

Global Skills Report

2021

The world's top
trending skills
benchmarked across
over 100 countries.

coursera

About the Global Skills Report

Every year, Coursera publishes the Global Skills Index, an in-depth look at the state of skills. This year, we are expanding our skills reports into a three-part series. This first installment, the Global Skills Report delves into the trends shaping the reskilling landscape for countries around the world.

To develop the Global Skills Report, we tap into our ecosystem of more than 77 million learners who have registered on our platform, 4,000 campuses, 2,000 businesses and 100+ governments to reveal entry-level career paths to opportunity for displaced workers, recent graduates, and anyone who hopes to advance their career.¹ The insights in this year’s report are based on Coursera platform data and research from Q1 2020 to Q1 2021. The findings are meant to help government, workforce, and industry leaders better understand the latest skill trends and their relationship to economic resiliency and growth. We also share learnings from the Coursera Workforce Recovery Initiative which, from April to December 31 2020, offered over 1 million displaced and unemployed workers across more than 100 countries access to thousands of job-relevant courses at no cost.

Table of Contents

P.3

Introduction

- P.4** Executive Summary
- P.6** How to Read the Report

P.8

Global Results

- P.8** Cutting-Edge
- P.9** Competitive
- P.10** Emerging
- P.11** Lagging

P.12

Regional Results

- P.8** North America
- P.9** Latin America and the Caribbean
- P.10** Europe
- P.11** Asia Pacific
- P.10** Middle East & North Africa
- P.11** Sub-Saharan Africa

P.62

Entry-Level Pathways

- P.63** The Role of Online Learning in Upskilling Pathways
- P.64** Cross-Cutting & Foundational Skills
- P.65** Cloud Computing
- P.66** Content Production
- P.67** Data & AI
- P.68** Engineering
- P.69** Marketing
- P.70** People & Culture
- P.71** Product Development
- P.72** Sales
- P.73** Care Economy
- P.74** Green Economy

P.76

Appendix

- P.77** Country Spotlights
- P.98** Technical Appendix
- P.103** Sources & Endnotes

Executive Summary

A NEW ECONOMY AND RESKILLING LANDSCAPE

The pandemic economy has created a complex landscape that threatens to leave millions of workers ill-prepared for the digital future. In 2020, the pandemic triggered losses equivalent to 255 million full-time jobs and \$3.7 trillion of income, making it the most severe recession since the Great Depression of the 1930s.² The work losses in 2020 were approximately four times greater than during the global financial crisis in 2009.³ Many of these jobs will not come back.⁴ We believe that the scale of this challenge means that now, perhaps more than ever, policymakers need an intimate understanding of the skills that drive sustained employment and economic growth.

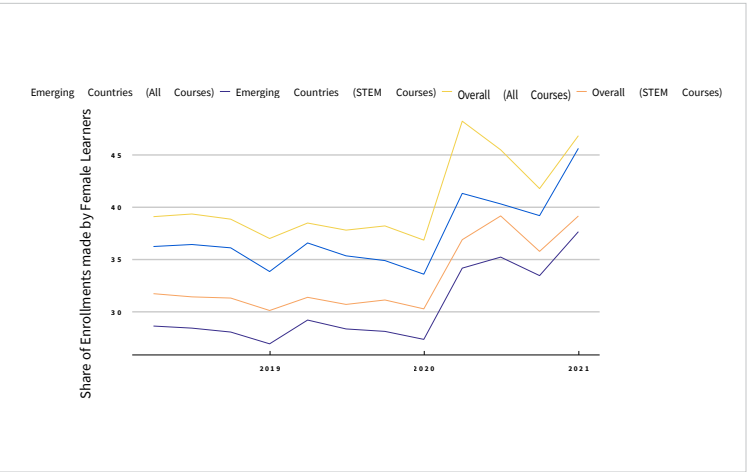
During the pandemic, the world saw a stark contrast between the massive job losses in hard-hit sectors—such as tourism, retail, and construction—and the positive job growth in industries like technology and finance. These shifts in the economy are expected to stick and imply a steep uphill climb for the displaced workers who could have previously shifted to another service sector job. A recent study of eight major economies showed that over 100 million workers—about one in 16 workers—will need to find a different occupation by 2030 post-COVID. This is 12% more than was estimated before the pandemic, and up to 25% more than was estimated before the pandemic for advanced economies.⁵

These challenges are not new. Since 1980, growth has been higher for high-wage and low-wage occupations at the expense of the middle-tier. The past four decades have hit workers who perform routine work hardest, and made manual service jobs that pay lower wages an increasingly central job category.⁶ The COVID-19 recession is likely to accelerate this polarization of labor markets, as companies tend to deploy more automation during downturns.⁷ In July 2020, two-thirds of executives said they were stepping up investment in automation and AI either somewhat or significantly.⁸

The result is reduced economic opportunity and social mobility for the less educated. In the US, 90% of children born in 1940 made more money than their parents. Since 1980, only about 50% make more than their parents.⁹ Across the globe, more unequal countries tend to have lower generational mobility,¹⁰ and the average unemployment rate has remained distinctively higher for less educated workers.¹¹

This double disruption of the pandemic and automation has disproportionately impacted women. Women are more affected by job losses than men. Globally, the total employment loss for women stands at 5% in 2020, versus 3.9% for men.¹² If no action is taken to address this gender gap, global GDP growth could be \$1 trillion lower in 2030 than it would be if women’s unemployment simply tracked that of men.¹³

As women continue to seek new opportunities, their share of course enrollments has increased at an unprecedented pace. The share of STEM course enrollments from female learners grew from 31% in 2018-2019 to 38% in 2020. Overall course enrollments for female learners increased from 38% to 45% within the same timeframe. The flexibility of self-directed learning offers hope and promise that this trend will continue long-term.¹⁶



The digital divide also persists with access to the internet remaining severely limited for many across the globe. According to a 2019 study, the internet penetration rate in developed countries is 87%, but it is just 47% in developing ones and 19% in the least-developed countries.¹⁷ Internet access is correlated with skill proficiency on Coursera (0.51).¹⁸

Unequal access to the internet has turned into unequal access to school and learning—and skill development—at a time when new knowledge and skills are most needed. Due to learning losses and increases in dropout rates, this generation of students stand to lose an estimated \$10 trillion in earnings, or almost 10% of global GDP. At the height of the COVID-19 lockdown, more than 160 countries mandated some form of school closures for at least 1.5 billion students.¹⁹

WHAT AN INVESTMENT IN SKILLS OFFERS THE FUTURE

We believe that this moment presents a unique opportunity to build more inclusive, modern, and scalable education systems. Reskilling the millions of workers that have been impacted by the pandemic and automation means that now, more than ever, the world needs innovative private-public reskilling solutions. For workers, governments, and economies, future growth is becoming predicated on skills.

In the coming years, governments will invest in some of the largest reskilling programs ever undertaken. For example, the World Economic Forum platform seeks to provide 1 billion people with better education, skills, and jobs by 2030.²⁰ These private-public partnerships not only have the potential to improve livelihoods, but they also have the potential to improve local economies as societies shift to a more digital and sustainable future.

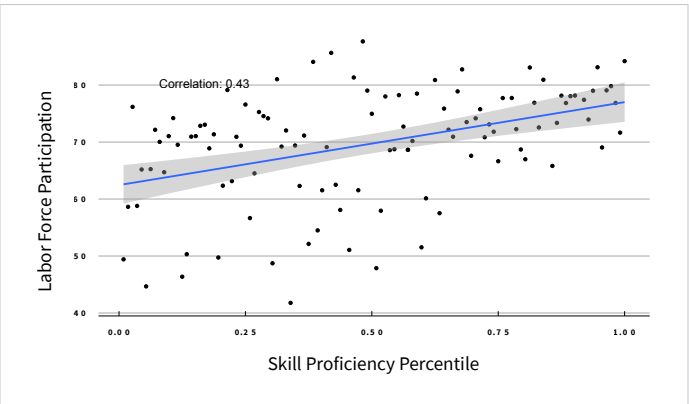
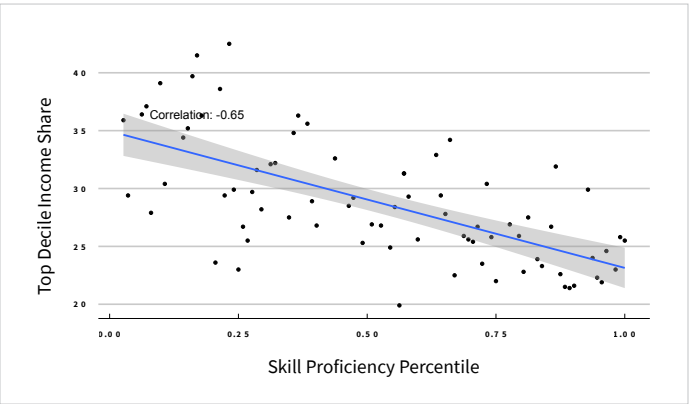
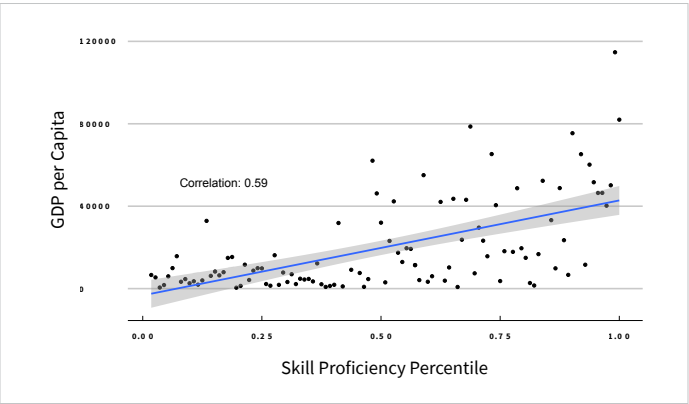
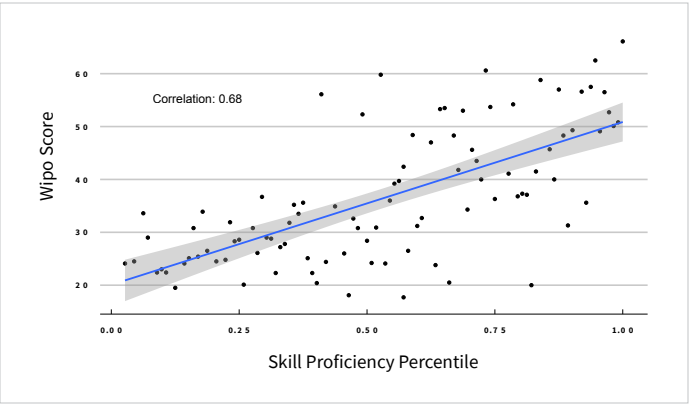
Skill investments have the potential to drive competitiveness, innovation, and equity. Although there is no ‘one size fits all’ model for promoting economic growth through skills, and the demand for specific skills greatly depends on local context,²¹ high-skilled countries see a variety of positive outcomes: A country’s skill proficiency on Coursera is associated with:

- superior performance on the Global Innovation Index (correlation of 0.73)²²
- higher labor force participation (correlation of 0.43)²³
- reduced concentration of wealth in the top 10% of earners (correlation of -0.64)²⁴
- increased economic output. The average GDP per capita for the bottom set of countries in this year’s ranking is \$7,549 versus \$38,339 for the top category—a difference of 5.5x²⁵

Skills will play a critical role in helping workers keep pace with the accelerated digital transformation that came with the pandemic. The top-performing countries across a number of economic outcomes show higher overall skill proficiency and over-index in many disruptive skills, such as Machine Learning, Financial Technology, and Critical Thinking.²⁶ These specializations cut across jobs and help drive productivity.

Skill investments could also have ripple effects on how governments handle imminent challenges like climate change. Today, 1.2 billion jobs rely directly on the effective management of a healthy environment, and 24 million new jobs could be created globally by 2030 if policies to promote a greener economy are put in place.²⁷

We believe that the resilience and economic gains of a skilled workforce should be accessible for all governments. At the height of the pandemic, Coursera launched the global Workforce Recovery Initiative to help governments stabilize their workforce and boost their economies’ resilience through job-relevant training. This initiative showed us first-hand the importance of aligning training to high-growth jobs and local industry needs.



Executive Summary (cont.)

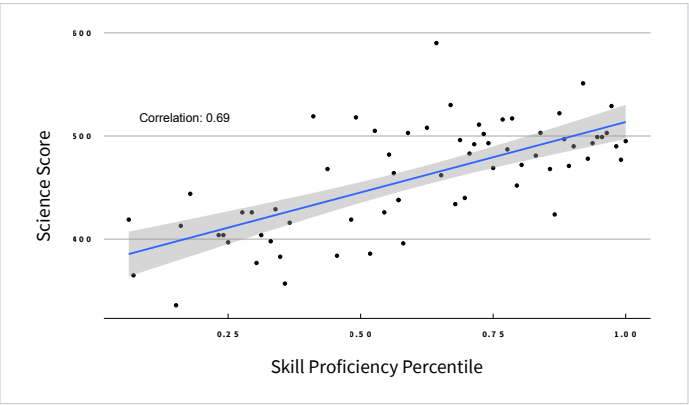
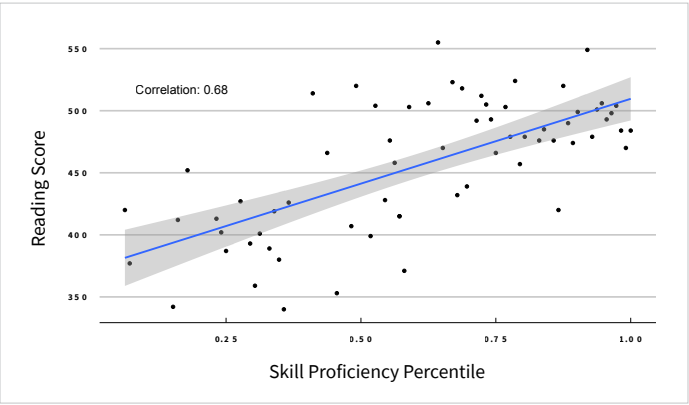
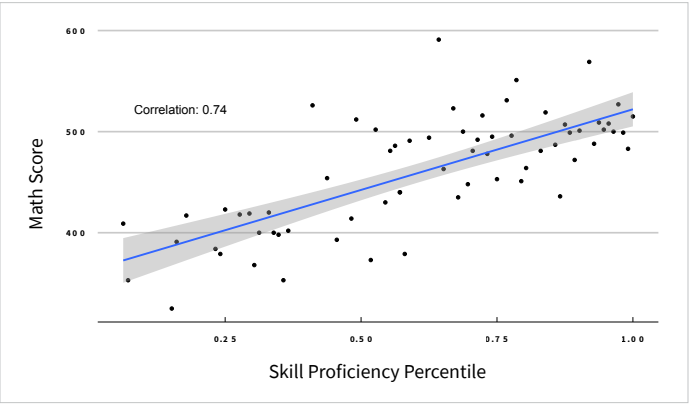
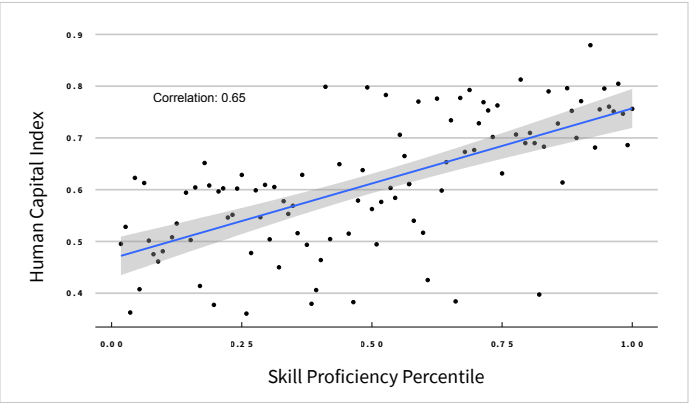
THE NEED FOR NEW PATHWAYS TO OPPORTUNITY

The future of work demands continuous upskilling and reskilling, but an individual’s ability to succeed in education and career starts with their upbringing and environment. A country’s placement on Coursera’s skills index is highly correlated (0.74) with the World Bank’s Human Capital Index,²⁸ which accounts for areas such as healthcare outcomes, years of basic schooling, and labor force participation in high productivity jobs. OECD PISA scores, which measure the performance of 15-year-old’s in countries across the world, also relate to outcomes on Coursera with positive correlations between skills proficiency and scores in math (0.73), science (0.68), and reading (0.67).²⁹

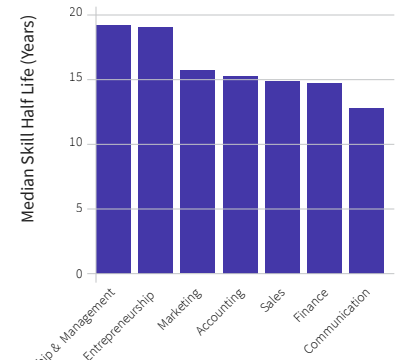
As learners move into adulthood, our research shows that the top skills needed for entry-level jobs of the future are more accessible than commonly thought. These digital economy skills are attainable with hours, not years, of online learning. A learner can develop core technical skills in a field like Sales in as little as 38 hours; or, can gain the skills to become a Data Analyst in 64 hours to start on the path of a career in data science.³⁰ Such pathways are just the beginning of the lifelong learning that is needed to keep up with the quick-changing digital economy.

Lifelong learning is particularly important for those that pursue careers in the quickly changing Technology and Data Science domains. In these disciplines, the median half-life of a skill, or the number of years it takes for a skill to reach half its value in the labor market, is about seven years shorter than the half-life of a skill outside of those domains.³¹ These trends call for making upskilling a more regular part of modern work life.

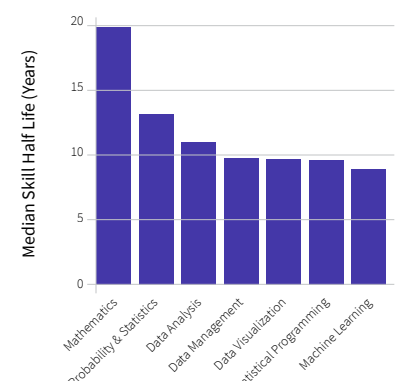
A small time investment can go a long way in online learning. Seventy-five percent of active learners spend less than three hours per week on the coursework to advance their careers.³² Whether a learner is a working parent or a recently unemployed professional that can dedicate many hours over a few weeks, online learning can make the jobs of the future more accessible to all types of workers.



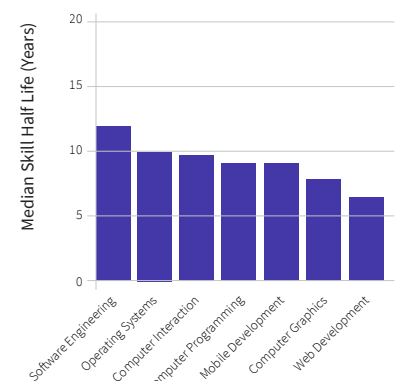
Shelf Life of skills



Business Skills



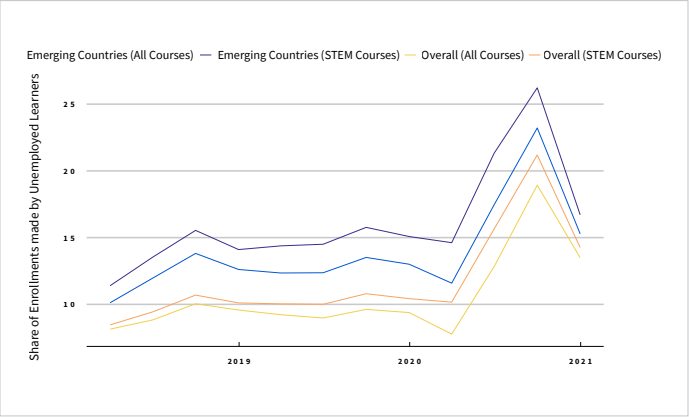
Data Skills



Technology Skills

The share of enrollments by unemployed learners also increased during the pandemic. Unemployed learners accounted for 10% of STEM enrollments between 2018 and 2019 and 17% in 2020. For overall course enrollments, their share increased from 9% enrollments between 2018 and 2019 to 14% in 2020. This is, in part, due to an urgent call to action among government and workforce leaders to upskill and reskill unemployed and displaced workers for high-growth, digital jobs.

Change in In-Focus Skills, Employed vs. Unemployed Learners³³



The rest of this report delves into skill trends across six regions, and identifies opportunities for government, educators, and industry to come together to help workers develop critical, job-ready skills for the digital economy. We tap into unique insights across our ecosystem to reveal the core skills needed for high-demand entry-level jobs, including the learning hours required to develop them, for displaced workers, recent graduates, and anyone who hopes to advance their career.

How to Read the Report

About the skills taxonomy

The Global Skills Report covers the domains of Business, Technology, and Data Science. We focus on these areas because they are the most popular domains on Coursera in terms of enrollments, and they encapsulate the skills most crucial to the future of work.

The competencies and skills in the Global Skills Report are the building blocks of the Business, Technology, and Data Science domains. The competencies within each domain capture the broad capabilities required to achieve expertise in these areas, and individual skills capture specific requirements to achieve mastery within each competency.

Functionally, our competencies and skills come from Coursera’s Skills Graph, which is a set of skills assembled through both open-source taxonomies like Wikipedia, as well as crowdsourcing from Coursera educators and learners on what they teach/learn on the Coursera platform.

About Coursera learner data

The skill trends and proficiency analyses in this report represent a view of the world through the lens of Coursera. An individual’s ability to access and use Coursera is influenced by many factors, such as: internet infrastructure; a learner’s educational background or past training; and, local culture or norms. We also depend on learner profile data such as gender, age, and location for the demographic analyses in this report.

The results may also be influenced by local economic or social conditions. For example, economic downturns sometimes drive learners to Coursera. Our partnerships also sometimes quickly bring thousands of new learners onto the platform. We try our best to report on or control for the undue influence of these factors in our research.

In general, our goal is to objectively represent what is happening across the Coursera ecosystem. Sometimes our results capture what is happening across an entire economy. Other times, the demographics and behavior of Coursera learners means that some results should not be extrapolated or interpreted as representing broad populations.

Reading the country rankings

For each graph in the regional sections, we show the rankings of countries on each domain and competency. The 108 countries within the report are ranked against each other, and we show the percentile rankings for each entity within its group.

A country or industry that is at 100% ranks at the top of the 108 countries and a country at 0% is at the bottom. For each groups’ percentile rankings, we also break them apart into four categories based on quartiles:

These groups identify where a particular country ranks within the relevant population.

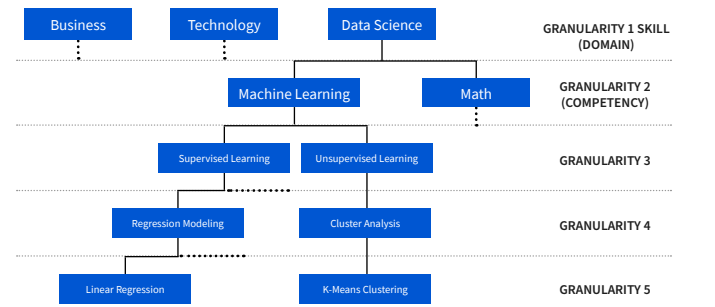
- CUTTING-EDGE** 76th percentile or above
- COMPETITIVE** 51st-75th percentile
- EMERGING** 26th-50th percentile
- LAGGING** 25th percentile or below

Interpreting skill metrics

OVER-INDEXING SKILLS:
Captures how much more likely a learner in the group of interest is to enroll in a course teaching a particular skill than the typical learner.

TRENDING SKILLS:
The demand for each skill based on a weighted index which consists of learner enrollments, Coursera search trends, Google search trends, and labor market value.

GLOSSARY OF COMPETENCY DEFINITIONS:
Within each of the three domains in the report, we cover the competencies that span key skills in business, technology, and data science. Below we define each competency we use in the Global Skills Report as well as provide sample skills within it as part of our Skills Taxonomy.



Sample Portion of Coursera’s Skills Taxonomy

Interpreting demographics and other statistics in the report

STAND-OUT INDUSTRIES:
Calculated as a location quotient (LQ), which measures a country’s industrial specialization relative to other countries. For each industry in a country, we calculate its share of a total employment and divide that figure by the average across all countries using data from the International Labor Organization (ILO).

TOP COURSES:
For each region in this report, we report the top courses based on the number of enrollments.

NUMBER OF LEARNERS:
The number of learners on Coursera in the region based on the number of registrations.

INTERNET PENETRATION:
The percent of individuals in the region with internet access based on data from the World Bank. For each region, we report the average across countries.

PERCENT OF GDP SPENT ON EDUCATION:
The percent of total government expenditures that are allocated to education by local, regional, and central governments in the region based on data from the World Bank. For each region, we report the average across countries.

MEDIAN AGE:
The median age of learners in a particular region based on self-reported Coursera profile data.

GENDER:
The distribution of males and females in a particular region based on self-reported Coursera profile data.

Global Results

The spectrum of skills performance

CUTTING-EDGE

Countries that are in the top quartile (76th percentile or above).

TOP GEOGRAPHIES:

All but two countries in the top quartile are high-income countries in Europe or Asia Pacific (Barbados and Cameroon as exceptions).

\$38,339

Average GDP per Capita

STAND-OUT INDUSTRIES:

- Arts (2.0X)
- Professional Services (2.0X)
- Human Health (2.0X)
- Information Technology (1.8X)
- Renewables & Environment (1.7X)

OVER-INDEXING SKILLS:

AI and Data Science skills like Artificial Neural Networks, Machine Learning, and Bayesian Statistics.

OPPORTUNITIES FOR GROWTH:

Skill investments that support innovation and the continued development of new products and services on the technological frontier.

COMPETITIVE

Countries that are in the second quartile (51st-75th percentile).

TOP GEOGRAPHIES:

Most major English-speaking countries fall in this category. Nearly all European countries that are in this group lie in Eastern or Southern Europe - highlighting the gap with the Western European countries that top the Global Skills Report rankings. Major Asia Pacific population centers like China and Indonesia also rank as Competitive.

\$23,589

Average GDP per Capita

STAND-OUT INDUSTRIES:

- Arts (1.6X)
- Renewables & Environment (1.6X)
- Public Administration (1.6X)
- Professional Services (1.5X)
- Information Technology (1.5X)

OVER-INDEXING SKILLS:

Business specialties like Accounting and Investment Management, and the human skills that are expected to be critical to the future of work like Communication, Problem Solving, and Critical Thinking.

OPPORTUNITIES FOR GROWTH:

Skill investments that leverage existing industry strengths to enter into more sophisticated, high value-add products or services for the digital economy.

EMERGING

Countries that are in the third quartile (26th-50th percentile).

TOP GEOGRAPHIES:

Most developing countries in Asia Pacific fall in this category, followed by the Middle East and Africa.

\$10,497

Average GDP per Capita

STAND-OUT INDUSTRIES:

- Energy (2.4X)
- Real Estate (2.0X)
- Household Activities (2.0X)
- Administrative Activities (1.2X)
- Public Sector (1.2X)

OVER-INDEXING SKILLS:

Skills related to hosting IT outsourcing hubs, such as Amazon Web Services, Web Development, and Programming.

OPPORTUNITIES FOR GROWTH:

Skill investments that support diversification away from energy production or other natural resource intensive activities.

LAGGING

Countries that are in the bottom quartile (25th percentile or below).

TOP GEOGRAPHIES:

Latin America (17 out of 28), followed by Asia Pacific (5), Africa (3) and the Middle East (3).

\$7,549

Average GDP per Capita

STAND-OUT INDUSTRIES:

- Household Activities (2.3X)
- Mining (1.9X)
- Public Administration, (1.4X)
- Civic & Social Organizations (1.3X)
- Hospitality & Food (1.2X)

OVER-INDEXING SKILLS:

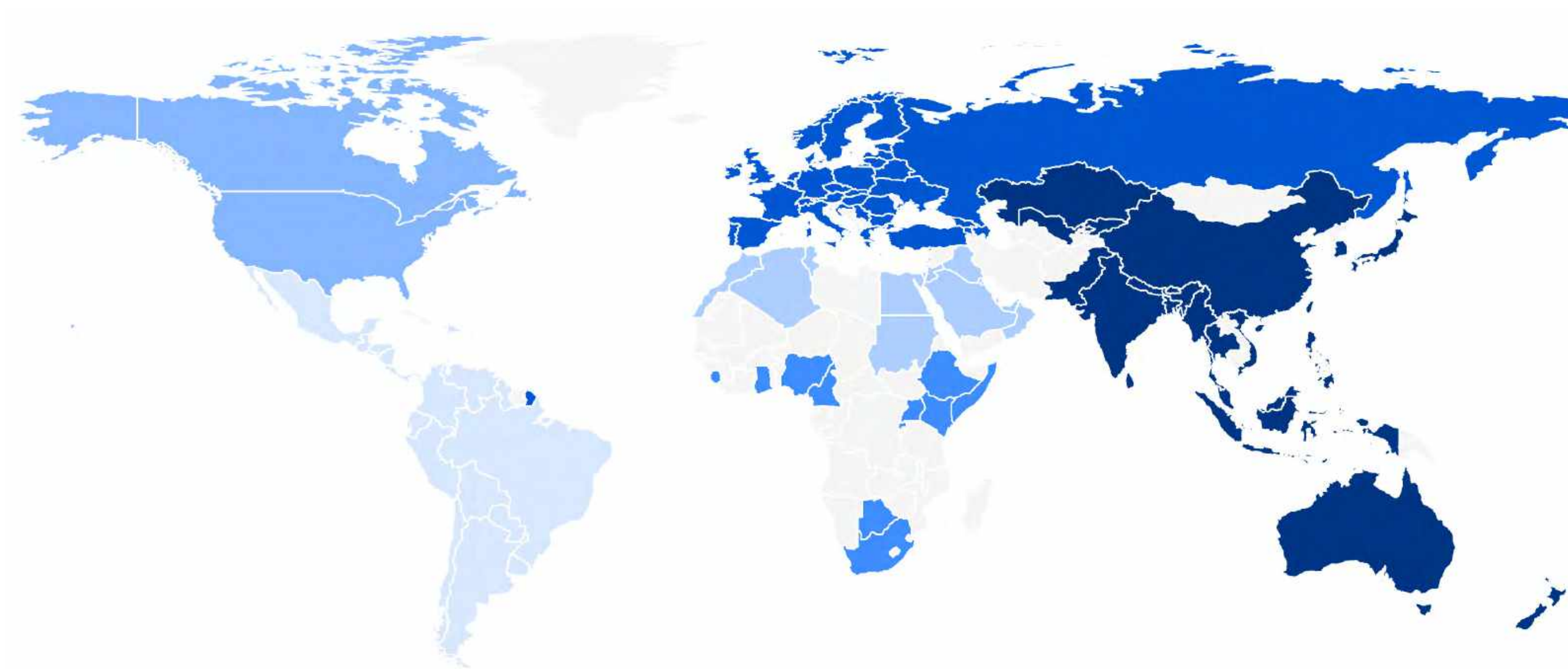
Soft skills like Adaptability and Creativity, and business skills in areas like Sales, HR, and Accounting.

OPPORTUNITIES FOR GROWTH:

Foundational skill investments in areas like computer literacy that create pathways out of subsistence work and the informal economy.

Regional Results

Skill trends across the globe



P.14
North America

P.22
Latin America and
the Caribbean

P.30
Europe

P.38
Asia Pacific

P.46
Middle East &
North Africa

P.54
Sub-Saharan Africa

NORTH AMERICA

Corporate innovation leaders facing social challenges

17.0M

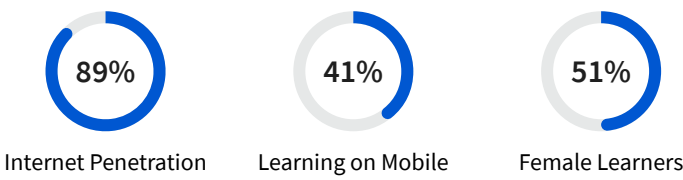
Coursera Learners

34

Median Age

5.2%

of GDP spent on Education



North America remains among the least economically vulnerable regions thanks to strong fiscal-stimulus packages, but enters the recovery playing catch-up in terms of skills performance.³⁴ The US and Canada, with overall rankings of #29 and #55, are behind other high-income countries in Europe and Asia Pacific on a number of digital economy skills, such as Operating Systems, Cloud Computing, and Mathematics. Both countries also show room for growth in Business skills like Communication, Entrepreneurship, and Leadership and Management.

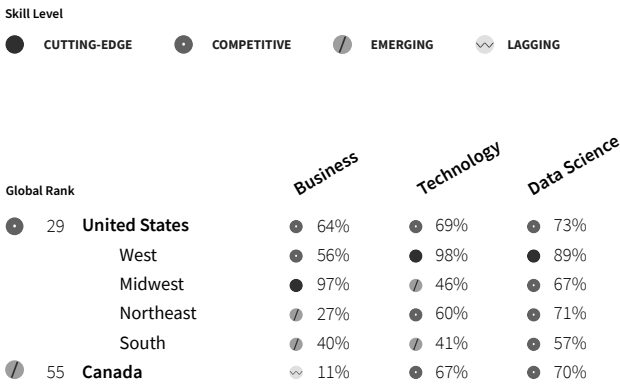
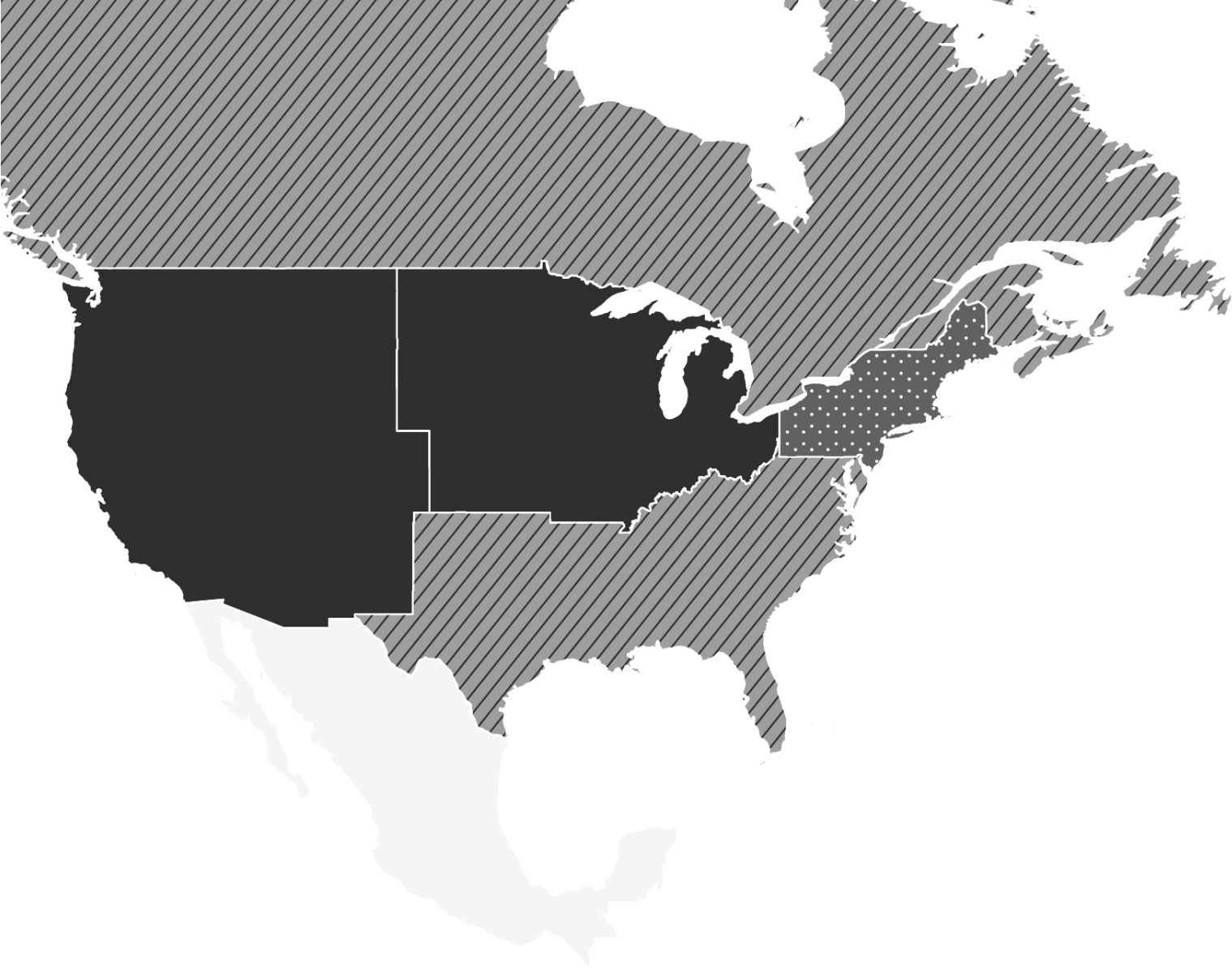
Making up ground will be critical to future growth given how much the region has benefited to date from the digital economy. Currently, the US and Canada are home to over 134 Fortune 500 companies, and many of these enterprises lead digital transformation on a global scale.³⁵ Over two-thirds of the market capitalization of the world’s 70 largest digital companies is attributable to the region.³⁶ The digital economy has also contributed to 86% of US labor productivity growth in recent years, despite accounting for only 8.2% of GDP.³⁷

Yet growth could be stunted if governments fail to address the social disparities that were exacerbated by COVID-19. Both the US and Canada saw a high association between infection rates and income, minority status, education, and conditions of work.^{38,39} Many workers whose jobs were displaced by the pandemic were unable to shift to online work due to skill gaps. In the US, 1 in 3 workers lack the foundational digital skills to perform their jobs, and these gaps are particularly pronounced in many of the sectors that were most impacted by the pandemic, such as Transportation, Retail, and Hospitality.⁴⁰

Differences in skills performance also continue to manifest across geographies. When US regions are individually ranked, the South lags behind, ranking in the 45th percentile overall compared to the 91st percentile for the American West—the top performing US region. This gap is driven by differences in Data and Technology skills, highlighting the risk that certain localities could be left behind if local workers are unable to upskill and participate in a more digital and distributed work life.

These trends combine with an education access and affordability crisis that only worsened with the pandemic, with over 17 million high school graduates deciding to cancel their college plans in the US.⁴¹ These numbers are in great part due to an affordability crisis with 75% of Americans believing that college is not affordable.⁴² Traditional college degrees are unaffordable to many due to both cost and structure. Typically, only 24 out of 100 US graduates earn a traditional four-year degree, and of those, 10 end up underemployed or working jobs below the level of their training.⁴³

The moment presents an opportunity to innovate and tackle long-standing challenges. Online learning offers the tools to dramatically reduce the costs of higher education; digital jobs and alternative educational paths provide new routes for more people to access economic opportunity; and the age of remote work means that organizations across the region will have an unprecedented opportunity to tap into new talent pools and diversify their workforce.



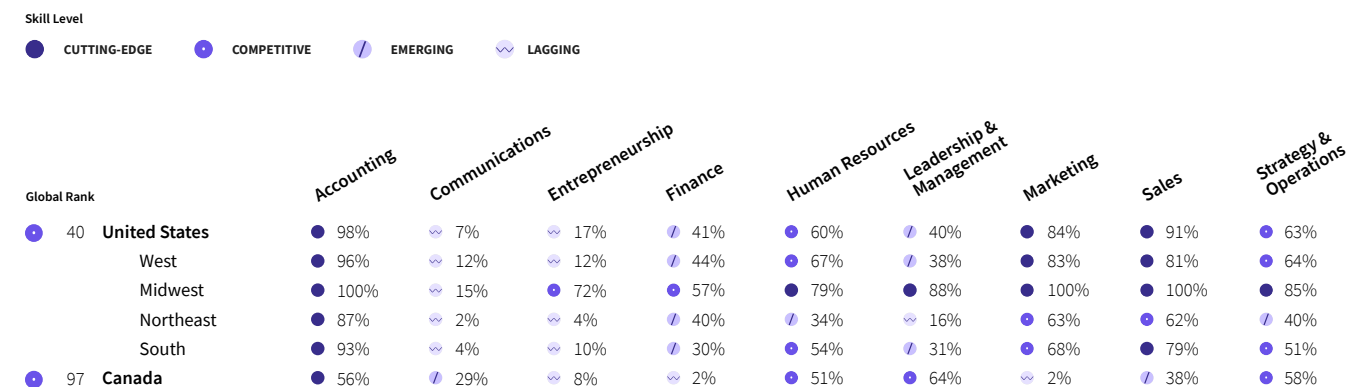
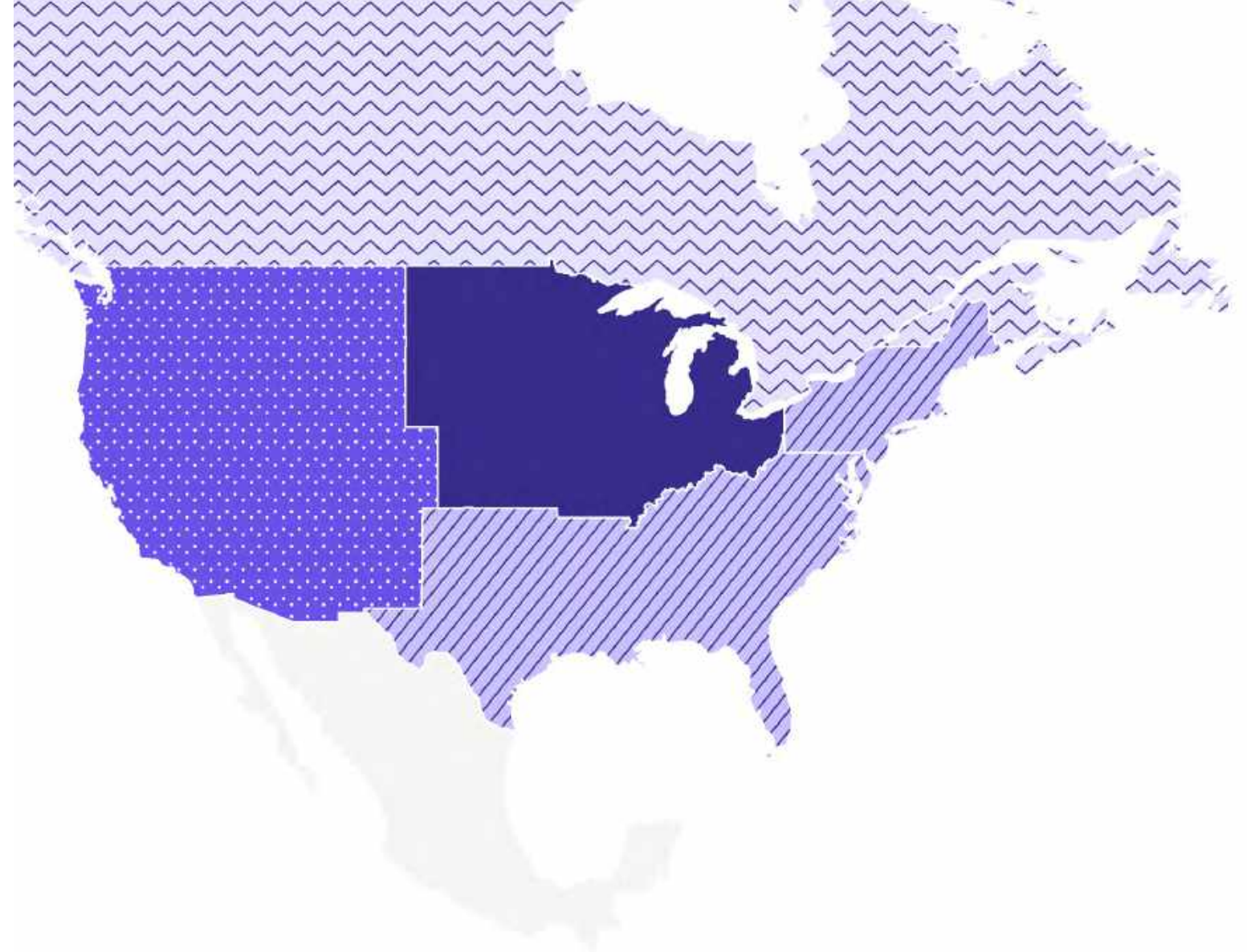
Communications skills remain a challenge for employers—and learner data backs up these reported gaps. A recent Wall Street Journal survey found that 92% of surveyed executives said soft skills were equally important or more important than technical skills, yet 89% said they have a very or somewhat difficult time finding employees with those soft skills.⁴⁶

Canada is behind in Finance skills. Despite hosting Toronto, which ranks as the second-largest financial center in North America and is commonly recognized for the stability of its banking system, Canada has recently lost several positions in international comparisons of financial sector competitiveness.⁴⁷

New York
New York State Department of Labor (NYSDOL)

In April 2020 alone, New York State lost more than 1.7 million private-sector jobs. To help unemployed workers reskill and upskill into high-demand local jobs, the New York Department of Labor invested in providing free access to Coursera training through the Workforce Recovery Initiative. The Coursera team customized learning pathways for 10 diverse economic regions, ranging from finance jobs in New York City Metropolitan to advanced manufacturing in areas like Buffalo. New York is working to involve local employers and cross-sector partnerships to connect workers to real, local jobs. This program has already served 25,000 learners who have enrolled in over 100,000 courses.

- Strategy and Operations
- Microsoft Excel
- Project Management
- Data Analysis
- Accounting
- Writing
- Finance
- Marketing
- Tableau Software
- Digital Marketing



Technology

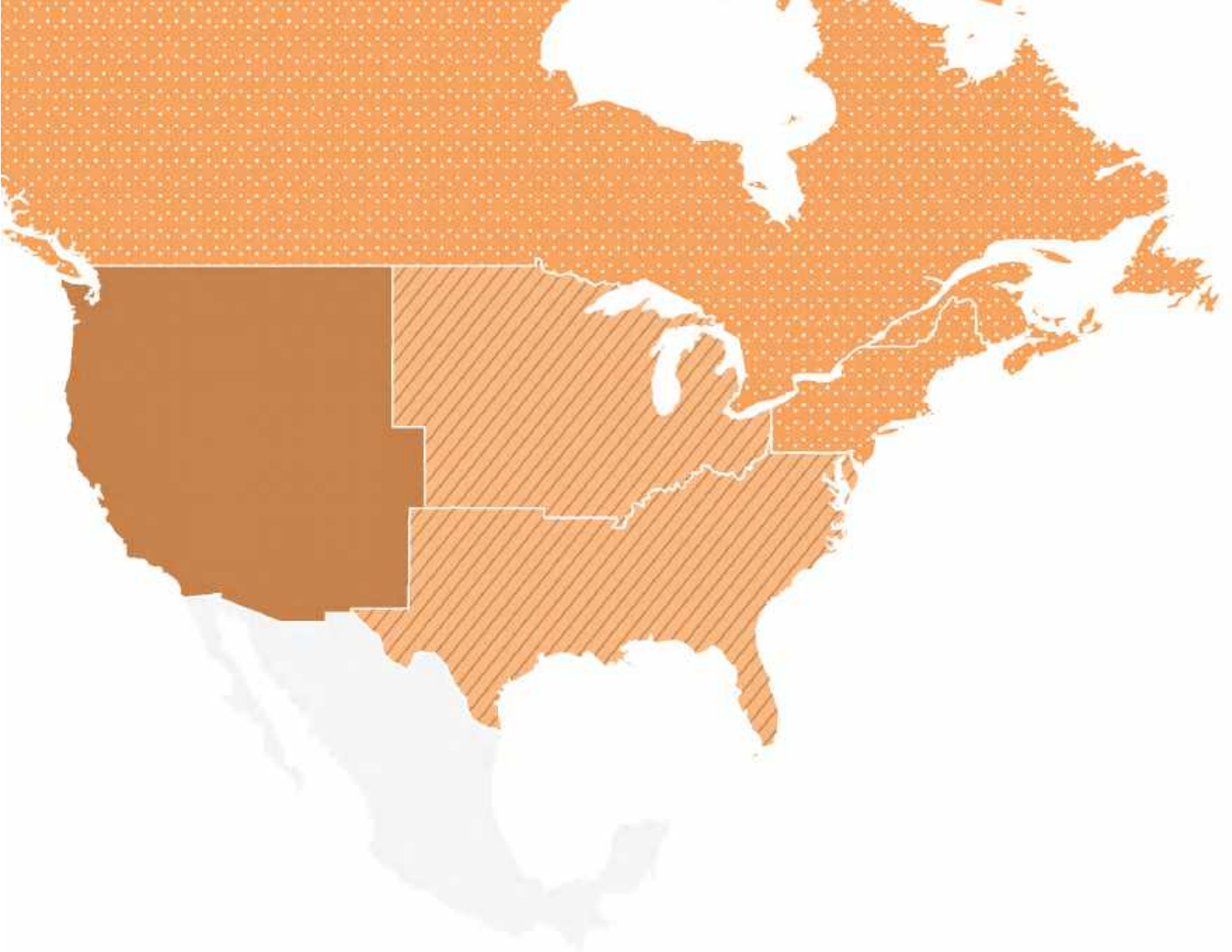
The West Coast remains the leader in Technology skills, driven by global leadership in Computer Programming, Software Engineering, and Web Development and the continued global leadership of technology hubs like San Francisco and Seattle. Ninety percent of the nation’s innovation sector employment growth in the last 15 years was generated in just five major coastal cities: Seattle, Boston, San Francisco, San Diego, and San Jose, California.⁴⁸

After the West Coast, Canada is second in Technology. Thanks to globally-renowned universities in engineering such as the University of Toronto, University of Waterloo, and University of British Columbia, Canada is poised to continue its growth as a technology leader in IT and areas like Artificial Intelligence (AI). No fewer than 500 global AI firms are currently headquartered in Canada, and more than 39,000 IT companies across the country generate \$181 billion annually.⁴⁹

Canada is a leader in Security Engineering. Canada ranks among the most secure countries in terms of the percentage of users that are subject to cyberattacks.⁵⁰ These capabilities will continue to grow in importance as digitization raises the profile of cybersecurity across industries.

TRENDING SKILLS:

- Theoretical Computer Science
- Programming Principles
- Design and Product
- C Programming
- Mathematics
- User Experience
- JavaScript
- Computational Thinking
- Data Structures
- Graphic Design



Skill Level

CUTTING-EDGE

COMPETITIVE

EMERGING

LAGGING

Global Rank

35 United States
West
Midwest
Northeast
South
37 Canada

Cloud Computing

Computer Networking

Computer Programming

Databases

Mobile Development

Operating Systems

Security Engineering

Software Engineering

Theoretical Computer Science

Web Development

37%	70%	75%	63%	62%	12%	55%	92%	60%	98%
45%	67%	91%	83%	74%	7%	52%	98%	80%	100%
41%	77%	58%	23%	43%	9%	51%	76%	48%	21%
35%	66%	74%	94%	63%	13%	58%	87%	69%	38%
30%	73%	54%	29%	51%	11%	62%	83%	40%	18%
55%	86%	71%	47%	61%	31%	71%	84%	62%	52%

Data Science

The West Coast remains the leader in Data Science, but the Northeast and Midwest are catching up. Many top universities in these regions, such as Northwestern, the Massachusetts Institute of Technology (MIT), and Carnegie Mellon University (CMU) have invested in recent years in new data science degree programs.⁵¹

Learners in the South score particularly low in Mathematics. These gaps start early in the life of students. Eighty-two percent of Southern states are below the national average for eighth-grade math on standardized tests.⁵²

Canada is lagging in Probability & Statistics. This may be a symptom of a broader trend of declining performance in quantitative disciplines. Canada, once a top-10 country in the world in mathematics education according to PISA, has now had its ranking and math scores decrease consistently for the past 15 years.⁵³

CASE STUDY:

Minnesota
The Minnesota Department of Employment and Economic Development (DEED) helps unemployed and displaced workers upskill and reskill for in-demand jobs. When the COVID-19 pandemic hit, hundreds of thousands of Minnesotans lost jobs or income due to reduced hours. DEED partnered with Coursera to deliver free online learning programs to Minnesotans from June 2020 through June 2021. More than 10,000 Minnesotans enrolled in Coursera, collectively completing almost 11,000 courses, covering topics ranging from IT and computer programming to COVID-19 contact tracing to digital marketing. The partnership has also empowered DEED to envision and explore new models for delivering workforce development services that are accessible, equitable, and scalable.

- TRENDING SKILLS:
- Python Programming

Statistical Machine Learning

Probability & Statistics

Machine Learning

Data Management

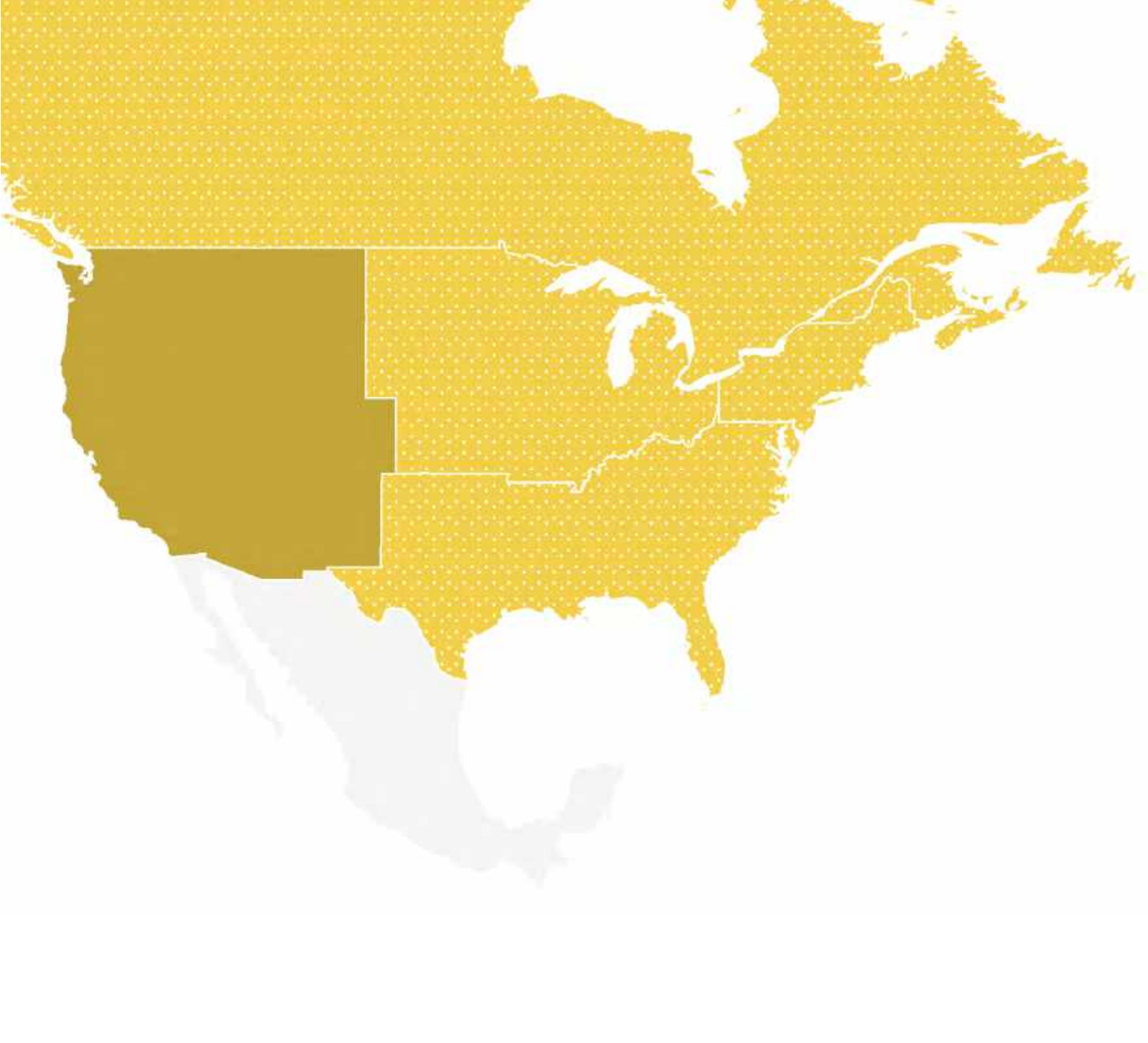
Machine Learning Algorithms

















































Applied Machine Learning

SQL

Data Visualization Software

Econometrics



		Skill Level													
		 CUTTING-EDGE	 COMPETITIVE	 EMERGING	 LAGGING										
Global Rank															
		Data Analysis		Data Management		Data Visualization		Machine Learning		Mathematics		Probability & Statistics		Statistical Programming	
 30	United States	 55%	 82%	 81%	 77%	 56%	 79%	 58%							
	West	 54%	 95%	 95%	 93%	 72%	 88%	 78%							
	Midwest	 65%	 77%	 73%	 71%	 47%	 83%	 51%							
	Northeast	 47%	 88%	 70%	 74%	 68%	 76%	 57%							
	South	 53%	 68%	 67%	 58%	 34%	 66%	 46%							
 33	Canada	 62%	 78%	 93%	 68%	 62%	 57%	 54%							

Business

Business skills offer the biggest opportunity for improvement, as Panama, Mexico, and Brazil score lower in this domain compared to Data Science and Technology. One possible intervention to promote the development of Business skills could be to help workers in small businesses gain better access to larger firms that operate in the formal sector of the economy. Small and medium enterprises comprise 99.5% of firms in the region (with almost nine out of 10 classified as micro-enterprises) and generate 60% of formal productive employment.⁶⁶ However, large enterprises tend to provide more work training and salary growth that is 3x higher than for workers in smaller, often informal, firms.⁶⁷

Accounting skills are an area of strength for Latin American and Caribbean countries, with 19 of the 23 countries in the region ranking in the top half globally. Building on this strength will require significant investments in complementary digital skills in fields like data analytics and process automation, which are expected to drive the future of the accounting profession and open new employment pathways. This will be particularly important given Accountants, Auditors, and Bookkeepers are among the occupations that are most susceptible to automation.⁶⁸

Many of the Caribbean nations that have historically served as IT and Business Process Outsourcing (BPO) hubs in Latin America, also rank highly in Business skills. These nations are focused on transitioning from Business Process Outsourcing (BPO) to the emerging Knowledge Process Outsourcing (KPO) industry, which is expected to be less susceptible to automation in the coming years.⁶⁹

TRENDING SKILLS:

- Strategy and Operations
- Microsoft Excel
- Marketing
- Digital Marketing
- Project Management
- Entrepreneurial Finance
- Business Analysis
- Budget Management
- Customer Analysis
- Finance

CASE STUDY:

Uruguay

INEFOP

INEFOP, the National Institute for employment and training from Uruguay, partnered with Coursera to complement its training in critical areas, including entrepreneurship and business, English language, and 4th Industrial Revolution skills. After a successful pilot where more than 35,000 citizens participated with positive feedback (4.7/5.0), INEFOP and Coursera decided to build a long-lasting partnership. The objective of the next phase is to enhance offerings and reach, and move faster to build virtual and hybrid training environments with top-quality content so that citizens are better prepared for the future of work.



Skill Level

- CUTTING-EDGE
- COMPETITIVE
- EMERGING
- LAGGING

Global Rank	Accounting	Communications	Entrepreneurship	Finance	Human Resources	Leadership & Management	Marketing	Sales	Strategy & Operations
45 Barbados	60%	38%	79%	14%	82%	71%	86%	75%	54%
58 Trinidad and Tobago	50%	46%	54%	29%	57%	65%	61%	46%	47%
68 Venezuela	81%	43%	53%	61%	39%	19%	33%	21%	29%
78 Saint Lucia	86%	54%	39%	18%	8%	68%	13%	4%	76%
84 Peru	88%	4%	78%	20%	27%	23%	16%	22%	35%
85 Costa Rica	58%	18%	43%	11%	44%	26%	35%	31%	55%
86 Dominican Republic	77%	25%	44%	24%	46%	11%	25%	20%	53%
87 El Salvador	82%	13%	55%	10%	30%	21%	34%	12%	39%
90 Uruguay	64%	17%	35%	60%	38%	20%	24%	7%	13%
91 Guatemala	68%	9%	56%	19%	18%	18%	38%	10%	20%
92 Bolivia	96%	16%	28%	21%	9%	9%	15%	9%	21%
93 Brazil	29%	27%	6%	78%	22%	13%	29%	18%	8%

Global Rank	Accounting	Communications	Entrepreneurship	Finance	Human Resources	Leadership & Management	Marketing	Sales	Strategy & Operations
94 Argentina	90%	11%	21%	59%	21%	7%	11%	8%	4%
95 Colombia	91%	14%	42%	13%	63%	13%	10%	26%	5%
96 Puerto Rico	63%	21%	18%	23%	36%	15%	22%	5%	12%
98 Honduras	69%	24%	32%	9%	45%	10%	13%	19%	16%
99 Ecuador	79%	28%	77%	5%	21%	3%	18%	13%	9%
100 Chile	95%	1%	47%	4%	7%	4%	30%	2%	11%
101 Nicaragua	84%	19%	27%	37%	10%	2%	6%	21%	6%
102 Guyana	25%	23%	7%	34%	11%	14%	17%	11%	14%
103 Panama	62%	5%	11%	31%	6%	4%	8%	4%	7%
106 Mexico	71%	20%	30%	3%	1%	6%	4%	6%	3%
107 Paraguay	46%	3%	2%	17%	4%	1%	4%	1%	1%

Technology

Barbados, Chile, and Brazil—which have traditionally had some of the strongest economies in the region—are Technology leaders.

Barbados recently outlined nine technology innovation moonshots and is investing in digital upskilling nationwide to transform its traditional sectors like Tourism, as well as diversify into new sectors.⁷⁰ Chile’s leadership may be explained by innovative government programs like Start-Up Chile, which has been replicated in over 50 countries.⁷¹

Nearly all Latin American countries are top-performers in Mobile Development. The region is home to one of the fastest-growing mobile markets in the world and is expected to have over 422 million users by 2025. Part of the reason for such growth is that mobile is the main tool for internet access in Latin America, providing a portable way for people living in rural areas to get online.⁷²

The region does well in Computer Programming, but is among the lowest-performing in Software Engineering. The former is focused on the knowledge of programming practices, whereas the other is focused on the higher-level work of architecting software. This trend may explain reports of Technology skill gaps, such as the Argentina IT industry being unable to fill about half of open vacancies in recent years.⁷³

TRENDING SKILLS:

- Theoretical Computer Science
- C Programming
- Programming Principles
- JavaScript
- Design and Product
- Algebra
- Mathematics
- HTML
- User Experience
- Scrum (Software Development)

CASE STUDY:

**Costa Rica
CINDE**

In Costa Rica, President Carlos Alvarado and Ministries of Labor and Foreign Trade partnered with the Costa Rica Investment Promotion Agency (CINDE), with support from the International Development Bank, to reactivate employment, especially among unemployed people, and energize the Costa Rican economy post-COVID. CINDE and Coursera offered citizens access to more than 4,000 courses taught by leading university and industry educators including Yale University, Princeton University, Google, IBM, and Amazon, and 1,000 short-form projects that provide hands-on experience with workplace tools like Python, SQL, HTML, and Google Analytics. CINDE had over 40 learning paths reviewed by employers to ensure training mapped to high-demand digital, strategic, and technical skills. This model enabled over 23,000 learners to complete 40,000 courses learning skills aligned to modern job sectors both locally and multi-nationally, including technology, computing, data science, and the English language.



Skill Level

- CUTTING-EDGE
- COMPETITIVE
- EMERGING
- LAGGING

Global Rank		Cloud Computing	Computer Networking	Computer Programming	Databases	Mobile Development	Operating Systems	Security Engineering	Software Engineering	Theoretical Computer Science	Web Development
7	Barbados	58%	40%	92%	100%	100%	83%	76%	34%	90%	41%
32	Trinidad and Tobago	87%	81%	89%	46%	6%	78%	97%	28%	37%	57%
38	Saint Lucia	1%	98%	99%	4%	1%	77%	79%	39%	100%	30%
56	Costa Rica	39%	60%	63%	66%	67%	97%	35%	43%	25%	37%
57	Brazil	98%	27%	64%	49%	30%	30%	33%	57%	30%	9%
59	Peru	90%	30%	65%	99%	85%	93%	18%	9%	20%	51%
64	Venezuela	29%	12%	88%	68%	91%	94%	21%	21%	32%	95%
71	El Salvador	38%	31%	38%	77%	84%	99%	21%	20%	19%	55%
79	Uruguay	51%	80%	63%	21%	82%	17%	13%	37%	29%	16%
81	Argentina	56%	36%	80%	72%	89%	45%	9%	13%	27%	28%
88	Chile	36%	3%	97%	64%	78%	41%	5%	13%	14%	10%
89	Dominican Republic	48%	26%	20%	40%	44%	38%	14%	46%	35%	13%

Global Rank

90	Nicaragua	<div><div></div></div> 72%	<div><div></div></div> 29%	<div><div></div></div> 40%	<div><div></div></div> 31%	<div><div></div></div> 96%	<div><div></div></div> 50%	<div><div></div></div> 10%	<div><div></div></div> 5%	<div><div></div></div> 8%	<div><div></div></div> 5%
91	Puerto Rico	<div><div></div></div> 33%	<div><div></div></div> 28%	<div><div></div></div> 27%	<div><div></div></div> 5%	<div><div></div></div> 29%	<div><div></div></div> 6%	<div><div></div></div> 31%	<div><div></div></div> 29%	<div><div></div></div> 22%	<div><div></div></div> 42%
94	Panama	<div><div></div></div> 11%	<div><div></div></div> 56%	<div><div></div></div> 33%	<div><div></div></div> 70%	<div><div></div></div> 65%	<div><div></div></div> 47%	<div><div></div></div> 15%	<div><div></div></div> 11%	<div><div></div></div> 9%	<div><div></div></div> 11%
96	Ecuador	<div><div></div></div> 15%	<div><div></div></div> 9%	<div><div></div></div> 66%	<div><div></div></div> 88%	<div><div></div></div> 90%	<div><div></div></div> 37%	<div><div></div></div> 8%	<div><div></div></div> 6%	<div><div></div></div> 13%	<div><div></div></div> 31%
97	Colombia	<div><div></div></div> 44%	<div><div></div></div> 19%	<div><div></div></div> 41%	<div><div></div></div> 76%	<div><div></div></div> 72%	<div><div></div></div> 26%	<div><div></div></div> 7%	<div><div></div></div> 12%	<div><div></div></div> 10%	<div><div></div></div> 15%
98	Mexico	<div><div></div></div> 29%	<div><div></div></div> 13%	<div><div></div></div> 21%	<div><div></div></div> 45%	<div><div></div></div> 94%	<div><div></div></div> 55%	<div><div></div></div> 3%	<div><div></div></div> 1%	<div><div></div></div> 5%	<div><div></div></div> 19%
99	Honduras	<div><div></div></div> 12%	<div><div></div></div> 2%	<div><div></div></div> 32%	<div><div></div></div> 36%	<div><div></div></div> 99%	<div><div></div></div> 29%	<div><div></div></div> 6%	<div><div></div></div> 2%	<div><div></div></div> 3%	<div><div></div></div> 13%
100	Guyana	<div><div></div></div> 5%	<div><div></div></div> 7%	<div><div></div></div> 26%	<div><div></div></div> 41%	<div><div></div></div> 4%	<div><div></div></div> 19%	<div><div></div></div> 66%	<div><div></div></div> 4%	<div><div></div></div> 6%	<div><div></div></div> 81%
101	Paraguay	<div><div></div></div> 16%	<div><div></div></div> 10%	<div><div></div></div> 61%	<div><div></div></div> 79%	<div><div></div></div> 79%	<div><div></div></div> 3%	<div><div></div></div> 4%	<div><div></div></div> 17%	<div><div></div></div> 13%	<div><div></div></div> 20%
104	Guatemala	<div><div></div></div> 26%	<div><div></div></div> 4%	<div><div></div></div> 18%	<div><div></div></div> 32%	<div><div></div></div> 83%	<div><div></div></div> 16%	<div><div></div></div> 1%	<div><div></div></div> 8%	<div><div></div></div> 4%	<div><div></div></div> 38%
105	Bolivia	<div><div></div></div> 7%	<div><div></div></div> 6%	<div><div></div></div> 37%	<div><div></div></div> 21%	<div><div></div></div> 92%	<div><div></div></div> 13%	<div><div></div></div> 2%	<div><div></div></div> 3%	<div><div></div></div> 12%	<div><div></div></div> 17%

Data Science

Venezuela, Uruguay, Argentina, and Costa Rica score the highest in Data Science skills in the region. This may be, in part, due to these countries having high concentrations of “tecnolatinas”—tech startups that have origins in the region. Tecnolatinas include companies like MercadoLibre, Despegar, and Globant in Argentina; dLocal, PedidosYa and ScannTech in Uruguay and OpenEnglish in Venezuela.⁷⁴ As of June 2020, more than 5 million Venezuelans had left their country due to ongoing political and economic crises,⁷⁵ yet pockets of data talent may remain in the roughly 200,000 learners that remain in the country.

Nearly all Latin American countries are top-performers in Data Analysis, and many also in Statistical Programming. This is partially driven by “nearshore” outsourcing trends, which has allowed US-based companies to outsource analytical programming work to Latin America while eliminating communications obstacles due to different time zones.⁷⁶

Mathematics skills are generally lacking across the region. These results align with other studies like the OECD’s PISA assessment, where the average math score for Latin American students was a Level 1, the lowest possible out of six. Experts say that one of the reasons for the poor math scores is the method of instruction that most Latin American students receive at school. Latin America and the Caribbean have large untapped potential for mathematical talent. A 2014 study by the International Mathematical Union found that better use of financial and human resources in the region, along with the strategic action of more developed countries, could have an important effect in the development of mathematics, underscoring a need for institutional collaboration to promote equity in math skills.⁷⁷

Skill Level

CUTTING-EDGE

COMPETITIVE

EMERGING

LAGGING

Global Rank		Data Analysis	Data Management	Data Visualization	Machine Learning	Mathematics	Probability & Statistics	Statistical Programming
40	Venezuela	94%	37%	22%	31%	38%	53%	96%
46	Uruguay	90%	30%	20%	53%	25%	44%	82%
48	Argentina	100%	31%	13%	38%	21%	26%	91%
50	Costa Rica	88%	40%	31%	40%	33%	33%	79%
56	Peru	95%	38%	11%	21%	22%	41%	92%
59	Colombia	93%	51%	16%	30%	13%	28%	88%
61	Ecuador	86%	11%	15%	12%	44%	50%	93%
62	Chile	96%	6%	8%	22%	17%	5%	98%
63	Trinidad and Tobago	63%	21%	18%	27%	49%	89%	65%
75	Puerto Rico	16%	29%	41%	38%	27%	38%	38%
77	Barbados	72%	99%	2%	5%	53%	100%	8%
78	El Salvador	96%	35%	17%	17%	10%	43%	28%

TRENDING SKILLS:

- Python Programming
- Statistical Machine Learning
- Data Management
- Probability & Statistics
- Machine Learning
- Machine Learning Algorithms
- Data Visualization Software
- Applied Machine Learning
- Big Data
- SQL

Global Rank		Data Analysis	Data Management	Data Visualization	Machine Learning	Mathematics	Probability & Statistics	Statistical Programming
80	Mexico	99%	7%	4%	6%	24%	72%	54%
83	Bolivia	97%	13%	7%	9%	26%	15%	69%
84	Brazil	6%	59%	38%	44%	18%	18%	44%
91	Honduras	98%	8%	14%	7%	13%	17%	32%
93	Dominican Republic	85%	13%	9%	20%	16%	13%	34%
94	Guatemala	87%	14%	6%	13%	15%	14%	33%
96	Nicaragua	89%	10%	5%	18%	9%	9%	31%
97	Paraguay	84%	5%	4%	13%	4%	6%	85%
101	Panama	88%	4%	21%	10%	8%	2%	39%
105	Saint Lucia	48%	92%	69%	2%	4%	3%	1%
107	Guyana	17%	3%	13%	4%	3%	1%	37%

EUROPE

A global skills leader facing talent shortages

14.2M

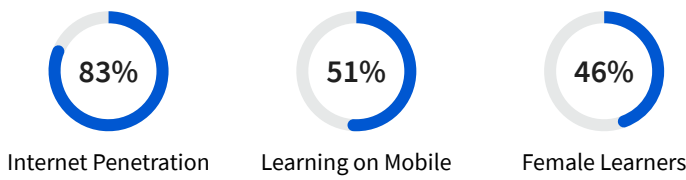
Coursera Learners

32

Median Age

4.9%

of GDP spent on Education



Europe enters its economic recovery in a position of strength in terms of skills. Nine out of the top 10 countries in this year’s overall rankings reside in Europe. These results are driven by particularly high scores in Technology and Data Science compared to other regions. Thirty-one out of the 35 countries in the region are in the top half globally in Technology, and 32 out of 35 in Data Science skills.

Nevertheless, Europe faces skill shortages of key digital talent pools compared to other regions. Over 70% of businesses in the region say that the lack of staff with adequate digital skills is an obstacle to investment.⁷⁸ Europe’s data science talent pool is around half that of the US, and retention is a challenge. Companies are losing skills overseas. Much of the AI talent coming into the European Union eventually ends up in the UK, revealing the significant competition within the region as various local players compete for the same talent pools.⁷⁹

There is also significant variation across the continent in the adoption of technology. For example, in the global automation race, Europe has the highest level worldwide, with 106 industrial robots per 10,000 employees installed in the manufacturing industry—Germany (3rd), Sweden (5th), Denmark (6th), Belgium (9th), and Italy (10th) all make the top 10. Yet the UK ranks 22nd worldwide with a density of 85 units per 10,000 employees, which is equivalent to the global average.⁸⁰

To emerge strongly in the economic recovery, there are a number of priorities for the region. In Western Europe, policymakers can invest in digital transformation skills related to IoT and manufacturing innovation. By 2023, Europe is expected to account for 25% of worldwide IoT spending. Manufacturing in the EU plays

a key role in research and innovation, being responsible for 64% of private sector research development expenditure and 49% of innovation expenditure in Europe.⁸¹ Investing in streamlining the regulatory environment for sustainability projects presents yet another opportunity. Forty-nine percent of the EU’s green recovery projects have barriers that are nonfinancial (regulatory, administrative, commercial, etc.).⁸² The digital transformation of regulatory systems is a huge opportunity across the continent.

In Eastern Europe, basic infrastructure and engineering skill investments offer high returns. Each percent of GDP spent on infrastructure, output could rise by 0.5 to 0.75% in the short run and by 2.0 to 2.5% in the long run.⁸³ Infrastructure in the region lags far behind Western Europe, with some 50% less electricity generation than that of the EU15, and there are significant gaps in internet adoption.⁸⁴ Promoting health could also have great dividends. Russia, for example, has one of the highest values for education and one of the lowest values for health in the region.⁸⁵ These foundational investments, and ensuring a skilled workforce is in place to support them, present great opportunities for the region.



Skill Level

CUTTING-EDGE COMPETITIVE EMERGING LAGGING

Global Rank			Business	Technology	Data Science
1	Switzerland	98%	84%	96%	
2	Luxembourg	100%	62%	85%	
3	Austria	95%	88%	95%	
5	Germany	91%	89%	94%	
6	Belgium	83%	86%	98%	
7	Sweden	89%	82%	96%	
8	Denmark	84%	87%	99%	
9	Russian Federation	79%	92%	97%	
11	Norway	96%	63%	88%	
12	Belarus	54%	99%	91%	
13	Czech Republic	62%	97%	90%	
14	Finland	63%	90%	100%	
15	Bulgaria	76%	95%	75%	
16	Italy	79%	91%	72%	
17	Netherlands	71%	79%	93%	
18	Hungary	55%	96%	84%	
21	Croatia	73%	83%	78%	
22	Greece	80%	73%	71%	

Global Rank			Business	Technology	Data Science
24	Latvia	68%	72%	77%	
27	Ukraine	36%	93%	82%	
28	France	61%	70%	79%	
30	Poland	52%	64%	76%	
31	Portugal	54%	80%	55%	
32	Spain	44%	59%	87%	
33	Serbia	43%	76%	68%	
34	Ireland	37%	79%	65%	
36	Estonia	67%	63%	59%	
47	Slovakia	46%	54%	66%	
48	Lithuania	45%	52%	63%	
49	Romania	30%	65%	62%	
51	United Kingdom	29%	57%	69%	
57	Armenia	71%	23%	60%	
60	Turkey	65%	47%	37%	
70	Georgia	72%	21%	39%	
72	Azerbaijan	93%	13%	24%	

Business

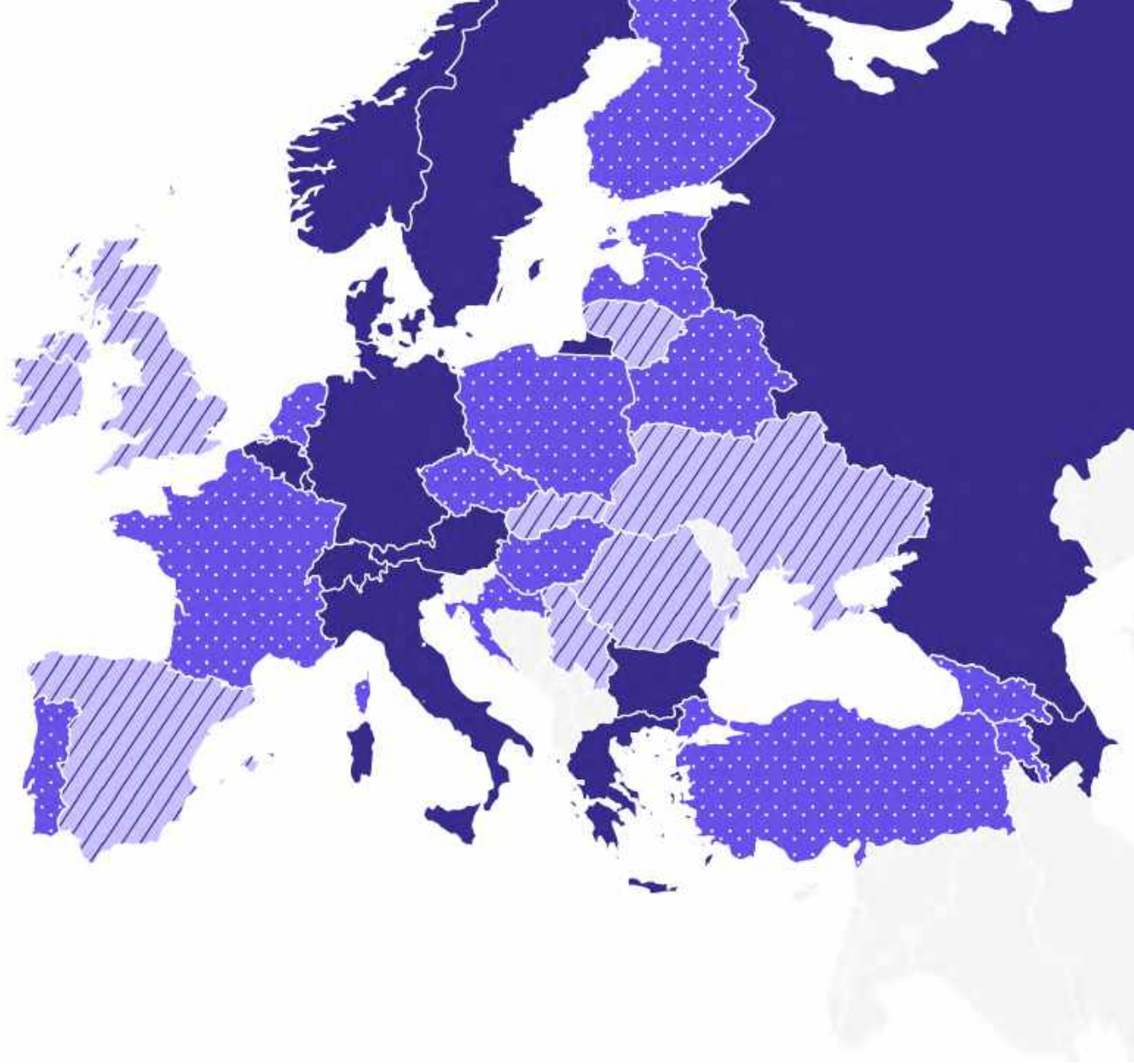
Outside of its traditional strength in Finance, the UK exhibits poor performance in many Business skills. Today, only 66% of working-age graduates in business-related subjects are in high-skilled employment. To address the gaps between employer needs and the skills of the workforce, the UK Government launched the Build Back Better Business Council—a new group which will see business leaders work directly with the government to fuel the COVID-19 economic recovery.⁸⁶

Eastern and Southern European countries generally underperform compared to Western European peers but show promise in specialities like HR. This may be partly explained by a historical underinvestment in developing professional and business sectors in economies that are heavily dependent on Tourism, like Greece (where 20.8% of GDP depends on Tourism), Portugal (16.5%) and Spain (14.3%).⁸⁷ However, some Eastern European countries—like Russia, Belarus, Ukraine, Estonia, and Lithuania—are top performers in HR. These countries continue to be top destinations for HR and back-office outsourcing.⁸⁷

The South Caucasus lead overall in Business. Azerbaijan, Armenia, and Georgia are global leaders in Business skills. In 2020, the Ministry of Labor and Social Protection of the Azerbaijan Republic and the United Nations Development Programme (UNDP) joined forces with Coursera to provide Workforce Recovery Initiative courses for 50,000 citizens.⁸⁸

TRENDING SKILLS:

- Strategy and Operations
- Microsoft Excel
- Project Management
- Marketing
- Digital Marketing
- Finance
- Data Analysis
- Leadership and Management
- Blockchain
- Human Resources



Skill Level

- CUTTING-EDGE
- COMPETITIVE
- EMERGING
- LAGGING

Global Rank		Accounting	Communications	Entrepreneurship	Finance	Human Resources	Leadership & Management	Marketing	Sales	Strategy & Operations
1	Luxembourg	88%	95%	97%	100%	84%	99%	89%	65%	98%
3	Switzerland	75%	83%	96%	99%	52%	94%	99%	96%	95%
4	Norway	61%	63%	91%	77%	72%	92%	98%	98%	94%
6	Austria	54%	87%	81%	97%	69%	89%	95%	86%	88%
8	Azerbaijan	70%	93%	89%	79%	96%	91%	46%	37%	88%
10	Germany	43%	73%	83%	88%	64%	85%	94%	92%	89%
12	Sweden	49%	72%	80%	73%	61%	87%	96%	97%	87%
18	Denmark	35%	60%	86%	72%	35%	86%	90%	96%	86%
19	Belgium	63%	61%	87%	93%	26%	88%	85%	79%	82%
22	Greece	59%	58%	67%	90%	75%	79%	87%	61%	63%
23	Italy	30%	78%	54%	95%	54%	75%	96%	57%	60%
24	Russia	10%	98%	36%	36%	100%	38%	74%	43%	45%
27	Bulgaria	36%	90%	48%	96%	71%	54%	76%	47%	54%
30	Croatia	32%	74%	51%	80%	80%	74%	93%	63%	66%
31	Georgia	53%	94%	60%	84%	71%	72%	78%	82%	15%
32	Netherlands	37%	64%	68%	76%	38%	77%	79%	85%	77%
33	Armenia	13%	96%	82%	62%	92%	60%	60%	24%	62%
36	Latvia	41%	42%	40%	69%	83%	51%	88%	84%	43%

Global Rank		Accounting	Communications	Entrepreneurship	Finance	Human Resources	Leadership & Management	Marketing	Sales	Strategy & Operations
37	Estonia	47%	31%	29%	94%	94%	41%	54%	46%	31%
39	Turkey	18%	63%	45%	67%	87%	58%	81%	63%	46%
42	Finland	31%	29%	22%	81%	46%	39%	82%	94%	83%
43	Czech Republic	24%	48%	34%	89%	73%	44%	70%	55%	41%
44	France	33%	33%	88%	87%	3%	82%	46%	40%	74%
49	Hungary	13%	75%	31%	91%	53%	43%	79%	58%	34%
50	Belarus	8%	96%	25%	50%	99%	22%	31%	23%	52%
51	Portugal	27%	47%	41%	98%	25%	49%	59%	36%	37%
53	Poland	20%	80%	26%	64%	59%	45%	71%	77%	33%
59	Slovakia	4%	34%	14%	86%	41%	29%	39%	38%	19%
61	Lithuania	15%	52%	16%	75%	79%	42%	62%	51%	36%
62	Spain	74%	36%	71%	71%	58%	28%	37%	29%	27%
63	Serbia	19%	66%	19%	55%	62%	37%	55%	33%	26%
69	Ireland	26%	26%	24%	83%	20%	36%	57%	49%	48%
70	Ukraine	4%	86%	21%	32%	97%	25%	28%	15%	24%
76	Romania	16%	39%	20%	54%	28%	32%	47%	48%	23%
77	United Kingdom	23%	21%	13%	85%	13%	33%	58%	50%	21%

Technology

European countries demonstrate particular strength in Software Engineering with nearly all countries ranking in the top half of the global rankings. The region continues to invest to maintain its leadership. The new Digital Europe Program (DEP) offers a budget of €600 million dedicated to developing advanced digital skills through new master’s programs and short-term specialized courses, and aims to expand the digital talent pool by around 256,000 people to deploy the latest technologies in businesses across Europe.⁸⁹

A number of countries have overtaken last year’s leader, Russia, on overall Technology performance by investing in Cloud Computing. Belarus, Finland, Serbia, Bulgaria, and Italy all significantly out-performed Russia on Cloud Computing to place in the top five. These countries are in a strong position to take advantage of the European Commission’s new €2 billion investment in common European data spaces such as the Connecting Europe Facility 2 (CEF2) program.⁹⁰

With the exception of a few mostly Eastern European countries, Mobile Development and Computer Networking are the weakest areas for most countries. This could mean that Western European nations do not see local demand for these skills, or depend on outsourcing partners in other countries for these talent pools.⁹¹

TRENDING SKILLS:

Theoretical Computer Science

C Programming

Programming Principles

Design and Product

JavaScript

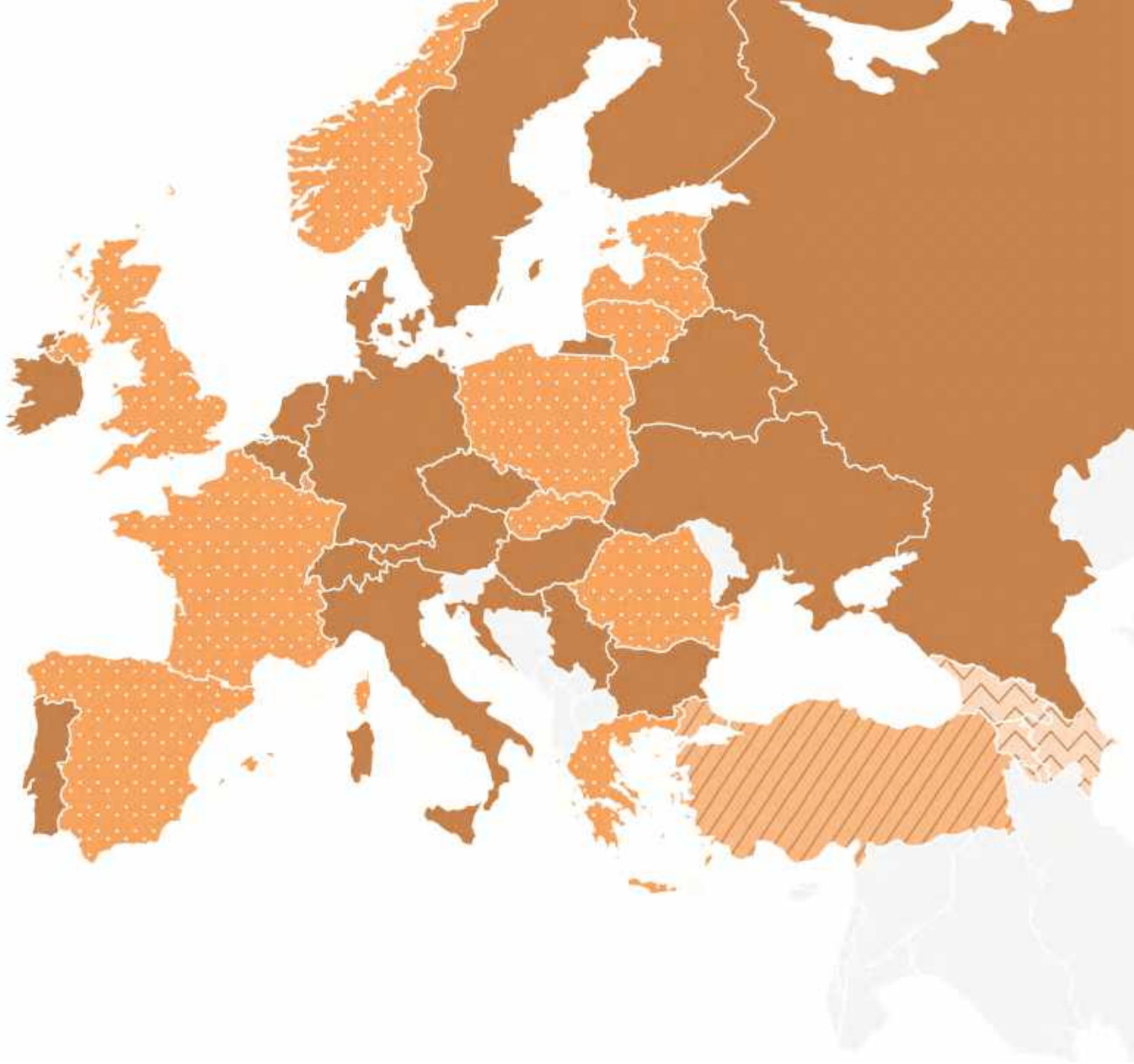
Computational Thinking

Mathematics

User Experience

MATLAB

HTML



Skill Level																					
		CUTTING-EDGE		COMPETITIVE		EMERGING		LAGGING													
Global Rank		Cloud Computing		Computer Networking		Computer Programming		Databases		Mobile Development		Operating Systems		Security Engineering		Software Engineering		Theoretical Computer Science		Web Development	
1		Belarus	88%	33%	98%	60%	97%	85%	11%	91%	94%	97%									
3		Czech Republic	71%	90%	84%	96%	76%	74%	90%	88%	88%	94%									
4		Hungary	65%	87%	67%	95%	69%	98%	91%	75%	86%	91%									
6		Bulgaria	81%	71%	78%	78%	86%	88%	68%	96%	98%	85%									
8		Ukraine	80%	59%	96%	90%	87%	66%	26%	79%	82%	87%									
9		Russia	22%	29%	100%	98%	95%	48%	12%	64%	79%	99%									
10		Italy	75%	57%	96%	34%	42%	87%	78%	100%	65%	50%									
11		Finland	95%	69%	82%	59%	75%	81%	46%	86%	96%	67%									
12		Germany	77%	44%	83%	80%	49%	95%	56%	95%	91%	88%									
14		Austria	66%	45%	79%	52%	45%	90%	65%	99%	78%	88%									
15		Denmark	61%	38%	73%	85%	80%	63%	84%	77%	87%	93%									
16		Belgium	76%	46%	71%	92%	71%	76%	63%	79%	83%	89%									
18		Switzerland	46%	16%	86%	97%	93%	86%	46%	94%	93%	82%									
19		Croatia	67%	79%	52%	89%	36%	89%	79%	71%	76%	70%									
20		Sweden	85%	54%	69%	54%	58%	84%	57%	90%	85%	75%									
22		Portugal	69%	76%	43%	88%	37%	92%	93%	80%	55%	72%									
23		Ireland	60%	72%	68%	57%	55%	60%	80%	97%	63%	59%									
24		Netherlands	79%	42%	62%	87%	38%	75%	72%	88%	77%	79%									

Data Science

Northern and Western Europe lead the globe in Data Science proficiency. Eight out of the top 10 countries across the globe in Data Science are in this region. The data economy’s value in the EU27 is predicted to increase to over €550 billion by 2025, representing 4% of the overall EU GDP.⁹²

The region is a global leader in Machine Learning, with Finland leading the way. Finland has been leading the way in AI education with a recent push by its government and the University of Helsinki to teach 1% of the world basic AI skills.⁹³

A number of countries stand out globally in one or two skills, despite lagging overall relative to European peers. Azerbaijan shows strengths in Data Analysis and Mathematics; Armenia and Romania do well in Mathematics; and Slovakia, Lithuania, and Serbia excel in Machine Learning and a number of complementary Data Science skills.

TRENDING SKILLS:

- Python Programming
- Statistical Machine Learning
- Probability & Statistics
- Machine Learning
- Machine Learning Algorithms
- Applied Machine Learning
- Data Management
- Econometrics
- SQL
- Probability Distribution

CASE STUDY:

Estonia
Amid the global pandemic, The Ministry of Social Affairs partnered with Coursera to upskill its citizens under the Coursera Workforce Recovery Initiative to further develop business, technology, data, and human skills across the country. Within a few hours of launch on day one, the Ministry of Social Affairs saw hundreds of learners signing up, and by the end of the program had trained 7% of Estonia’s entire national population or 1.2% of the national unemployed labor force.



Skill Level

- CUTTING-EDGE
- COMPETITIVE
- EMERGING
- LAGGING

Global Rank		Data Analysis	Data Management	Data Visualization	Machine Learning	Mathematics	Probability & Statistics	Statistical Programming
1	Finland	63%	96%	78%	100%	90%	99%	86%
2	Denmark	57%	72%	92%	95%	96%	93%	87%
3	Belgium	71%	85%	82%	96%	92%	96%	75%
4	Russia	2%	56%	42%	62%	99%	67%	100%
5	Sweden	43%	91%	88%	99%	82%	97%	80%
6	Switzerland	78%	80%	60%	88%	87%	98%	77%
7	Austria	73%	64%	86%	91%	88%	91%	89%
8	Germany	59%	90%	79%	97%	81%	90%	81%
9	Netherlands	71%	84%	84%	89%	78%	95%	76%
11	Belarus	3%	94%	45%	70%	94%	56%	99%
12	Czech Republic	75%	88%	43%	90%	91%	85%	72%
13	Norway	38%	87%	79%	98%	77%	94%	79%
15	Spain	91%	73%	40%	65%	48%	63%	90%
17	Luxembourg	92%	54%	58%	84%	50%	74%	73%
18	Hungary	52%	96%	71%	80%	84%	78%	61%
20	Ukraine	4%	89%	29%	73%	96%	55%	97%
24	France	29%	79%	39%	92%	74%	86%	71%
25	Croatia	54%	49%	96%	87%	65%	80%	63%

Global Rank		Data Analysis	Data Management	Data Visualization	Machine Learning	Mathematics	Probability & Statistics	Statistical Programming
26	Latvia	79%	69%	90%	63%	83%	49%	88%
27	Poland	21%	79%	54%	79%	80%	77%	84%
28	Bulgaria	40%	55%	37%	78%	97%	69%	55%
31	Italy	67%	100%	57%	71%	69%	71%	67%
32	Greece	74%	75%	56%	69%	73%	73%	48%
34	United Kingdom	46%	60%	64%	72%	79%	75%	52%
35	Serbia	13%	61%	44%	76%	86%	82%	59%
36	Slovakia	61%	76%	47%	81%	59%	62%	47%
37	Ireland	44%	98%	74%	64%	60%	61%	35%
39	Lithuania	33%	65%	61%	79%	63%	48%	56%
41	Romania	18%	53%	80%	67%	76%	65%	50%
43	Armenia	24%	50%	53%	54%	89%	40%	64%
44	Estonia	12%	62%	33%	75%	75%	58%	42%
47	Portugal	42%	57%	30%	60%	58%	51%	40%
65	Georgia	22%	28%	48%	46%	38%	21%	62%
68	Turkey	13%	48%	26%	55%	55%	29%	20%
82	Azerbaijan	76%	29%	34%	25%	70%	8%	22%

ASIA PACIFIC

A tale of two Asias

22.7M

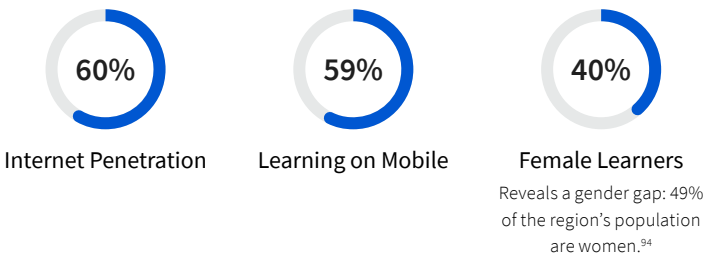
Coursera Learners

28

Median Age

4.3%

of GDP spent on Education



A stark contrast remains between developing and developed nations’ skills performance at a time when 81 million jobs were lost due to the pandemic.⁹⁵ East Asian countries such as Japan, China, Hong Kong, Taiwan, and Singapore demonstrate high proficiency across the three skill domains, whereas South and Central Asian countries rank near the bottom of the global rankings. These economies with lower skills performance were generally more impacted by COVID-19 and struggled more to deploy technologies to contain the pandemic. In 2020, Southern Asia’s economies lost 12.7% of working hours—nearly three times Eastern Asia’s losses of 4.2% and second only to Latin America and the Caribbean.⁹⁶

The differences in performance relate, in part, to urban-rural digital divides. The latest estimates show that 70% of urban households in the region have access to the internet, compared to only 36% of rural homes.⁹⁷ These rural homes are more likely to reside in areas where informal employment is more common. Currently, 1.3 billion of the world’s 2 billion informal workforce resides in Asia Pacific, and rural workers are twice as likely to work in informal arrangements.⁹⁸ Investments in computer literacy and other foundational skills training via mobile devices, which tend to be more widely adopted than computers, are a promising area for new government programs.⁹⁹

Only 40% of learners in the region are female, revealing a gap in access to online learning that corroborates other gender gaps in the region. Especially in South Asia, women receive lower pay and spend more time in unpaid care work than men. In India, four out of five women do not work.¹⁰⁰ Potential output by the middle of the decade could be some 5% lower than before the pandemic in the absence of policies that improve access to education and employment for women.¹⁰¹ The return on such investments is expected to be significant: studies across countries show that as a women’s share of the labor force increases by 10%, real wage growth increases by nearly 10%.¹⁰²

Beyond addressing these labor market challenges, the region has an opportunity to invest in skills that support a number of globally-leading sectors, such as e-commerce, logistics, and manufacturing. In the five years before the pandemic, Asia Pacific generated about three-quarters of global retail growth and two-thirds of online growth. Retail is leapfrogging development stages that the US and Europe once toiled through, and executives are exploring cutting-edge e-commerce questions, such as how to optimize online experiences, or apply Artificial Intelligence to optimize targeting and pricing. Such advancements are expected to move along with the upskilling of the IT services sector, in which countries like India and the Philippines have historically shown global leadership.¹⁰³

Engineering skills—particularly those that relate to improving supply chains—could support the vast logistics infrastructure investments taking place across the region. By 2030, 12 of the top 15 global trade lanes will involve Asian countries, and many of the top trade lanes already involve major regional players like China, Japan, India, and Vietnam.¹⁰⁴

Transforming the manufacturing sector by accelerating the adoption of digital skills presets yet another opportunity. Over 6 billion new IoT connections are expected to come online in Asia Pacific by 2025—accounting for half of all global additions.¹⁰⁵ Most ASEAN countries have been slow to adopt Industry 4.0 technologies but some—including Singapore, Thailand, and Vietnam—have drafted plans for encouraging manufacturers to adopt Industry 4.0 technologies.¹⁰⁶ Otherwise, there has been scant progress in implementing these road maps. In contrast, China and India have been faster to draw the benefits of Industry 4.0. The Chinese government included implementation guidelines in its “Made in China 2025” strategy, and the Indian government is working on a National Policy for Advanced Manufacturing.¹⁰⁷



Skill Level											
CUTTING-EDGE			COMPETITIVE			EMERGING			LAGGING		

ASIA PACIFIC

Business

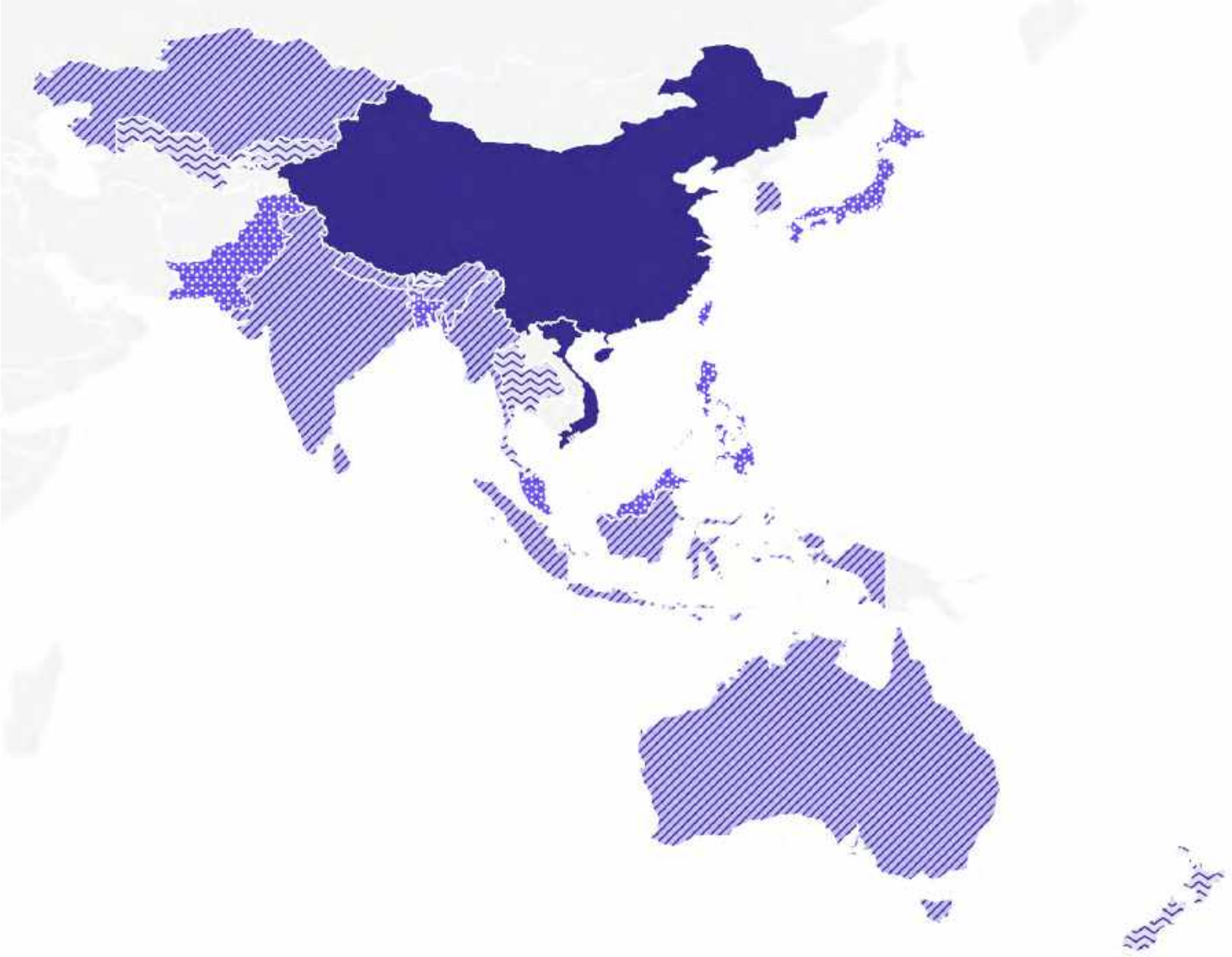
Vietnam is the overall leader. This result is driven by strong scores in Communication, Entrepreneurship, Leadership and Management, and Strategy and Operations. Vietnam was among the most resilient economies in the region in 2020 and one of the few to not face a single quarter of contraction. Vietnam has also been a major beneficiary of the supply chain relocation trend out of China over the past several years.¹⁰⁸

China, Hong Kong, and Singapore maintain their position as regional Finance hubs. The trio tops the region in Finance skill proficiency. All three also continue to score high on other measures of finance-sector leadership, such as business environment, reputation, and availability of talent.¹⁰⁹

Australia and New Zealand lag behind other countries in the region. In recent years, Australia and New Zealand have fallen behind the rest of the Asia Pacific region when it comes to business agility, tech skills, and communications infrastructure.¹¹⁰

TRENDING SKILLS:

- Strategy and Operations
- Microsoft Excel
- Digital Marketing
- Data Analysis
- Finance
- Project Management
- Marketing
- Blockchain
- Tableau Software
- Leadership and Management



Skill Level									
CUTTING-EDGE									
COMPETITIVE									
EMERGING									
LAGGING									
Global Rank	Accounting	Communications	Entrepreneurship	Finance	Human Resources	Leadership & Management	Marketing	Sales	Strategy & Operations
14	11%	99%	100%	35%	31%	98%	43%	66%	99%
16	67%	70%	75%	96%	85%	73%	80%	73%	59%
17	80%	85%	76%	88%	93%	71%	67%	52%	38%
28	54%	57%	85%	92%	49%	66%	92%	68%	61%
34	45%	88%	66%	66%	88%	50%	53%	72%	56%
41	57%	89%	38%	63%	33%	47%	72%	67%	50%
46	34%	76%	95%	51%	40%	69%	41%	64%	68%
48	66%	84%	65%	43%	50%	54%	32%	34%	78%
52	79%	65%	62%	71%	13%	53%	64%	41%	28%
54	44%	82%	71%	28%	42%	56%	48%	35%	65%
55	28%	77%	58%	70%	12%	59%	49%	44%	49%
56	52%	54%	33%	48%	91%	34%	51%	53%	10%

Global Rank	Accounting	Communications	Entrepreneurship	Finance	Human Resources	Leadership & Management	Marketing	Sales	Strategy & Operations
60	46%	45%	61%	46%	32%	46%	63%	60%	38%
64	22%	59%	52%	21%	29%	76%	29%	59%	69%
71	3%	91%	79%	12%	55%	63%	38%	90%	44%
72	14%	92%	15%	25%	96%	27%	14%	27%	29%
73	21%	79%	63%	33%	56%	46%	19%	25%	46%
75	40%	22%	13%	65%	19%	35%	50%	54%	42%
82	42%	6%	5%	56%	17%	30%	42%	54%	57%
83	2%	50%	29%	8%	95%	17%	26%	76%	25%
88	9%	32%	50%	45%	16%	29%	45%	32%	17%
89	29%	10%	38%	63%	4%	24%	21%	71%	4%
105	6%	13%	3%	13%	90%	5%	5%	3%	2%

Technology

Japan is the world leader in Technology skills. Japan has long been a leader in industrial automation and robotics,¹¹¹ and has recently made significant investments in accelerating the commercialization of quantum computing with initiatives like the Quantum Innovation Initiative Consortium.¹¹² Nevertheless, regional peers like Singapore and Vietnam show up strongly in our rankings and present increased competition.

Indonesia stands out in Cloud Computing. As one of the largest markets in the region, global technology firms have made significant investments in Indonesia in recent years, including an early expansion from Alibaba Cloud; Amazon Web Services (AWS) recently unveiling plans to build data centres in the country by early 2022; Microsoft opening a development center; and, Google Cloud Platform (GCP) adding their presence last year.¹¹³

China lags overall in Technology skills, despite top ranks in specialties like Databases and Theoretical Computer Science. A comparative study of undergraduate seniors in computer science found that Chinese students scored below US undergraduates, but roughly in line with students in India and Russia.¹¹⁴ This may explain some of the gaps in areas like Web Development, Computer Networking, and Cloud Computing.

TRENDING SKILLS:

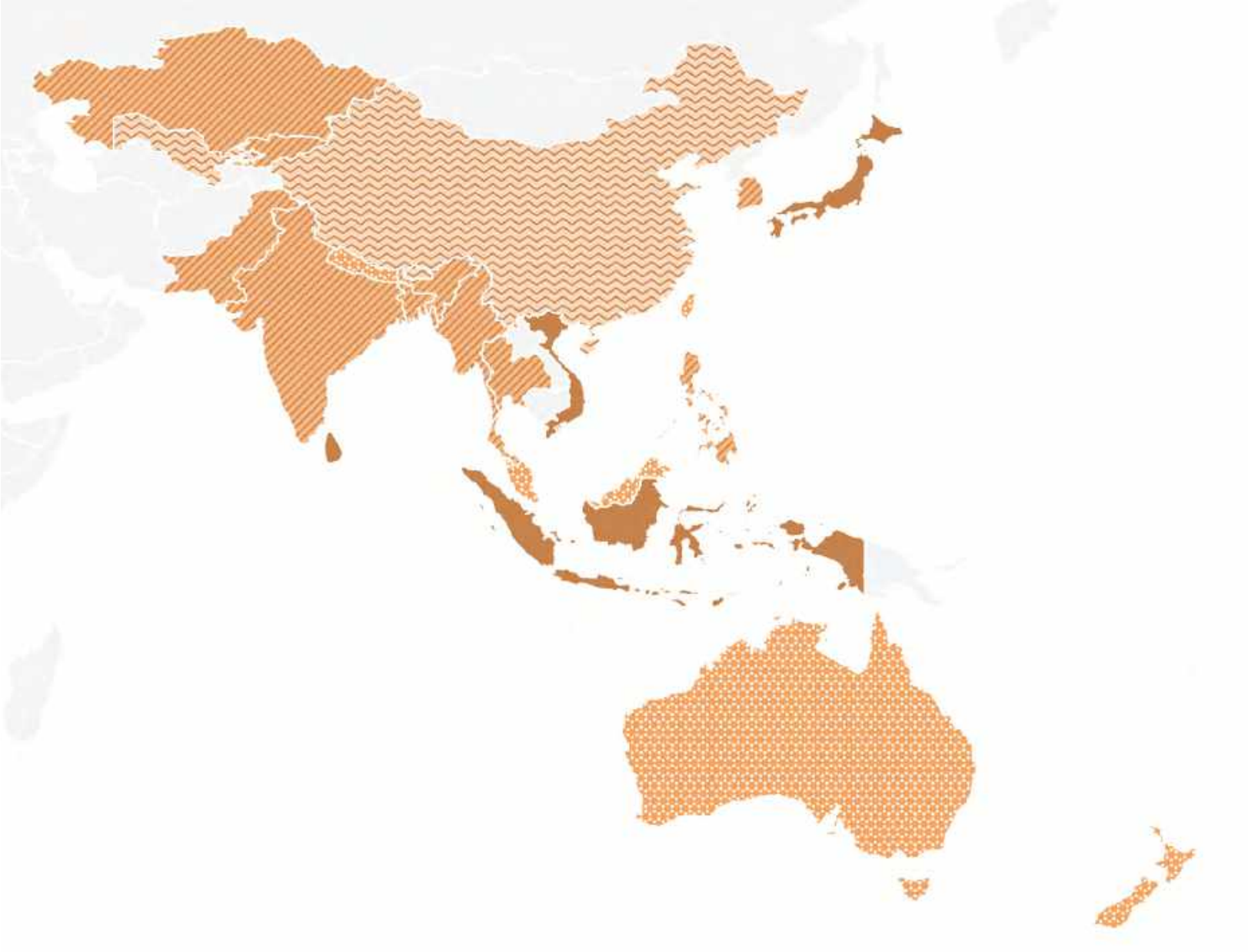
- Theoretical Computer Science
- C Programming
- Programming Principles
- Data Structures
- Web Development
- Design and Product
- Computational Thinking
- Microarchitecture
- JavaScript
- Internet of Things

CASE STUDY:

Philippines

Department of Science & Technology (DOST)

The Department of Science and Technology in the Philippines partnered with Coursera to train thousands of Filipino citizens in cutting-edge technology skills, including data science, cybersecurity, and Python. The first program boasted a completion rate of 88%. The partnership grew in light of the pandemic to train 75,000 learners. To date, government employees and citizens have completed 1.3 million learning hours and provided an average rating of 4.9/5.



Skill Level

- CUTTING-EDGE
- COMPETITIVE
- EMERGING
- LAGGING

Global Rank		Cloud Computing	Computer Networking	Computer Programming	Databases	Mobile Development	Operating Systems	Security Engineering	Software Engineering	Theoretical Computer Science	Web Development
1	Japan	99%	96%	81%	46%	26%	40%	28%	74%	97%	78%
5	Singapore	96%	96%	56%	74%	59%	79%	82%	66%	84%	71%
13	Vietnam	74%	99%	49%	71%	71%	57%	38%	89%	74%	63%
17	Sri Lanka	97%	97%	38%	38%	46%	73%	88%	40%	53%	53%
25	Indonesia	100%	82%	34%	42%	40%	15%	44%	49%	23%	92%
33	Taiwan	88%	52%	85%	44%	77%	25%	39%	54%	89%	96%
36	New Zealand	73%	84%	46%	56%	16%	62%	85%	72%	61%	49%
44	Australia	79%	55%	59%	55%	34%	54%	70%	67%	58%	35%
48	Malaysia	91%	61%	31%	65%	25%	42%	69%	48%	46%	64%
52	Nepal	92%	68%	25%	13%	23%	71%	89%	25%	49%	58%
54	Hong Kong	71%	20%	54%	53%	60%	21%	30%	46%	92%	65%
55	Pakistan	86%	88%	12%	35%	29%	39%	73%	38%	26%	84%

Global Rank		Cloud Computing	Computer Networking	Computer Programming	Databases	Mobile Development	Operating Systems	Security Engineering	Software Engineering	Theoretical Computer Science	Web Development
63	Myanmar	94%	93%	6%	8%	21%	51%	67%	35%	31%	7%
65	Thailand	96%	51%	30%	62%	21%	22%	29%	32%	50%	56%
66	India	83%	43%	16%	28%	14%	58%	34%	55%	54%	34%
67	Bangladesh	93%	88%	13%	26%	11%	34%	45%	22%	29%	40%
68	Republic of Korea	52%	25%	51%	18%	41%	18%	17%	47%	70%	74%
69	Kazakhstan	10%	58%	95%	51%	68%	67%	22%	23%	44%	54%
75	Kyrgyzstan	38%	21%	93%	39%	66%	54%	20%	30%	42%	24%
77	Philippines	82%	75%	13%	22%	10%	38%	37%	33%	11%	12%
85	China	25%	1%	60%	96%	31%	5%	27%	27%	96%	14%
93	Bhutan	2%	54%	2%	3%	13%	28%	98%	10%	68%	6%
102	Uzbekistan	18%	21%	88%	13%	12%	2%	4%	18%	21%	4%

Data Science

Japan leads the region in Data Science. Data skills present a unique opportunity for Japan, which has a national healthcare system that is a treasure trove of data. Aging demographics and rising healthcare costs also support the business case for further investments in the digital transformation of healthcare.¹¹⁵

Asia Pacific countries that have invested heavily in national AI programs perform well. These include China who aims to build a domestic AI industry worth nearly \$150 billion in the next few years and to become the leading AI power by 2030, and Singapore whose National AI Strategy aims to invest \$150 million over five years.¹¹⁶

Central Asia lags the rest of Asia Pacific in Data Science skills. Governments around the region have started to earmark budgets to address these gaps. For example, Kazakhstan is investing in the implementation of the “Digital Silk Way” to improve its high-speed and security infrastructure for the transfer, storage, and processing of data.¹¹⁷

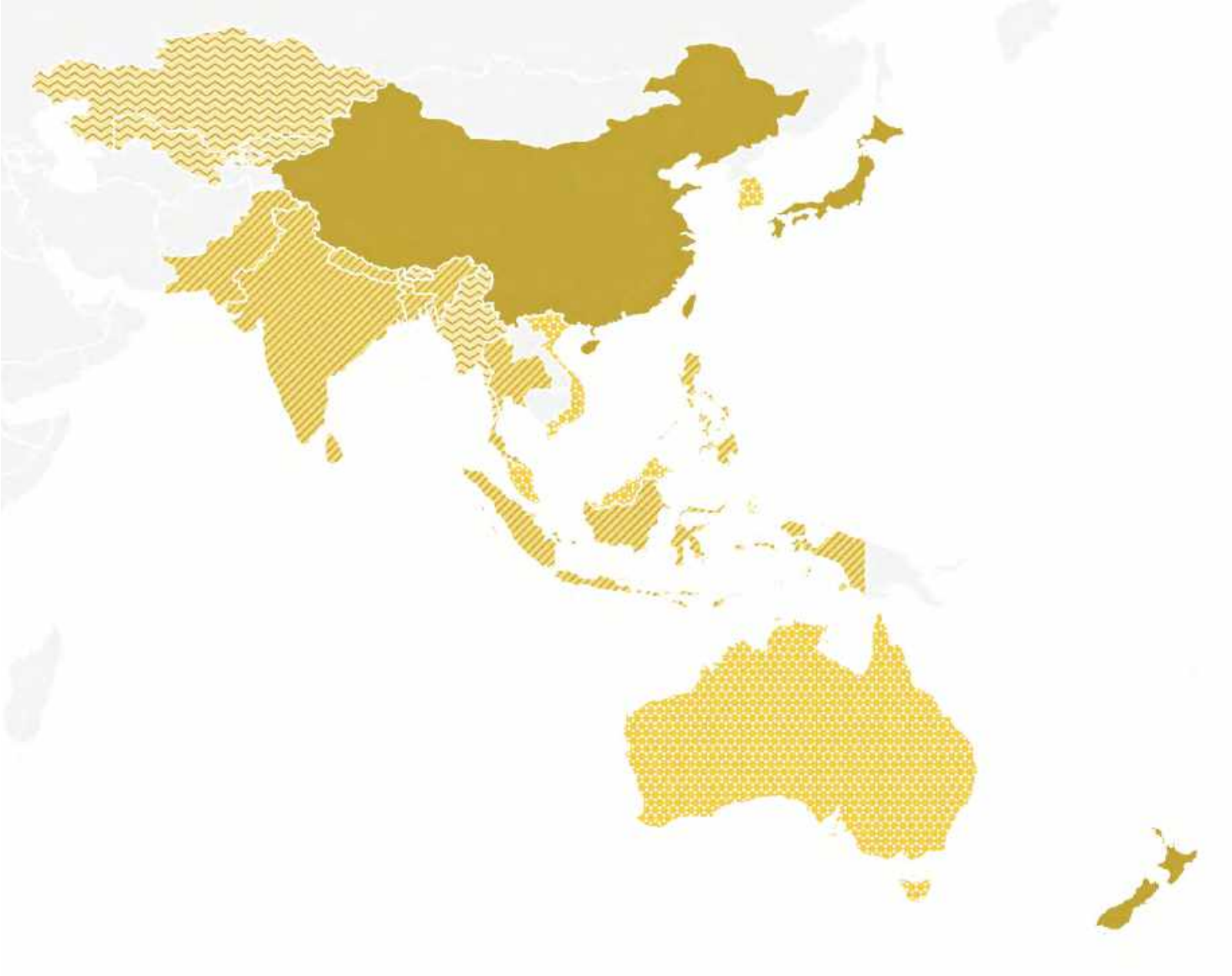
TRENDING SKILLS:

- Python Programming
- Statistical Machine Learning
- Machine Learning
- Probability & Statistics
- Machine Learning Algorithms
- Applied Machine Learning
- Data Management
- Econometrics
- Deep Learning
- SQL

CASE STUDY:

**Pakistan
Higher Education Commission (HEC)**

HEC, an independent, autonomous, and constitutionally established institution of primary funding, overseeing, regulating, and accrediting the higher education efforts in Pakistan, partnered with Coursera to build a learning program that provides job skills to Pakistani students. The program consists of a variety of job-related learning paths such as data analytics, computer science, and cybersecurity. Over 8,000 citizens signed up the first week of launch, filling all available spots—with a waiting list of over 24,000 within two weeks. Together, HEC and Coursera plan to create 20 additional job-related learning pathways for students, in addition to an open catalog of 1,200 courses.



Skill Level

- CUTTING-EDGE
- COMPETITIVE
- EMERGING
- LAGGING

Global Rank		Data Analysis	Data Management	Data Visualization	Machine Learning	Mathematics	Probability & Statistics	Statistical Programming
10	Hong Kong	58%	71%	96%	88%	98%	87%	70%
14	Japan	26%	71%	63%	96%	93%	96%	83%
16	Singapore	77%	93%	77%	82%	79%	81%	66%
19	Taiwan	41%	83%	46%	83%	88%	79%	74%
21	China	35%	86%	72%	86%	95%	92%	41%
23	New Zealand	80%	70%	98%	66%	64%	70%	63%
29	Australia	83%	97%	88%	61%	67%	60%	46%
42	Vietnam	66%	81%	36%	56%	71%	54%	43%
45	Republic of Korea	7%	45%	32%	85%	71%	71%	68%
51	Malaysia	79%	67%	59%	50%	46%	42%	29%
53	Nepal	31%	15%	97%	54%	52%	64%	38%
54	Sri Lanka	21%	41%	49%	63%	57%	54%	24%

Global Rank		Data Analysis	Data Management	Data Visualization	Machine Learning	Mathematics	Probability & Statistics	Statistical Programming
57	Indonesia	69%	66%	46%	48%	35%	24%	45%
58	Thailand	39%	63%	19%	57%	51%	36%	36%
60	Philippines	9%	25%	10%	14%	100%	84%	71%
66	India	25%	43%	38%	52%	54%	34%	15%
67	Bangladesh	60%	38%	65%	35%	41%	46%	23%
76	Pakistan	49%	36%	50%	37%	32%	31%	16%
86	Kyrgyzstan	1%	21%	12%	42%	29%	11%	94%
87	Kazakhstan	11%	32%	3%	16%	66%	12%	95%
92	Myanmar	64%	34%	21%	28%	37%	23%	5%
99	Uzbekistan	4%	18%	1%	26%	28%	4%	96%
106	Bhutan	8%	2%	24%	3%	7%	10%	30%

MIDDLE EAST & NORTH AFRICA

Seeking greater diversification and global integration

4.2M

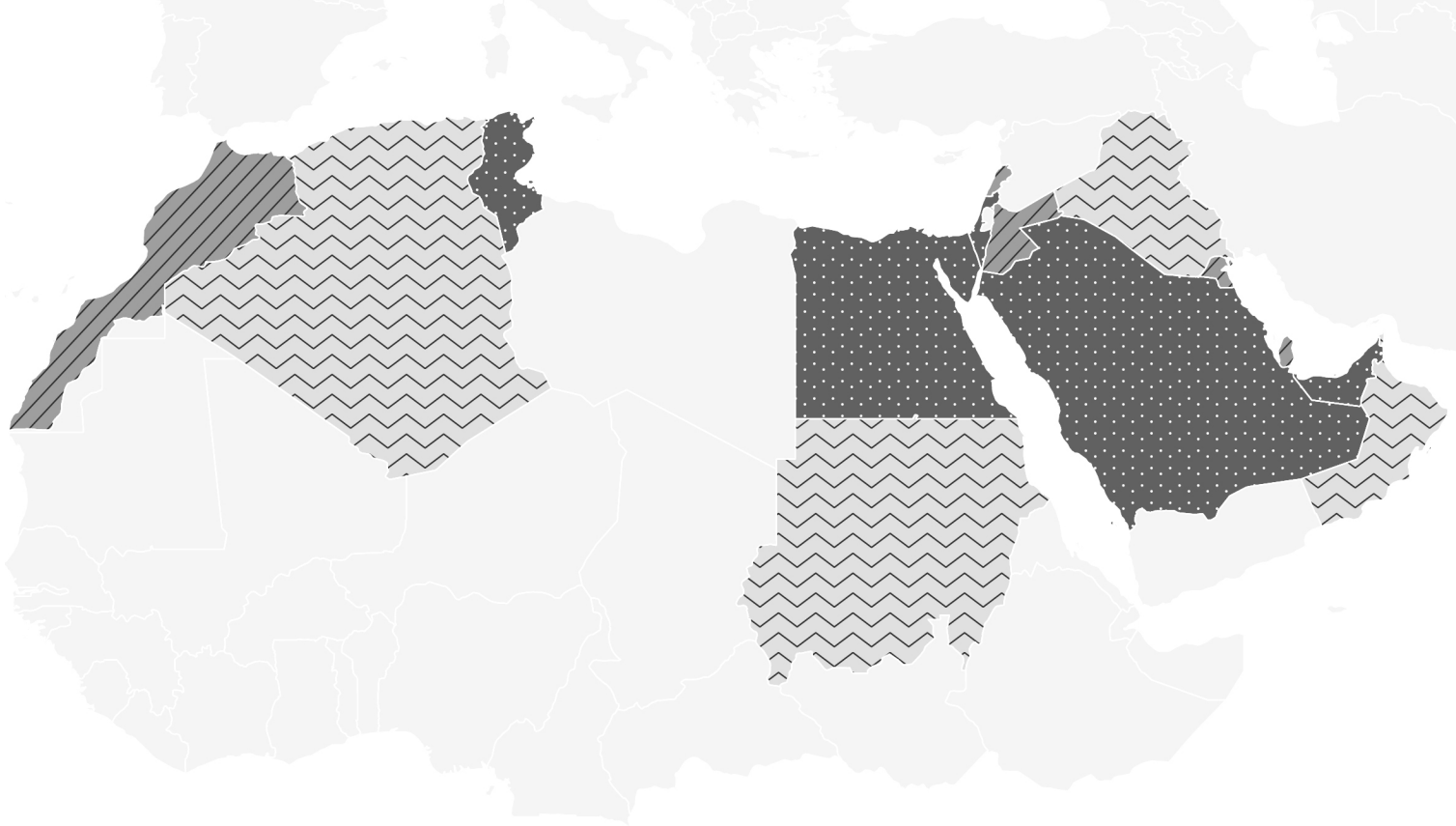
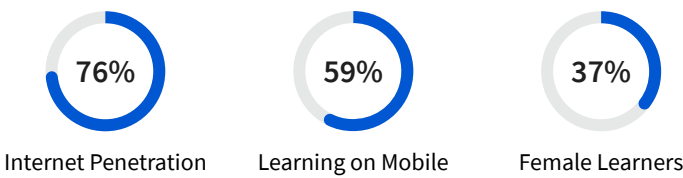
Coursera Learners

30

Median Age

4.5%

of GDP spent on Education



The Middle East and North Africa is home to a number of global skill leaders, as well as some emerging players. Israel and UAE lead the region in skills performance, but they follow different formulas. Israel is strong in Technology and Data Science, whereas the UAE is the regional Business leader, but lags in Technology and Data Science skills. Other top-performing countries in the region—like Saudi Arabia, Lebanon, Kuwait, and Qatar—follow this pattern of performing well in Business but lagging in Technology and Data Science.

Digital skills development will be a critical ingredient in tackling a number of pressing challenges. GDP in the region could remain below pre-crisis trends for a decade due to insufficient diversification and poor integration in global value chains.¹¹⁸ This underscores the need to develop the skills that will help internationalize local industry and modernize government services.

One example of this is the digital transformation of trade activities. On average, it costs \$442 dollars and 53 hours to comply with border requirements to export goods in MENA.¹¹⁹ The region is also one of the most restrictive regions regarding trade in services.¹²⁰ Automation technologies supported by a workforce with expertise in areas like software engineering offer great promise to tackle such challenges.

Improving labor force participation of women and youth is another opportunity. Only 37% of learners in the region are women. Though female education has recently risen with fewer schooling gaps between the younger generations of men and women, MENA's average female labor force participation rate remains about 20%, or half the global average of 47%.¹²¹ Across the region, women also earn on average nearly 79% less than men on a per capita basis.¹²² The proportion of youth (15-24) not in employment nor in education or training (NEET) has also increased for both young women and men since at least 2012.¹²³ In 2020, the rate in the region was estimated at 34.3%, compared to a global rate of 22.3%.¹²⁴

The era ahead offers much opportunity for the young, fast-developing nations of the region. By 2050 more than 300 million young people will be coming onto the job market in MENA—a potential addition to the workforce not much smaller than the region's total population today. This means that, between now and then, MENA needs to create 10 million jobs a year to keep pace with the number of new labor market entrants. The skills development systems of MENA will need to be in a constant state of innovation to keep up and ensure that the region's future economy is more global, inclusive, and resilient.¹²⁵

Skill Level			
● CUTTING-EDGE ● COMPETITIVE ● EMERGING ● LAGGING			
Global Rank			
	Business	Technology	Data Science
● 35 United Arab Emirates	● 99%	● 33%	● 34%
● 38 Israel	● 25%	● 74%	● 80%
● 43 Tunisia	● 48%	● 77%	● 48%
● 52 Saudi Arabia	● 88%	● 54%	● 18%
● 53 Egypt	● 58%	● 44%	● 54%
● 54 Kuwait	● 81%	● 43%	● 32%
● 56 Qatar	● 82%	● 45%	● 27%
● 59 Lebanon	● 90%	● 32%	● 33%
● 71 Jordan	● 74%	● 28%	● 25%
● 75 Morocco	● 39%	● 35%	● 36%
● 87 Sudan	● 28%	● 26%	● 17%
● 88 Oman	● 38%	● 24%	● 10%
● 95 Algeria	● 4%	● 31%	● 21%
● 103 Iraq	● 26%	● 3%	● 6%

Business

The UAE is among the world’s top performers in Business, with particular strength in Entrepreneurship. The UAE has also long been a pioneer in the region for ease of doing business, ranking top in the Middle East and 16th globally in the World Bank’s latest Ease of Doing Business Index.¹²⁶ The UAE government has also expanded its commitment to supporting tech entrepreneurship through initiatives like the Khalifa Fund & Dubai Future Foundation, which complements growing private sector and independent initiatives like Hub71—a community of over 100 technology startups.¹²⁷

Saudi Arabia is heavily investing in innovation. Through programs like Vision 2030 and Project HQ, Saudi Arabia is offering incentives such as tax breaks to corporations that move their regional headquarters to the Kingdom. A group of 24 international firms including Deloitte, PwC, Bechtel, and PepsiCo recently announced they would sign on to the program.¹²⁸

Despite its strengths in Data Science and Technology, Israel ranks lower than regional peers in Business skills. These gaps may be explained by a lack of on-the-job training from local employers. In recent years, Israeli employers have voiced concern about the inadequacy of vocational skills available locally. There is generally less vocational and work-based training available in Israel than in many other OECD countries.¹²⁹

TRENDING SKILLS:

Strategy and Operations

Microsoft Excel

Digital Marketing

Marketing

Project Management

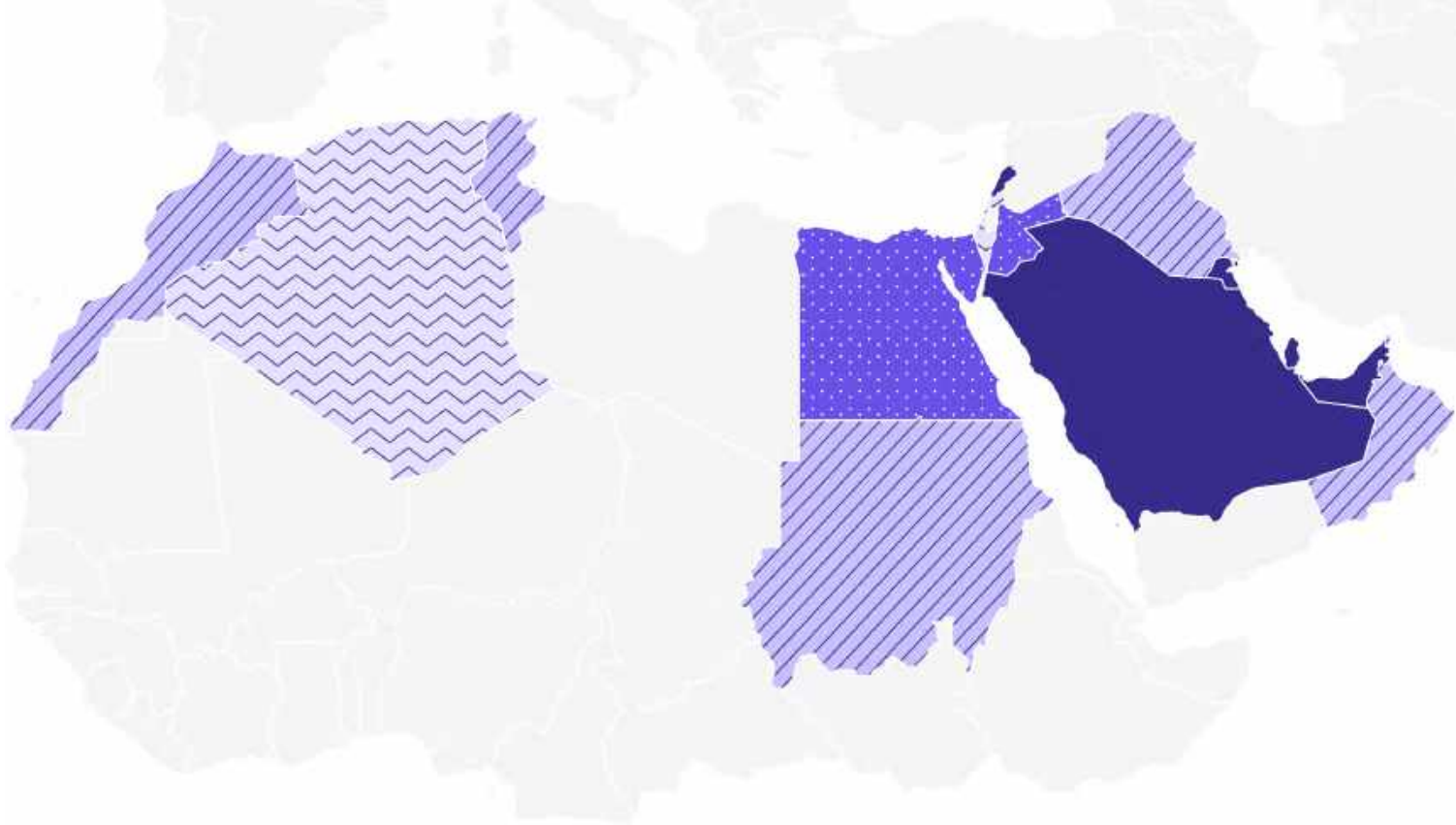
Human Resources

Leadership and Management

Data Analysis

Finance

Accounting



Skill Level										
CUTTING-EDGE										
COMPETITIVE										
EMERGING										
LAGGING										
Global Rank										
Accounting										
Communications										
Entrepreneurship										
Finance										
Human Resources										
Leadership & Management										
Marketing										
Sales										
Strategy & Operations										
2	United Arab Emirates	83%	100%	99%	68%	74%	100%	91%	95%	97%
11	Lebanon	76%	71%	90%	82%	37%	84%	88%	83%	84%
13	Saudi Arabia	55%	68%	92%	49%	76%	97%	69%	88%	91%
20	Qatar	85%	53%	74%	52%	66%	79%	73%	71%	92%
21	Kuwait	89%	55%	84%	79%	65%	80%	54%	69%	81%
29	Jordan	94%	41%	63%	46%	78%	78%	52%	70%	70%
47	Egypt	51%	88%	59%	16%	88%	70%	44%	45%	71%
57	Tunisia	17%	71%	69%	29%	77%	61%	9%	17%	79%
66	Morocco	12%	67%	46%	38%	63%	63%	27%	28%	75%
67	Oman	48%	35%	64%	39%	43%	55%	20%	42%	67%
79	Sudan	38%	44%	23%	7%	29%	57%	21%	39%	90%
80	Iraq	5%	81%	49%	4%	98%	48%	3%	16%	22%
81	Israel	21%	30%	9%	74%	68%	21%	36%	29%	13%
104	Algeria	1%	40%	4%	6%	48%	12%	12%	13%	18%

Technology

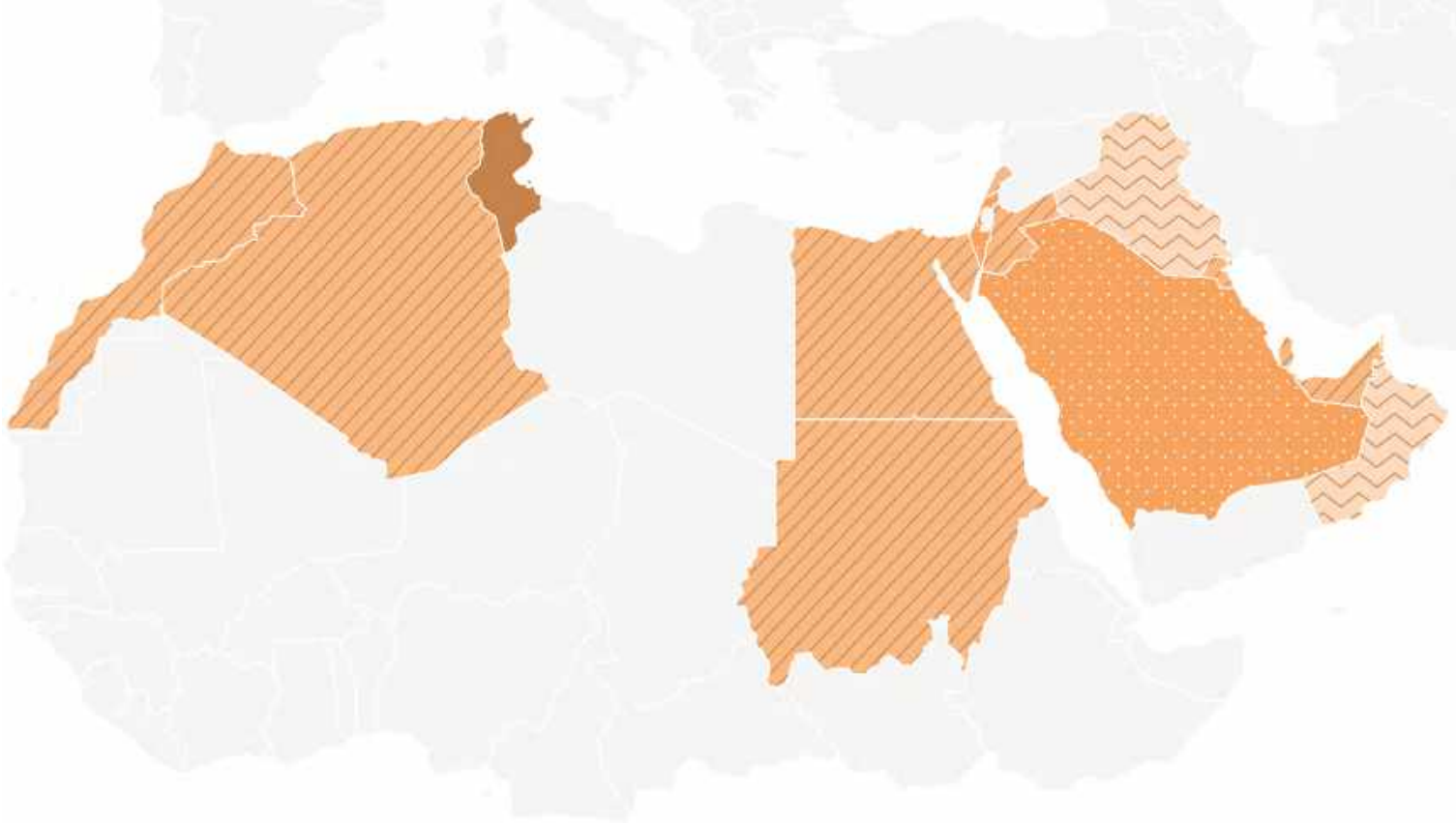
MENA demonstrates particular strength in Security Engineering, with nearly all countries ranking in the top half globally. Many governments in the region have made cybersecurity a high priority, with new initiatives and organizations such as Saudi Arabia’s National Cyber Security Authority, Egypt’s High Council for Cybersecurity, the UAE’s National Electronic Security Agency, and Oman’s Arab Region Cybersecurity Centre.¹³⁰

Israel defies the regional lag in Technology. The local government routinely spends northward of 4% of its GDP on research and development (the US spends about 2.8% for comparison).¹³¹ This contributes to a vibrant “Silicon Wadi”—Israel’s startup ecosystem—which routinely generates world-class startups in areas like artificial intelligence and cybersecurity.¹³²

Tunisia is the top performer in Northern Africa. Major innovation-enabling regulatory improvements have also taken place in Tunisia in the past few years. In 2018, the government passed the Startup Act, a legal framework designed to spur innovation demand and foster entrepreneurship with a broader vision to develop the country into a “Startup Nation” at the crossroads of the Mediterranean, MENA, and sub-Saharan Africa. To date, close to 400 ventures have received the Startup Label across a wide range of industries and it’s now one of the top countries in the region in venture capital investments.¹³³

TRENDING SKILLS:

- Theoretical Computer Science
- C Programming
- Programming Principles
- Design and Product
- Adobe Photoshop
- Computational Thinking
- Graphic Design
- Web Development
- JavaScript
- Microarchitecture



Skill Level											
CUTTING-EDGE											
COMPETITIVE											
EMERGING											
LAGGING											
Global Rank											
Cloud Computing											
Computer Networking											
Computer Programming											
Databases											
Mobile Development											
Operating Systems											
Security Engineering											
Software Engineering											
Theoretical Computer Science											
Web Development											
26	Tunisia	62%	91%	45%	82%	88%	88%	61%	78%	52%	43%
29	Israel	49%	48%	72%	81%	24%	70%	87%	69%	95%	47%
50	Saudi Arabia	13%	78%	14%	37%	8%	100%	100%	52%	41%	4%
60	Qatar	32%	79%	22%	20%	57%	69%	81%	53%	38%	26%
61	Egypt	8%	41%	29%	33%	96%	27%	54%	70%	57%	63%
62	Kuwait	13%	34%	19%	75%	47%	82%	92%	63%	56%	29%
70	Morocco	34%	50%	23%	17%	63%	29%	38%	36%	47%	44%
72	United Arab Emirates	21%	53%	10%	29%	15%	63%	77%	59%	28%	60%
73	Lebanon	27%	63%	21%	25%	19%	36%	36%	45%	43%	62%
74	Algeria	50%	64%	29%	14%	32%	23%	60%	16%	38%	45%
78	Jordan	14%	23%	15%	6%	13%	20%	95%	44%	45%	33%
80	Sudan	4%	85%	7%	69%	88%	44%	96%	31%	17%	8%
82	Oman	31%	17%	9%	63%	5%	91%	88%	21%	34%	21%
106	Iraq	6%	22%	5%	1%	4%	4%	23%	7%	16%	1%

Data Science

Data Visualization may be an under-tapped strength for the region, particularly in Northern Africa. Egypt, Morocco, and Algeria are all globally competitive in these skills. The global data visualization market was valued at \$2.99 billion in 2020 and expected to reach \$5.17 billion by 2026.¹³⁴

Data Science and Statistical Programming are generally lagging for the region. These skills are associated with some of the fastest growing jobs in the region between 2018 and 2022—data scientists and data analysts. A lack of university programs in these specialties, outdated curricula, and talent attraction challenges have resulted in gaps for these talent pools.¹³⁵

Israel defies the regional lag in Data Science and continues investing to become a global Artificial Intelligence leader. In 2020, Israel ranked behind only the US, China, and the UK in terms of private investment in Artificial Intelligence. It’s also a global leader in the applications of AI technologies in industries like Education and Manufacturing.¹³⁶

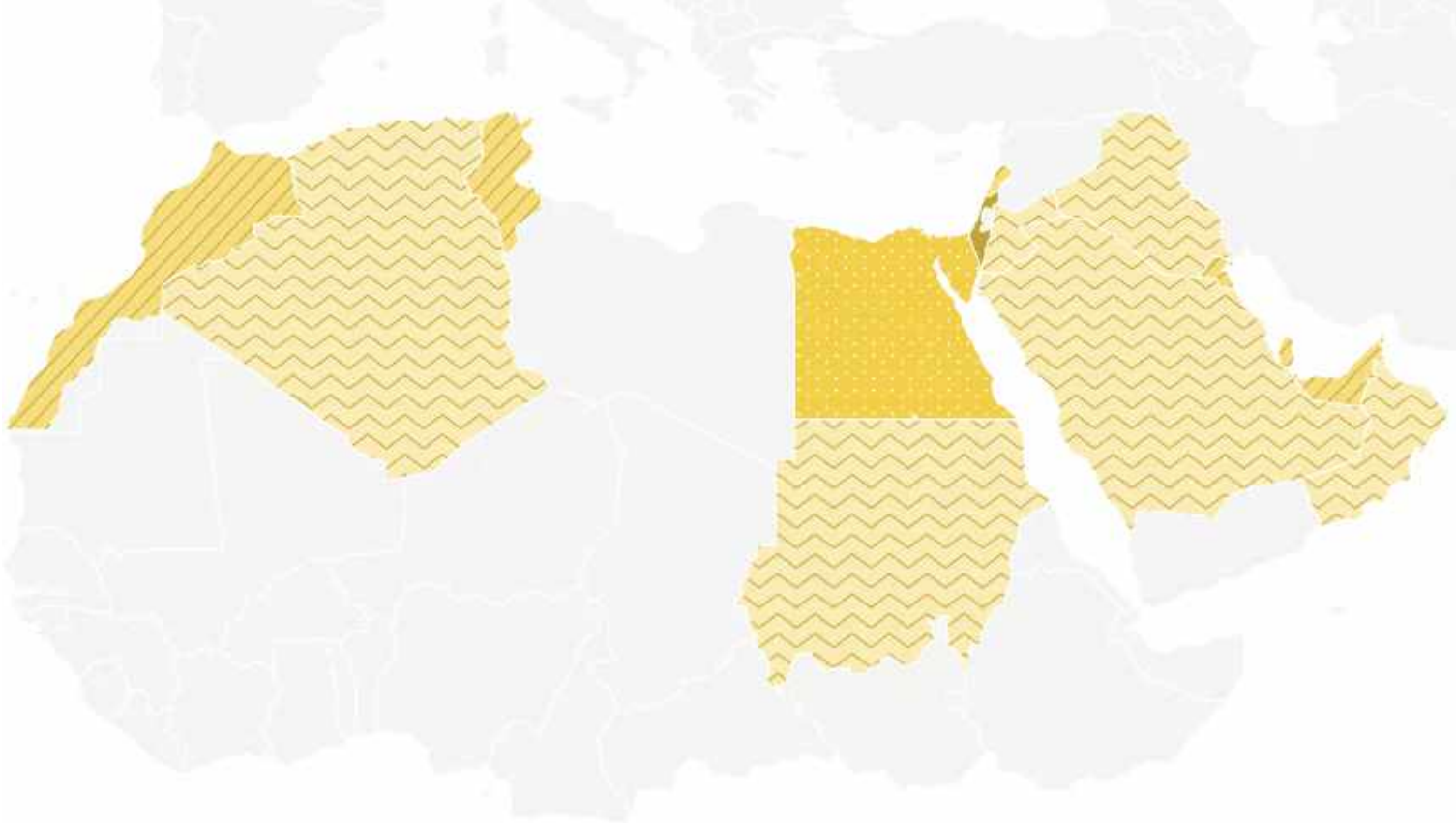
CASE STUDY:

United Arab Emirates
Abu Dhabi School of Government (ADSG)
Abu Dhabi School of Government (ADSG), a government entity in Abu Dhabi, is responsible for overseeing and planning the learning and development of all Abu Dhabi government employees. ADSG partnered with Coursera over two years ago to reshape its culture of learning.

ADSG also plays a significant role in Abu Dhabi’s ambition in building a sustainable and open economy driven by a confident society. This successful partnership with Coursera allowed ADSG to train more than 43,000 employees who enrolled in 187,230 courses.

ADSG’s learners are deeply engaged in the learning programs, allowing them to complete more than 1.1 million lessons in Coursera. Through this achievement, ADSG has become the leading player in providing the highest quality of global public sector training and development activities, leveraging international best practices tailored to Abu Dhabi’s short- and long-term needs.

- TRENDING SKILLS:**
- Python Programming
 - Statistical Machine Learning
 - Machine Learning
 - Probability & Statistics
 - Machine Learning Algorithms
 - Data Management
 - Applied Machine Learning
 - Econometrics
 - Deep Learning
 - SQL



Skill Level								
CUTTING-EDGE COMPETITIVE EMERGING LAGGING								
Global Rank								
		Data Analysis	Data Management	Data Visualization	Machine Learning	Mathematics	Probability & Statistics	Statistical Programming
22	Israel	19%	58%	68%	94%	85%	88%	60%
49	Egypt	81%	54%	85%	45%	61%	45%	27%
55	Tunisia	27%	74%	52%	59%	40%	37%	29%
69	Morocco	23%	46%	76%	46%	43%	27%	12%
71	United Arab Emirates	82%	46%	55%	24%	46%	13%	17%
72	Lebanon	36%	23%	27%	36%	45%	38%	21%
73	Kuwait	34%	42%	23%	39%	63%	30%	18%
79	Qatar	45%	39%	35%	34%	42%	21%	14%
81	Jordan	46%	24%	29%	41%	31%	29%	6%
85	Algeria	20%	19%	89%	33%	36%	22%	21%
89	Saudi Arabia	28%	22%	25%	32%	30%	35%	10%
90	Sudan	51%	12%	75%	19%	11%	68%	9%
98	Oman	14%	20%	54%	29%	19%	7%	13%
102	Iraq	10%	4%	51%	11%	12%	16%	7%

SUB-SAHARAN AFRICA

Promoting labor market inclusion with skills

2.4M

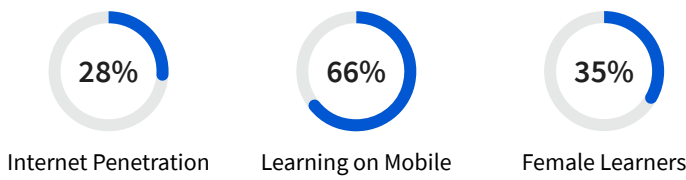
Coursera Learners

33

Median Age

4.7%

of GDP spent on Education



In sub-Saharan Africa, skill investments have the potential to promote labor market inclusion and support a quicker recovery of global trade relations. The shock to African economies came in three waves. First, lower trade and investment from China in the immediate term; second, a demand slump associated with the lockdowns in the European Union and OECD countries; and third, a supply shock affecting local and intra-African trade.¹³⁷ COVID-19 also widened the poverty gap between women and men, pushing 47 million more women and girls into impoverished lives by next year, and undoing progress made in recent decades, with informal workers worst hit in sub-Saharan Africa.¹³⁸

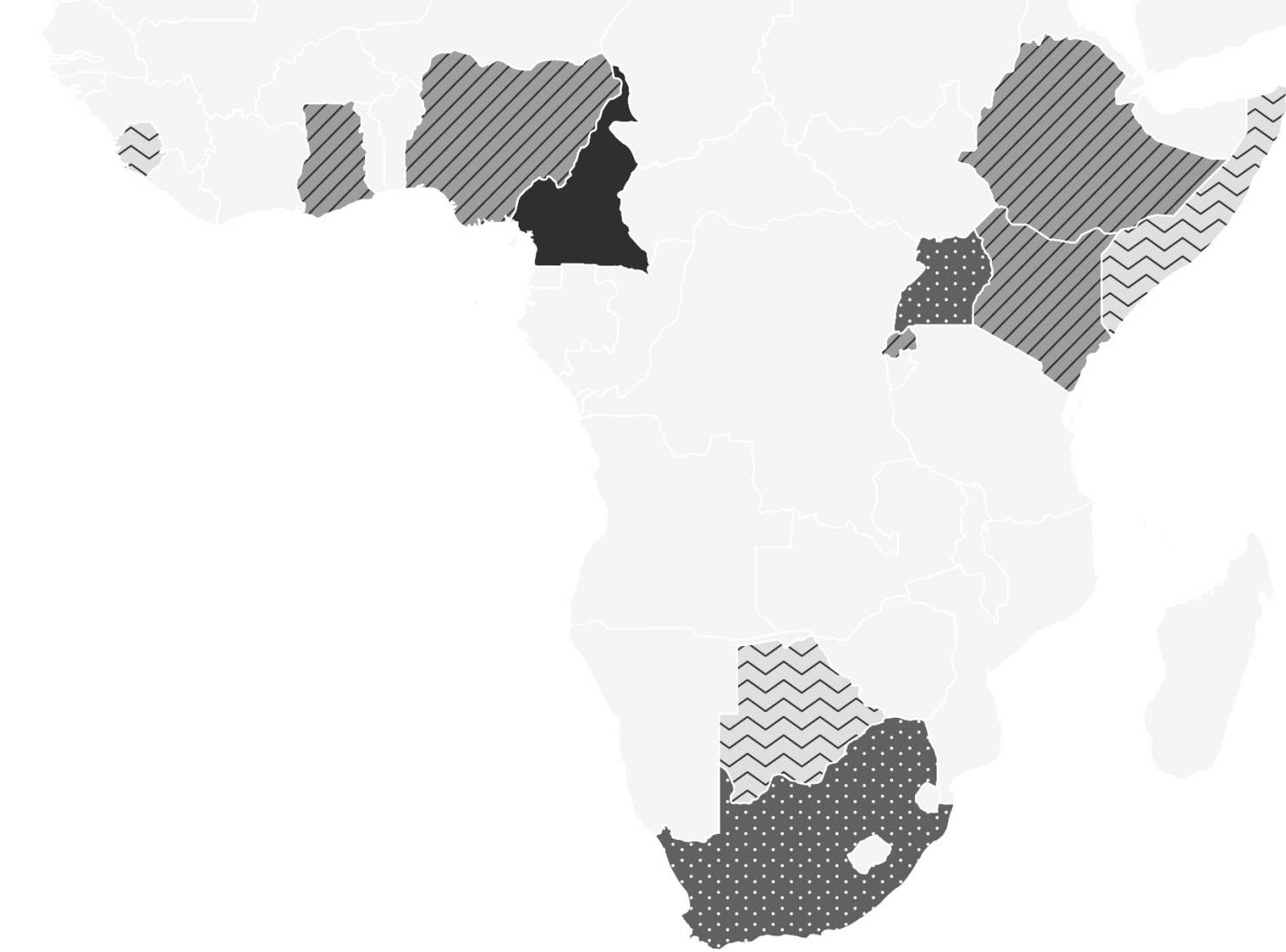
Although many African countries are endowed with rich natural resources, there’s a growing need to diversify local economies. South Africa and several other African countries are a major source of the world’s gold output. Botswana, the Democratic Republic of the Congo (DRC), and Sierra Leone are major sources of diamonds. In addition, the continent produces a good proportion of the world’s tropical hardwood, coffee, cocoa, and rubber. However, relying on one economic activity or on a narrow range of exports and imports is detrimental to a national economy.¹³⁹

As it looks to diversify and move towards the digital economy, sub-Saharan Africa has the opportunity to take advantage of a young workforce and growing middle class. Africa is forecasted to host 42% of the world’s youth (15-24-year-olds) by 2030, and more than double its youth population by 2055. In 2019, the population of Africa was an estimated 1.3 billion, with 350 million already considered middle class.¹⁴⁰

A number of more targeted strategies could also be beneficial. First, investing in agricultural innovation. Africa could be two to three times more productive if it intensified agricultural productivity. Today, more than 60% of the population of sub-Saharan Africa work as small-scale farmers, and about 23% of sub-Saharan Africa’s GDP comes from agriculture.¹⁴¹

Second, fostering financial inclusion. Digital platforms can also boost agricultural productivity through prompt payments for produce, information sharing, and agro-industrial activities. Another strategy is to remove restrictive barriers to especially intra-African trade as well as trade with other regions.¹⁴²

Finally, supporting Africa in becoming the next great manufacturing hub. Business-to-business spending in Africa’s manufacturing is projected to reach \$666.3 billion by 2030, \$201.28 billion more than it did in 2015. It has the potential to be “the world’s next great manufacturing center,” potentially capturing part of the 100 million labor-intensive manufacturing jobs that will leave China by 2030.¹⁴³



Skill Level			
CUTTING-EDGE			
COMPETITIVE			
EMERGING			
LAGGING			
Global Rank	Business	Technology	Data Science
19	94%	75%	64%
37	96%	55%	31%
42	66%	58%	51%
58	32%	81%	35%
66	78%	20%	40%
73	77%	29%	13%
77	69%	22%	19%
80	87%	15%	8%
90	92%	5%	5%
105	41%	2%	4%
108	1%	1%	1%

Business

Eight out of the 11 ranked countries rank in the top half globally in Business skills, revealing a pocket of talent on Coursera in an important area of skills development for the region. For example, recent programs in Kenya and South Africa, which have been rigorously evaluated, have shown that training in specific business skills can lead to higher profits and sustainability for businesses and gains in employment and earnings for employees.¹⁴⁴

As gateways of commerce to Central Africa, Cameroon, and Nigeria lead regional Business rankings. The strong performance in Business from both countries may be partly explained by recent achievements in regional economic integration, such as the Enugu-Bamenda Road Project that linked the two countries and extended the Trans-African Highway.¹⁴⁵

Rwanda is a global leader in Strategy and Operations skills.

Rwanda was in the middle of an economic boom prior to COVID-19. Economic growth exceeded 10% in 2019, driven in great part by large public investments for the implementation of the National Strategy of Transformation.¹⁴⁶

TRENDING SKILLS:

Strategy and Operations

Project Management

Microsoft Excel

Digital Marketing

Data Analysis

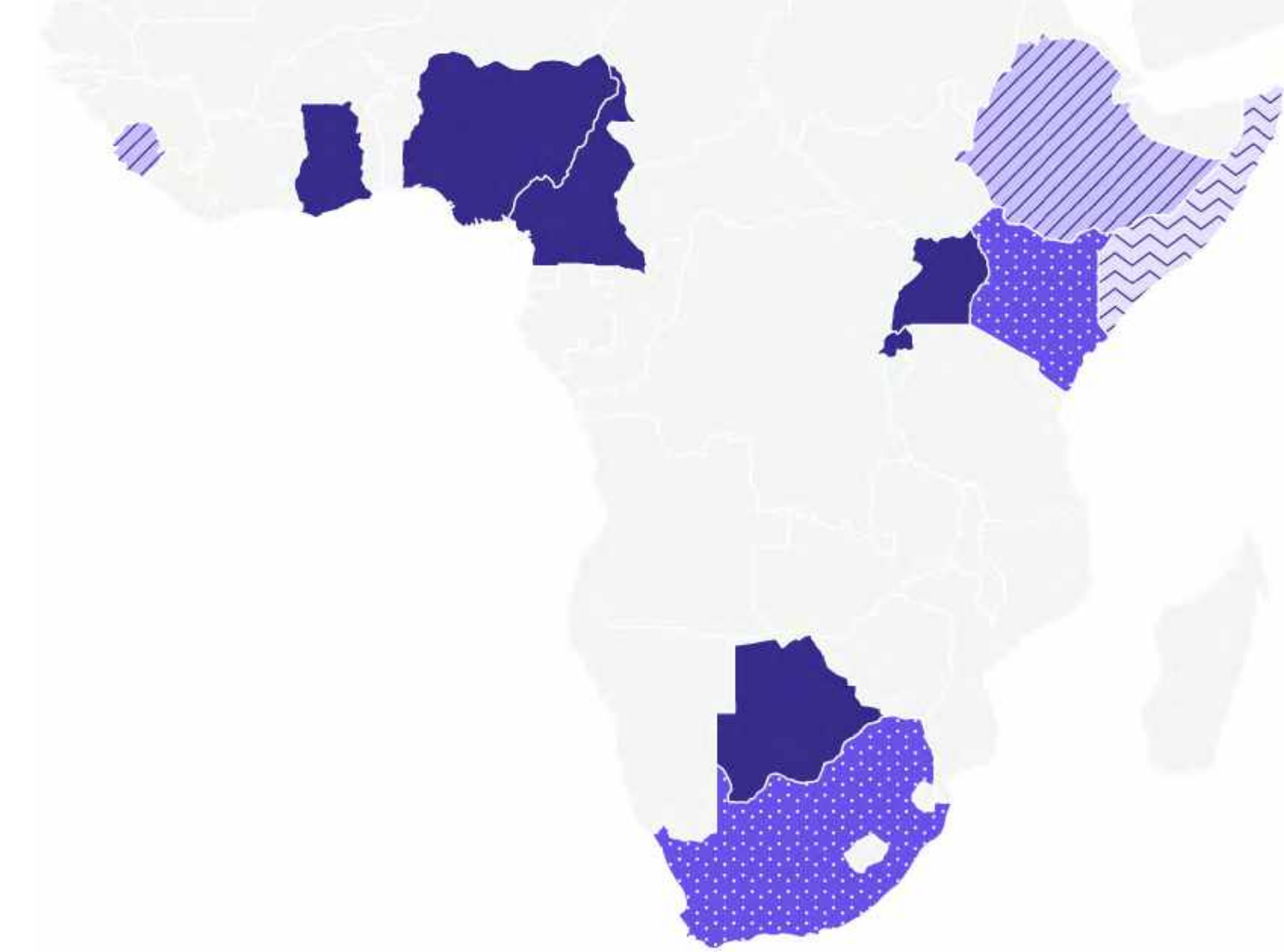
Leadership and Management

Marketing

Finance

Accounting

Human Resources



Skill Level										

Technology

Ethiopia leads the way with particular strength in Computer Networking and Security Engineering. Cybersecurity has recently been top of mind for regional policymakers. In 2020, the Ethiopian Information Network Security Agency (INSA) thwarted a major cyberattack from an Egypt-based actor related to the filling of the Nile River’s Grand Ethiopian Renaissance Dam (GERD).¹⁴⁷

Cameroon and Rwanda are the region’s Mobile Development leaders. These countries are serving one of the fastest-growing mobile markets in the world. Nearly half a billion people are predicted to be on mobile Internet in sub-Saharan Africa by 2025. At the end of 2019, 477 million people in sub-Saharan Africa were already subscribed to mobile services, and the region is expected to continue to grow at a compound annual growth rate of 4.3% until 2025.¹⁴⁸

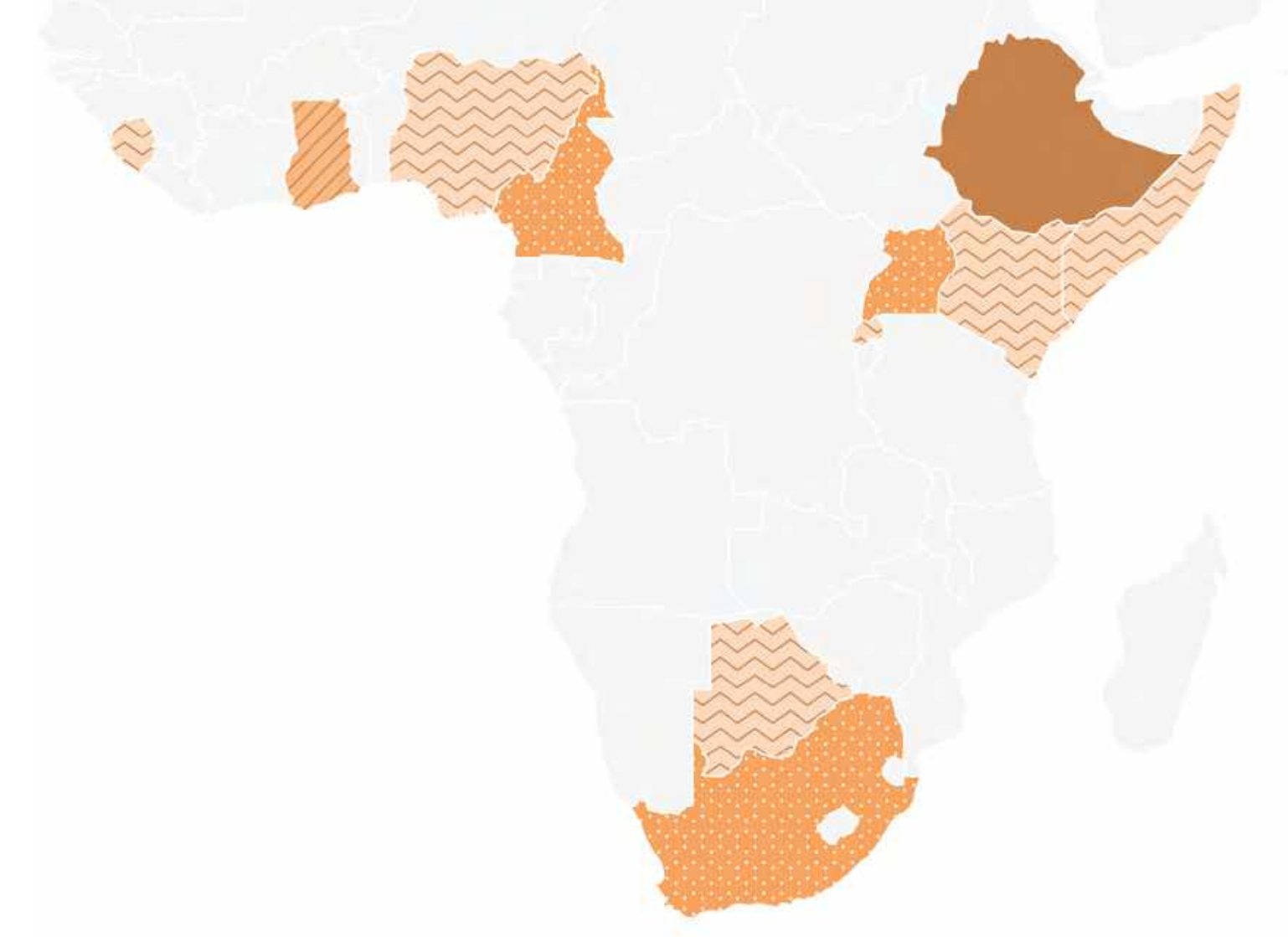
The region generally lags in Computer Programming and Software Engineering. This presents a significant opportunity for skills investment as the region increases its viability as a global software development services provider. In recent years, several large players such as Code of Africa, Techno Brain Group, and Andela have expanded their operations across the continent.¹⁴⁹





























































































































CASE STUDY:

South Africa
Ingressive for Good

Ingressive for Good (I4G) is a non-profit organization that exists to equip young Africans in need with technology skills to help them impact and contribute to the development of Africa—social and economically. I4G and Coursera launched a joint program to upskill 5,000 African youth in soft and technical skills, and increase the earning power of youth across the continent. This program is part of I4G’s goal to train one million African youth in tech for free and bridge the tech skills and opportunities gap in Africa. As of November 2020, over 20,000 youth applied to the program in the first month, over 5,000 citizens enrolled in courses, and 100+ youth have been placed in jobs.

- TRENDING SKILLS:**
- Theoretical Computer Science
 - Design and Product
 - Programming Principles
 - Web Development
 - Graphic Design
 - JavaScript
 - C Programming
 - Computational Thinking
 - Computer Programming
 - Microarchitecture



		Skill Level									
		 CUTTING-EDGE	 COMPETITIVE	 EMERGING	 LAGGING						
Global Rank											
		Cloud Computing	Computer Networking	Computer Programming	Databases	Mobile Development	Operating Systems	Security Engineering	Software Engineering	Theoretical Computer Science	Web Development
	21 Ethiopia	 46%	 100%	 39%	 67%	 52%	 96%	 99%	 29%	 39%	 36%
	28 Cameroon	 40%	 94%	 42%	 71%	 98%	 59%	 74%	 38%	 33%	 73%
	46 South Africa	 54%	 63%	 36%	 48%	 50%	 56%	 71%	 50%	 63%	 77%
	49 Uganda	 19%	 95%	 24%	 16%	 35%	 96%	 96%	 24%	 36%	 46%
	76 Ghana	 21%	 89%	 8%	 7%	 33%	 53%	 94%	 26%	 15%	 29%
	84 Kenya	 28%	 65%	 11%	 19%	 9%	 35%	 63%	 41%	 24%	 32%
	87 Rwanda	 59%	 18%	 28%	 15%	 81%	 4%	 49%	 19%	 18%	 22%
	92 Nigeria	 20%	 37%	 4%	 9%	 17%	 24%	 75%	 63%	 4%	 39%
	103 Botswana	 23%	 5%	 4%	 10%	 7%	 46%	 41%	 14%	 7%	 3%
	107 Sierra Leone	 3%	 11%	 3%	 12%	 3%	 8%	 24%	 15%	 2%	 2%
	108 Somalia	 4%	 47%	 1%	 2%	 2%	 1%	 19%	 4%	 1%	 27%

Data Science

African countries are global leaders in Data Visualization. These skills are particularly important to local, open-source community initiatives such as Code for Africa, which focuses on data journalism as a key tool to promote digital democracies and empower citizens with actionable information.¹⁵⁰

With the exception of South Africa and Rwanda, most African countries perform poorly in Mathematics. These gaps start early in life—nearly nine out of 10 children between the ages of about six and 14 in sub-Saharan Africa will not meet minimum proficiency levels in reading and math.¹⁵¹

Nigeria lags behind other large countries. Despite being Africa’s largest economy and having one of the most vibrant startup hubs in Lagos, Nigeria ranks near the bottom globally in Data skills.¹⁵²

CASE STUDY:

Sub-Saharan Africa
Commonwealth of Learning

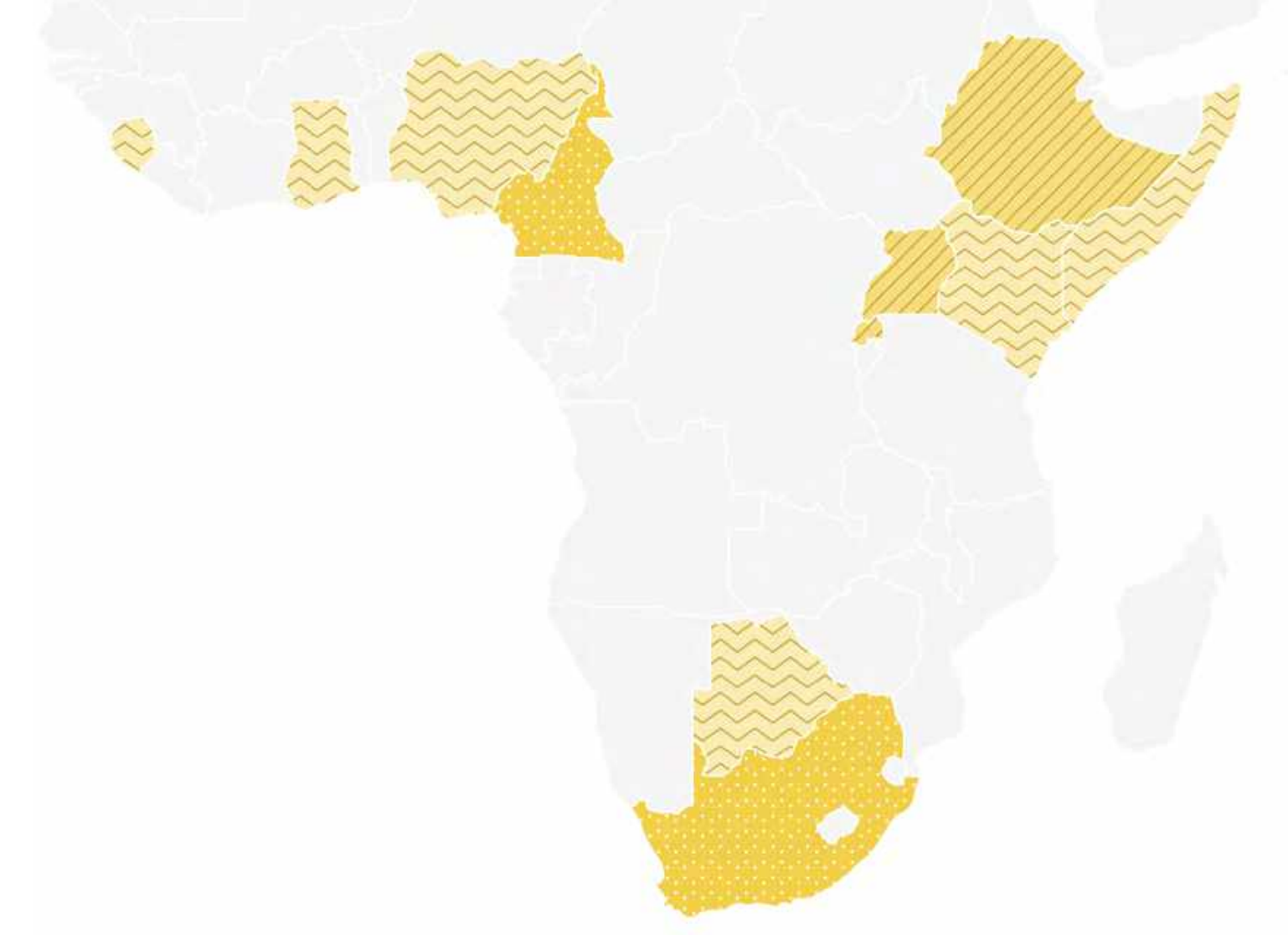
The Commonwealth of Learning (COL) is a learning and development organization for all 54 Commonwealth member nations across Africa, the Caribbean, and the Asia Pacific.

During the pandemic, unemployment struck many sectors, from tourism to manufacturing. This displacement disproportionately impacted underserved populations, especially women and youth. COL was determined to ensure these citizens had access to the resources they needed to prepare for a digital future.

COL and Coursera partnered to offer unemployed and displaced workers free skills training so they can re-enter the workforce in high-demand local jobs. Over 128,000 learners have enrolled in a record 1 million courses to learn new business and technology skills through the landmark partnership and unlock economic opportunity. Local Ministers of Education and Labor across Commonwealth nations have been the driving force behind engaging their local communities in the program and connecting learners to local jobs.

TRENDING SKILLS:

- Python Programming
- Statistical Machine Learning
- Probability & Statistics
- Machine Learning
- Data Management
- Machine Learning Algorithms
- Statistical Visualization
- Applied Machine Learning
- Econometrics
- SQL







Skill Level

- CUTTING-EDGE
- COMPETITIVE
- EMERGING
- LAGGING

Global Rank		Data Analysis	Data Management	Data Visualization	Machine Learning	Mathematics	Probability & Statistics	Statistical Programming
38	Cameroon	68%	52%	100%	49%	29%	59%	49%
52	South Africa	37%	63%	94%	51%	54%	39%	26%
64	Rwanda	38%	33%	83%	43%	23%	47%	53%
70	Ethiopia	15%	9%	63%	47%	39%	52%	19%
74	Uganda	32%	44%	91%	21%	20%	63%	25%
88	Kenya	30%	26%	66%	29%	21%	32%	11%
95	Ghana	56%	16%	87%	23%	14%	20%	13%
100	Nigeria	50%	27%	62%	15%	5%	25%	4%
103	Botswana	29%	17%	71%	8%	6%	19%	3%
104	Sierra Leone	70%	47%	28%	4%	1%	46%	2%
108	Somalia	5%	1%	99%	1%	2%	4%	4%

Entry-Level Pathways

Closing employability gaps in the post-COVID economy

	 SCHOOL (K-12)	 UNIVERSITY (19-25)	 UNEMPLOYED YOUTH (19-25)	 ADULT LEARNERS (25+)
CAREER CONCERNS	<ul style="list-style-type: none">Discover educational and professional interests	<ul style="list-style-type: none">Find a first job, compete in recruiting, and launch a career	<ul style="list-style-type: none">Find a gateway job to a fulfilling career	<ul style="list-style-type: none">Maintain stable employment and career growth
LEARNING PRIORITIES	<ul style="list-style-type: none">Learn how to workBe digitally literateDevelop basic technical skills	<ul style="list-style-type: none">Get job-ready soft skillsBecome productive with technologyGet job-ready technical skills	<ul style="list-style-type: none">Complete remedial skills training or apprenticeships	<ul style="list-style-type: none">Enhance soft skills for career growthKeep pace with changing technology (4IR, automation)
SUPPORTING PARTNERS	<ul style="list-style-type: none">Ministries of EducationTeachers	<ul style="list-style-type: none">Ministries of EducationUniversity Professors and StaffBusinesses	<ul style="list-style-type: none">Ministries of LaborWorkforce DevelopmentAgencies Trade UnionsBusinesses	<ul style="list-style-type: none">BusinessesAdult Education Providers
ROLE OF ONLINE LEARNING	<ul style="list-style-type: none">Education and career exploration	<ul style="list-style-type: none">Fill curriculum gaps and strengthen connections between education and careers	<ul style="list-style-type: none">Offer widely accessible, affordable reskilling pathways at-scale	<ul style="list-style-type: none">Support career transitions

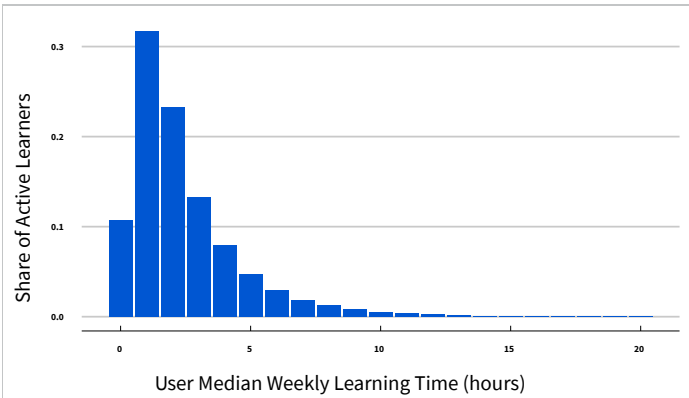
The Role of Online Learning in Upskilling Pathways

The needs of workers evolve as they move through their education and career. Various institutions play a role at different points in this journey. The graphic on the left summarizes these key stages.

For students, online learning can be a valuable complement to traditional education. Sixty percent of university students learning on Coursera report enrolling in courses not offered by their institution.¹⁵³ As cutting-edge skills develop faster than faculty may be able to update their syllabi, digital content can complement the core content of university programs. Courses that develop specific skills in computer programming and data analysis, for example, are more likely to be missing from a university’s curriculum and have higher rates of engagement from Coursera learners.

For adult learners, online learning can make lifelong learning more accessible. Whether an individual is a working parent that needs to spread their coursework across nights, weekends, or the daily commute, or a recently unemployed professional that can dedicate concentrated hours over the span of a few weeks, the self-paced nature of online learning is flexible, affordable, and designed to suit the busy working adult.

This diversity in learners—running the gamut of young students to working adults—translates to a variety of learning styles on the platform. Roughly 75% of active learners spend less than three hours per week on their coursework. Almost 20% spend less than an hour a week, 35% spend between one and two hours, and another 20% spend about three hours. The top 25% dedicate significantly more time. Regardless of the path chosen, learners acquire skills in ways that fit into their schedules.



Distribution of Median Learning Hours

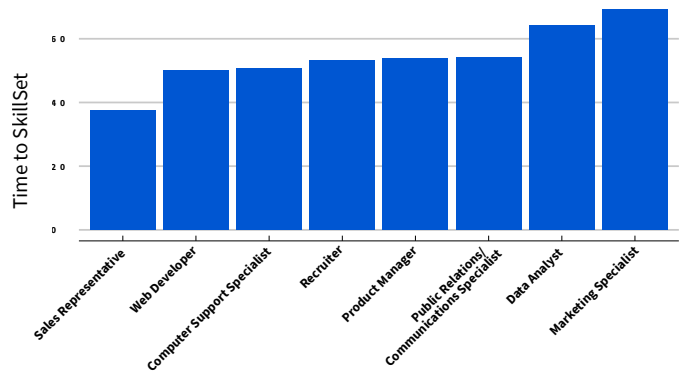
The next section outlines the strategies available for the leaders designing reskilling programs that target the jobs of the future. It defines the core skills sets and entry-level pathways corresponding to each job category identified in the World Economic Forum’s Future of Jobs report. The role of these emerging jobs in fueling future economic growth is considerable. Across the G20, fully meeting the labor market demand for emerging professions and skills to meet the needs of the new technological era could add \$11.5 trillion in GDP growth over the next decade.¹⁵⁴

WORLD ECONOMIC FORUM—FUTURE SKILLS CATEGORIES	
Cloud Computing Delivering innovative computing services	Marketing Building brand and acquiring customers
Content Production Driving brand through creative visual or written assets	People & Culture Creating positive work environments
Data & AI Driving strategy with insights	Product Development Fulfilling customer needs through innovation
Engineering Developing software solutions	Sales Finding customers and solutions for their challenges
Green Economy Building a sustainable future	Care Economy Supporting the well-being of our communities

Note: Due to constraints in data availability, the Care and Green Economy cluster are not covered in all of our analyses.

For each of the future job categories, the path to skill acquisition is quantified in terms of the average number of hours spent by real learners on Coursera. While we do not have full information on the starting point of every learner, the results indicate that the foundational skills for new digital economy entry-level jobs can be quite accessible.

The quickest skill sets can be achieved in just over 35 hours, while the most time-consuming require close to 70 hours. While some learners make rapid progress in a matter of a couple of weeks, reskilling requires diligence and commitment, and Coursera allows learners with other obligations to move at their own pace and stretch learning over months.



Our learning hours analysis should be interpreted as a measure of what it takes to develop the core technical skills to pursue a role, but not necessarily all of the credentials and qualifications an employer may be looking for. By designing training programs with this framing in mind, workforce leaders can work with employers to bridge gaps and ease the transition for workers into high-demand jobs.



Cross-Cutting & Foundational Skills

The digital economy requires foundational and cross-cutting skills that cut across professions and industries. These cover areas such as digital literacy that enable workers to participate in increasingly tech-heavy work environments; human skills that are expected to stand the test of time; and career management skills that facilitate job transitions.

JOB READINESS

Why it matters: About a quarter of all adults in the OECD do not know how to use a computer.¹⁵⁵ In the US, adults who are not digitally literate have a lower rate of labor force participation and tend to work in lower skilled jobs.¹⁵⁶

Skills

- Computer Literacy
- Spreadsheet and Word Processing Software
- Business English

HUMAN SKILLS

Why it matters: Over the past 50 years, the US economy, as just one of many developed-world examples, has witnessed a steady decline in jobs that involve routine manual and cognitive skills, while experiencing a corresponding increase in jobs that require non-routine analytical and interpersonal skills.¹⁵⁷

Skills

- Communications
- Problem Solving
- Teamwork

CAREER MANAGEMENT

Why it matters: Research has long shown that half to upwards of 80% of jobs are filled through connections and networking. Job seekers increasingly need to find others who can help them get better faster—small workgroups, organizations, and broader and more diverse social networks.¹⁵⁸

Skills

- Career Planning
- Job Search
- Interviewing

CLOUD COMPUTING

Delivering innovative computing services

WHAT IT IS:

The delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the internet.

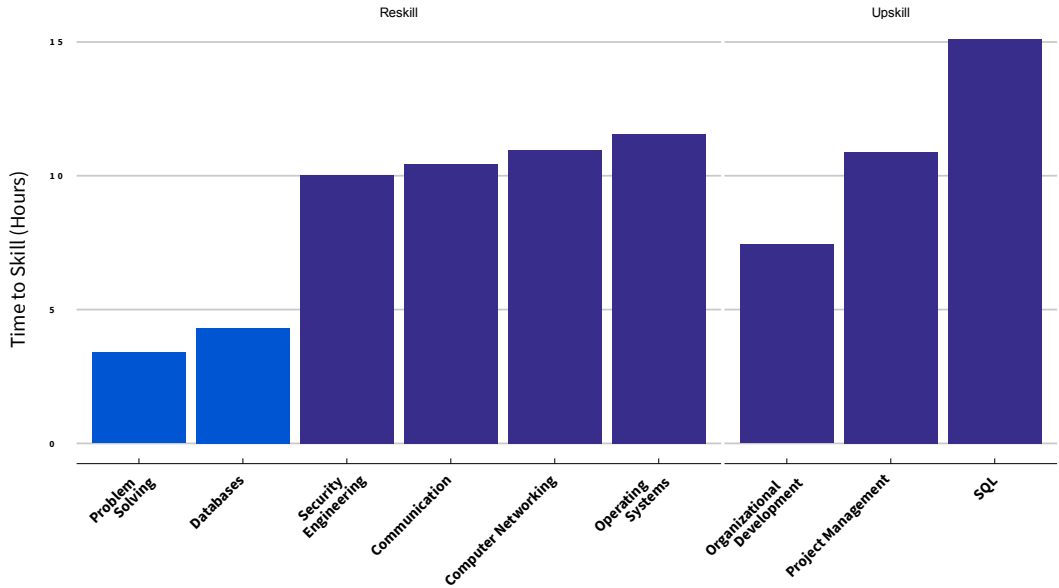
WHY IT MATTERS:

With public cloud services spending projected to reach \$370 billion in 2022, demand for cloud computing skills will only continue to accelerate. Nearly three-quarters of IT decision-makers (71%) believe their organizations have lost revenue due to a lack of cloud expertise, and the lack of cloud professionals costs businesses up to \$250 million per year.¹⁵⁹

ENTRY-LEVEL TARGET JOB:

Computer Support Specialist (51 hours)

Skills Profile



TOP JOBS:

- Site Reliability Engineer
- Platform Engineer
- Cloud Engineer
- DevOps Engineer
- Cloud Consultant

TOP FIELDS OF STUDY:

- Computer Science
- Engineering
- Business
- Mathematics and Statistics
- Arts and Humanities

KEY LEARNING AREAS FOR ENTRY-LEVEL CLOUD COMPUTING ROLES:

- Cloud platforms like AWS, Azure, and Google Cloud
- Operating systems and computer networking concepts
- Databases and cloud storage
- Data security
- DevOps and technologies like Kubernetes

CONTENT PRODUCTION

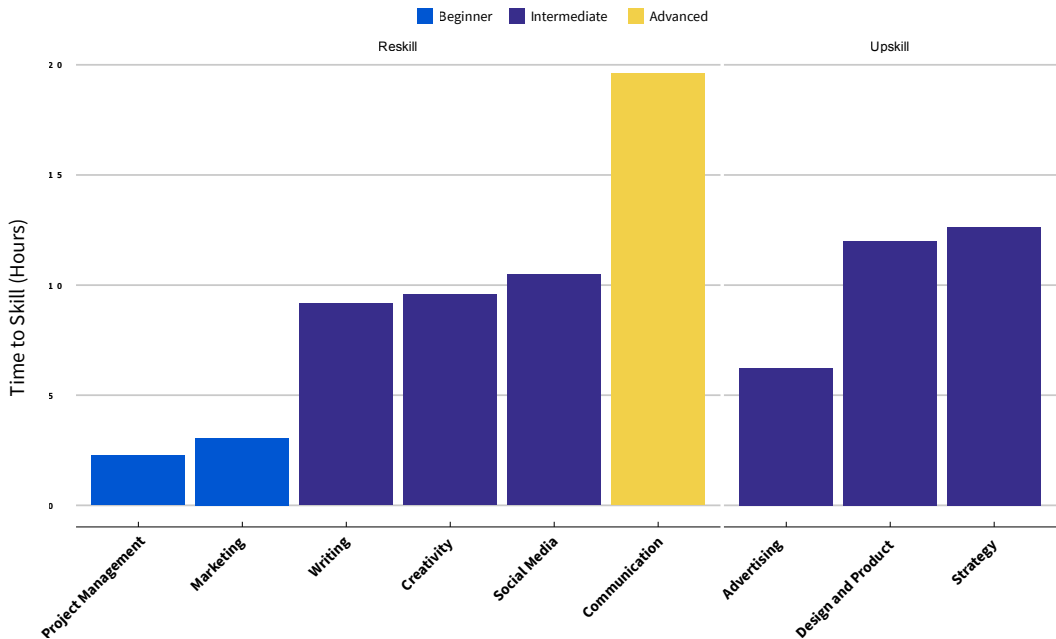
Driving brand through creative visual or written assets

WHAT IT IS:
The process of developing and creating visual or written assets, such as videos, eBooks, blog posts, whitepapers, or infographics.

WHY IT MATTERS:
Content marketing market is expected to grow by \$269 billion during 2020-2024,¹⁶⁰ driven by growth in time spent on social media. Roughly one-third of all time on the internet is spent on social media.¹⁶¹

ENTRY-LEVEL TARGET JOB:
PR/Communications Specialist (54 hours)

Skills Profile



- TOP JOBS:**
- Social Media Coordinator
 - Content Specialist
 - Content Producer
 - Writer
 - Creative Copywriter

- TOP FIELDS OF STUDY:**
- Arts and Humanities
 - Business
 - Social Sciences
 - Computer Science
 - Engineering

- KEY LEARNING AREAS FOR ENTRY-LEVEL CONTENT PRODUCTION ROLES:**
- Effective writing and communication
 - Project management
 - Content marketing strategies
 - Copywriting and the editorial process
 - Gain influence and share content in social networks

DATA & AI

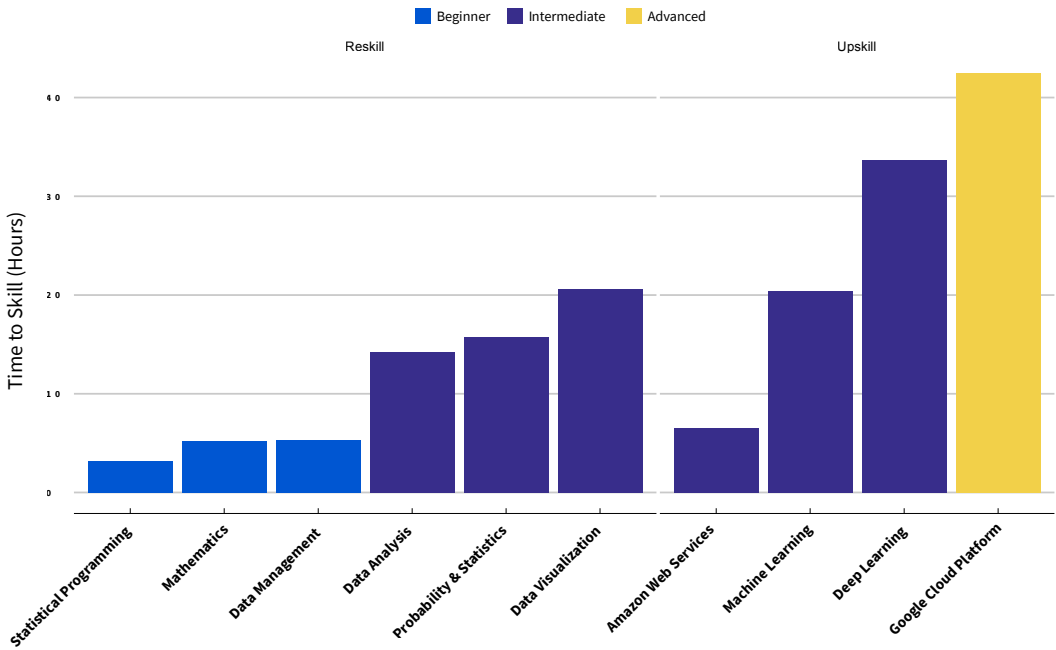
Driving strategy with insights

WHAT IT IS:
Developing code and quantitative algorithms to organize and synthesize large amounts of information used to answer questions and drive strategy in an organization.

WHY IT MATTERS:
Data & AI jobs have been among the fastest growing, at 40+% annualized growth over the past five years.¹⁶²

ENTRY-LEVEL TARGET JOB:
Data Analyst (64 hours)

Skills Profile



- TOP JOBS:**
- Artificial Intelligence Specialist
 - Data Scientist
 - Data Engineer
 - Big Data Developer
 - Data Analyst

- TOP FIELDS OF STUDY:**
- Business
 - Computer Science
 - Engineering
 - Biological Sciences
 - Social Sciences

- KEY LEARNING AREAS FOR ENTRY-LEVEL DATA & AI ROLES:**
- Data analysis in Excel
 - Databases and data management in SQL
 - Statistical programming in Python or R
 - Statistical techniques like regression and A/B testing
 - Data visualization

ENGINEERING

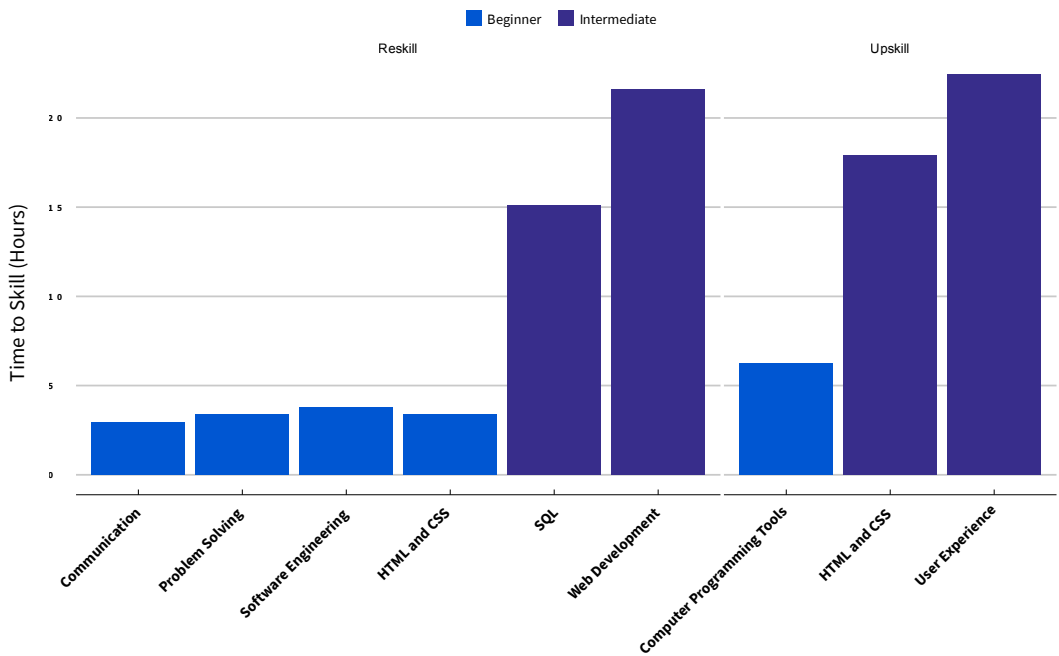
Developing software solutions

WHAT IT IS:
The process of analyzing user requirements and then designing, building, and testing software applications which will satisfy those requirements.

WHY IT MATTERS:
Software engineering jobs are expected to grow 22% through 2029, which is much faster than the 4% average across all occupations.¹⁶³

ENTRY-LEVEL TARGET JOB:
Web Developer (49 hours)

Skills Profile



- TOP JOBS:**
- Python Developer
 - Full Stack Engineer
 - JavaScript Developer
 - Backend Developer
 - Frontend Engineer

- TOP FIELDS OF STUDY:**
- Engineering
 - Computer Science
 - Business
 - Physical Sciences
 - Biological Sciences

KEY LEARNING AREAS FOR ENTRY-LEVEL ENGINEERING ROLES:

- Programming practices and developer environments
- Practice the basics of coding in a high-level language like Python
- Basic algorithms like loops and conditional logic
- Basic web application with CSS, HTML, and JavaScript
- Practice how to collaborate on code in a team with other developers

MARKETING

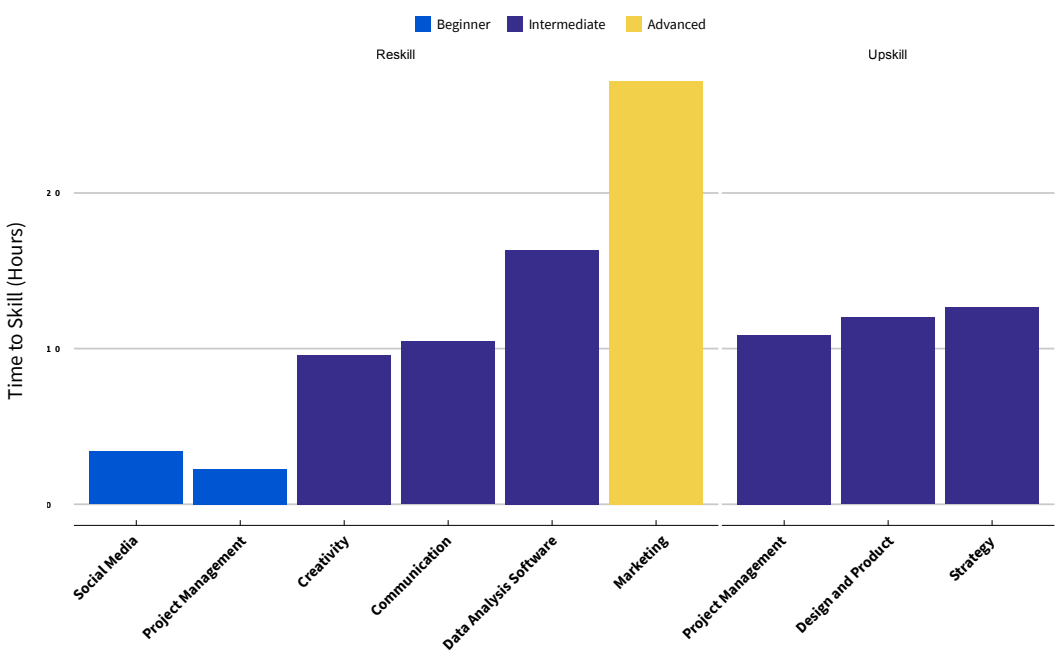
Building brand and acquiring customers

WHAT IT IS:
The activities a company undertakes to promote the buying or selling of a product or service.

WHY IT MATTERS:
Modern consumers want seamless experiences, with 90% of them expecting consistent brand interactions across all channels. Digital marketing allows companies to reach users anywhere, anytime—and digital tracking enables companies to serve more effective, personalized advertising.¹⁶⁴

ENTRY-LEVEL TARGET JOB:
Marketing Specialist (69 hours)

Skills Profile



- TOP JOBS:**
- Growth Hacker
 - Digital Marketing Specialist
 - E-commerce Specialist
 - Commerce Manager
 - Head of Digital*

- TOP FIELDS OF STUDY:**
- Business
 - Arts and Humanities
 - Engineering
 - Social Sciences
 - Computer Science

KEY LEARNING AREAS FOR ENTRY-LEVEL MARKETING ROLES:

- Basics of social media marketing
- Project management skills
- Strategic advertising campaigns
- Measurement and campaign optimization
- Content marketing and other complementary marketing specialities

*WEF 2020 Jobs of Tomorrow

PEOPLE & CULTURE

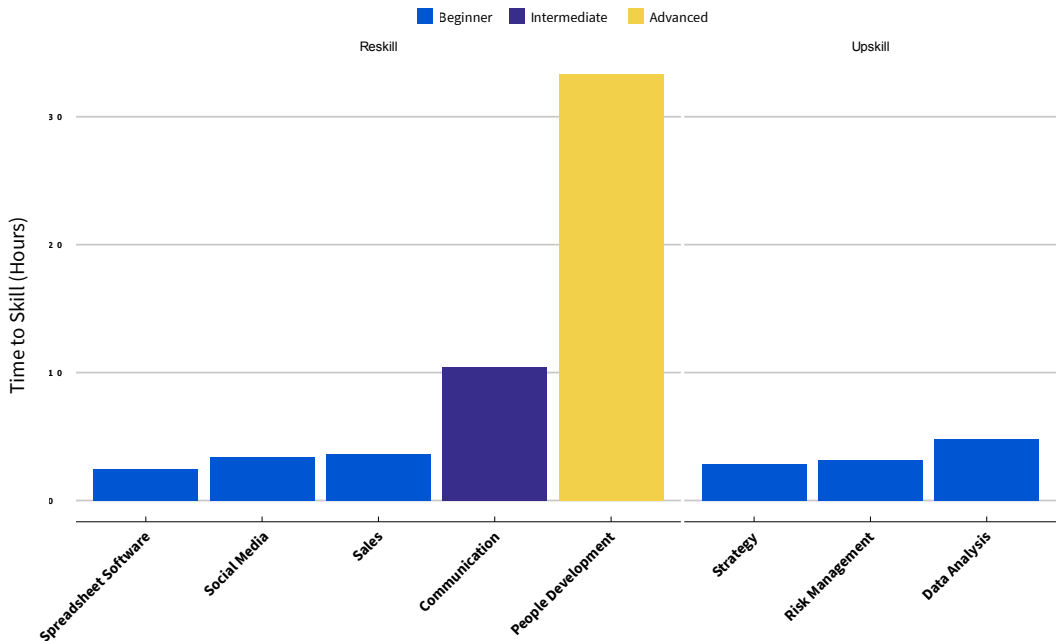
Creating positive work environments

WHAT IT IS:
Creating positive work environments for employees in which they feel integrated, engaged, and aligned to their workplace.

WHY IT MATTERS:
Organizations with highly engaged employees report 2.3 times greater-than-average revenue growth and have employees that are 87% less likely to leave.¹⁶⁵

ENTRY-LEVEL TARGET JOB:
Recruiter (53 hours)

SkillSet Details



- TOP JOBS:**
- Information Technology Recruiter
 - Human Resources Partner
 - Talent Acquisition Specialist
 - Business Partner
 - Recruiter

- TOP FIELDS OF STUDY:**
- Education
 - Legal Professions
 - Arts and Humanities
 - Business
 - Social Sciences

- KEY LEARNING AREAS FOR ENTRY-LEVEL PEOPLE & CULTURE ROLES:**
- Managing human capital
 - Motivation, rewards, and systems of work
 - How to recruit, hire, and onboard employees
 - Promoting diversity and inclusion in the workplace
 - How to design compensation and benefits

PRODUCT DEVELOPMENT

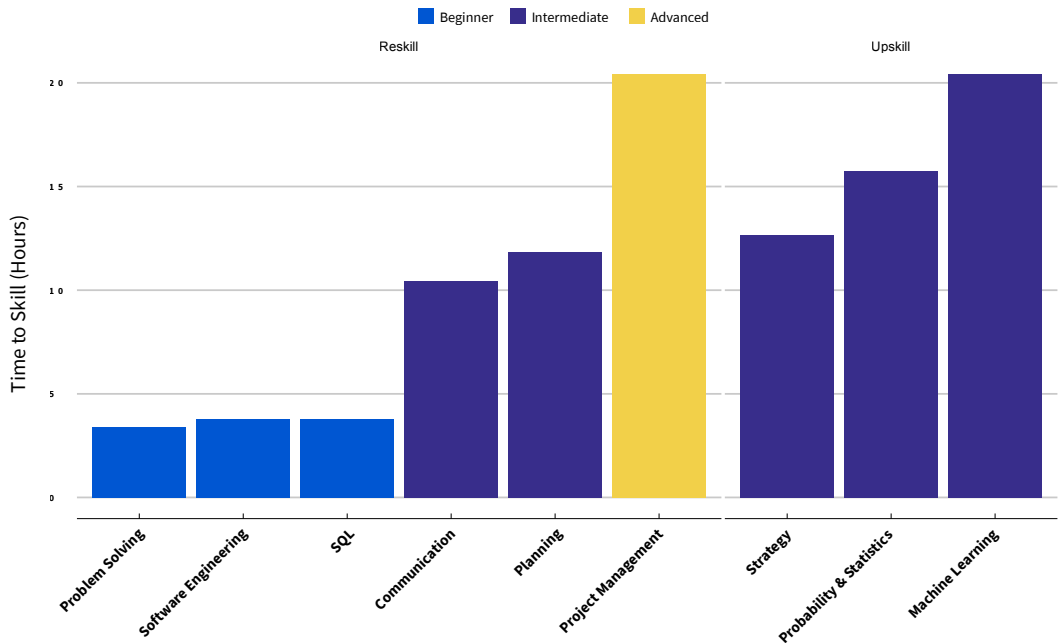
Fulfilling customer needs through innovation

WHAT IT IS:
Product Development is the process of delivering a new product or improving an existing one for customers. These customers can be external or internal within a company. Product Development can involve many different types of products from software to hardware to consumer goods and services.

WHY IT MATTERS:
Customer expectations are at an all-time high. Over three-quarters of customers said it's easier than ever to take their business elsewhere, switching to different brands to find an experience that matches their expectations. And two-thirds of customers expect companies to provide new products and services more frequently and say it takes more to impress them with new products and services (than ever before).¹⁶⁶

ENTRY-LEVEL TARGET JOB:
Product Manager (54 hours)

SkillSet Details



- TOP JOBS:**
- Product Manager
 - Quality Assurance Tester
 - Agile Coach
 - Product Analyst
 - Scrum Master

- TOP FIELDS OF STUDY:**
- Business
 - Engineering
 - Computer Science
 - Social Sciences
 - Arts and Humanities

- KEY LEARNING AREAS FOR ENTRY-LEVEL PRODUCT DEVELOPMENT ROLES:**
- Strategy and planning
 - How to conduct market research
 - User experience design
 - Management methodologies like Agile and Scrum
 - Problem solving techniques

SALES

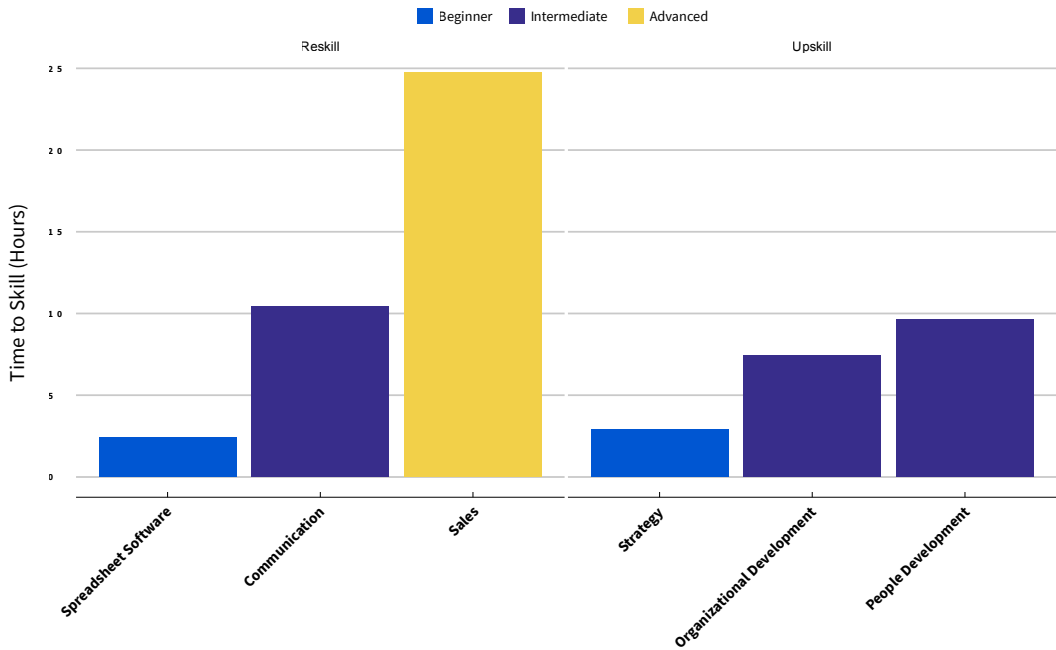
Finding customers and solutions for their challenges

WHAT IT IS:
Finding prospective customers for a company’s products and services and working with them to identify their challenges and needs, and ultimately find a solution.

WHY IT MATTERS:
The role of the salesperson is transforming. By 2025, 80% of B2B sales interactions between suppliers and buyers are expected to occur in digital channels, and 60% of B2B sales organizations will transition from experience and intuition-based selling to data-driven selling.¹⁶⁷

ENTRY-LEVEL TARGET JOB:
Sales Development Rep (SDR) (38 hours)

SkillSet Details



- TOP JOBS:**
- Customer Success Specialist
 - Sales Development Representative
 - Commercial Sales Representative
 - Business Development Representative
 - Partnerships Specialist

- TOP FIELDS OF STUDY:**
- Business
 - Engineering
 - Computer Science
 - Social Sciences
 - Arts and Humanities

- KEY LEARNING AREAS FOR ENTRY-LEVEL SALES ROLES:**
- Time management and other professional productivity skills
 - Sales process
 - Customer Relationship Management (CRM) systems like Salesforce
 - Business writing, public speaking, and strategic communications for sales
 - Negotiation skills

CARE ECONOMY

Supporting the well-being of our communities

WHAT IT IS:
Care work encompasses a range of sectors such as education, health, and social work involving teachers, nurses, community health workers, social workers, and domestic workers.

WHY IT MATTERS:
The world’s population is living longer than at any other time in history. Populations of all countries are aging, even in countries that currently have comparatively high fertility rates but lower life expectancy at birth. Provision of care for persons with short-term or with chronic illnesses or disabilities also needs to be considered. Care for the elderly and the sick often falls on women and girls.¹⁶⁸

CASE STUDY:
In 2020, Johns Hopkins Bloomberg School of Public Health with Bloomberg Philanthropies launched a contact tracing course on Coursera in three languages to quickly train needed global professionals in the fight against COVID-19. The course reached over 750K learners and resulted in over 340K course completions.

ENTRY-LEVEL TARGET JOB:
Contact Tracer

- TOP JOBS:**
- Medical Transcriptionists
 - Physical Therapist Aides
 - Radiation Therapists
 - Medical Assistants
 - Medical Equipment Preparers

- TOP FIELDS OF STUDY:**
- Health Professions
 - Social Sciences
 - Biological Sciences
 - Arts and Humanities
 - Business

GREEN ECONOMY

Building a sustainable future

WHAT IT IS:

The green economy is defined as an economy that aims at making issues of reducing environmental risks and ecological scarcities, and that aims for sustainable development without degrading the environment.

WHY IT MATTERS:

By 2030, 24 million new jobs will be created globally if the right policies to promote a greener economy are put in place. Today, 1.2 billion jobs rely directly on the effective management and sustainability of a healthy environment.¹⁶⁹

ENTRY-LEVEL TARGET JOB:

Green Marketer

TOP JOBS:

- Wind Turbine Technicians
- Green Marketers
- Biofuels Processing Technicians
- Solar Energy Installation Managers
- Water Resource Specialists

**KEY LEARNING AREAS
FOR ENTRY-LEVEL GREEN
ECONOMY ROLES:**

- Greenhouse gases and carbon footprints
- Climate risk and issues like food security
- Different responses to climate change
- Sustainable agriculture and pollution control
- Renewable energy and systems transformation

Conclusion

For workers, governments, and economies across the globe, growth is increasingly predicated on skills. While COVID-19 disrupted education systems and jobs worldwide, the transition to online learning ensured people could learn skills to adapt and rebuild their careers. Workforce development leaders will play a critical role in ensuring these systems can be extended and sustained moving forward.

This moment presents an opportunity to build more inclusive, modern, and scalable workforce and education programs. Reskilling the millions of workers that have been impacted by the double disruption of the pandemic and automation means that now, more than ever, the world needs innovative private-public solutions. If done right, these training investments have the potential to support increased competitiveness, innovation, and equity for countries around the world.

Contrary to what learners sometimes hear, the jobs of the future can be open to everyone—and with the help of new technologies, they are more accessible every day. Today, it can take just a few weeks or months to acquire the specialized skills in emerging professions. Let’s keep working together to build a world where anyone, anywhere has the power to transform their life through learning.

P.77	P.98	P.103
Country Spotlights	Technical Appendix	Sources & Endnotes
P.77		
P.78		
P.79		
P.82		
P.85		
P.92		
P.95		

Country Spotlights

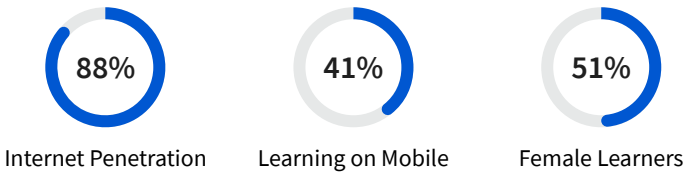
INTRODUCTION
This year, we highlight 20 major economies and their unique skill trends. Together, these markets account for 57% of the world’s population and 63% of global GDP.

United States

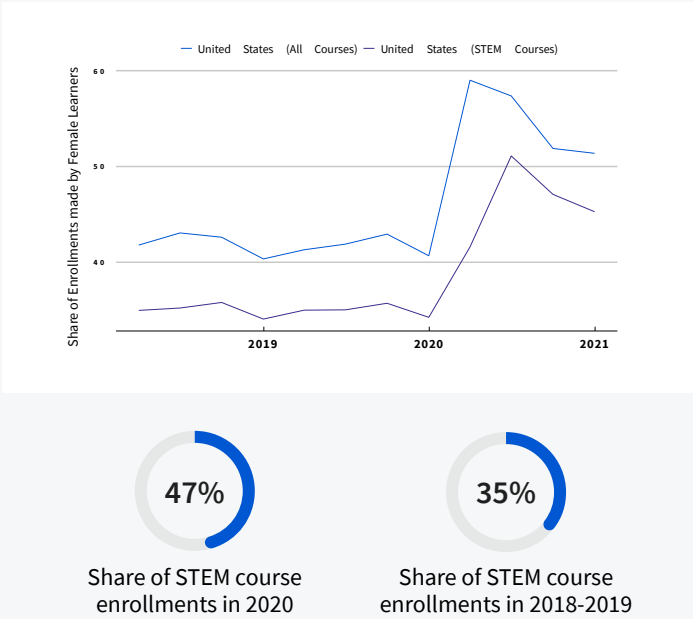
15M
Coursera Learners

34
Median Age

5%
of GDP spent on Education



Female Learner Trends



Top Courses

1.	The Science of Well-Being
2.	COVID-19 Contact Tracing
3.	Technical Support Fundamentals
4.	Machine Learning
5.	Learning How to Learn: Powerful mental tools to help you master tough subjects
6.	Programming for Everybody (Getting Started with Python)
7.	Financial Markets
8.	Introduction to Psychology
9.	First Step Korean
10.	The Bits and Bytes of Computer Networking

Trending Skills

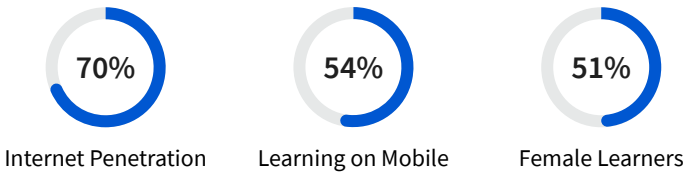
RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Programming Principles	Statistical Machine Learning
3.	Project Management	Design and Product	Probability and Statistics
4.	Data Analysis	C Programming	Machine Learning
5.	Accounting	Mathematics	Data Management
6.	Writing	User Experience	Machine Learning Algorithms
7.	Finance	Graphic Design	Applied Machine Learning
8.	Marketing	JavaScript	SQL
9.	Tableau Software	Data Structures	Data Visualization Software
10.	Digital Marketing	Computational Thinking	Econometrics

Mexico

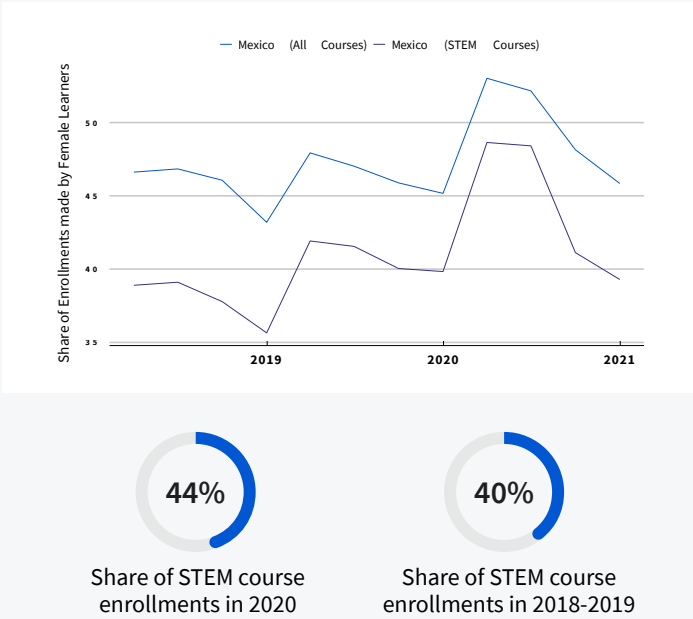
4.1M
Coursera Learners

31
Median Age

4.9%
of GDP spent on Education



Female Learner Trends



Top Courses

1.	Accounting for Non Accountants
2.	Personal Finance
3.	Nutrition and Obesity: Controlling Weight
4.	Foundations of Writing
5.	First Step Korean
6.	Basic Algebra
7.	Psychological First Aid
8.	English for Career Development
9.	Learning How to Learn
10.	The Science of Well-Being

Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Algebra	Statistical Machine Learning
3.	Marketing	Programming Principles	Data Management
4.	Digital Marketing	C Programming	Probability & Statistics
5.	Customer Analysis	Design and Product	Machine Learning
6.	Entrepreneurial Finance	MATLAB	R Programming
7.	Budget Management	JavaScript	Machine Learning Algorithms
8.	Business Analysis	Mathematics	Applied Machine Learning
9.	Project Management	Hardware Design	Data Visualization Software
10.	Finance	Adobe Photoshop	Big Data

LATIN AMERICA

Colombia

1.9M

Coursera Learners

34

Median Age

4.5%

of GDP spent on Education

65%

Internet Penetration

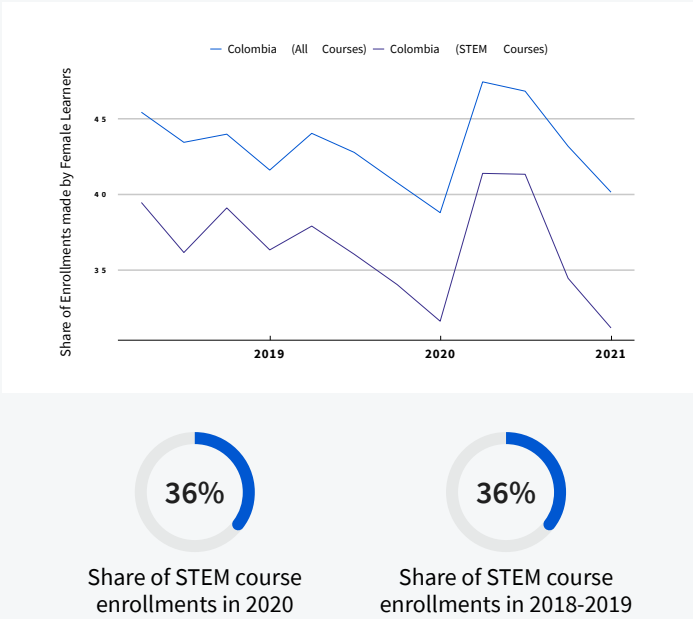
47%

Learning on Mobile

50%

Female Learners

Female Learner Trends



Top Courses

1.	Psychological First Aid
2.	Foundations of Corporate Finance
3.	Foundations of Excel for Business
4.	Digital Competencies - Office Tools (Microsoft Word, Excel, Power Point)
5.	First Step Korean
6.	Learning How to Learn
7.	Sexuality... Much More than Sex
8.	English for Career Development
9.	The Science of Well-Being
10.	Applied Excel for Business (Advanced)

Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Programming Principles	Statistical Machine Learning
3.	Digital Marketing	JavaScript	Data Management
4.	Entrepreneurial Finance	Algebra	Probability and Statistics
5.	Marketing	C Programming	Machine Learning
6.	Business Analysis	MATLAB	Machine Learning Algorithms
7.	Adaptability	Design and Product	Big Data
8.	Budget Management	HTML	R Programming
9.	Customer Analysis	Scrum (Software Development)	Data Visualization Software
10.	Business Process Management	Mathematics	Applied Machine Learning

LATIN AMERICA

Brazil

3.2M

Coursera Learners

32

Median Age

6.2%

of GDP spent on Education

70%

Internet Penetration

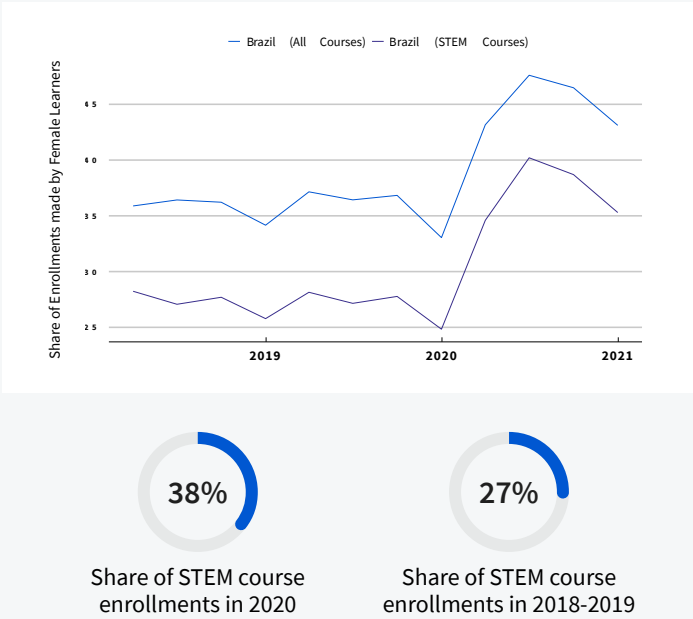
46%

Learning on Mobile

46%

Female Learners

Female Learner Trends



Top Courses

1.	Marketing Digital
2.	Introduction to Computer Science with Python (Part 1)
3.	The Science of Well-Being
4.	Systematic Review and Meta-analysis
5.	English for Career Development
6.	Learning How to Learn: Powerful mental tools to help you master tough subjects
7.	Machine Learning
8.	Financial Management
9.	Financial Markets
10.	UX / UI: Foundations of Interface Design

Trending Skills

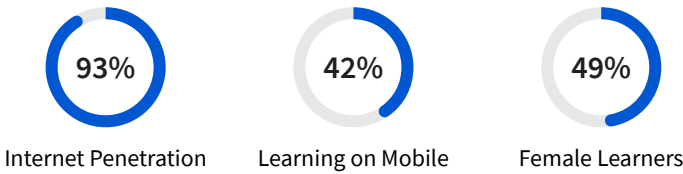
RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Design and Product	Statistical Machine Learning
3.	Digital Marketing	JavaScript	Probability and Statistics
4.	Marketing	C Programming	Data Management
5.	Project Management	User Experience	Machine Learning
6.	Finance	Computational Thinking	Machine Learning Algorithms
7.	Customer Analysis	Programming Principles	Applied Machine Learning
8.	Business Analysis	Mathematics	R Programming
9.	Data Analysis	HTML	Econometrics
10.	Blockchain	Scrum (Software Development)	SQL

United Kingdom

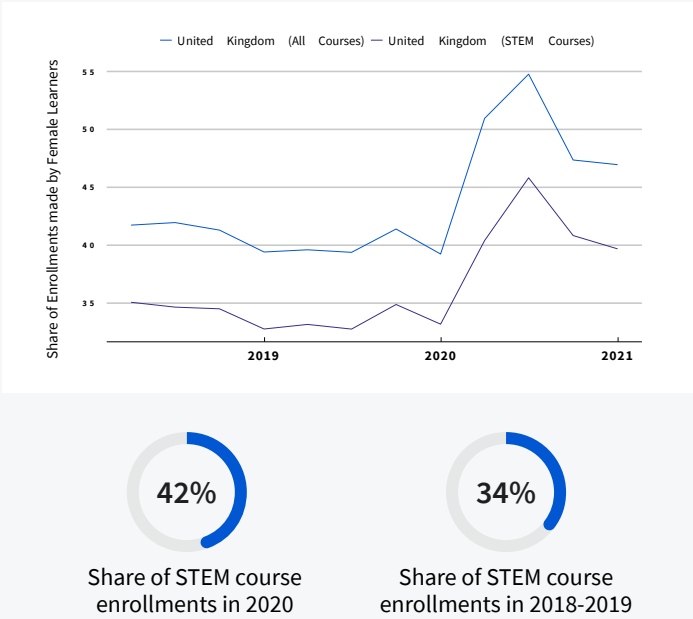
2.1M
Coursera Learners

33
Median Age

5.5%
of GDP spent on Education



Female Learner Trends



Top Courses

1.	The Science of Well-Being
2.	Machine Learning
3.	Learning How to Learn: Powerful mental tools to help you master tough subjects
4.	Financial Markets
5.	Introduction to Psychology
6.	Programming for Everybody (Getting Started with Python)
7.	COVID-19 Contact Tracing
8.	Introduction to English Common Law
9.	Modern Art & Ideas
10.	Introduction to Philosophy

Trending Skills

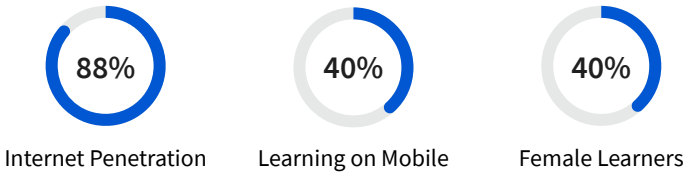
RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Programming Principles	Statistical Machine Learning
3.	Project Management	Design and Product	Probability & Statistics
4.	Marketing	C Programming	Machine Learning
5.	Data Analysis	Mathematics	Machine Learning Algorithms
6.	Digital Marketing	User Experience	Data Management
7.	Finance	Graphic Design	Applied Machine Learning
8.	Leadership and Management	Computational Thinking	Econometrics
9.	Writing	JavaScript	SQL
10.	Accounting	Web Development	R Programming

Germany

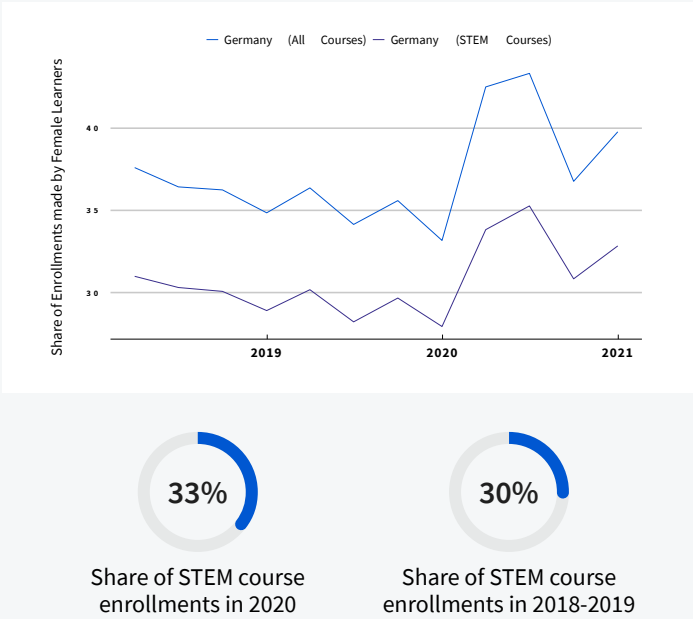
988K
Coursera Learners

32
Median Age

4.8%
of GDP spent on Education



Female Learner Trends



Top Courses

1.	The Science of Well-Being
2.	Machine Learning
3.	Learning How to Learn: Powerful mental tools to help you master tough subjects
4.	Programming for Everybody (Getting Started with Python)
5.	Neural Networks and Deep Learning
6.	Financial Markets
7.	English for Career Development
8.	Introduction to Psychology
9.	Social Psychology
10.	AI For Everyone

Trending Skills

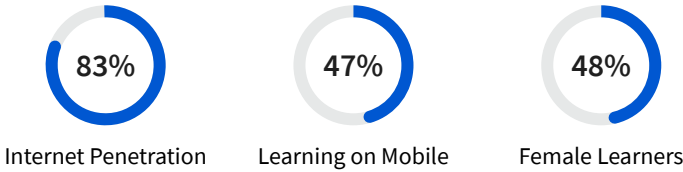
RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	C Programming	Statistical Machine Learning
3.	Project Management	Design and Product	Machine Learning
4.	Data Analysis	Programming Principles	Probability & Statistics
5.	Digital Marketing	MATLAB	Machine Learning Algorithms
6.	Marketing	JavaScript	Applied Machine Learning
7.	Finance	Computational Thinking	Data Management
8.	Tableau Software	User Experience	Deep Learning
9.	Leadership and Management	Mathematics	Econometrics
10.	Blockchain	Scrum (Software Development)	R Programming

Russia

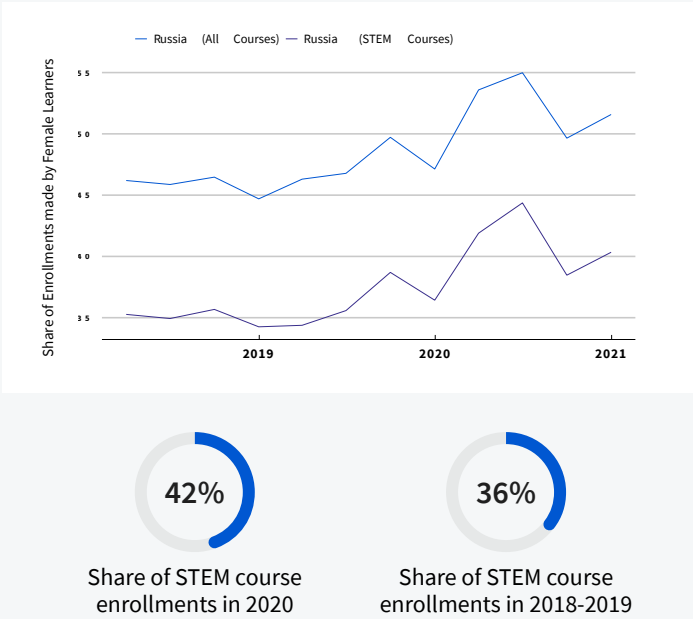
2.1M
Coursera Learners

31
Median Age

3.7%
of GDP spent on Education



Female Learner Trends



Top Courses

1.	Fundamentals of Python Programming
2.	Learning How to Learn: Powerful Mental Tools to Help You Master Tough Subjects
3.	Neurolinguistics
4.	English for Career Development
5.	The Science of Well-Being
6.	Economics for Non-Economists
7.	Machine Learning
8.	Fundamentals of Photography
9.	Mathematics and Python for Data Analysis
10.	Psychology of Communication

Trending Skills

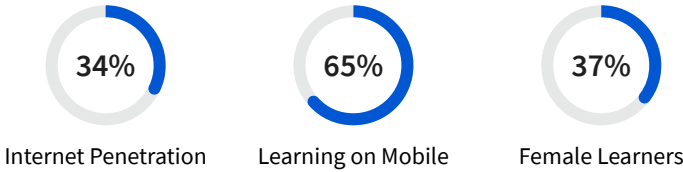
RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	C Programming	Statistical Machine Learning
3.	Project Management	Programming Principles	Probability & Statistics
4.	Marketing	JavaScript	Machine Learning Algorithms
5.	Digital Marketing	Design and Product	Applied Machine Learning
6.	Customer Analysis	System Programming	Econometrics
7.	Leadership and Management	HTML	Data Management
8.	Data Analysis	Computational Thinking	Machine Learning
9.	Human Resources	Mathematics	Probability Distribution
10.	Finance	User Experience	SQL

India

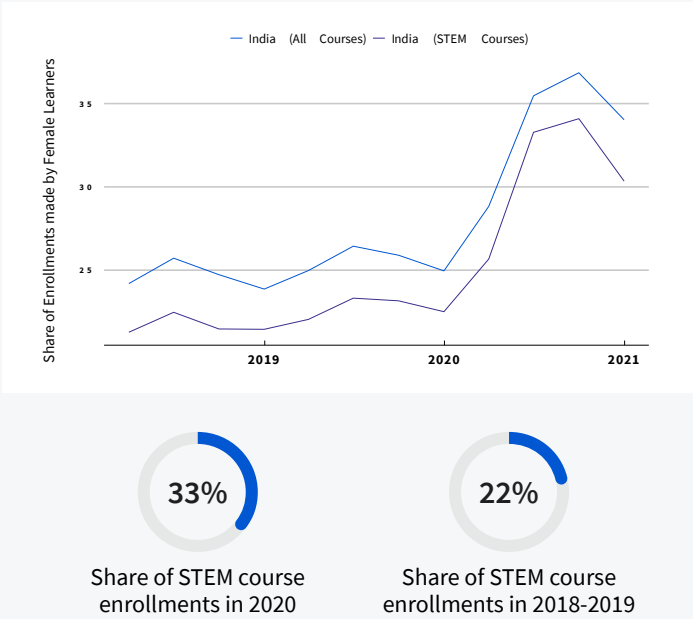
10.6M
Coursera Learners

27
Median Age

3.8%
of GDP spent on Education



Female Learner Trends



Top Courses

1.	Programming for Everybody (Getting Started with Python)
2.	Machine Learning
3.	English for Career Development
4.	Python Data Structures
5.	AI For Everyone
6.	Learning How to Learn: Powerful mental tools to help you master tough subjects
7.	Financial Markets
8.	Write Professional Emails in English
9.	Neural Networks and Deep Learning
10.	The Science of Well-Being

Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	C Programming	Statistical Machine Learning
3.	Digital Marketing	Programming Principles	Machine Learning
4.	Data Analysis	Data Structures	Probability and Statistics
5.	Finance	Web Development	Machine Learning Algorithms
6.	Blockchain	Design and Product	Applied Machine Learning
7.	Tableau Software	Microarchitecture	Data Management
8.	Marketing	Computational Thinking	Econometrics
9.	Project Management	JavaScript	Deep Learning
10.	Human Resources	Internet of Things	SQL

ASIA PACIFIC

Singapore

600K

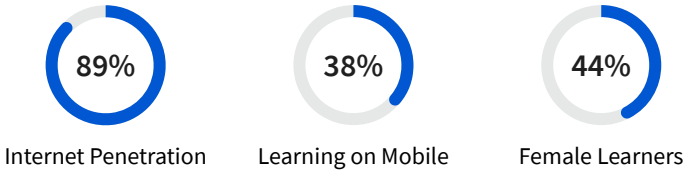
Coursera Learners

31

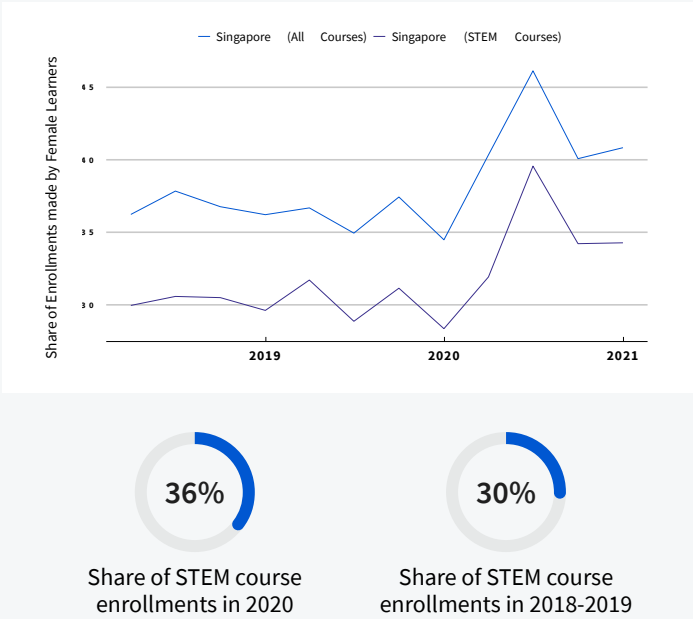
Median Age

2.9%

of GDP spent on Education



Female Learner Trends



Top Courses

1.	The Science of Well-Being
2.	Machine Learning
3.	Programming for Everybody (Getting Started with Python)
4.	First Step Korean
5.	Financial Markets
6.	AI For Everyone
7.	Learning How to Learn: Powerful mental tools to help you master tough subjects
8.	Introduction to Psychology
9.	Moral Foundations of Politics
10.	Planet Earth...and You!

Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Programming Principles	Statistical Machine Learning
3.	Data Analysis	C Programming	Probability and Statistics
4.	Digital Marketing	Design and Product	Machine Learning
5.	Tableau Software	Computational Thinking	Data Management
6.	Finance	User Experience	Machine Learning Algorithms
7.	Project Management	Mathematics	Applied Machine Learning
8.	Marketing	JavaScript	Data Visualization Software
9.	Accounting	Data Structures	SQL
10.	Blockchain	Algorithms	Econometrics

ASIA PACIFIC

Australia

967K

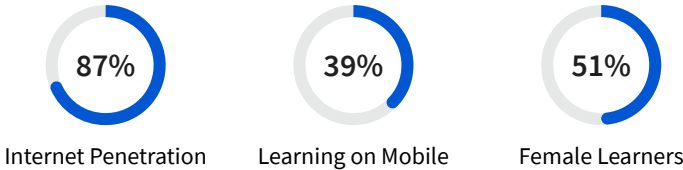
Coursera Learners

34

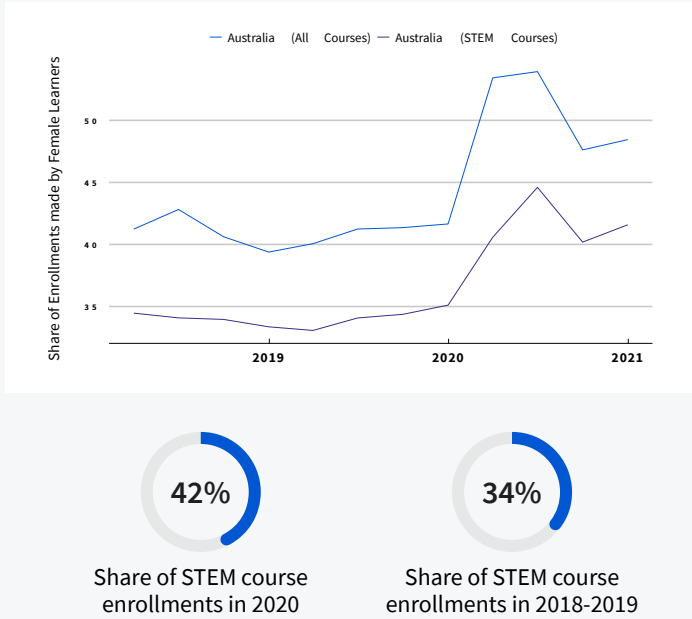
Median Age

5.3%

of GDP spent on Education



Female Learner Trends



Top Courses

1.	The Science of Well-Being
2.	Machine Learning
3.	Learning How to Learn: Powerful mental tools to help you master tough subjects
4.	Financial Markets
5.	Introduction to Psychology
6.	Programming for Everybody (Getting Started with Python)
7.	COVID-19 Contact Tracing
8.	Excel Skills for Business: Essentials
9.	Social Psychology
10.	First Step Korean

Trending Skills

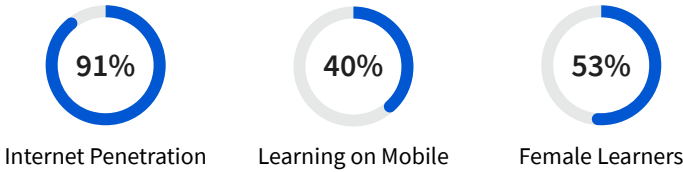
RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Programming Principles	Statistical Machine Learning
3.	Project Management	Design and Product	Probability and Statistics
4.	Data Analysis	Mathematics	Machine Learning
5.	Digital Marketing	C Programming	Data Management
6.	Marketing	User Experience	Machine Learning Algorithms
7.	Writing	Graphic Design	Applied Machine Learning
8.	Finance	Computational Thinking	SQL
9.	Tableau Software	JavaScript	Econometrics
10.	Business Analysis	Web Development	Data Visualization Software

New Zealand

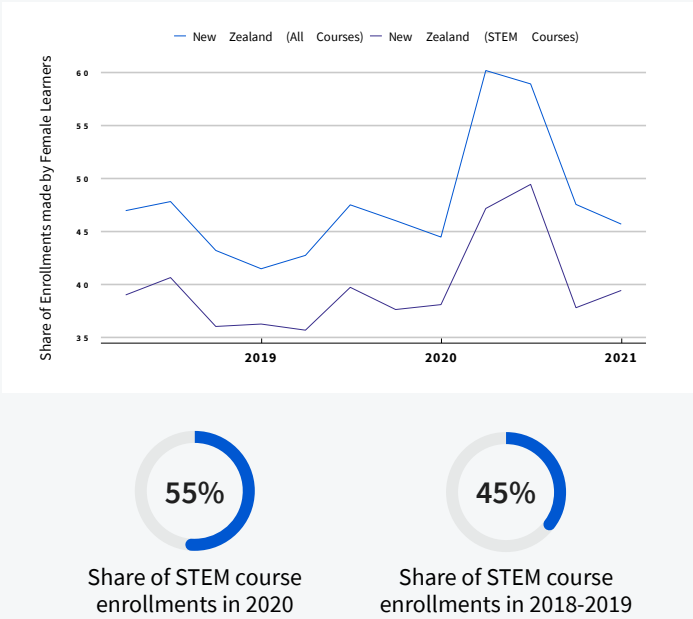
152K
Coursera Learners

34
Median Age

6.4%
of GDP spent on Education



Female Learner Trends



Top Courses

1.	The Science of Well-Being
2.	Learning How to Learn: Powerful mental tools to help you master tough subjects
3.	Machine Learning
4.	Introduction to Psychology
5.	Financial Markets
6.	Social Psychology
7.	COVID-19 Contact Tracing
8.	First Step Korean
9.	Successful Negotiation: Essential Strategies and Skills
10.	English for Career Development

Trending Skills

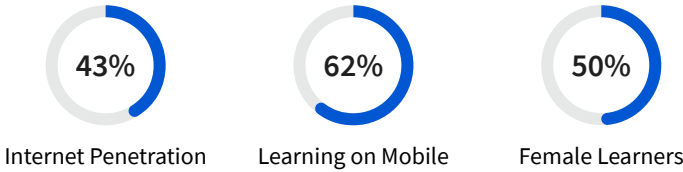
RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Design and Product	Statistical Machine Learning
3.	Project Management	C Programming	Probability and Statistics
4.	Digital Marketing	Programming Principles	Data Management
5.	Data Analysis	User Experience	Machine Learning
6.	Writing	Mathematics	Machine Learning Algorithms
7.	Marketing	JavaScript	Applied Machine Learning
8.	Accounting	Graphic Design	SQL
9.	Finance	Web Development	Econometrics
10.	Leadership and Management	Algebra	R Programming

Philippines

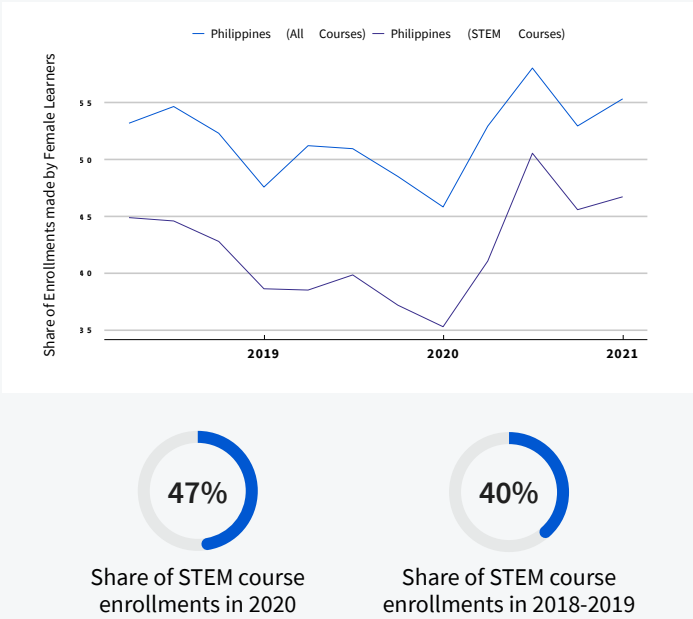
1.1M
Coursera Learners

29
Median Age

2.7%
of GDP spent on Education



Female Learner Trends



Top Courses

1.	COVID-19 Contact Tracing
2.	The Science of Well-Being
3.	First Step Korean
4.	Excel Skills for Business: Essentials
5.	Write Professional Emails in English
6.	Learning How to Learn: Powerful mental tools to help you master tough subjects
7.	Programming for Everybody (Getting Started with Python)
8.	Psychological First Aid
9.	English for Career Development
10.	Learn to Speak Korean 1

Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Design and Product	Statistical Machine Learning
3.	Project Management	Programming Principles	Probability and Statistics
4.	Digital Marketing	Graphic Design	Machine Learning
5.	Accounting	Search Engine Optimization	Data Management
6.	Marketing	Mathematics	General Statistics
7.	Leadership and Management	C Programming	Data Visualization Software
8.	Writing	Computational Thinking	Machine Learning Algorithms
9.	Social Media	Adobe Photoshop	Econometrics
10.	Data Analysis	Web Development	SQL

ASIA PACIFIC

Malaysia

347K

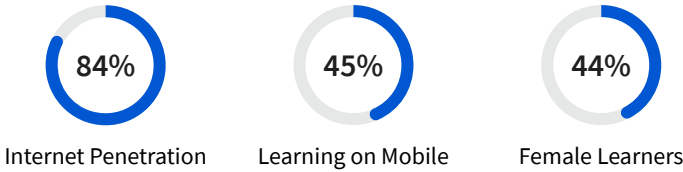
Coursera Learners

30

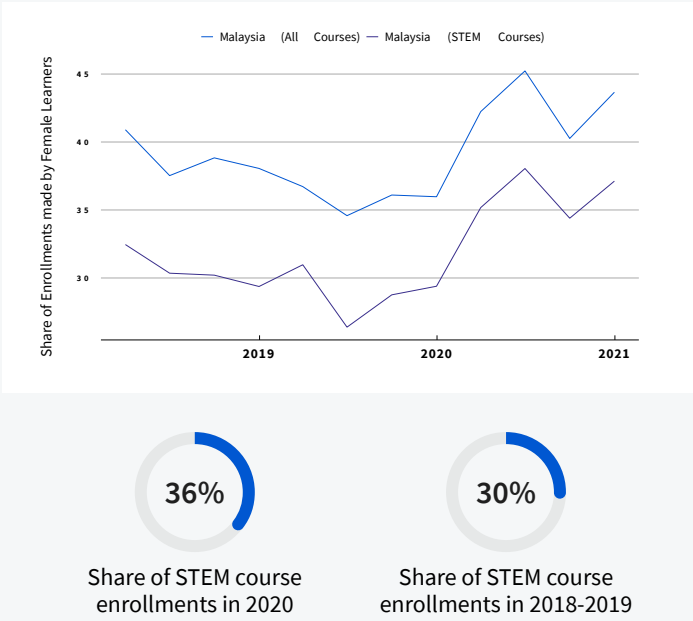
Median Age

4.7%

of GDP spent on Education



Female Learner Trends



Top Courses

1.	First Step Korean
2.	The Science of Well-Being
3.	Machine Learning
4.	Programming for Everybody (Getting Started with Python)
5.	Chinese for Beginners
6.	Learning How to Learn: Powerful mental tools to help you master tough subjects
7.	Financial Markets
8.	Successful Negotiation: Essential Strategies and Skills
9.	English for Career Development
10.	Introduction to Psychology

Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	C Programming	Statistical Machine Learning
3.	Digital Marketing	Programming Principles	Probability and Statistics
4.	Data Analysis	Design and Product	Machine Learning
5.	Finance	Computational Thinking	Data Management
6.	Project Management	JavaScript	Data Visualization Software
7.	Marketing	Mathematics	Machine Learning Algorithms
8.	Accounting	Internet of Things	Applied Machine Learning
9.	Tableau Software	Web Development	Econometrics
10.	Leadership and Management	Microarchitecture	SQL

ASIA PACIFIC

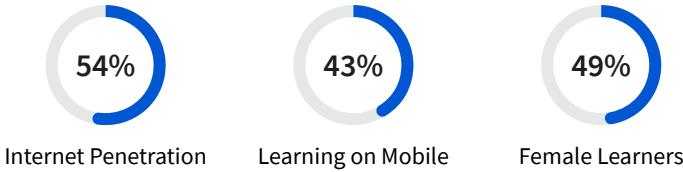
China

3.6M

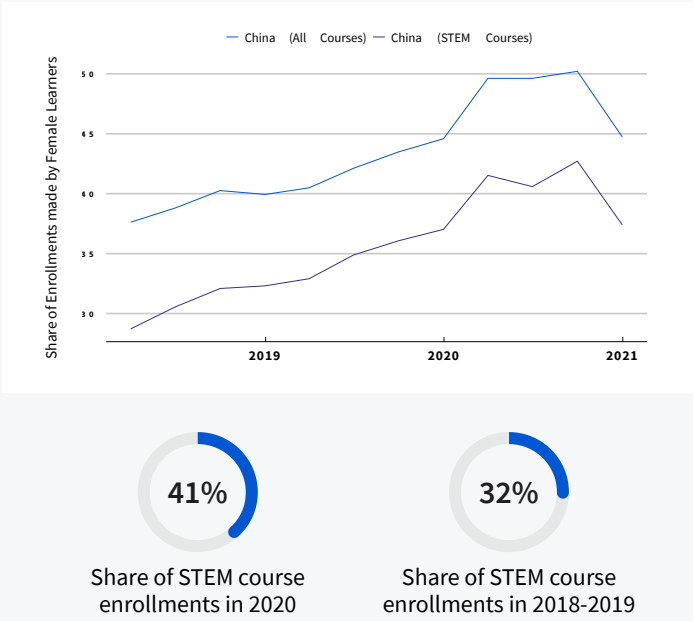
Coursera Learners

29

Median Age



Female Learner Trends



Top Courses

1.	Machine Learning
2.	Programming for Everybody (Getting Started with Python)
3.	The Science of Well-Being
4.	Financial Markets
5.	Learning How to Learn: Powerful mental tools to help you master tough subjects
6.	Algorithms, Part I
7.	English for Career Development
8.	Neural Networks and Deep Learning
9.	Introduction to Psychology
10.	Python Data Structures

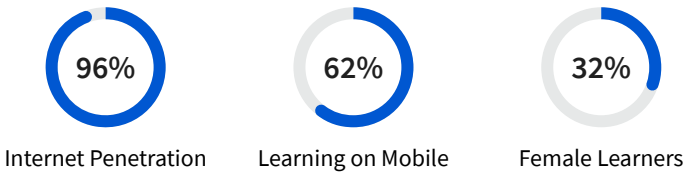
Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	C Programming	Statistical Machine Learning
3.	Finance	Programming Principles	Probability and Statistics
4.	Marketing	Algorithms	Machine Learning Algorithmst
5.	Tableau Software	Mathematics	Machine Learning
6.	Data Analysis	Design and Product	Applied Machine Learning
7.	Writing	Data Structures	Data Management
8.	Accounting	Linear Algebra	Deep Learning
9.	Business Analysis	MATLAB	Econometrics
10.	Learning How to Learn	Computational Thinking	R Programming

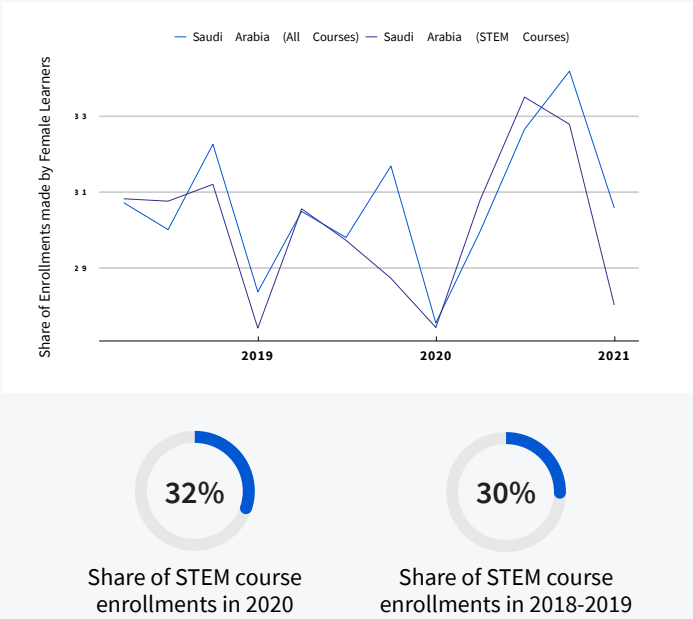
Saudi Arabia

489K
Coursera Learners

33
Median Age



Female Learner Trends



Top Courses

1.	Learning How to Learn: Powerful mental tools to help you master tough subjects
2.	English for Career Development
3.	Machine Learning
4.	The Science of Well-Being
5.	Understanding Research Methods
6.	Financial Markets
7.	Successful Negotiation: Essential Strategies and Skills
8.	COVID-19 Contact Tracing
9.	Programming for Everybody (Getting Started with Python)
10.	Write Professional Emails in English

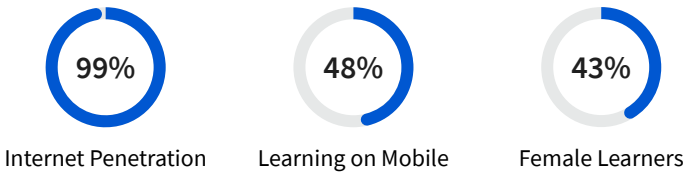
Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Design and Product	Statistical Machine Learning
3.	Project Management	C Programming	Machine Learning
4.	Data Analysis	Programming Principles	Probability and Statistics
5.	Digital Marketing	Graphic Design	Machine Learning Algorithms
6.	Marketing	Mathematics	Data Management
7.	Accounting	Microarchitecture	Applied Machine Learning
8.	Leadership and Management	Internet of Things	Econometrics
9.	Finance	Computational Thinking	Markov Model
10.	Human Resources	Web Development	Deep Learning

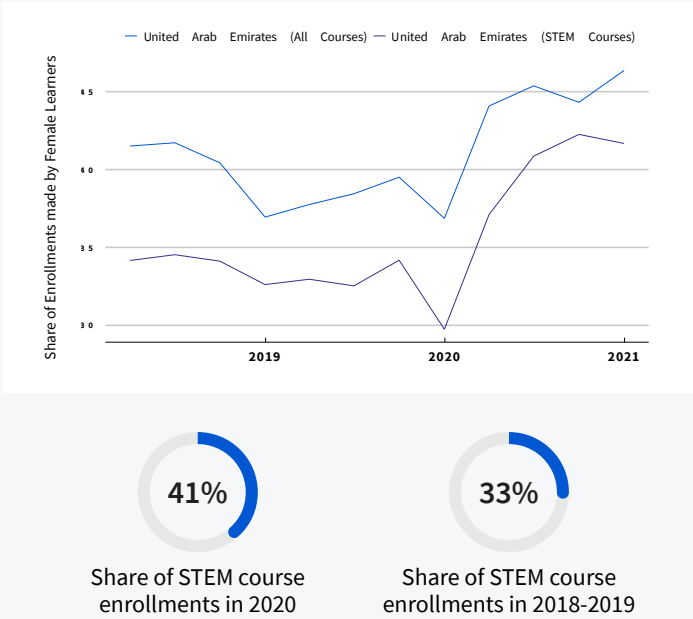
United Arab Emirates

441K
Coursera Learners

33
Median Age



Female Learner Trends



Top Courses

1.	The Science of Well-Being
2.	COVID-19 Contact Tracing
3.	Learning How to Learn: Powerful mental tools to help you master tough subjects
4.	English for Career Development
5.	Machine Learning
6.	Successful Negotiation: Essential Strategies and Skills
7.	Financial Markets
8.	Excel Skills for Business: Essentials
9.	Programming for Everybody (Getting Started with Python)
10.	Write Professional Emails in English

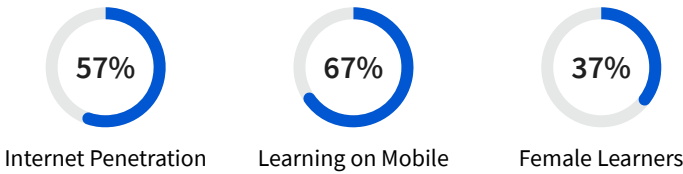
Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	Programming Principles	Statistical Machine Learning
3.	Digital Marketing	Design and Product	Machine Learning
4.	Project Management	C Programming	Probability and Statistics
5.	Marketing	Graphic Design	Data Management
6.	Finance	Mathematics	Machine Learning Algorithms
7.	Human Resources	Computational Thinking	Applied Machine Learning
8.	Leadership and Management	Adobe Photoshop	Econometrics
9.	Data Analysis	Microarchitecture	Statistical Visualization
10.	Accounting	Web Development	Data Visualization Software

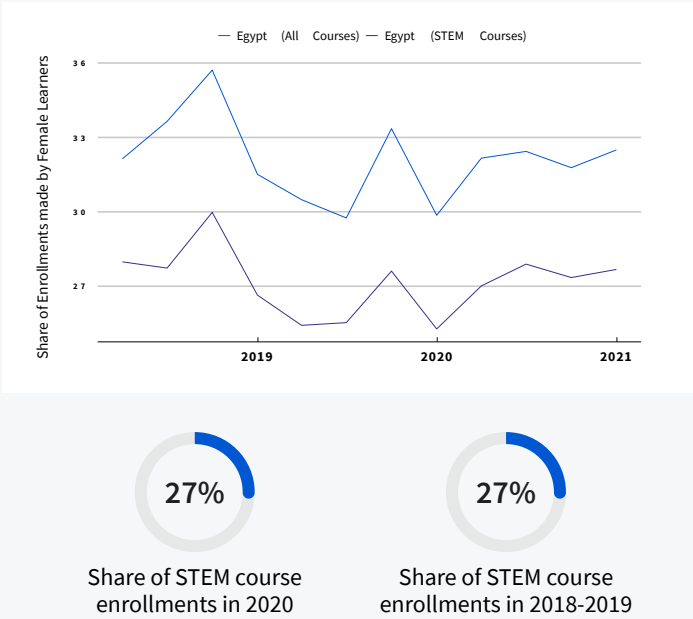
Egypt

1.3M
Coursera Learners

26
Median Age



Female Learner Trends



Top Courses

1.	English for Career Development
2.	Learning How to Learn: Powerful mental tools to help you master tough subjects
3.	Machine Learning
4.	Programming for Everybody (Getting Started with Python)
5.	Speak English Professionally: In Person, Online & On the Phone
6.	Write Professional Emails in English
7.	The Science of Well-Being
8.	Successful Negotiation: Essential Strategies and Skills
9.	Social Psychology
10.	Technical Support Fundamentals

Trending Skills

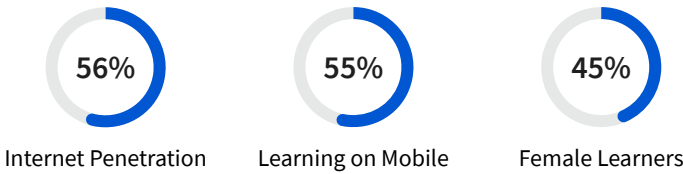
RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Microsoft Excel	C Programming	Statistical Machine Learning
3.	Marketing	Programming Principles	Machine Learning
4.	Digital Marketing	Design and Product	Probability and Statistics
5.	Human Resources	Adobe Photoshop	Machine Learning Algorithms
6.	Project Management	Computational Thinking	Applied Machine Learning
7.	Accounting	Graphic Design	Data Management
8.	Data Analysis	Data Structures	Econometrics
9.	Leadership and Management	Web Development	Deep Learning
10.	Sales	Microarchitecture	Markov Model

South Africa

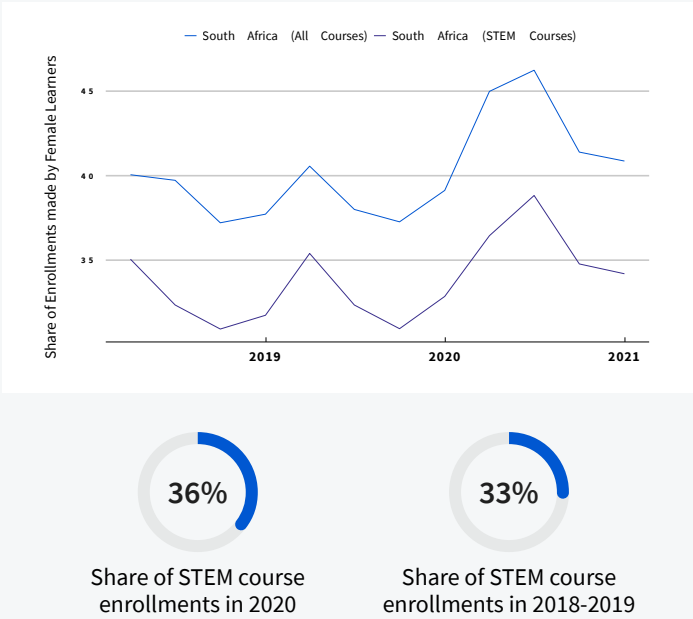
446K
Coursera Learners

34
Median Age

6.2%
of GDP spent on Education



Female Learner Trends



Top Courses

1.	The Science of Well-Being
2.	Machine Learning
3.	Learning How to Learn: Powerful mental tools to help you master tough subjects
4.	Financial Markets
5.	COVID-19 Contact Tracing
6.	Introduction to Psychology
7.	Programming for Everybody (Getting Started with Python)
8.	Social Psychology
9.	Technical Support Fundamentals
10.	Successful Negotiation: Essential Strategies and Skills

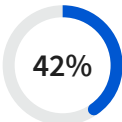
Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Project Management	Design and Product	Statistical Machine Learning
3.	Microsoft Excel	Programming Principles	Machine Learning
4.	Digital Marketing	C Programming	Probability and Statistics
5.	Leadership and Management	Web Development	Data Management
6.	Data Analysis	Graphic Design	Machine Learning Algorithms
7.	Marketing	Mathematics	Applied Machine Learning
8.	Finance	JavaScript	SQL
9.	Accounting	Computational Thinking	Econometrics
10.	Business Analysis	Computer Programming	Probability Distribution

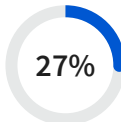
Nigeria

756K
Coursera Learners

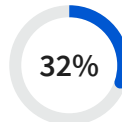
32
Median Age



Internet Penetration

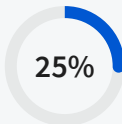
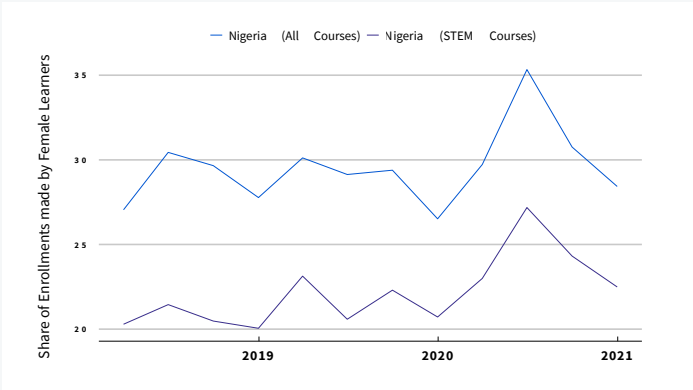


Learning on Mobile

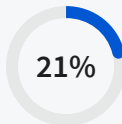


Female Learners

Female Learner Trends



Share of STEM course enrollments in 2020



Share of STEM course enrollments in 2018-2019

Top Courses

1.	Machine Learning
2.	Programming for Everybody (Getting Started with Python)
3.	Learning How to Learn: Powerful mental tools to help you master tough subjects
4.	Technical Support Fundamentals
5.	Financial Markets
6.	Successful Negotiation: Essential Strategies and Skills
7.	Excel Skills for Business: Essentials
8.	COVID-19 Contact Tracing
9.	The Strategy of Content Marketing
10.	English for Career Development

Trending Skills

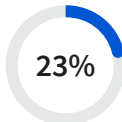
RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Project Management	Design and Product	Statistical Machine Learning
3.	Data Analysis	Graphic Design	Machine Learning
4.	Microsoft Excel	Web Development	Probability and Statistics
5.	Digital Marketing	Programming Principles	Data Management
6.	Leadership and Management	JavaScript	Machine Learning Algorithms
7.	International Business	Computational Thinking	Applied Machine Learning
8.	Human Resources	Product Management	Statistical Visualization
9.	Human Resource Management System	C Programming	Econometrics
10.	Business Analysis	Computer Programming	business analytics

Kenya

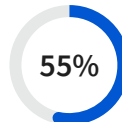
226K
Coursera Learners

32
Median Age

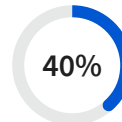
5.2%
of GDP spent on Education



Internet Penetration

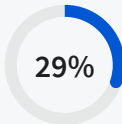
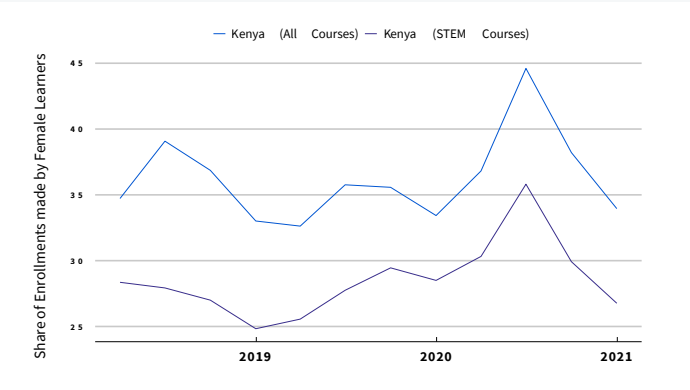


Learning on Mobile

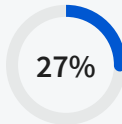


Female Learners

Female Learner Trends



Share of STEM course enrollments in 2020



Share of STEM course enrollments in 2018-2019

Top Courses

1.	Programming for Everybody (Getting Started with Python)
2.	Technical Support Fundamentals
3.	The Science of Well-Being
4.	Machine Learning
5.	Financial Markets
6.	Excel Skills for Business: Essentials
7.	Introduction to Psychology
8.	Initiating and Planning Projects
9.	Learning How to Learn: Powerful mental tools to help you master tough subjects
10.	Budgeting and Scheduling Projects

Trending Skills

RANK	BUSINESS	TECHNOLOGY	DATA SCIENCE
1.	Strategy and Operations	Theoretical Computer Science	Python Programming
2.	Project Management	Programming Principles	Statistical Machine Learning
3.	Microsoft Excel	Design and Product	Probability and Statistics
4.	Digital Marketing	Web Development	Machine Learning
5.	Data Analysis	JavaScript	Data Management
6.	Leadership and Management	Graphic Design	Statistical Visualization
7.	Marketing	Computer Programming	R Programming
8.	Finance	C Programming	Machine Learning Algorithms
9.	Accounting	Computational Thinking	Econometrics
10.	Budget Management	Data Structures	Applied Machine Learning

Technical Appendix

OVERVIEW

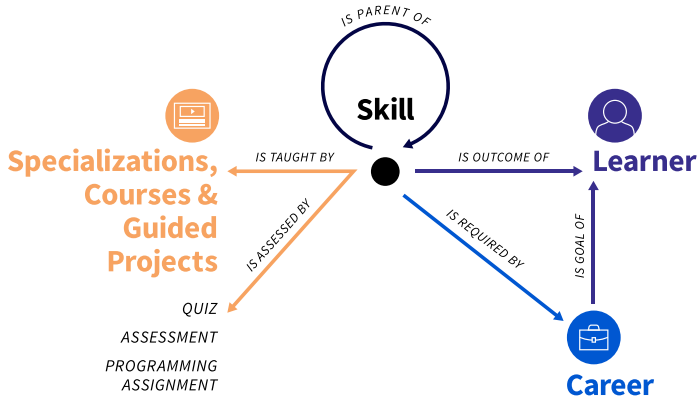
The Coursera Global Skills Report (GSR) assesses the skill proficiency of learners, measures which skills are trending globally, and identifies fields of study and roles engaging highly with the essential skills for the future of work.

This GSR report focuses on the 108 countries with the most learners on the Coursera platform. These 108 countries account for over 95% of learners on the Coursera platform. Building the GSR involves data from several components:

1. The Coursera Skills Graph
2. Skill Proficiency Scores and Benchmarking by Country
3. Correlations with Third-Party Data
4. Trending Skills
5. Over-Indexing Skills
6. Time to Skill and SkillSet
7. Half-Life of a Skill

THE COURSERA SKILLS GRAPH

The Coursera Skills Graph maps the connections among skills, content, careers, and learners on the Coursera platform.



For the Global Skills Index, we leverage the following parts of the Skills Graph:

Skill to skill: Describes the connections among skills and generates a skills taxonomy where broad, higher-level skills are parents of more granular, lower-level skills (see Figure 1).

Skill to content: Maps skills to the Coursera courses that teach them.

Skill to assessment: Maps skills to the graded items that assess them. Graded items on Coursera can be of several types: multiple choice quizzes, peer review assignments like essays and projects, or programming assignments.

Skill to learner: Connects competencies, i.e., Level 1 skills, to learners who have demonstrated them by passing relevant graded items. We measure this using a variant of the Glicko algorithm, described further below.

Relationships among skills

We assemble a vast skills taxonomy of over 38,000 skills in the subject areas of business, technology, and data science through a combination of open-source taxonomies like Wikipedia and crowdsourcing from Coursera educators and learners.

Guided by open-source data combined with knowledge from industry experts, we assemble a structured taxonomy that connects Coursera domains to the set of skills within them, ranging from competencies (granularity 2 skills) down to very specific skills (granularity 3+ skills). For the Global Skills Report, we focus on measuring performance at the competency level.

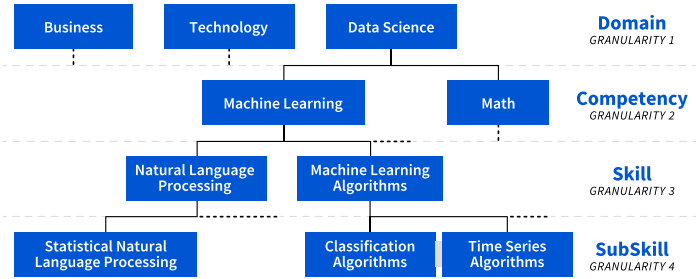


Figure 1: Sample Portion of Coursera's Skills Taxonomy

To illustrate the mapping among domains, competencies, and skills, Figure 1 shows a snapshot of a subsection of Coursera's Skills Taxonomy.

The full set of competencies for which we measure learner proficiency in the Global Skills Report, grouped by domain, are listed in Figure 2.

BUSINESS

Skills in this domain focus on the practice and day-to-day running of a business.

- 1) **Accounting** is about proper record keeping and communication of financial information for corporations in accordance with government regulations.
Sample skills: Auditing, Financial Accounting
- 2) **Communications** is the practice of discussion between two or more individuals in written or oral forms.
Sample skills: People Skills, Writing
- 3) **Finance** is focused on the efficient allocation of capital towards investment opportunities under conditions of risk or uncertainty.
Sample skills: Financial Ratios, Blockchain
- 4) **Management** is about how to set a company's strategy and coordinate the effort of employees.
Sample skills: People Management, Business Analytics
- 5) **Marketing** is the process of creating relationships with potential and actual customers, allowing businesses to identify how they should present themselves and who they should cater to.
Sample skills: Digital Marketing, Product Placement
- 6) **Sales** is focused on taking a company's products and services to market and transacting with actual customers.
Sample skills: Cross-Selling, Lead Generation

- 7) **Entrepreneurship** is the process of designing, launching and running a new business.
Sample skills: Adaptability, Innovation
- 8) **Strategy and Operations** consists of the planning and strategic work organizations undertake to grow and prosper.
Sample skills: Operations Management, Strategy

- 9) **Human Resources** refers to the corporate function of overseeing the various aspects of employment, such as onboarding/offboarding, labor law compliance, employee benefits, and talent acquisition.
Sample skills: Benefits, Employee Relations

TECHNOLOGY

Skills in this domain focus on the creation, maintenance, and scaling of computer systems and software.

- 1) **Computer Networking** is the process of creating a digital telecommunications network where connected devices exchange data with each other.
Sample skills: Cloud Computing, Internet of Things
- 2) **Databases** are an organized collection of data, generally stored and accessed electronically from a computer system.
Sample skills: Relational Database, Key Value Database
- 3) **Operating Systems** consists of building system software that provides common services for other types of computer programs.
Sample skills: Mobile App Development, C Programming Language
- 4) **Security Engineering** is a specialized field that focuses on the security aspects in the design of systems that need to be able to deal robustly with possible sources of disruption.
Sample skills: Cybersecurity, Cryptography
- 5) **Software Engineering** involves applying rigorous principles to the design, development, maintenance, testing, and evaluation of computer software.
Sample skills: Software Architecture, Software Development
- 6) **Computer Programming** is the process that professionals use to write code that instructs how a computer, application, or software program performs.
Sample skills: JavaScript, Java
- 7) **Theoretical Computer Science** focuses on mathematical aspects of computer science and the theory behind algorithms, data structures, computational complexity, and related topics.
Sample skills: Algorithms, Cryptography
- 8) **Cloud Computing** involves delivering computing resources, namely hardware, software, or software development platforms via the internet.
Sample skills: Software as a Service, Kubernetes
- 9) **Web Development** is the work involved in developing web sites. It can range from developing a simple static page to complex web applications such as e-commerce sites.
Sample skills: Angular, HTML and CSS
- 10) **Mobile Development** is the process of developing software applications for mobile devices such as mobile phones or tablets.
Sample skills: Android Development, iOS Development

DATA SCIENCE

Skills in this domain focus on capturing and utilizing the data generated within a business for decision-making and/or powering underlying products and services.

- 1) **Data Management** comprises everything related to managing and accessing data for reporting, analysis, and model building.
Sample skills: Cloud APIs, Hadoop
- 2) **Data Visualization** involves the creation and study of visual representations of data to communicate information clearly and efficiently.
Sample skills: Tableau, Plotting Data
- 3) **Machine Learning** creates algorithms and statistical models that computer systems can use to perform a specific task without explicit instructions.
Sample skills: Multi-Task Learning, Deep Learning
- 4) **Math** is the study of numbers and their relationships, applying these principles to models of real phenomena.
Sample skills: Calculus, Linear Algebra
- 5) **Statistical Programming** is the set of programming languages and tools used to create statistical models and algorithms.
Sample skills: R, Python
- 6) **Statistics** deals with all aspects of data collection, organization, analysis, interpretation, and presentation.
Sample skills: Regression, A/B Testing
- 7) **Data Analysis** is the process of inspecting, cleansing, transforming, and modeling data with the goal of discovering useful information, informing conclusions, and supporting decision-making.
Sample skills: Exploratory Data Analysis, Spatial Data Analysis

Technical Appendix (cont.)

Relationships between skills and content

The skills in the Coursera Skills Taxonomy are mapped to the courses that teach them using a machine learning model trained on a data set of university instructor and learner-labeled skill-to-course mappings. Features of the model include occurrence counts (e.g., in the lecture transcripts, assignments, and course descriptions) and learner feedback.

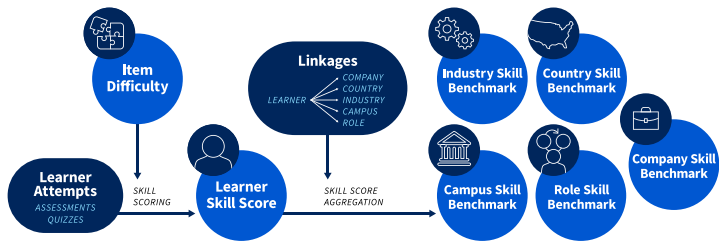
With over 2,500 courses in Business, Technology, and Data Science from top-ranked university and industry partners around the world, our catalog spans the wide variety of skills that are relevant to the competencies in this report.

For each skill-course pair, this machine learning model outputs a score that captures how likely it is that the skill is taught in the course. To define the set of skill-to-course tags that power this report, we tune a cutoff threshold based on expert feedback from our content strategy team.

When a skill within a competency is tagged to a course, we extract the graded items in that course as being relevant for assessing a given competency. These competency-to-assessment mappings were reviewed with industry experts to ascertain their fidelity and adjusted as needed. This final set serves as the pool we use to measure individual learners’ skill proficiencies.

COURSERA SKILLS BENCHMARKING

To benchmark skill proficiency at the country level, we first benchmark the skill proficiency of each learner in each skill. Then, we aggregate those proficiencies to compute statistics like the country skills proficiency in a particular skill.



Individual Skill Scores

With the set of assessments for each competency defined, we consider grades for all learners taking relevant assessments and train machine learning models to simultaneously estimate individual learners’ skill proficiencies (i.e., how proficient each learner is in each competency) and individual assessment difficulties (i.e., how challenging each

assessment is). Each skill has its own model to estimate these parameters.

This methodology allows us to measure learner skill proficiencies adjusting for item difficulty. This is essential because the Coursera platform contains a wide variety of courses ranging from the introductory college level to the advanced graduate level. Adjusting for item difficulty ensures we neither penalize learners for taking difficult courses nor over-reward learners for strong performance in easy courses.

Because learners attempt various numbers of graded items at various levels of difficulty, we also assess the precision with which we are measuring skill proficiency for each learner through the calculation of standard errors. The full details of our methodology for individual skill scoring are detailed in a public technical paper.

Country Skill Scores

With skill scores computed at the individual level, and linkages between users and countries, we are able to compute the country proficiency level for each of the skills in this report. We do this by taking a weighted average of the individual skill scores. For weights, we use the inverse standard errors from the individual skill scoring algorithm. This means that learners in whose scores we are more confident count for more in their country’s skill proficiency score than learners in whose scores we are less confident.

For computing the aggregate scores in Business, Technology, and Data Science, we take the average of the country scores in each of the competencies within those domains. Similarly, to get the overall score of a country for use in the correlations with third-party data, we take the average of that country’s Business, Technology, and Data Science scores.

We compare countries to each other via a percentile ranking of all skills proficiency estimates. Performance bands for a group’s skill proficiency are computed by segmenting skill proficiencies into quartiles:

- Cutting-Edge for 76th percentile or above
- Competitive for 51st to 75th percentile
- Emerging for 26th to 50th percentile
- Lagging for 25th percentile or below

Coursera’s 77 million registered learners span the globe and myriad industries, and the Global Skills Report reflects the average skill proficiency of learners in each country on the Coursera platform, accounting for the precision with which we measure each individual’s skill proficiency. Note that the Global Skills Report estimate may not reflect the average skill proficiency of all members within an entity because Coursera learners are not necessarily representative of a country.

CORRELATIONS WITH THIRD-PARTY DATA

Using the average skill proficiency of each country across Business, Technology, and Data Science, we are able to link our dataset at the country level with other country-level indicators. This allows us to correlate the rankings with external metrics of interest.

We take the following metrics from the World Bank:

- GDP per capita
- Share of individuals with access to the internet
- Share of income held by the top 10%
- Human Capital Index

We take the following metrics from the International Labor Organization (ILO):

- Labor force participation rate

We take the following metrics from the OECD:

- Program for International Student Assessment (PISA)

TRENDING SKILLS

We measure trending skills within each domain (Business, Technology, and Data Science), incorporating several measures of internal and external demand for each skill into a single, weighted index:

Learner Enrollments: The average enrollments per course by learners in content tagged to a particular skill.

Search Trends: The number of searches on Coursera by logged in learners for a particular skill.

Google Trends: The Google Trend Index for a particular skill, which provides a measure of search activity on Google pertaining to specific keywords and topics.

Within a given domain we calculate the above fields for each skill. To ensure all metrics are on the same scale, we first compute the z-score of each attribute within its domain and then generate a weighted average of z-scores to calculate the index value for a skill in a particular time period.

OVER-INDEXING SKILLS

To determine which skills learners are most interested in within a particular country group or job group, we look for skills that over-index in the number of enrollments. While trending skills reveal what is generally popular, over-indexing skills reveal what is **disproportionately** popular within a particular group.

The methodology is fairly straightforward and works as follows:

1. Compute the share of enrollments in courses teaching skill S overall (say 20%)
2. Compute the share of enrollments in courses teaching skill S from students within group G (say 30%)
3. Compute the “skill-quotient” of skill S for group G as (30% / 20% = 1.5)

We restrict to skills with greater than 1,000 enrollments to ensure the over-indexing skills are sufficiently popular (and then use the “skill-quotient” formula to show the ones that are uniquely popular within a given group of learners).

The notion of whether a course teaches a skill is derived from the Coursera Skill Graph, described earlier in this appendix.

TIME TO SKILL AND SKILLSET

In this report, we introduce a novel time-to-skill metric. For each skill, we set cutoffs for Beginner, Intermediate, and Advanced proficiencies based on the distribution of learner skill proficiencies of learners on our platform. Then, we know from learner behavior on the platform and our skill to course linkages in the skill graph how long each learner spends on assignments teaching a particular skill. Conditional on a learner reaching a level of proficiency (say Intermediate), we can measure how long they spent learning in courses teaching the relevant skill to reach the Intermediate level. Then, we take the median value over all learners reaching a particular proficiency level in a particular skill to come away with the time it takes a typical learner to learn this skill to a certain level. We call this metric “time to skill.”

Many learners who are making career changes don’t simply learn one skill, they learn multiple skills. This motivates the “time to SkillSet” metric. A SkillSet is a collection of up to six skills and proficiency targets that a learner should achieve to Reskill into a new career or Upskill within a current career path. To understand which skills are associated with which roles (and build SkillSets), we use a combination of job posting data and course enrollment data to understand what skills are most in demand for which roles. Once we have our SkillSets, we determine how long it might take someone to reskill into a Data Analyst role, we simply sum the time it would take them to learn each of the six skills in the Data Analyst SkillSet to the requisite proficiency level. For each job group in this report, we work with labor market experts to determine the relevant entry-level SkillSet for that field.

HALF-LIFE OF A SKILL

The half-life of a skill is defined as the number of years it takes for a skill to reach half its value in the labor market. We compute the half-life of a skill by combining Google search trends data with data from the Coursera Skills Graph.

Technical Appendix (cont.)

For each granularity 3 or below skill (EX: Fortran, a programming language), we examine the full Google search trend history for that skill. In the event that search interest in the skill peaked over three years ago, and the skill has consistently declined in search interest since then, we fit an exponential decay curve to the search trends. In the case of Fortran, visual inspection reveals the search interest takes a little under three years to halve each time and nicely fits an exponential decay curve.

We exclude skills that are not yet in decline and those whose decline pattern is not modeled particularly well by an exponential decay curve. To assess the half-life of a skill at the competency level, we take the median half-life of the more granular skills within each competency (EX: R programming rolls up into statistical programming). The relationships between skills in Coursera Skills Graph allow us to generalize the behavior of skills that were popular in the past to similar skills that are popular now, providing insights on what will happen to the trending skills of today and when students with today’s top skills will need to re-skill in the future.

Sources & Endnotes

1.

The Coursera data used covers platform activity between March 1, 2020 to Feb 28, 2021.

2.

ILO Monitor: COVID-19 and the world of work. Seventh edition. International Labor Organization. January 2021.

3.

Ibid.

4.

Pandemics and Automation: Will the lost jobs come back? IMF. January 2021.

5.

The Future of Work After COVID-19. McKinsey Global Institute. February 2021. Note: The eight countries featured in this study are France, Germany, Japan, Spain, United Kingdom, United States, China, and India

6.

The Work of the Future: Building Better Jobs in an Age of Intelligent Machines. Massachusetts Institute of Technology, Future of Work Initiative. January 2021.

7.

Job Polarization and Jobless Recoveries. National Bureau of Economic Research. November 2018.

8.

The Future of Work After COVID-19.

9.

The Fading American Dream: Trends in Absolute Income Mobility Since 1940. National Bureau of Economic Research. March 2017.

10.

The Work of the Future: Building Better Jobs in an Age of Intelligent Machines.

11.

Education Pays Off, but You Have to be Patient. International Labor Organization. January 2020.

12.

ILO Monitor: COVID-19 and the world of work. Seventh edition.

13.

COVID-19 and Gender Equality: Countering the Regressive Effects. McKinsey Global Institute. July 2020.

14.

The Scarring Effect of COVID-19 on Youth Unemployment in Europe. Bruegel. November 2020.

15.

The Future of Youth in the Era of COVID-19. International Monetary Fund. December 2020.

16.

Tackling the COVID-19 Youth Employment Crisis in Asia and the Pacific. International Labor Organization and Asian Development Bank. 2020.

17.

Measuring Digital Development: Facts and Figures. International Telecommunications Union. 2019.

18.

Individuals Using the Internet. World Bank Open Data. See the Correlations with Third-Party Data section for additional details.

19.

2020 Year in Review: The Impact of COVID-19 in 12 Charts. The World Bank Group. December 2020.

20.

The Reskilling Revolution: Better Skills, Better Jobs, Better Education for a Billion People by 2030. World Economic Forum. January 2020.

21.

Workforce Skills and Innovation: An Overview of Major Themes in the Literature. OECD Centre for Educational Research and Innovation. 2011.

22.

The Global Innovation Index. World Intellectual Property Organization (WIPO). 2020. See the Correlations with Third-Party Data section for additional details.

23.

Labor Force Participation Rate. International Labor Organization. 2020. See the Correlations with Third-Party Data section for additional details.

24.

Income Held by the Top Ten Percent. World Bank Open Data. See the Correlations with Third-Party Data section for additional details.

25.

GDP per Capita. World Bank Open Data. See the Correlations with Third-Party Data section for additional details.

26.

See the Technical Appendix. The top 25 over-indexing skills for Cutting-Edge countries are: People Analysis, Probability Distribution, Investment Management, Graph Theory, Linear Algebra, Brand Management, Bayesian Statistics, Risk Management, Critical Thinking, Artificial Neural Networks, Regression, Bioinformatics, General Statistics, Applied Machine Learning, Other Programming Languages, Social Media, FinTech, Probability & Statistics, Strategy, Market Research, Strategy and Operations, Design and Product, Deep Learning, Machine Learning Algorithms, and Business Analysis.

27.

Greening with Jobs: World Employment Social Outlook. International Labor Organization. 2018.

28.

Human Capital Index. World Bank Open Data. See the Correlations with Third-Party Data section for additional details.

29.

PISA 2018 Database. OECD. See the Correlations with Third-Party Data section for additional details.

30.

See the Time to Skill and SkillSet section in the Appendix for methodological details.

31.

The Unbounded University: Unlocking Opportunities through Online Learning. Coursera. 2021. See the Half-Life of a Skill section in the Appendix for methodological details.

32.

See the Distribution of Median Learner Hours chart.

33.

Future of Jobs 2020. World Economic Forum. October 2020.

34.

Which economies are most vulnerable to covid-19's long-term effects? The Economist. December 2020.

35.

Fortune Global 500. Fortune Magazine. 2020.

36.

The Digital Economy Report. United Nations. September 2019.

37.

Productivity & Innovation Competencies in the Midst of the Digital Transformation Age: A EU-US Comparison. European Commission. October 2019.

38.

Black neighbourhoods in Toronto are hit hardest by COVID-19. Global News Canada. June 2020.

39.

Association of Social and Demographic Factors With COVID-19 Incidence and Death Rates in the US. University of Michigan. January 2021.

40.

Applying a Racial Equity Lens to Digital Literacy. National Skills Coalition. December 2020.

41.

Table 7. Impact of Coronavirus Pandemic on Post-Secondary Educational Plans, by Reasons for Changes, Week 25. US Census Bureau. March 2021.

42.

What is the Price of College? National Center for Education Statistics. December 2019.

43.

It's Time to Rethink Education. Kaufmann Foundation. June 2020.

44.

Business and Professional Services. World Business Chicago. 2021.

45.

Silicon Prairie Takes Root in the Great Plains. The New York Times. December 2012.

46.

Bridging the Soft Skills Gap. US Chamber Foundation. 2018.

47.

Global Financial Centers Index. China Development Institute. September 2020.

48.

The Case for Growth Centers: How to Spread Innovation Across America. Brookings Institute. December 2019.

49.

The Future is Canada - and it's Open for Business. Wired Magazine. April 2019.

50.

Canada is Among the Most Secure Countries. Financial Post. March 2020.

51.

The 10 Best AI and Data Science Program. Forbes Magazine. February 2021.

52.

NAEP Report Card Analysis. Southern Education Foundation. 2019.

53.

PISA Canada Country Note. OECD. 2019.

54.

Pandemic Persistence Clouds Latin America and Caribbean Recovery. International Monetary Fund. October 2020.

55.

Exploring the Potential of Gender Parity to Promote Economic Growth. The World Bank. October 2020.

56.

Youth unemployment rates: a challenge for the future of work in Latin America and the Caribbean. International Labor Organization. August 2019.

57.

In Latin America, companies still can't find the skilled workers they need. World Economic Forum. 2017.

58.

Latin America Economic Outlook 2020: Digital Transformation for Building Back Better. OECD. September 2020.

59.

Supporting technology adoption through Sector Skills Councils. Interamerican Development Bank. December 2019.

60.

The Future of Work in Latin America and the Caribbean. Interamerican Development Bank. 2019.

61.

Greening with Jobs: World Employment Social Outlook. International Labor Organization. 2018.

62.

GlobalABC Regional Roadmap for Buildings and Construction in Latin America 2020-2050. International Energy Agency. July 2020.

63.

Fintech in Latin America and the Caribbean: Stocktaking. International Monetary Fund. March 2019.

64.

Digital Payments in Latin America. American Express. 2020.

65.

Brazil launches 'Pix' instant payments system, Whatsapp to enter 'soon'. Reuters. November 2020.

66.

Supporting SME Development in Latin America and the Caribbean. OECD. April 2019.

67.

Learning Better: Public Policy for Skills Development. Interamerican Development Bank. 2017.

68.

Future of Jobs 2020. World Economic Forum. October 2020.

69.

The Turning Point for Knowledge Services in Latin America. Nearshore Americas. July 2020.

70.

Time to Pivot: The Caribbean as a World Leader. Interamerican Development Bank. October 2020.

71.

Startup Chile Impact. Startup Chile. 2021.

72.

The Current and Upcoming Trends in Latin America's Mobile Growth. TechCrunch. October 2020.

Sources & Endnotes (cont.)

73. These Latin American Bootcamps are Teaching Girls to Code. World Economic Forum. March 2017.

74. TecnoLatinas: Latin America Riding the Technology Tsunami. Interamerican Development Bank. May 2017.

75. Venezuelan Migrants and Refugees in Latin America and the Caribbean. Migration Policy Institute. August 2020.

76. Five Latin American Nations Growing as Outsourcing Hot Spots. Nearshore Americas. April 2019.

77. All Children Count: Early Mathematics and Science Education in Latin America and the Caribbean: Overview report. Interamerican Development Bank. November 2015.

78. Digital Skills and Jobs: Shaping Europe's Digital Future. European Commission. March 2021.

79. The Global AI Agenda: Europe. MIT Technology Review. 2021.

80. UK Falling Back in Global Automation Race. International Federation of Robotics. May 2019.

81. Advanced Manufacturing. European Commission. 2021.

82. A Green COVID-19 Recovery and Resilience Plan for Europe. EY. September 2020.

83. Central, Eastern, and Southeastern Europe After COVID-19: Securing the Recovery Through Wise Public Investment. International Monetary Fund. September 2020.

84. Ibid.

85. COVID-19 and Human Capital: Europe and Central Asia Economic Update. The World Bank. Fall 2020.

86. Pioneering Reforms to Boost Skills and Jobs. Department for Education, Government of the United Kingdom. January 2021.

87. Growth in slow motion: Western Europe to lag behind global recovery average. The Economist Intelligence Unit. June 2020.

88. Digital resonance: the new factor influencing location attractiveness. Kearney. 2020.

89. UNDP and Coursera join forces to support 50000 Azerbaijani citizens who lost their jobs during COVID-19 gain new skills and knowledge. United Nations Development Program. September 2020.

90. Digital Skills and Jobs. European Commision. March 2021.

91. Connecting Europe Facility. European Commision. March 2021.

92. What is the demand for IT Outsourcing Services on the European market? Center for the Promotion of Imports, Dutch Ministry of Foreign Affairs. December 2019.

93. Building the Data Economy. European Commision. March 2021.

94. Finland continues its quest to teach 1 % of the world the basics of AI. University of Helsinki. October 2020.

95. Population, female (% of Total Population). World Bank Open Data.

96. Asia–Pacific Employment and Social Outlook. International Labor Organization. 2020.

97. ILO Monitor: COVID-19 and the world of work. Seventh edition. International Labor Organization. January 2021.

98. Measuring Digital Development: Facts and Figures. International Telecommunications Union. 2020.

99. ILO Monitor: COVID-19 and the world of work. Seventh edition.

100. Asia–Pacific Employment and Social Outlook.

101. Labor Force Participation Rate, Female. World Bank Open Data.

102. Navigating the Pandemic: A Multispeed Recovery in Asia. International Monetary Fund. October 2020.

103. When More Women Join the Workforce, Wages Rise Including for Men. Harvard Business Review. January 2018.

104. The Future of Retail in Asia. Bain & Company. August 2020.

105. Demystifying Asia Pacific Trade Trends. DHL. May 2016.

106. The Mobile Economy in Asia Pacific. GSMA. 2020.

107. Industry 4.0: Reinvigorating ASEAN Manufacturing for the Future. McKinsey. February 2018.

108. Ibid.

109. This is Asia's top-performing economy in the Covid pandemic — it's not China. CNBC. January 2021.

110. Global Financial Centers Index. China Development Institute. September 2020.

111. Australia lags behind Asia Pacific neighbours in skills, technology infrastructure: CEDA. Xinhua. September 2019.

112. Could Japan become a role model for the Fourth Industrial Revolution? World

Economic Forum. July 2018.

113. Japan group to bring quantum computers to the workplace. Nikkei Asia. July 2020.

114. Inside Indonesia's Cloud Awakening. CIO. June 2020.

115. Computer science skills across China, India, Russia, and the United States. National Academy of Sciences of the United States of America. April 2019.

116. Could Japan become a role model for the Fourth Industrial Revolution? World Economic Forum. July 2018.

117. National and International AI Strategies. Future of Life Institute. February 2020.

118. Recent Policies, Regulations and Laws Related to Artificial Intelligence Across Central Asia. University of Chinese Academy of Sciences; Ai Mo Innovation Consultants. October 2020.

119. Regional Economic Outlook: Middle East and Central Asia. International Monetary Fund. October 2020.

120. MENA Economic Update: Trading Together: Reviving Middle East and North Africa Regional Integration in the Post-COVID Era. The World Bank. October 2020.

121. Ibid.

122. Labor Force Participation Rate, Female. World Bank Open Data.

123. The Impact of COVID-19 on the Arab Region: An Opportunity to Build Back Better. United Nations. July 2020.

124. Global Employment Trends of Youth 2020: Arab States. International Labor Organization (ILO). 2020.

125. Ibid.

126. The Middle East & North Africa: From Transition to Transformation. The World Bank. April 2019.

127. Ease of Doing Business Rankings. The World Bank. 2020.

128. Abu Dhabi-Based Hub71 Raises Over \$50M For Startups In Two Years. Forbes Magazine. February 2021.

129. Saudi Arabia says foreign companies must have regional HQs in Kingdom to access government contracts. Arab News. February 2021.

130. A Skills beyond School Review of Israel. OECD. 2014.

131. Shining a Light on Cybersecurity Policy in the Middle East. Belfer Center, Harvard Kennedy School. February 2020.

132. Global R&D investments unabated in spending growth. R&D World. March 2020.

133. 5 Start-Up Hubs to Watch - Beyond Silicon Valley. World Economic Forum. October 2020.

134. Three Reasons Why VCs Should Be Investing in Tunisian Startups. Entrepreneur Middle East. February 2021.

135. Data Visualization Market - Growth, Trends, COVID-19 Impact, and Forecasts. Mordor Intelligence. 2021.

136. Digital stability: How technology can empower future generations in the Middle East. European Council on Foreign Relations. March 2020.

137. Stanford AI Index. Stanford University. 2021.

138. COVID-19 and Africa: Socio-economic implications and policy responses. OECD. May 2020.

139. COVID-19 has widened the gender poverty gap, says the UN. World Economic Forum. September 2020.

140. COVID-19 effects in sub-Saharan Africa and what local industry and governments can do. United Nations Industrial Development Organization. April 2020.

141. Youth Empowerment. Office of the Special Advisor on Africa, United Nations. 2020.

142. Winning in Africa's Agricultural Market. McKinsey. February 2019.

143. COVID-19 crisis amplifies the urgency for economic diversification in Africa. United Nations. September 2020.

144. The potential of manufacturing and industrialization in Africa. Brookings Institute. September 2018.

145. The Skills Balancing Act in Sub-Saharan Africa: Investing in Skills for Productivity, Inclusivity, and Adaptability. The World Bank. 2019.

146. Enugu-Bamenda Road, tool of regional integration and AfDB success story. African Development Bank. November 2013.

147. Rwanda: Country Overview. The World Bank. 2021.

148. Africa's Evolving Cyber Threats. Africa Center for Strategic Studies. January 2021.

149. The Mobile Economy: Sub-Saharan Africa. GSMA. 2020.

150. Outsourcing in Africa. Empower Africa. 2021.

151. About Code for Africa. Code for Africa. 2021.

152. 617 million children and adolescents not getting the minimum in reading and math. UNESCO. September 2017.

153. Global Startup Ecosystem Report. Startup Genome. February 2021.

154. Student Survey. Coursera for Campus. June 2020.

155. Jobs of Tomorrow: Mapping Opportunity in the New Economy. World Economic Forum. January 2020.

156. Programme for the International Assessment of Adult Competencies (PIAAC). OECD. 2021.

157. A Description of U.S. Adults Who Are Not Digitally Literate. National Center for Education Statistics. May 2018.

158. The Skills Needed for the 21st Century. World Economic Forum. 2015.

159. Navigating the future of work: Can we point business, workers, and social institutions in the same direction? Deloitte. July 2017.

160. The Cost of Cloud Expertise. London School of Economics. September 2017.

161. Global Content Marketing Market 2020-2024. Business Wire. February 2020.

162. Digital 2020: Global Digital Overview. The Next Web. January 2020.

163. Jobs of Tomorrow: Mapping Opportunity in the New Economy. World Economic Forum. January 2020.

164. Occupational Outlook: Software Developers. Bureau of Labor Statistics. September 2020.

165. 40 Stats On Digital Transformation And Customer Experience. Forbes Magazine. May 2020.

166. Engaging the Workforce. Deloitte. 2016.

167. Customer Expectations Hit All Time Highs. Salesforce Research. 2021.

168. Future of Sales 2025: Why B2B Sales Needs a Digital-First Approach. Gartner. September 2020.

169. Care work and care jobs for the future of decent work. International Labor Organization. June 2018.

About the Data Science Team at Coursera

The Data Science team at Coursera develops the statistical and machine learning models that power a personalized learning experience, leads the experimentation and inference that informs Coursera’s strategy, and builds the products to access data for the company’s university partners and enterprise customers.

The team has ideated and launched learner and enterprise-facing products powered by machine learning that have been covered in TechCrunch, Harvard Business Review, MIT Technology Review, and the World Economic Forum. See more of their work on the Coursera Data Blog.

THE DATA SCIENTISTS BEHIND THE GLOBAL SKILLS REPORT

Emily Glassberg Sands is the VP of Data Science at Coursera. Emily holds a Ph.D. from the Department of Economics at Harvard and a BA from Princeton. Her academic research blends experimentation, econometrics, and machine learning to better understand labor markets and consumer decision-making, and has been featured in the popular press including the New York Times, the Wall Street Journal, and National Public Radio. She is also a member of the World Economic Forum Council on New Metrics.

Rachel Reddick is a Staff Data Scientist working primarily on Coursera’s Skills Graph and related applications. Her recent emphasis has been on developing ways to measure the skills of learners and identifying suitable roles for them based on their developed proficiency. She has previously worked on Coursera’s search and recommendations algorithms. Prior to Coursera, Rachel got her Ph.D. in Astrophysics at Stanford.

Eric Karsten is a Data Scientist at Coursera. He works within the Insights and Research vertical, partnering with external university and NGO researchers to use Coursera’s data to answer valuable questions for the world. He also works with the Content Strategy team to forecast skills trends and content demand using signals from the Coursera platform. His work has been included in publications from the World Economic Forum. Eric holds an MA in Economics and a BA in mathematics, both from the University of Chicago.

coursera