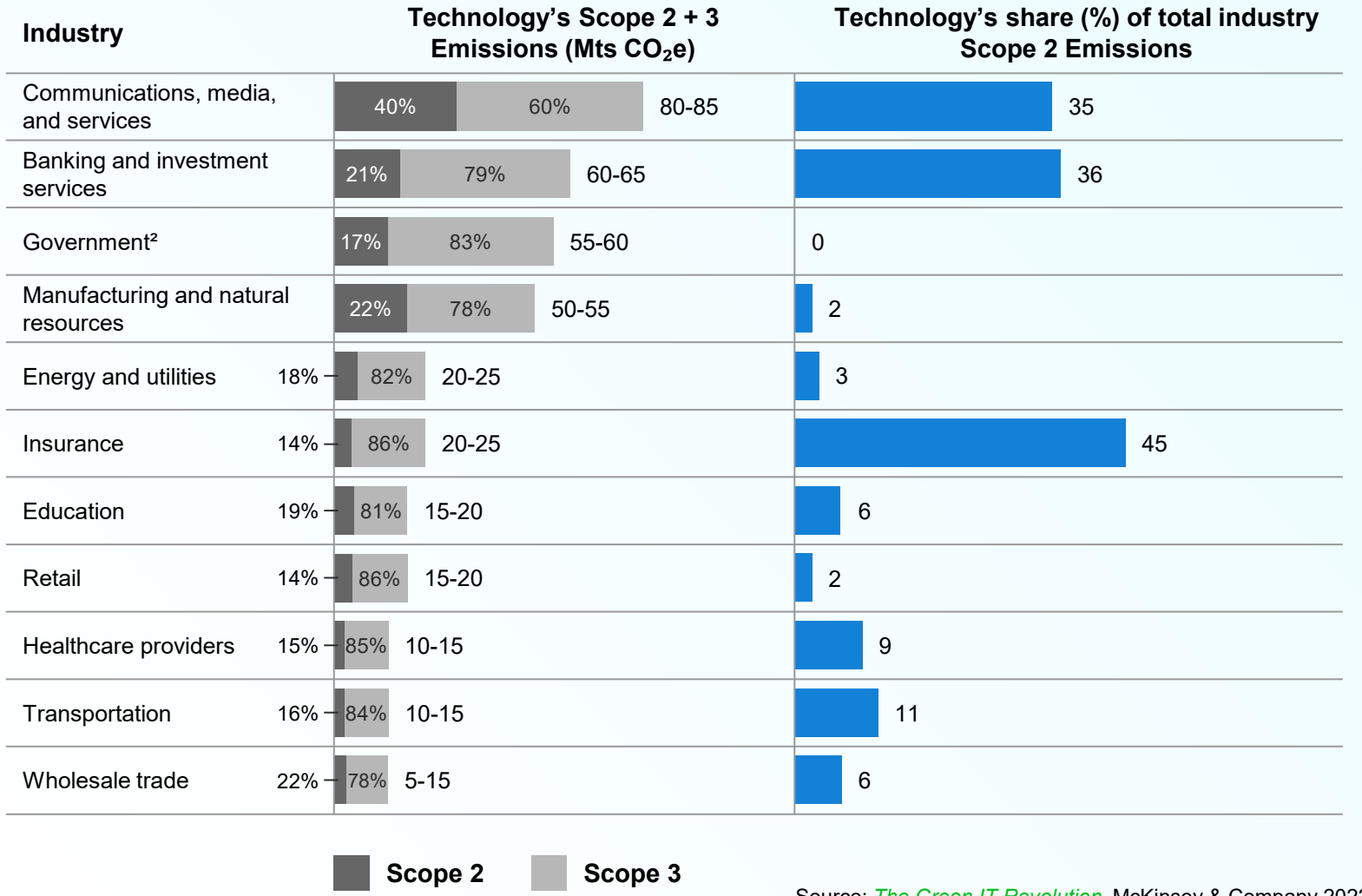
Technology's Emissions by Industry

Technology Contributes as Much as 45% of Scope 2 Emissions



Source: *The Green IT Revolution*, McKinsey & Company 2022

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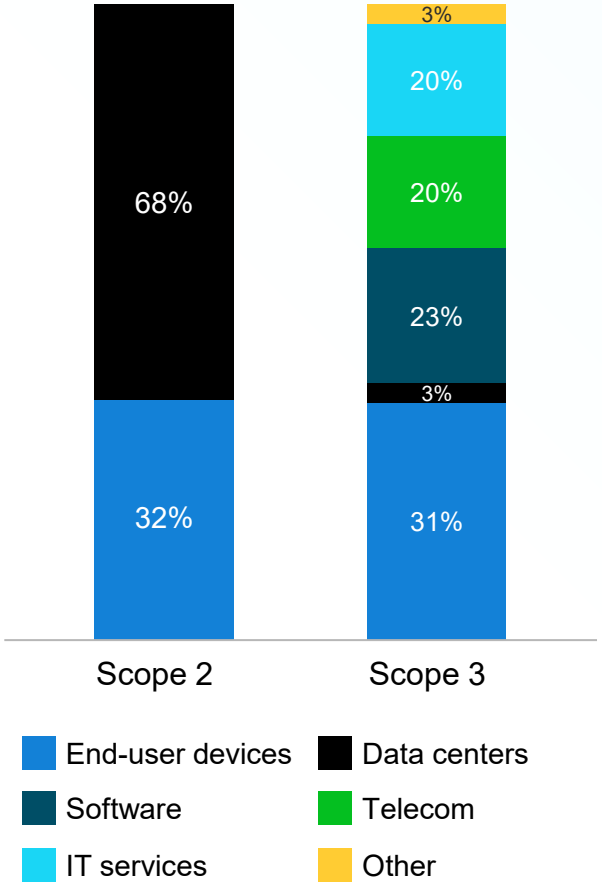
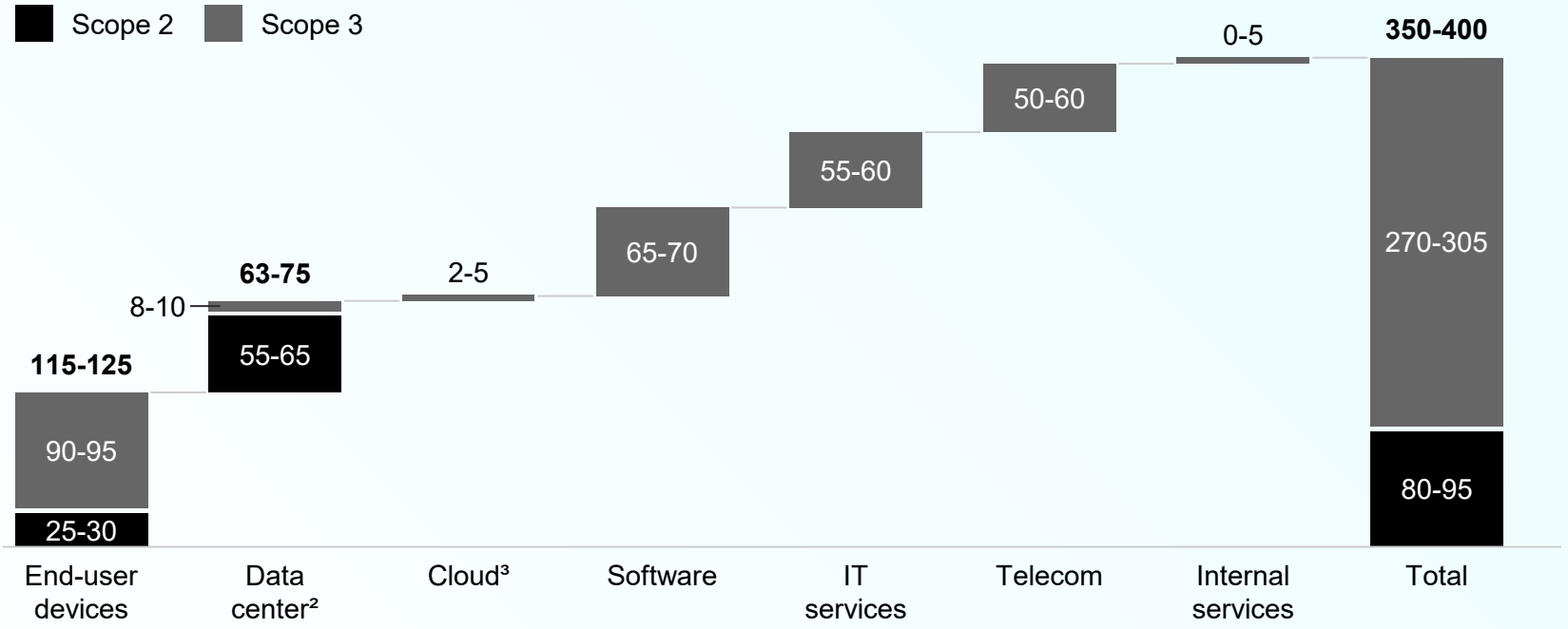
End-user Devices, Data Centers Account for 50% of IT's Scope 2, 3 Emissions

Emission contributions by technology type





¹Megatons of carbon dioxide equivalent gases.
²Includes emissions from on-premises data center and co-location.
³Infrastructure as a service (IaaS) only, Software as a service (SaaS) and Platform as a service (PaaS) spending accounted for in software category

Source: *The Green IT Revolution*, McKinsey & Company 2022

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IT Leaders Have Three Sustainability Tiers of Impact That Scale in Consequence

1

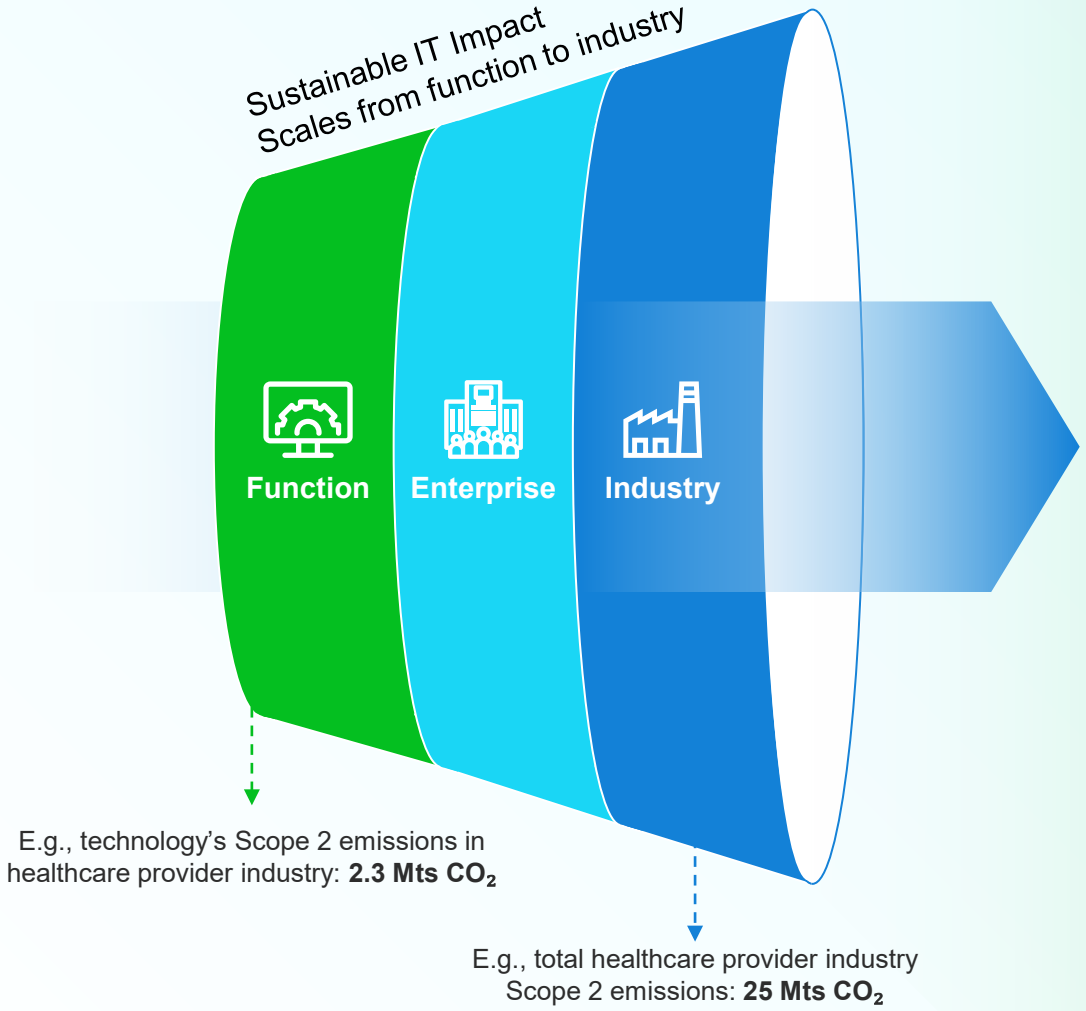
IT function – As a function, IT exemplifies sustainable design and operations by shifting to cloud-hosted infrastructure, uses energy-efficient hardware and software coding, automates IT services, establishes a circular lifecycle for end-user devices, optimizes data center energy consumption, and establishes vendor sustainability requirements.

2

Enterprise – As IT drives digital business transformation, it virtualizes services infrastructure (Everything-as-a-Service), automates emission-intensive business processes, enables paperless operations, supports an optimal hybrid workforce model, and reduces need to travel through virtual meeting support. As principal data managers, IT facilitates sustainability accounting, reporting and decision-making, and enterprise risk management.

3

Industry/sector – IT cooperation within and across industries will scale digitization of common operating processes, certified technology sourcing and circular lifecycle management, pervasive as-a-service infrastructure, best-practice climate risk management; and standardized sustainability accounting and reporting facilitated by a common platform.



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IT’s Environmental Sustainability Levers

Environmental sustainability *in* IT

- Data Center & Cloud Computing
- Sustainable Software Development
- Circular IT Hardware
- IT Vendor Management & Procurement
- E-waste

Environmental sustainability *by* IT for the enterprise

- Energy-efficient Buildings
- Energy Resource Management
- Hybrid Work
- Eco-friendly Travel & Transportation
- E-services

Environmental sustainability *by* IT for the industry/sector

- Common Process Digitization
- Standard Sourcing Certifications
- As-a-Service Infrastructure
- Climate Risk Management
- ESG Accounting & Reporting Platform

Source: Adapted from Sustainability IT Playbook for Technology Leaders, Niklas Sundberg, Packt, 2022

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Environmental Impact Model – Goals by Category

Energy			
	Common technology certification standards	Industry-pervasive as-a-service platforms	Common energy-sourcing and facility standards
Industry	100% certified hardware and end-user devices	Fully cloud-hosted infrastructure	100% green-certified facilities
Enterprise	Preferred Energy Star-certified (etc.) hardware	SaaS and cloud-hosted IT services	100% renewable energy
Function			

Emissions			
	Common industry process standards	Standardized and automated carbon accounting model	Carbon-negative/ neutral industry
Industry	Fully digitized enterprise business processes	Enterprise carbon accounting platform	Carbon-negative/ neutral enterprise
Enterprise	Fully automated IT services	Technology GHG measured and tracked	Carbon-neutral technology infrastructure
Function			

Waste			
	Common water resource management standards	Industrywide digital document management	Industrywide technology circular lifecycles
Industry	100% enterprise direct-use water recycling	Fully paperless enterprise	0 enterprise technology landfill
Enterprise	Low-impact data center cooling (on-prem and hosted)	Digitized documents	Circular lifecycles for all end-user devices
Function			

Sourcing			
	Common supplier certification standards	Common procurement practices and standards	Common sustainable technology requirements
Industry	Sustainability-certified supply chain partners	Carbon-neutral enterprise procurement	100% sustainably sourced technology infrastructure
Enterprise	Sustainability-certified technology vendors	Carbon-neutral technology procurement	100% sustainably sourced IT services
Function			

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Environmental Sustainability Standards

	Energy	Emissions	Waste	Sourcing

***In* IT**	• Technology infrastructure energy consumption (kWh, % renewable)
	• Data center energy consumption
	  • Percentage workloads considered portable
	• End-user devices energy consumption
	• Application portfolio energy consumption
	  • Percentage green design
	  • Number applications per user
	• Percentage of compute workloads cloud-hosted
	• Lifecycle energy consumption of IT products and services
	• Percentage energy sources controlled/influenced
		• Technology infrastructure emissions
		  • Owned/on-premises
		  • Third party-source/ hosted
		• Data center emissions
		• End-user device emissions
		  • Average lifecycle of end-user devices
		  • Average emissions reduction achieved by lifecycle extension
		  • Percentage end-user devices BYOD
		• Application portfolio emissions (avg. workloads)
		• Lifecycle emissions of IT products and services
			• Device and hardware lifecycle circularity (E.g., servers, laptops, phones, monitors, printers, network equipment reused, refurbished, repurposed, recycled, remanufactured
			• Percentage IT devices reused/refurbished or repurposed
			• Percentage IT devices recycled/remanufactured
			• Percentage equipment not disposed sustainably (I.e., landfilled)
			• Percentage of device/hardware units donated responsibly
			• Refresh cycle of IT devices
				• Software sourced sustainably (i.e., vendors, manufacturers and supply chain sustainability)
				• Hardware sourced sustainably
				• Eligible technology devices/hardware meeting ENERGY STAR®, Epeat, and/or TCO Certified criteria
				• IT procurement process sustainability
				• Outsourcer sustainability
				• Infrastructure services sourced sustainably (e.g., cloud, data centers, e-commerce providers)
				• Business services sourced sustainably (e.g., consulting firms, integrators)
				• Mobile communication services sourced sustainably

By* IT	• Enterprise facility energy consumption
	• Hybrid workforce enablement
	• Enterprise manufacturing energy consumption
	• Percentage energy sources controlled/influenced
		• Enterprise facilities emissions
		• Virtual meetings enablement
		• Eco-friendly business travel
		• Enterprise transportation emissions
		• Procurement emissions
		• Enterprise supply-chain emissions
		• Enterprise manufacturing emissions
			• Water consumption and discharge
			  • Enterprise facilities
			  • Third- party facilities
			• Paperless enterprise enablement
			  • Percentage of enterprise processes electronic
			• Manufacturing waste
				• Supply chain vendor (e.g., transportation, delivery) sustainably
				• Procurement process sustainability
				• Sustainable sourcing for manufacturing

Sourcing E-sustainability requirement categories

- Energy - Transportation - Waste - Packaging

Criteria for sustainability within above categories

- Carbon product footprint
- Ecolabel/energy certifications
- Renewable energy use: Solar, wind, geothermal, hydropower, tidal, biomass
- GHG emissions
- Low-carbon fuels/electric vehicles in fleet
- Product lifespan
- Commitment to recycled material in product, packaging
- Waste reduction
- Compliance with government rules, directives

*For the enterprise

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IT’s Social and Governance Impacts, Levers, and Standards

Social and Governance Impacts

IT Must Acknowledge and Manage Two-Sided Impacts

Positive Impacts

Health

- AI accelerates clinical trials
- Devices and wearables enable preventative and wellness monitoring
- Telemedicine improves equitable and accessible access

Flexibility of work

- Virtual collaboration platforms, 5G and cloud hosting enables remote work
- Improves productivity, reduces commuting stress and emissions

Education

- Virtual learning improves accessibility
- VR, AI and learning sciences enable immersive, holistic experience

Diversity, equity, and inclusion

- Use of AI to screen data can ID and remove bias in recruitment and pay systems, and reveal equity gaps.

Socio-environmental

- Sensing devices optimize smart building energy usage; detect wildfires earlier
- IOT optimizes waste management process and city traffic patterns

Negative Impacts

Health

- Workstations and devices can cause eyestrain, repetitive motion disorders
- Social media use can cause distraction and harm mental health
- Heavy sedentary technology use contributes to obesity

Remote work

- Can lead to isolation, work-life imbalance and decline in creativity
- Increases cybersecurity risk and distractions (avg. 2.5 hours wasted daily)

Diversity, equity, and inclusion

- IT careers under-represent, under-pay and under-promote women and people of color
- 47% of population lack access to high-speed broadband; 2.9 billion have no Internet access
- Only 3% of the Internet is accessible to people with disabilities
- Lawsuits claiming digital violations of the ADA and other acts jumped 52% from 2018 to 2020.

AI ethics

- AI can be used in unethical ways and can perpetuate bias

Sources: Screen Education survey; WebAIM; TechRepublic; UsableNet

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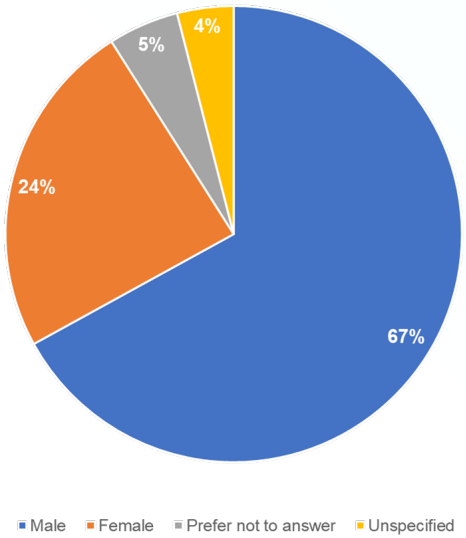
IT Must Close its Substantial Workforce Diversity Gap

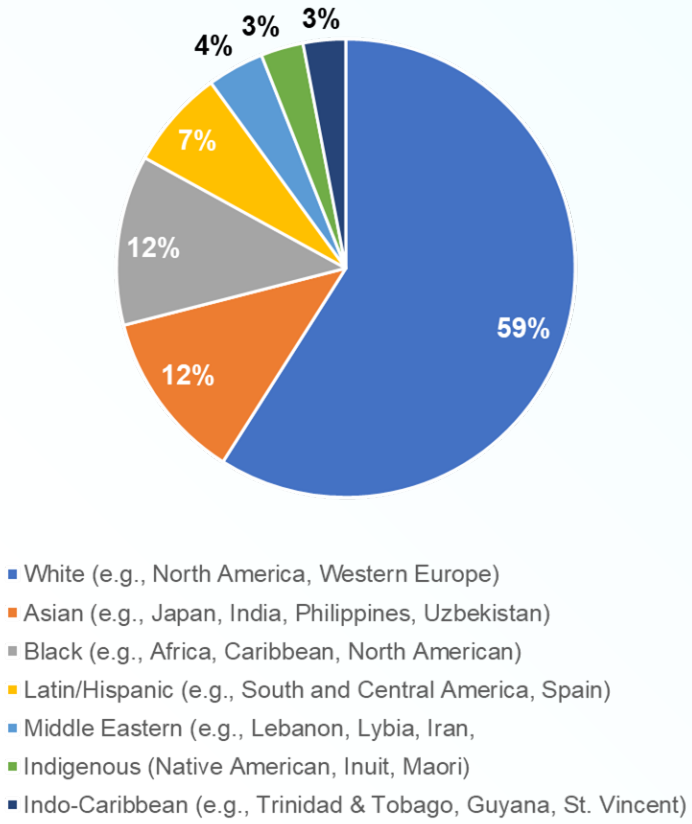
Studies show gender and ethnic diversity on executive teams results in a 25% and 36% greater likelihood to outperform EBIT industry averages, respectively.

Diversity in IT workforce 2022

Gender



Ethnicity



Representation in major industries
(2022 USA statistics)

	Women	Black/ African-American	Hispanic or Latino
Agriculture	28%	3%	25%
Finance & Insurance	53%	12%	12%
Hospitals and health services	78%	17%	14%
Hospitals and health services	78%	17%	14%
Mgmt., scientific, and technical consulting	43%	9%	8%
Retail	48%	13%	19%

Sources: McKinsey & Co. Diversity Wins Report; Info-Tech “IT Talent Trends 2022” (80% surveyed in North America and Europe); US Bureau of Labor Statistics

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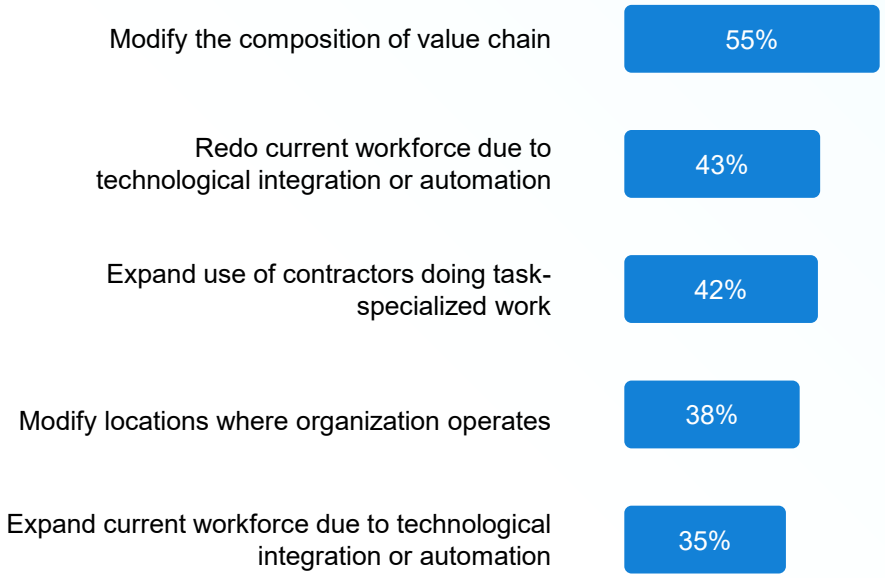
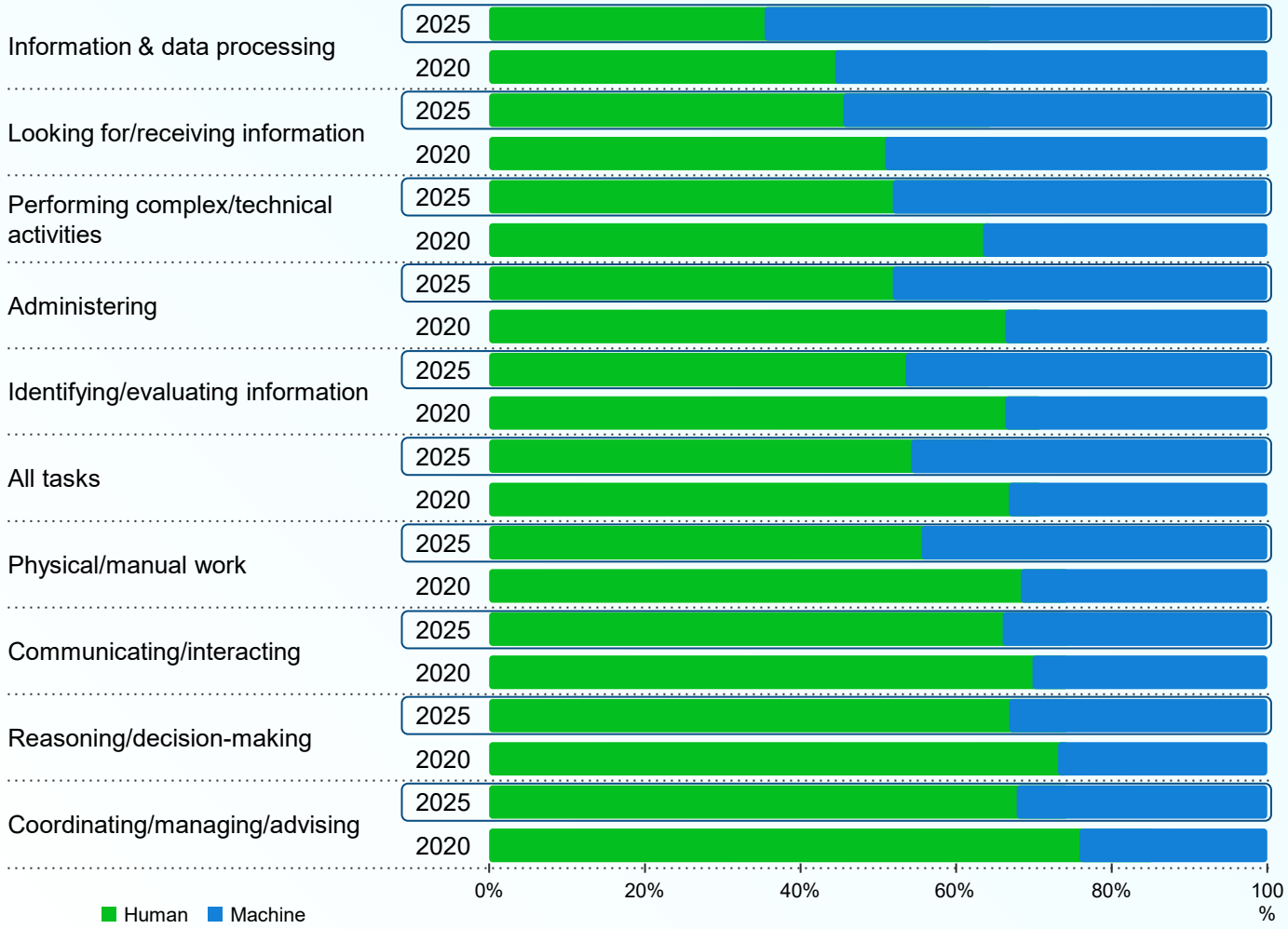
Automation Is Changing Tasks, Roles and Skills

Percentage of companies with expected changes to workforce by 2025



Source: World Economic Forum

Share of task hours performed by humans and machine – 2020 versus 2025



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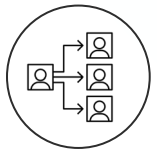
IT Leaders Must Help Today's Employees Become Tomorrow's Effective Workforce

The Challenge: The decrease in roles made redundant by automation is exceeding the growth in roles from emerging professions, according to a 2020 study by the World Economic Forum.

- By 2025, this could result in a net loss of 85 million jobs.
- Reskilling effort will be significant: 50% of workers will need to change an average of 40% of their core skills by 2025.



Top job roles with increasing and decreasing demand across industries

Decreasing demand

1. Data entry clerks
2. Administrative & executive secretaries
3. Accounting, bookkeeping & payroll clerks
4. Accountants & auditors
5. Assembly & factory workers
6. Business service & administration managers
7. Client information & customer service workers
8. General & operations managers
9. Mechanics & machinery repairers
10. Material-recording & stock-keeping clerks
11. Financial analysts
12. Postal-service clerks

Increasing demand

1. Data analyst or scientists
2. AI & machine learning specialists
3. Big data specialties
4. Digital marketing or strategy
5. Process automation specialists
6. Business development professionals
7. Digital transformation specialists
8. Information security analysts
9. Software & application developers
10. Internet of things specialists
11. Project managers
12. Business services & administration managers

Top skills for 2025

1. Analytical thinking & innovation
2. Active learning & learning strategies
3. Complex problem-solving
4. Critical thinking & analysis
5. Creativity, originality & initiative
6. Leadership & social influence
7. Technology use, monitoring & control
8. Technology design & programming
9. Resilience, stress tolerance & flexibility
10. Reasoning, problem-solving & ideation
11. Emotional intelligence
12. Troubleshooting & user experience

Source: World Economic Forum

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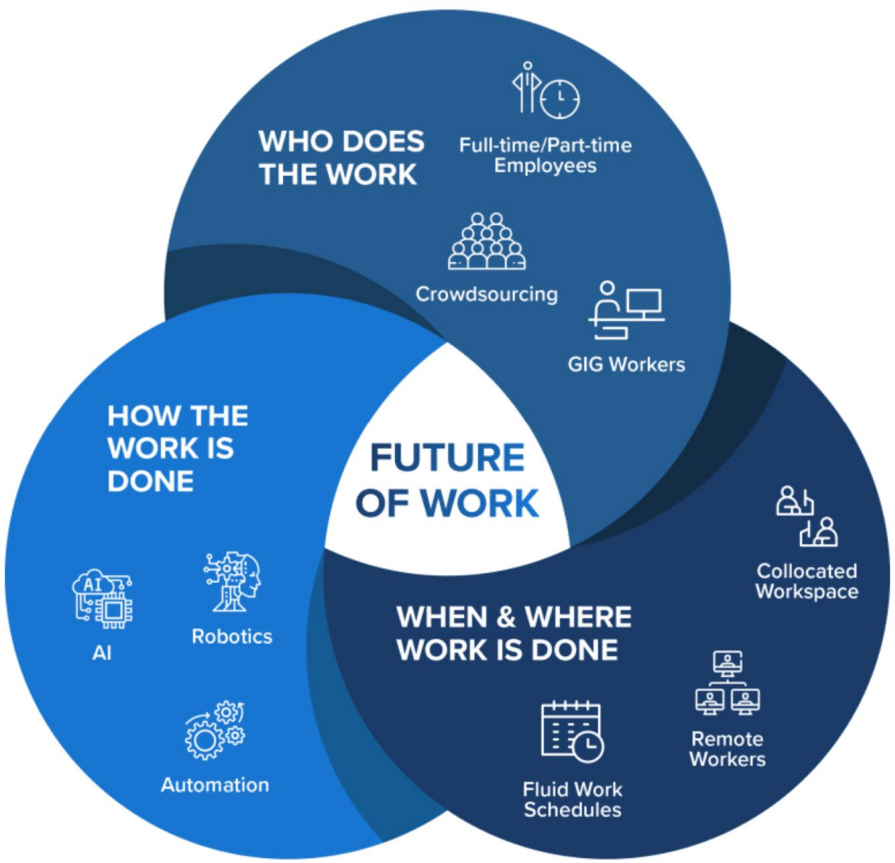
IT Can Enable a Sustainable Future of Work

Technology is key to Future of Work and must share accountability for its sustainable enablement

Technology is a chief enabler of Future of Work



Social and governance responsibilities associated with Future of Work

- Provide a robust and agile virtual collaboration platform
- Enable seamless remote and hybrid work by individuals and teams
- Mitigate cyber risk associated with work taking place outside of secured office environments
- Monitor decision quality, productivity and performance impacts of AI-based and automated assistance
- Manage cultural impacts of less face-to-face time of managers, staff and peers
- Plan for and manage reskilling and upskilling for new roles replacing positions eliminated or changed by automation and digitalization

Source: Society for Human Resource Management

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Sustainable Data Governance is a Critical IT Responsibility

IT Must Ensure Socially Responsible, Equitable and Secure Use of Data

Key responsibilities for data governance

Data privacy protection – Data is collected, generated, analyzed and disseminated in ways that do not harm people and society.

Data security – Protecting data from harm, internal or external, intentional or unintentional.

Data stewardship – Ensuring management and use of personal data is consistent with the expectations of those who are sharing it, and that data is not used in ways that cause harm to health and safety.

Data transparency, equity – Demonstrating openness in use of personal data; clarifying and potentially increasing the benefits people receive in exchange for sharing their data.

Anti-bias – AI algorithms trained to avoid biased conclusions; data used for training and analysis must itself be unbiased.

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AI Ethics are Evolving Daily in Labs and Courts

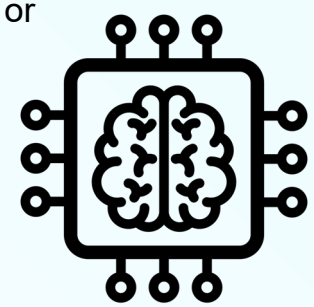
A 141-point UNESCO recommendation on AI ethics has been adopted by 193 member states

AI ethics challenges

- Lack of transparency – AI decisions are not always understandable or explainable even by their programmers.
- Questionable neutrality – AI decisions are susceptible to inaccuracies and discriminatory outcomes due to biases.
- Environmental harm – AI's energy consumption and emissions intensity are greater than other forms of computing. Lack of AI development transparency frustrates ability to make ethical environmental choices.
- Degraded creativity value-chain – Creator integrity and copyrights are being challenged as AI grows capable of producing "art."
- Negative externalities – AI-enabled platforms' unregulated use of personal data could accelerate loss of citizen privacy to corporations and governments, damage competition, propagate false information in social media "echo chambers," degrade the value of workers, and create a net loss of jobs.
- Weaponization of AI superintelligence could destabilize balance of power and enable systems to make decisions that cause harm not intended by their creators or commanders.

Recommendations to address AI ethics from UNESCO report

- Put in place multi-stakeholder and adaptive governance and collaboration.
- Conduct ethical and privacy impact assessments.
- Adopt government regulatory frameworks or certification systems.
- Continually evaluate training data for bias and programming for bugs.
- Inform people when a decision is made on basis of AI algorithms, and provide a means to correct the decision.
- Protect personal data throughout the AI systems lifecycle.



Sources: Bloomberg; *Harms of AI*, Daron Acemoglu, MIT; UNESCO

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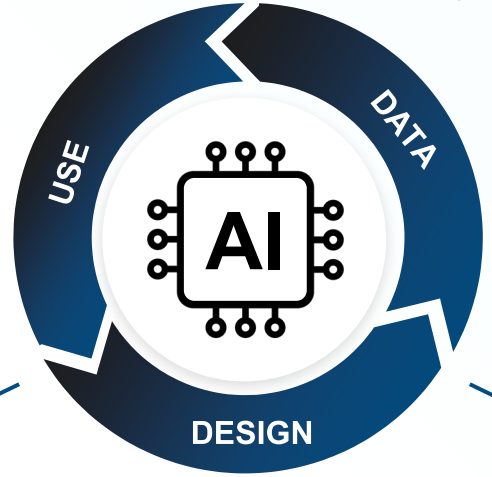
IT Must Address AI Bias

Documented AI pattern biases have ranged from facial recognition systems to credit-limit setting to racial bias in healthcare risk analysis to job candidate screening – all based on erroneous interpretations of data

How bias enters AI cycle

- Deployment bias from use in ways and contexts not intended by AI developers
- Confirmation bias for results aligning with existing beliefs
- Error propagation – Biased or flawed ML applications generate inputs for other ML algorithms



- Data sampling and selection bias
- Bias and discrimination embedded in data distributions
- Lack of representative data sets and underrepresentation of marginalized groups

- Lack of diversity in AI design teams
- Exclusionary design, model building and testing
- Lack of adequate cross validation

Ways to minimize AI bias

- Test algorithms in real-life situations
- Establish processes and practices for bias monitoring, detection and correction
- Increase transparency on how the algorithms are being trained and which are being used
- Include a “human-in-the-loop” that creates a continuous feedback loop leading to greater accuracy
- Integrate fairness definitions into the training process.
- Consider rounding out problematic data sets with synthetic data
- Deploy tools created to reduce bias (e.g., IBM’s AI Fairness 360)

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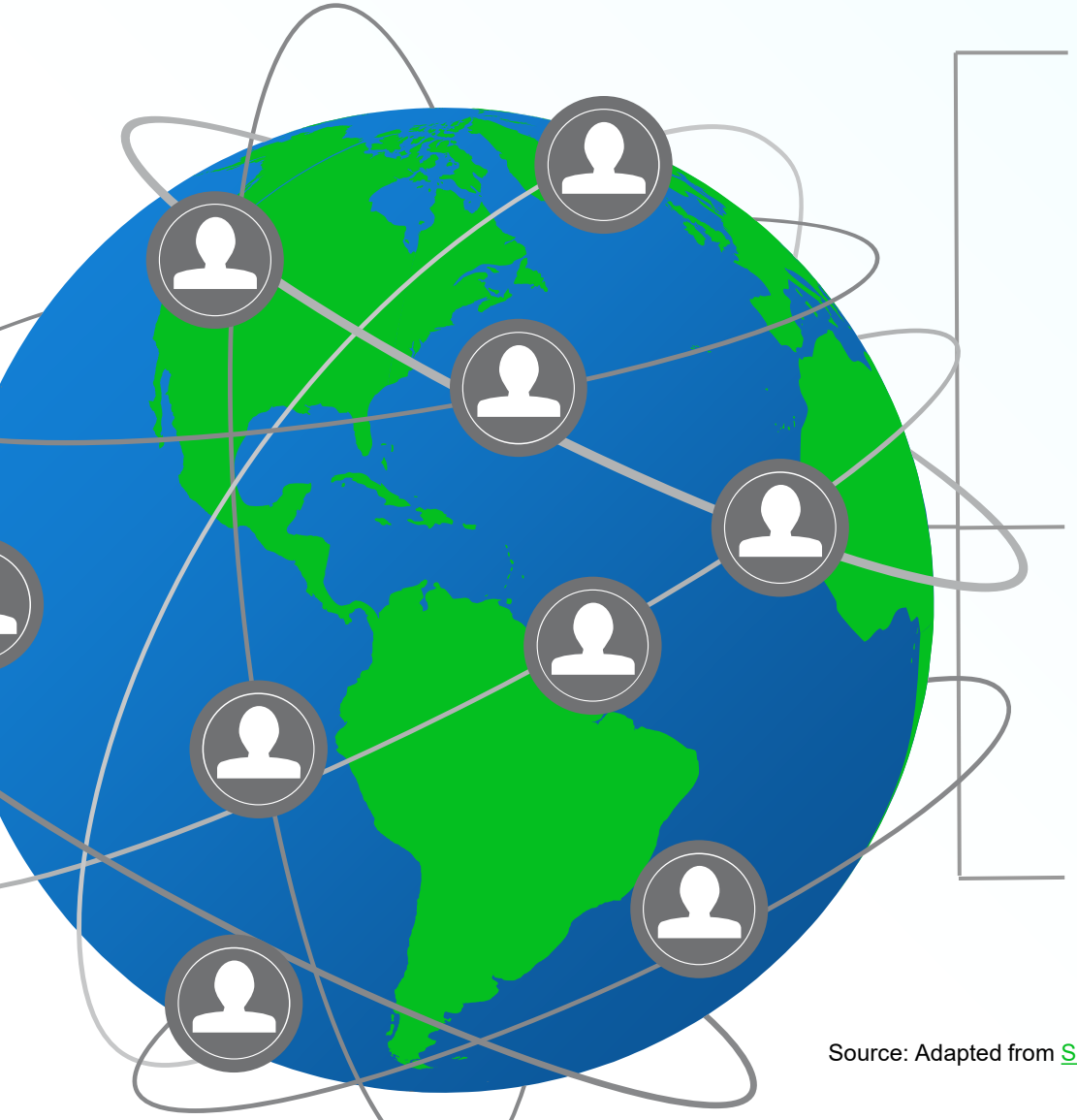
IT’s Social and Governance Levers



Social sustainability

- Technology accessibility
- Employee and tech partner Diversity, Equity and Inclusion
- Technology systems design inclusiveness
- Vendor social accountability
- Employee Health and Safety

Governance sustainability

- Governance and Accountability
- Investment and Training
- Data Usage, Privacy, Security
- Business Resiliency
- Enterprise Risk Management

- Economic Risk Mgmt. and Fraud Prevention
- Sustainable Future of Work
- Workforce Reskilling
- Responsible Technology Innovation
- AI Governance

Source: Adapted from Sustainability IT Playbook for Technology Leaders, Niklas Sundberg, Packt, 2022

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Social Impact Model – Goals by Category

Tier 1 goals are first priority and the fundamentals on which Tier 2 and 3 accomplishments are built

Social and Economic Inclusion

Tier 3	Inclusiveness considered in systems' origination and early design	Accessibility criteria included in systems design and engineering	Technology vendor ecosystem diversity exceeds industry averages
Tier 2	Inclusiveness criteria applied to systems design and engineering	Full accessibility of digital products and services	Diversity in IT talent pipeline exceeds industry averages
Tier 1	User inclusiveness measured and tracked for diverse populations	Robust adoption of assistive technology	Diversity in IT staff exceeds industry and regional averages

Sourcing Social Accountability

Tier 3	100% of technology vendors and compliant with code/criteria	100% of enterprise vendors and compliant with code/criteria
Tier 2	Human rights practices code/criteria applied to new technology vendors	Human rights practices code/criteria applied to new enterprise vendors
Tier 1	Technology vendors assessed for human rights risk and practices	Enterprise vendors assessed for human rights risk and practices

Health and Safety

0 Incidents of IT product/service non-compliance with health and safety policies
IT products, services assessed for health and safety impacts
Potential health and safety impacts of IT product and services identified

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Governance Impact Model – Goals by Category

Tier 1 goals are first priority and the fundamentals on which Tier 2 and 3 accomplishments are built

Culture				Data governance		
Employees fully engaged in sustainability mission	Sustainability incentives and related compensation in place	Adequate pipeline for sustainability-related skills	Tier 3	Full compliance with data security policies	Full compliance with data privacy policies	Full compliance with data usage policies
Transparent sustainability mission, goals, initiatives, and progress	Sustainability addressed in technology budgets	Mentoring, coaching in place for sustainability teams	Tier 2	Root-cause investigations for data security incidents	Personal data mgmt. consistent with expectations of owners	Data owners receive equitable value for use of their data
Sustainability governance and accountability in place	Adequate funding in place and embedded in relevant budgets	Sustainability training in place	Tier 1	Data security policies regularly reviewed and assessed	Data owners have control and visibility over how their data is used	Data lifefcycle management is conducted sustainably

Risk management				Technology and innovation		
Full compliance with sustainability-related risk management policies	Essential workers enabled to work remotely/alternate sites	Full compliance with financial fraud and corruption policies	Tier 3	Full compliance with responsible technology innovation policies	Full compliance with ethical AI policies	Workers displaced by automation are reskilled/ upskilled for new roles
Environmental, social and economic risks evaluated regularly	Resiliency requirements, oversight in place for key vendors/providers	Financial reviews are transparent, redundant, frequent	Tier 2	Innovative technology projects assessed for ESG impacts	AI management balances transparency, privacy and security	Automation impacts routinely assessed
Enterprise risk management incorporates ESG risks	Business continuity plans in place and up to date	Financial fraud and corruption safeguards in place	Tier 1	Technology innovations are developed and implemented sustainably	AI products and services are developed and implemented sustainably	Future of Work sustainability strategy in place

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Social and Governance Sustainability Standards

Tier 1 standards are top priority and core IT responsibilities, and typically addressed before Tiers 2 and 3

	Social Standards	Governance Standards	
TIER 1 (top priority)	• IT products and services with potential for negative health impacts • Percentage relevant IT products and services assessed for health and safety impacts • Accommodations and approach to ensure accessibility of digital products and services • Accessibility criteria and application • Extent of adoption of assistive technology • Approach to increase diversity in workforce and talent pipeline • Representation of diverse groups in IT staff	• IT and enterprise sustainability mission, core values, and communication approach • ESG governance approach • Accountability for sustainability reporting (i.e., completeness, accuracy, timeliness) • Frequency of data security policy/procedure review and update • Incidents of noncompliance with data security policies/procedures, over time period • Approach to provide constituents with greater control of personal data • Approach to ensure personal data management consistent with constituent expectations • Substantiated complaints of data misuse or noncompliance with constituents' data instructions • Number, percentage of constituents impacted by data exposure or loss, over time period • Approach to assess and minimize environmental and economic risks to enterprise systems and service continuity • Resiliency requirements, assessments and oversight of key vendors • Incidents resulting in business interruption/downtime, and average and cumulative duration, and constituents affected over time • Percentage essential workers enabled to work remotely or from alternative/back-up locations	
TIER 2	• Inclusiveness categories, criteria and approach applied to IT systems design and engineering • Approach to hold IT vendors socially accountability • Approach to diversify partner ecosystem • Percentage of diverse technology vendors/service providers, and percentage of total spend	• Approach for funding IT and enterprise ESG initiatives • ESG-specific funding as percentage of relevant budgets • Sustainability as a factor in setting and approving technology budgets • Average sustainability training hours per employee	• Approach to data usage governance (e.g., policy awareness/enforcement, user consent mechanisms, training) • Data usage policy violations and constituents impacted • Approach to provide data usage transparency to constituents • Enterprise risk governance approach • Enterprise risk management practices associated with ESG sustainability • Criteria and mechanisms to ensure technology innovations are environmentally, socially and economically sustainable • Percentage technology innovation projects conducted with ESG risk and impact assessments, over time • Approach to support sustainable Future of Work • Approach and expenditures for upskilling/reskilling workers for new roles when positions automated or eliminated by technology
TIER 3	• Social sustainability criteria for IT vendors • Approach to assess, monitor and hold accountable IT vendors and supply chain partners for social requirements compliance • Percentage new and existing IT vendors compliant with social sustainability requirements • Approach to assess and address corruption risk in IT vendors and supply chain partners • Approach to address digital divide in underserved communities		• Approach to minimize risk of financial fraud, internally and for internal and third-party providers • Approach to increase transparency, redundancy and frequency of financial review • Approach to minimize negative economic, environmental and social impacts from AI-enabled products and services • Approach to minimize negative economic, environmental and social impacts from AI-enabled products and services • Incidents of failure to comply with AI-specific policies or procedures, over time period • Approach to identify and reduce bias in AI analytics

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How to Use the Standards

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Sustainability Standards are Topics Against Which Improvement is Targeted, Measured, and Reported

They provide IT leaders a uniform foundation on which to build their action plans

Examples of IT standards topics

Environment

- Technology infrastructure energy consumption (kWh, % renewable)
- Lifecycle energy consumption of IT products and services
- Technology infrastructure emissions
- Lifecycle emissions of IT products and services
- Device and hardware lifecycle circularity
- Percentage IT devices reused/refurbished or repurposed
- Refresh cycle of IT devices
- Virtual meeting enablement
- Eco-friendly business travel
- Paperless enterprise enablement
- Water consumption and discharge
- Sourcing environmental sustainability impact assessment
- Eligible tech meeting certification criteria
- IT procurement process environmental impact assessment

Social

- Health and safety impacts of IT products and services
- Technology systems user-accessibility
- Technology design inclusiveness
- IT workforce diversity, equity and inclusion
- Vendor ecosystem diversity
- Digital community engagement/digital divide reduction
- Technology vendor human-rights requirements, assessment and accountability
- Supply-chain human rights requirements, assessment and accountability

Governance

- Sustainability governance and accountability
- Sustainability funding and incentives
- Sustainability training, coaching and talent pipeline
- Environmentally, socially and economically -responsible technology innovation
- Future-of work-strategy sustainability enablement
- Reskilling automation-displaced workers
- Governance of data usage, security, and privacy
- Business continuity/resilience strategy and planning for enterprise and value-chain partners
- Enterprise risk management incorporating ESG risks
- Financial fraud and corruption safeguards
- AI governance (transparency, privacy, security, ethics, environmental impact)

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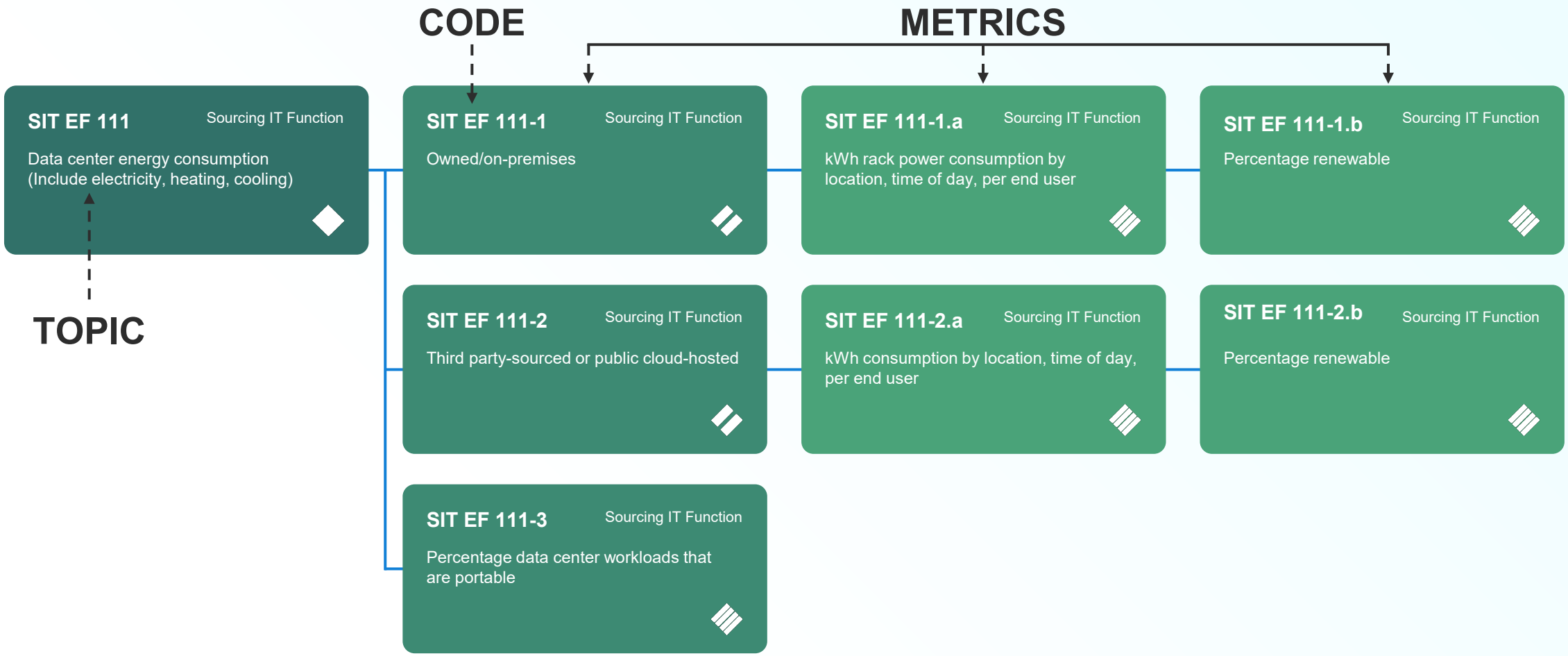
Nested within topics are the actual metrics IT should assess

Each metric has a unit of measure (e.g., kWh, %), suggested metric categorization (e.g., by location, per end user) and a unique identification code



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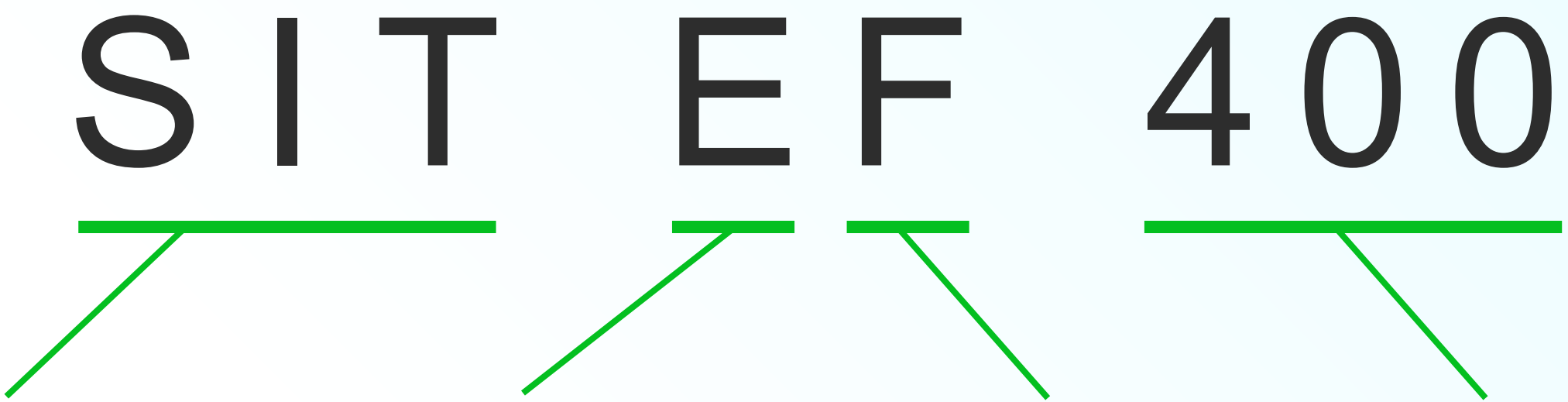
Code Breakdown



SIT
Sustainability.org standards

The first E
indicates Environmental

F for Function (IT) or E for Enterprise
the two tiers to which the standards can apply

The numeric value
indicates a group or “family” designation (e.g., emissions or risk management

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Code Breakdown – Social and Governance Standards

SIT
Sustainability.org standards

S or G for Social or Governance

The numeric value indicates a group or “family” designation (e.g., Culture or Risk Management)

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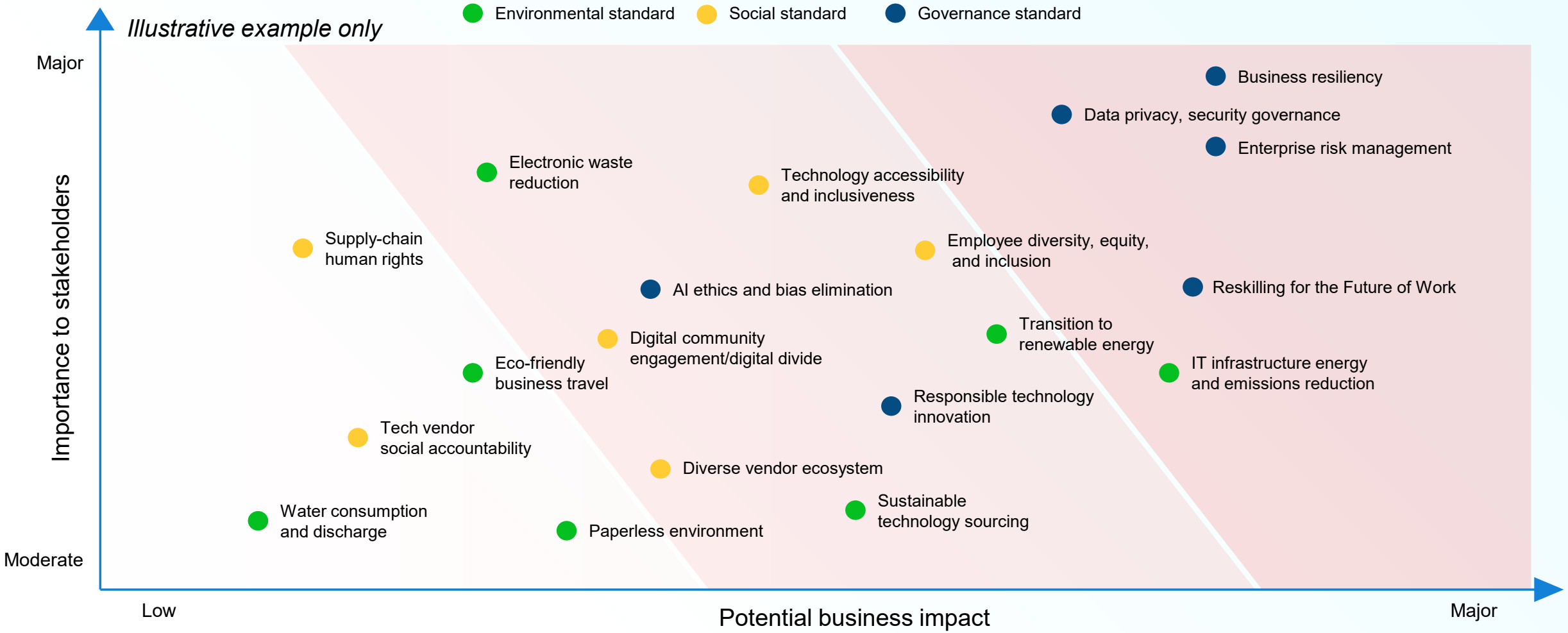
Prioritize Standards That Have Highest “Materiality” – Importance to IT/Business Stakeholders and Potential Business Impact

Further refine priorities based on standards in which IT can have a major, visible and rapid impact



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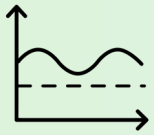
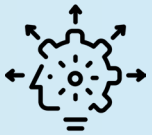
Use Standard Topics and Metrics in Setting Targets and Sustainability Improvement Strategy

Goal	Combat climate change via energy/emissions reductions			
Prioritized IT Standards Topics	Data center energy consumption and emissions (SIT EF 111 and EF 211)			
General Steps	 **Baseline current state**	 **Set targets based on industry benchmarks**	 **Identify hurdles and pain points**	 **Identify required capabilities and step-changes**
Metrics, Challenges and actions	*34 kWh all locations (SIT EF 110-1.a)* *2.3 mts GHG emissions all locations (EF 211-1)* *43% renewable energy sources EU location; 28% North American locations (SIT EF 110-1.b)* *80% of energy sources controlled (SIT EF 140)*	*8.5 kWh per end user* *0.8 mts GHG emissions* *85% renewable energy sources by 2025 in EU; 60% in North America*	*Limited energy management and tracking* *C-suite reluctance to move data to hosted cloud* *Lack of sustainability requirements in current data hosting contracts*	*Energy management and control over sources* *Full migration of data servers to hosted environments* *Renew and replace host contracts with sustainability requirements*

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Jumpstart Your Journey Today

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Advancing Global Sustainability through Technology Leadership

Our mission is to unite the world's largest community of technology and sustainability leaders to define sustainability transformation programs, author best practices and frameworks, set standards and certifications for governance, provide education and training, and raise awareness for IT-centric ESG programs that make their organizations and the world sustainable for generations to come.