A photograph of a man and a woman working together on a laptop. The man is on the left, looking at the screen. The woman is on the right, smiling and looking at the screen. They are in a modern office setting. The image is overlaid with a large purple and blue geometric shape that contains the title and subtitle.

READINESS FOR THE FUTURE OF WORK

An Overview of the 2035 Landscape
and the Emerging Policy Instruments
for Preparing Our Youth and Societies

ATKearney

 **MISK**
GLOBAL FORUM
منتدى مسك العالمي

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Executive Summary

With each historic revolution in the technologies of production, the global economy has undergone transformative shifts in the structure and dynamics of labor markets.

In the context of the 4th Industrial Revolution unfolding now, these structural shifts are unprecedented by virtue of technology’s remarkable advance into capabilities that were once the exclusive province of the human mind. And yet, like each revolution that preceded it, this one carries at least as many opportunities as challenges. However, it also demands that leaders and policymakers orchestrate the required preparation with new levels of strategic foresight and policy sophistication.

This report centers on two fundamental questions. First, what will be the key features of the future landscape of work in 2035? Second, what policies and strategies must leaders consider as they seek to prepare their youth and their societies for this very different future?

In answering these fundamental and urgent questions, this report – building on the work of the 2018 Global Youth Index¹ – focuses on both the perspectives of today’s youth as they prepare to face the future, and of national strategic readiness.

Strategic Context: Considering the broader set of contextual factors within which labor markets will operate, four global forces of change will be of fundamental importance in shaping the future of work.

- **The 4th Industrial Revolution:** This latest industrial revolution, and the disruptive technological breakthroughs it entails, will fundamentally alter the future of production and employment.
- **Growing Sustainability Imperative:** The growing impact of environmental change, and its long-term consequences in terms of both challenges and opportunities in relation to the future of work.
- **Socio-cultural Transformation:** Brought about by globalization, the increasing accessibility of knowledge and pervasive spread of social media, this trend is driving a fundamental shift in the mindset of emerging generations, including with respect to the social acceptability of new forms and models of employment.

- **Geo-economic Reordering:** Manifested on one hand by the return of economic nationalism and protectionism due to the highly unequal distribution of economic benefits from the prior phases of globalization, and on the other hand by the further integration of global data flows and regional connections, these changes form the most visible pattern of structural change in the long-term operating environment with profound consequences for the international labor markets.

These forces of change will not only shape the future of work, but will also influence the attitudes of young people towards it, posing new challenges and providing novel solutions for policymakers.

The Parameters of Change: Based on an extensive literature review and the survey results of the Global Youth Index, this paper examines four parameters that together constitute an analytic framework for understanding the future landscape of work:

- **Patterns of Technology-driven Job Displacement:** Of the jobs that will be categorically displaced by technologies and innovations, low-skill and middle-skill jobs are the most vulnerable due to a higher probability of automation. High-skill jobs have historically been less impacted by automation; however, they too are increasingly challenged by breakthroughs in AI and machine learning.
- **Patterns of New Job and Job Category Creation:** New job creation will most likely be driven by a combination of underlying economic drivers and the insusceptibility of certain human capabilities to automation. Sectors featuring demographically-driven demand, platform-driven service growth or positioned for innovation-driven new business model emergence will likely be the primary domains of new job generation.
- **Changing Task Composition of Labor:** Technology is anticipated to permeate the workplace at all levels, becoming an integral part of many, if not most jobs in the future. An increasingly prevalent role of human beings will be to manage machines and overcome engineering bottlenecks by virtue of relatively irreplaceable attributes and capacities including adaptability, creativity, critical thinking, social skills and even manual dexterity.
- **Landscape of Employment Models and the Future of the Firm:** Future employment models will be increasingly fluid, featuring a greater prevalence of part-time, remote and project-based work, with compensation increasingly based on outcomes rather than time logged. This emerging “platform economy” and the reduced transactions costs enabled by technology will also require companies to be more agile, adaptive and to keep ever more intensely for top talent.



1. Commissioned by the MISK Foundation

Fundamental Challenges: Today's youth, more educated and connected than ever before, are optimistic about their future prospects. However, countries vary dramatically in terms of how well they are preparing their young people for the future labor market, from optimizing education and employment support systems, to cultivating entrepreneurial, global and knowledge-based ecosystem. In particular, there are three fundamental challenges facing national and global leaders as they prepare their youth and societies for the future of work:

• Imbalance in Job Displacement and Creation Patterns:

With jobs and tasks increasingly displaced by automation, the relatively slow pace of new job creation will increase the risk of stagnant or jobless growth, placing added pressure on both the middle class and underprivileged populations and regions.

• Widening Gap between Education and Skill Demand:

As the dizzying pace of change creates demand for skills not currently supplied by traditional educational models, the potential for youth to achieve their full potential is being undermined systematically.

• Irreducible Uncertainty of the Future Labor Market:

The future work environment will be a function of a complex array of intersecting human individual and institutional choices on issues such as political dynamics, global competition, changing social norms, evolving markets and innovation. Taken together, this will create a global labor market in continuous flux demanding tremendous resilience and adaptive capacity of both individuals and societies

Strategic and Policy Priorities: Managing these challenges and mitigating the risks will require deep, comprehensive whole-society collaboration and a genuine partnership between the public, private and social sectors. This reality implies a new role for government: shifting from the direct

actor and employer of last resort to the orchestrator of the enabling environment – as referee, rule-setter and incentive manager. In the context of this new role for government, three categories of policy interventions are crucial in the near term:

• Job Generating Growth:

This broad economic growth category targets the development of three areas with the most potential to generate job growth: enduring growth sectors with demographically-driven demand, such as healthcare and education; those adjacent to current economic know-how that can be activated more easily; and the enablement of entrepreneurship, R&D and innovation-driven growth.

• Future Ready Youth:

This youth-focused category includes policies for revamping the education system and better preparing young people for the future labor market through interventions in the education system, curricula, learning environments, teachers' capabilities, and the transition between education and the workplace.

• Adaptive, Enabling Environment:

This category features policy instruments designed to create a protective environment for those who are unemployed or at risk of unemployment, an inclusive workplace for marginalized groups, and adaptive capacities that enable society to anticipate structural changes in the economy and respond smoothly and effectively.

In each of the categories above, this report presents a set of specific policy levers and tools for policymakers to consider, acknowledging that different countries in their unique development journeys will have different policy priorities and face different trade-offs. Finally, we explore the case of the Kingdom of Saudi Arabia and analyze the specific implications there for the future of work. It is our hope that the assessment and strategic policy levers presented here will be of value to global leaders seeking to proactively prepare youth today for the vast changes in the labor landscape of 2035.

About This Report

In today's world, youth under 30 comprise half of the world's population with a quarter of them under the age of 15. Most of these young people live in low and middle income countries and are growing up in a period of intensive technological and economic transformation. While these transformations are continually shaping educational systems, social constructs, and the working environment towards new levels of productivity, innovation, and prosperity, they also carry tremendous uncertainties. For many individuals and societies, these transformations raise the question of whether technological changes will undermine job prospects, render skills obsolete and limit the fulfillment of youth's aspirations.

To better understand these challenges in preparing youth for emerging opportunities and to help policymakers guide their societies through this historic transition successfully, MiSK Foundation and A.T. Kearney collaborated to shed light on the Future of Work and how we can prepare for it together.

Introduction

Context and Purpose: With each historic transition in the structure of the global economy, the future of work has emerged as a central focus of concern, and the current period, characterized by the 4th Industrial Revolution, is no exception.

The frame for much of today's discourse was provided by Fray and Osborne's 2013 study, which found that as many as 47% of jobs would be subject to automation². In the six years since, a number of significant subsequent studies that have provided a higher resolution, albeit still significantly uncertain map of the emerging landscape of work. One pertinent example is the 2018 Global Youth Index, which evaluates the challenges and opportunities for youth development in 25 countries representing 80% of the world's GDP. With 25,000 participants aged between 18 and 30, the Index gives insight into current global economic changes from the perspective of the world's youth, deepening our understanding of their attitudes towards the future. As part of the larger body of work now available, this makes it possible to consider the future of work from two perspectives that have previously lacked detailed exploration: 1) that of the young people whose careers will be shaped by the future working landscape; and 2) that of national strategic readiness. To date, there has been a great deal of work on potential policy interventions, but few analyses have stepped back to consider the requirements of national readiness as a whole, including the key choices and trade-offs facing national leaders. This report, based on an extensive review of recent academic literature and data from the Global Youth Index, seeks to explore these two perspectives and provide a framework of key policy considerations for national leaders seeking to prepare their youth and societies for the future of work in 2035.

An Urgent Strategic Imperative:

Across all studies of the future of work, even the most optimistic, there is consensus that the pace of change is accelerating in the structure of labor markets, the task composition of jobs, and the forms of employment. Thus, the 2035 global working environment will be significantly different in a number of ways, with profound consequences for policymakers in all countries. Preparation will therefore require clear strategic choices with difficult trade-offs between short and long-term priorities, the distribution of generational benefits, the benefits and costs of economic openness and competition, and much else. For many countries, particularly those with large youth populations, failure to navigate these choices successfully will risk not just reduced economic competitiveness and stagnant growth, but also social and political challenges because of the central role of labor market dynamics in the social contract. However, before these tradeoffs can be examined, it is necessary to first understand the overarching forces of change shaping the future of work and their likely implications for the 2035 landscape. These forces will be particularly significant for the global youth who will be most subject to and bear the consequences of these structural changes, but also have the greatest opportunities to shape them.



47%

Jobs in the U.S.
are subject to
automation

2. Carl Benedikt Frey and Michael A. Osborne, "The Future of Employment: How Susceptible Are Jobs to Computerisation?", 2013



The Emerging World of Work: Mapping the 2035 Global Landscape

The Forces of Structural Change

Before examining the 2035 future of work in terms of its key endogenous parameters, it is necessary to consider the broader set of contextual global factors within which labor markets will operate.

Because work is integral to all sectors of the economy and segments of society, the range of factors relevant to its trajectory is exceptionally wide. However, our analysis suggests that four global forces of change will be of particular importance in shaping the future of work in 2035.

• **4th Industrial Revolution and the Future of Production:**

A central disruptive force is the accelerating advance of technologies, in particular the increasing sophistication and affordability of advanced automated systems, and the combined potential of machine learning and artificial intelligence. These automating technologies are the direct drivers of labor displacement, but they are also part of the broader 4th Industrial Revolution and the changing structure of production emerging within it. These larger systemic changes are particularly relevant for the future of the work because they include a diverse set of routing and coordination technologies, such as the Internet of Things (IoT), that are expected over time to enable not just the automation of specific functions and tasks, but also ever larger segments of supply and value chains. By enabling the automation of manufacturing and the tasks associated with dynamically tracking, monitoring, inspecting and routing the flow of products, the 4th Industrial Revolution in 2035 will magnify the disruptive power of automation, machine learning and AI with respect to employment.

• **Growing Sustainability Imperative:**

Few pressures are likely to be of greater long-term consequence on the future of work than the growing imperative of environmental sustainability. Over 70% of the youth surveyed globally think that climate change will be

quite or extremely important in the future³. Increasing levels of pollution and more frequent extreme weather events including damaging storms, extended droughts, and flooding will profoundly impact the economy and society and, even by 2035, the costs of increased food and water insecurity – both direct and indirect – are likely to be considerable. [See Chart 1 – Cost of Extreme Weather Events] Coastal cities, which in many countries are critical centers of economic activity and employment, are particularly vulnerable. However, environmental challenges could also represent an opportunity for job creation as countries come to terms with the urgency of investing in resilience and sustainability, and public support for investment in adaptive strategies, for example in agriculture and water systems, grows.

• **Socio-Cultural Transformation:**

For several decades, the intertwined forces of globalization and technology have disrupted traditional social and cultural institutions around the world. The ever-widening accessibility of knowledge and the advance of social media in particular have created an environment in which new structures of identity and allegiance beyond the tribe, community and state are more readily available. Youth across the world, especially “Gen Z” – loosely defined as people born between 1995 and 2000 –, have come of age in a truly connected digital era. Their identities, for the first time in thousands of years of human history, are defined more by age than by the geography. One consequence of this is the changing mindset of the emerging generations, whose views about the employment landscape and their own professional trajectories will embrace far more flexibility – in the form of project-based, remote and short-term employment – than previous generations.

• **Geo-Economic Reordering:**

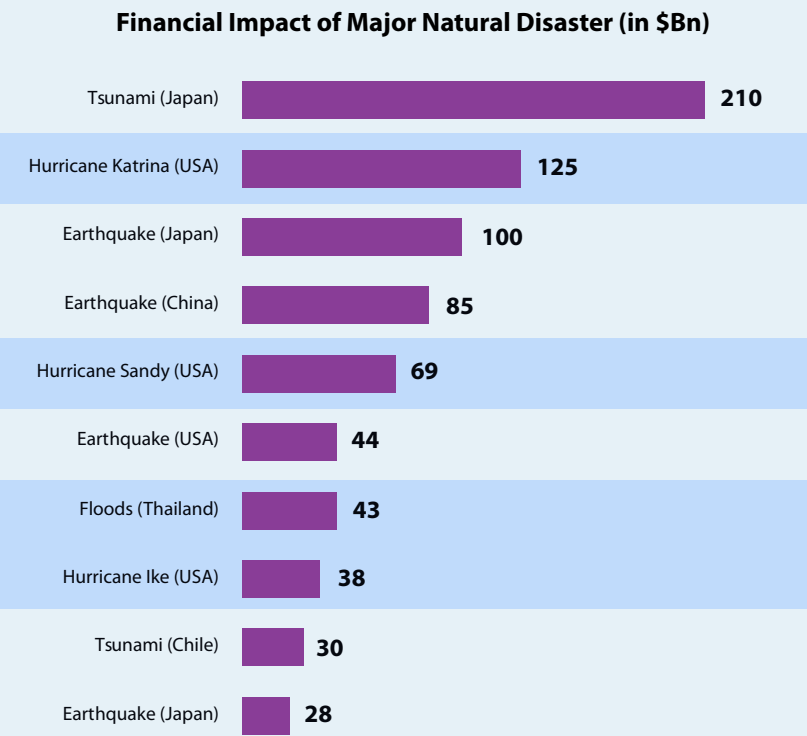
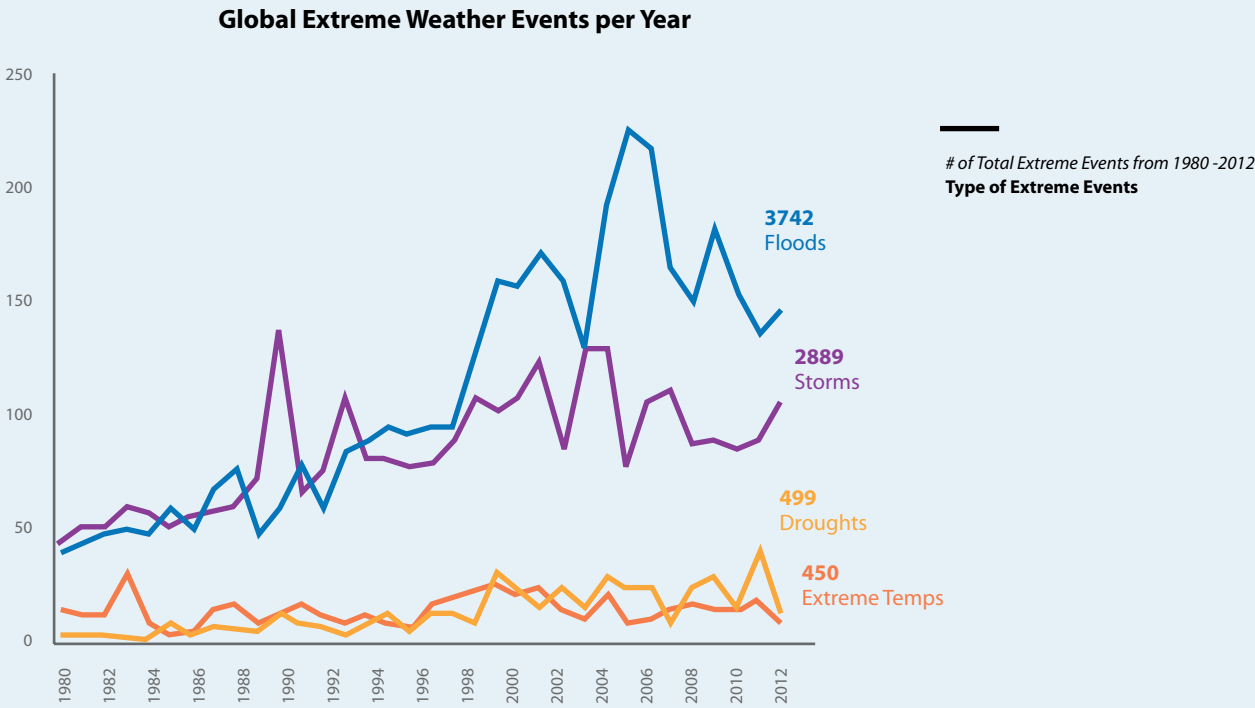
Today, perhaps the most visible structural pattern of change shaping the long-term operating environment is the evolution of globalization and the reordering of geo-economic dynamics. On one hand, globalization is now deepening beyond international and regional trade connections into the

3. Global Youth Index Survey, 2018

digital realm, generating increasingly integrated data flows. On the other, there is a return of economic nationalism and protectionism. According to OECD estimates, for example, the Group of Twenty (G20) countries have launched 1,224 new measures restricting trade since the global financial crisis, less than a quarter of which have since been lifted. This trend has many drivers, but central among them is the unequal distribution of economic benefits from prior phases of

globalization. The resulting frustration in many countries has transmuted into anti-globalization political movements. We are also witnessing the increasing use and growing sophistication of geo-economic instruments of power to achieve geopolitical objectives. Despite the potential short-term domestic benefits, this fragmentation and volatility could have profound consequences for trade and investment, global economic growth, and the international mobility of talent.

Chart 1 - Extreme Weather Events and Economic Impact



Sources: EM-DAT: The OFDA/CRED International Disaster Database; IPCC, Munich Re, NatCatSERVICE; A.T. Kearney analysis

The 2035 Global Work Landscape

This paper seeks to clarify the key characteristics of the future landscape of work and its implications for policymakers and individuals, especially the youth, who will be the backbone of the labor market in 2035.

Its orienting intent is to outline a set of anticipatory policy interventions that merit consideration by senior government and private sector decisions makers as they seek to prepare their youth, organizations and societies for this rapidly unfolding future. Based on an extensive literature review and the survey results of the Global Youth Index, we have identified four parameters that together constitute an analytic framework for understanding the emerging landscape in ways most useful in practical terms for policy design. Only by understanding these basic characteristics of the future labor market, can we begin to think about their broader social and political implications and design effective policy accordingly.

1. Patterns of Technology-driven Job Displacement

This parameter is the primary focal point of public debate and anxiety: the jobs and job categories most likely to be displaced wholesale by technology. With each major technological revolution, there have been deep anxieties about jobs being replaced by machines. As early as the 1930s, John Maynard Keynes offered a definition of the potential technological unemployment “due to our discovery of means of economizing the use of labor outrunning the pace at which we can find new uses for labor.”⁴ Just as many labor-intensive agricultural jobs were replaced by machines during previous phases of industrialization, today the threat to jobs is from robotics, AI, and other rapidly advancing technologies. Policymakers and citizens therefore need to understand what types of jobs will be most vulnerable to partial or complete displacement in order to mitigate the risk of social upheaval caused by new forms of unemployment.

The technology-driven displacement effect is described by Daron Acemoglu and Pascual Restrepo as a process by which “[automation], which enables capital to replace labor in tasks it was previously engaged in, shifts the task content of production against labor”⁵. As we will discuss later in this paper, the primary impact of this displacement will be to reshuffle the task composition of jobs. However, numerous studies⁶ have indicated that technology will also undoubtedly eliminate some jobs more completely, in terms of both sectors of the economy and specific professions. The pattern of these displacements is most relevant for policymakers from the perspective of skill levels. We anticipate, based on the common findings of many academic studies, that the degree of displacement will relate either to the proportion of routine, codifiable tasks they entail, or to the ability for the work to be conducted solely on the basis of pattern recognition.



What are the jobs and job categories most likely to be displaced by 2035?

4. Keynes, 1933, p. 3
5. Acemoglu and Restrepo, “Automation and New Tasks: The Implications of the Task Content of Production for Labor Demand”, 2018
6. Brookings, “Automation and AI: How Machines are Affecting People and Places”, 2019; Frey & Osborne 2013, OECD, “Social, Employment and Migration Working Papers”, 2018

Low-skill Job Displacement:

These professions include most service workers, shop sales workers and other elementary occupations.⁷ They require a minimal level of education, usually correlated with low wages, and are highly replaceable. In 2035, the most vulnerable jobs in this category will be those focused mostly on routine manual work that can be done by robots. In terms of sectors, we anticipate that agricultural, textile and apparel manufacturing, and mining will see the most job displacement. Manufacturing laborers, food preparation workers and cashiers are likely to be among the most impacted occupations. Overall, the displacement effect in this category is likely to be high, impacting an already fragile low-income populations.

Categories Impacted:

- Agricultural, Forestry and Fishery
- Textile and Apparel Manufacturing
- Mining

Occupations:

- Cashier
- Manufacturing Laborer
- Food Preparation Assistant



7. Definition based on OECD: High-skill occupations include jobs classified under the ISCO-88 major groups 1, 2, and 3. That is, legislators, senior officials, and managers (group 1), professionals (group 2), and technicians and associate professionals (group 3). Middle-skill occupations include jobs classified under the ISCO-88 major groups 4, 7, and 8. That is, clerks (group 4), craft and related trades workers (group 7), and plant and machine operators and assemblers (group 8). Low-skill occupations include jobs classified under the ISCO-88 major groups 5 and 9. That is, service workers and shop and market sales workers (group 5), and elementary occupations (group 9).

Middle-skill Job Displacement:

Jobs in this category entail some skills or techniques that must be learned in school or acquired through training. They often require a high school or college diploma and can be found in many sectors of the economy, from machine operators and assemblers in manufacturing, to office clerks in the service sector. The trend towards a “squeeze in the middle” while low and high-skill jobs continue to grow is likely to continue [See Chart 2-Labor Market Polarization]. This is based on the number of jobs that are conducted in a predictable environment, based on pre-defined processes, and that require a relatively low level of interpersonal skills, and/or physical or manual dexterity. The largest displacement effect is likely to be seen in sectors such as logistics, transportation and automotive manufacturing; and occupations including assemblers, machine operators, truck drivers and office administrators.

Categories impacted:

- Logistics & Transportation
- Automotive Manufacturing

Occupations:

- Assemblers
- Drivers and Mobile Plant Operators
- Payroll and Timekeeping Clerks

High-skill Job Displacement:

This category includes jobs in the managerial, professional, technical and related professions. They require higher education, years of training and have traditionally been safe from automation. However, given recent breakthroughs in machine learning, jobs that are based on information-gathering and pattern-identification – no matter how sophisticated – could also be at risk. For instance, AI-enabled translation will quickly replace many translators, and machine learning can increasingly train computers to detect cancers from pathology images more accurately than experienced pathologists⁸. Nevertheless, despite the fact that some high-skill jobs will experience disruption, most still require a combination of critical thinking, problem solving, managerial capabilities and adaptivity, which will remain beyond the capabilities of technology – at least in the short term.

Categories impacted:

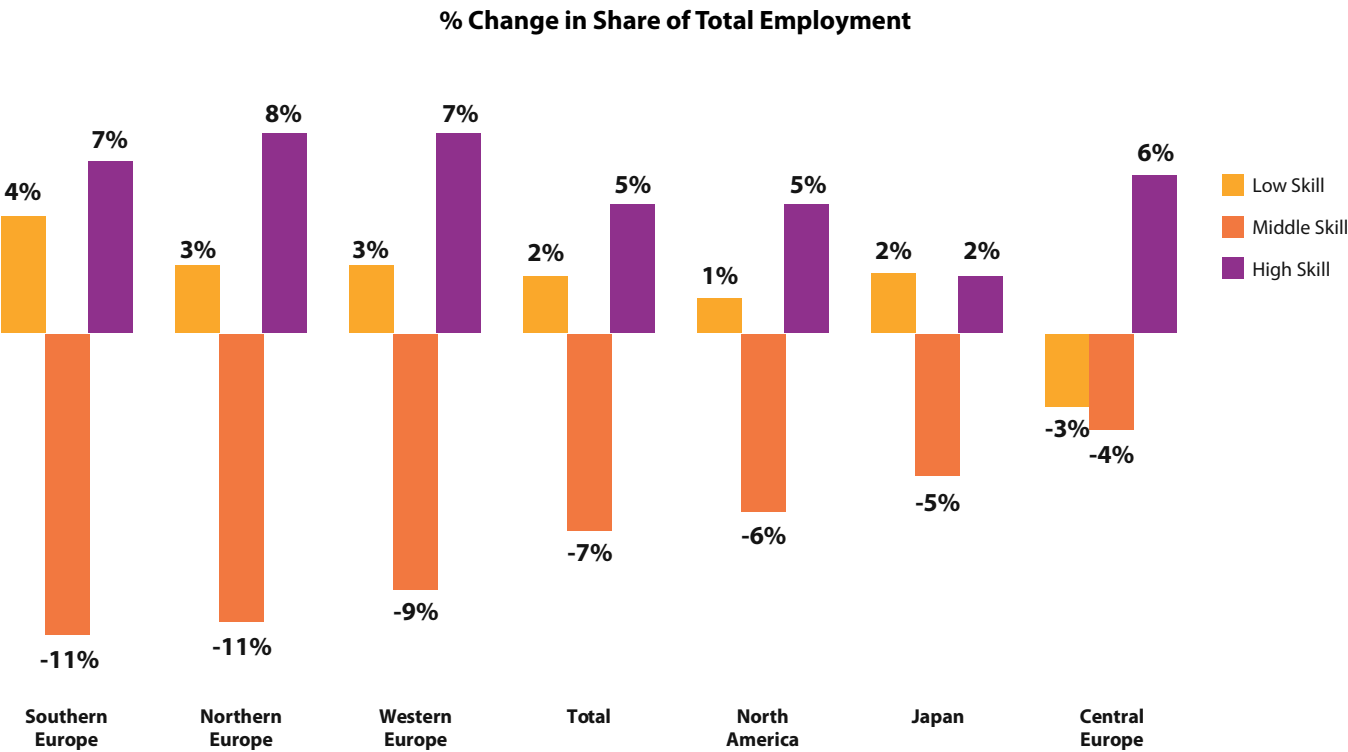
- Legal
- Healthcare

Occupations:

- Paralegal
- Pathologist
- Translator

Chart 2 - Labor Market Polarization

Selected OECD countries by region, 1995 to 2015



6. OECD, 2018



Overall, by 2035 the displacement effect will mostly be felt in low-skill and middle-skill jobs. In addition, the OECD predicts that the risk of automation is highest among teenage jobs, and therefore more likely to exacerbate youth unemployment⁹. Policymakers must consider these trends as they develop job creation strategies and identify new growth areas to mitigate the risks of technology-driven unemployment.

8. The Guardian: “AI cancer detectors”, 2018
9. OECD, 2018

2. Patterns of New Job and Job Category Creation

The new set of jobs, job categories and job-generating sectors that will be needed by 2035 is at least as important a consideration as job displacement. History has repeatedly shown that as jobs are displaced, others are created in their stead. Looking ahead, the future job creation landscape is deeply uncertain; however, by considering demographically-driven patterns of demand and job characteristics across various sectors, it is possible to anticipate which existing jobs and categories are most likely to grow, and broadly where new ones will emerge. Here, policymakers can be guided by Hausmann's work on economic complexity to consider markets that are adjacent to existing constellations of know-how at the country level. What is clear is that the generation of new jobs will be a function of underlying economic drivers and the relative insusceptibility of certain categories of bundled tasks (jobs) to automation.



What new jobs and job categories are most likely to be created in that timeframe?

Demand-driven Growth:

Demographic change and the demand patterns it drives will propel job creation in both new and existing sectors. For example, aging populations and increasing incomes in many countries will continue to open up larger markets for healthcare and personal care than ever before. Some studies predict that personal health aids and home health aides will see over 40% growth by 2026¹⁰. Many healthcare jobs require physical and manual skills, and rely heavily on interpersonal interactions, making them less likely to be replaced by machines. It is also expected that education and domestic work will experience high growth due to demographically-driven demand.

Categories impacted:

- Healthcare
- Education
- Domestic work

Occupations:

- Home Health Aides
- Child Care Workers
- Teachers

Platform-driven Growth:

Another potential driver of job generating growth is the increasing supply of goods and services through new technology platforms. WeChat, China's dominant messaging and social media app, facilitated the creation of more than 20 million jobs in 2017, more than twice the 2014 figure. Many of them are occupied by bloggers and entrepreneurs using their accounts to produce, publish and distribute content – more cheaply as in wholly new forms than they could before^{11,12}. With creative, content-driven roles also less susceptible to technology displacement, this type of platform-driven job creation is likely to be most pronounced in industries such as culture, entertainment and journalism.

Categories impacted:

- Media, Entertainment & Culture

Occupations:

- Performing Artist
- Social Media Influencer

10. U.S. Bureau of Labor Statistics

11. Wechat Impact Report, 2018

12. China Academy of Information and Communications Technology

Innovation-driven Growth:

Innovators do not generally comprise a large portion of the employment market, but the new opportunities they create are a critically important engine of its evolution. As David Autor points out¹³, novel tasks tend to be conducted by humans first because of our flexibility and adaptability to the environment. Once fully developed, they can be formalized, codified and automated. Thus, innovation can drive job-generating growth in existing sectors and create wholly new sectors. For example, as many countries struggle to mitigate the risks of environmental degradation, innovations in fields of renewable energy, recycling, waste management, infrastructure and alternative food processing are likely to see relatively faster growth than other sectors. It is estimated that this move towards a green economy could create net growth of 18 million new jobs by 2030¹⁴. However, to transform innovation into a dynamic labor force, both the public and private sectors must actively anticipate emerging trends, invest in R&D and facilitate the required infrastructure.

Categories impacted:

- Energy
- Advanced Technology
- Sustainability & Recycling
- New Categories

Occupations:

- Energy Engineer
- Wind Turbine Installation Worker
- New Occupations

In sum, it is likely that by 2035, countries with either an aging population or a youth bulge can expect to see growth in healthcare and education jobs. To some extent, this will be independent of policy choices as long as there is a stable political and economic environment. However, for countries to stimulate supply-driven job creation, enabling policy decisions will be needed to increase access to the digital infrastructure and lower barriers to entry. Finally, we will see a significant divide in job creation between countries that are able to unleash their innovation potential, and those that cannot.

13. David Autor, “Task Approach’ to Labor Markets”,2013
14. The International Labour Organization (ILO), “World Employment Social Outlook 2018: Greening with Jobs”



3. Changing Task Composition of Labor

Our findings suggest that most significant changes in the future of work from the perspective of both young people and policymakers will unfold in the third parameter, which focuses not on jobs, but rather tasks as the fundamental unit of analysis. As outlined by David Autor, Frank Levy, and Richard Murnane¹⁵, the impact of automation can be calculated with the Task Model, which treats every job as a bundle of tasks that can be separated and distributed across multiple agents, as opposed to thinking about the capacity of a single agent, either an individual or a robot. As most technologies are designed to complete specific tasks instead of replacing the function of an occupation, much of the change in the future of work is likely to involve changes in the task composition of jobs rather than their wholesale displacement. As Autor puts it, “tasks that cannot be substituted by automation are generally complemented by it.”¹⁶ By looking at task composition, we can paint a more accurate picture of how jobs will evolve in the future.



How will the task composition of jobs be altered?

15. David Autor, Frank Levy, and Richard Murnane “The Skill Content of Recent Technological Change: An Empirical Exploration.” The Quarterly Journal of Economics (2003)
16. David Autor “Why Are There Still So Many Jobs? The History and Future of Workplace Automation”

The logic in the changing task composition can be examined through two lenses. The first is engineering bottlenecks¹⁷, where tasks cannot be performed by machines due to technical constraints. Assuming that most non-engineering bottleneck tasks will eventually be automated, future labor will focus heavily on tasks that cannot be done by machines. The second lens contextualizes this abstract, but future-proof framework and divides tasks into five categories as a function of whether they are routine, non-routine, interactive, cognitive or manual¹⁸. The table below shows that in 2035, many routine manual and some routine cognitive tasks will be machine-driven, while human workers will perform more non-routine analytic, interactive and manual tasks.

Given the current trajectory, in 2035 technology will permeate the workplace at all levels, becoming an integral part of future jobs. The role of human beings will therefore increasingly be to work alongside machines and overcome engineering bottlenecks - conducting interactions with one another, engaging in critical thinking and problem-solving, and performing manual work that requires finger dexterity. In high-skill domains such as investment banking, associates will stop spending hours balancing financial statements and focus more on building relationships and designing transactions with the help of enhanced financial tools. At the low-skill end, home health aides will spend more time having conversations with and being companions for their customers, but spend less energy on physical tasks such as helping with patients’ mobility. Policymakers must consider these and other changes in task composition and cultivate labor force skills that are fit for these very different roles.

Task Category	Tasks / Skills	Task Automatability & Owner
Non-routine analytic	Developing, researching, designing, gathering information, investigating, documenting	Unlikely to be automated by 2035; Mostly done by humans
Non-routine interactive	Informing, advising, training, teaching, tutoring, educating, organizing, planning, preparing work processes, promoting, marketing, public relations, buying, providing, selling, be a supervisor	Unlikely to be automated by 2035; Mostly done by humans
Routine cognitive	Measuring, controlling, quality checks	Likely to be partially automated by 2035; Augmented task done by both humans and machines
Routine manual	Fabricating, producing goods, supervising, controlling machines, transporting, stocking, posting	Highly likely to be automated by 2035; Mostly done by machines
Non-routine manual	Repairing, patching, nursing, healing, serving	Unlikely to be automated by 2035; Mostly done by humans

17. Based on Frey and Osborne (2013), engineering bottlenecks include fine arts, originality, negotiation, persuasion, social perceptiveness, assisting and caring for others, manual and finger dexterity
18. Based on Autor, Levy and Murnane's task-based framework first proposed in 2003, and German skills data from the German BIBB/IAB- and BIBB/BAuA Survey Employment Surveys 1998/99, 2005/06, 2011/12



4. Landscape of Employment Models and the Future of the Firm

Finally, the forms of employment and the very nature of the firm will also change by 2035.

In a world where the transactional costs of complex coordination that previously were a central driver of firm formation are being radically reduced by the 4th Industrial Revolution, the explosion of new employment models already underway is likely to intensify. We have already seen companies such as Uber deeply disrupt the landscape of employment models and the relationship between employers and the

workforce. We anticipate that the interactions between employers, employees and machines will undergo even more significant structural changes. One related consideration for policymakers will be how large corporate and small and medium enterprises react to changing patterns of labor supply. Shifting corporate structures and employment benefits are likely to have significant implications not only for the economy and labor market, but also for the social and political landscape. Here we examine four dimensions of work, each of which has an emerging trajectory that, in combination, suggest how the landscape of employment models may look in 2035.

Time:

In 2035, the total time dedicated to a specific job will decrease, largely enabled by technology-driven increases in productivity that complement human contributions and free up more time for people in a given job. More people will be able to engage in part-time rather than full-time jobs, and even those who are employed full-time will be able to enjoy shorter working days and longer weekends for leisure.

Presence:

More jobs exist outside of the office environment, and physical presence will no longer be required by most employers. Cheaper communication tools and better connectivity have already made it possible for ever more tasks to be done remotely and for workers to transmit their output without any significant deterioration in quality. The demise of “presenteeism” will give more freedom for people to work where they want to, and give rise to telemigration, in which white-collar workers will sell their labor services across borders without physically migrating to another country¹⁹.

Goal:

The nature of work in 2035 will be increasingly result-oriented rather than process-oriented. As technology and process innovations increasingly replace routine tasks, more people will be focused on sequential execution of specific projects, rather than performing the same function or processes in a permanent position.

Compensation:

With more people working on projects with shorter time frames, employees will be compensated based on the output of their work, rather than receiving a fixed salary according to the time logged. And, as a result, companies will become more flexible and agile through contractual arrangements that incentivize higher productivity and quality.

To summarize, in 2035 employment models will be much more fluid. There will be an emergence of what is alternately called either the “gig economy” or the platform economy. This report uses the latter term to describe an environment characterized by diverse temporary contract and freelance models and the shrinking of lifelong employment models as digitally mediated platforms reshape labor participation. The future labor market will be one in which employers can locate and access the skills and talents they demand much more efficiently. At the same time, previously marginalized groups such as women, minorities and the disabled, will be able to engage in the workplace on more flexible terms, leading to a more inclusive labor market overall. Moreover, the increasing cross-border

nature of employment transactions will mitigate immigration concerns in some developed countries, significantly strengthening economic performance and increasing the international competitiveness of regions with an underutilized talent pool at the same time. For example, Vietnam’s Business Process Outsourcing (BPO) industries have seen consistent annual growth of 20% to 25% for the past decade, and the country jumped five places in A.T. Kearney’s 2017 Global Services Location Index, largely because of its cheap labor and the availability of well-educated young Vietnamese who are fluent in English²⁰. Such examples are only the beginning of what will be a profoundly important trend.

While employers will enjoy more freedom in the future to create incentive schemes with increasingly fluid employment models, this trend could also diminish job security and lead to inadequate worker protections if not regulated properly. As the power of employers grows, destabilizing labor market dynamics, it is likely that balancing trends towards new powerful forms of labor organization and the increasing provision of social protections will emerge. Policy makers will need to navigate these changes in dialogue with labor unions and civil society organizations. This potential growth in social protection may itself be a source of job creation, given the highly interpersonal nature of jobs such as counselling and social advocacy.



Flexibility in the employment model could give more power to employers and diminish job security and lead to inadequate worker protections if not regulated properly.



19. Richard Baldwin, “The Globotics Upheaval: Globalisation, Robotics and the Future of Work”, 2019
20. 2017 A.T. Kearney Global Services Location Index-The Widening Impact of Automation

Early Signals of Change: The Future of the Work from the Perspective of Today's Youth

Currently, 50% of the world's population are under the age of 30, and 90% of them live in developing countries.

As such, facilitating the youth to develop appropriate skills as the society transitioning to the knowledge economy remains a serious matter for most countries to grapple with. Furthermore, young people are growing up during a period of intensive technological and economic transformation, and despite the diversity of their experiences around the world, they also share multiple challenges including the threat of environmental degradation and a future economy in which jobs will be constantly reshaped by technological innovation²¹.

• Work-Related Orientation, Preferences and Expectations:

The Global Youth Index reveals that despite these challenges, younger generations remain unapologetically optimistic – about education, their economic future, and the confidence that they will have an impact on their individual situations and on world issues. Interestingly, this optimism is more prevalent in developing countries. Regarding the future of work, at least two thirds of the survey participants in every country said that new technologies, such as automation and artificial intelligence (AI), presented more of an opportunity than a threat to their society, while more than three-quarters expressed positive attitudes to lifelong learning and viewed education as essential for success. Overall, across the countries covered, 82% of individuals were positive about lifelong education and 79% said education is necessary for success. This optimism also carries to entrepreneurship. Finally, more than three-quarters (78%) agreed that taking a risk for the right reasons is acceptable, and more than two-thirds (68%) said they would like to start their own business someday, strong indicators of entrepreneurial orientation.

• Preparedness for the Labor Market:

Despite this widespread optimism, the readiness for transitioning our youth to the knowledge economy is facing huge deficits globally. Young people around the world are finding it increasingly difficult to move from education into work. In fact, the rate of youth unemployment is increasing,

having reached 13.1% in 2017, and today there are more young people not in education, employment, or training (NEET) than ever before. Furthermore, those aged between 15 and 24 are nearly three times more likely to be unemployed than those aged between 25 and 55.

• Key Differences by Country:

The ability for young people to access high quality employment varies dramatically by country. For example, in Germany, the youth unemployment rate stands at just 6%, while in South Africa it is 57%. In more general terms, there are very different trends affecting those residing in developed economies versus those in developing economies, with measures such as overall unemployment, infrastructure, economic growth and gender inequality revealing a large gap between wealthy and less wealthy countries.

Taken together, these insights reveal important opportunities for policymakers. The pace of change, along with young people's optimism regarding their future economic prospects and upcoming trends such as AI, lifelong learning, and entrepreneurship, reveal a clear path for policymakers to initiate change promptly. This is an especially urgent opportunity for developing countries, where youth perceptions of economic opportunity are more positive than in advanced economies. For governments to capitalize on this optimism, they should develop programs to develop skills inside and outside the formal education system, in addition to

providing the right ecosystem for the knowledge economy to spur the growth of 'future-proof' jobs. However, transitioning youth to the future of work should not be considered purely the responsibility of the public sector; the private sector must also play its part. In fact, the role of private sector investments in lifelong learning, with a focus on digital and 21st century skills, is paramount to ensure that young employees' optimism is realized in a future that requires them to be flexible and resilient enough to adapt to changes that have not yet been imagined. If public and private entities can align to capitalize on the optimism of the world's youth, the challenges of the transition could instead become opportunities.

50%

of the world's population are youth

90%

of them live in developing countries

21. See Global Youth Index website for details



82%

of individuals were positive about lifelong education



78%

said education is necessary for success



68%

agreed that they would someday like to start their own business

Navigating the Great Transition: Key Challenges for People and Policymakers

Despite the optimism expressed by youth globally regarding future work opportunities, the future labor market faces three key challenges that may significantly impact the youth who will soon enter the workforce. These include: the imbalance in job displacement and creation patterns that leads to unemployment and growth stagnation; a widening gap between education and labor market skill demands; and, finally, the irreducible uncertainty of the future labor market overall.

• Challenge 1: Imbalance in Job Displacement and Creation Patterns

Employment and job market dynamic are fundamentally a function of job displacement and creation. Each major technological paradigm shift results in a short-lived imbalance between the rate at which existing jobs are displaced and new ones are created. In general, job displacement technologies can be disseminated

relatively quickly. In comparison, job creation tends to be much slower, especially in the beginning, because it takes longer to for firms to build up successful business models and for the labor force to acquire new capabilities. The long-term net effect of technology shifts historically has led to more work being created than displaced. However, in the short term, the workforce being replaced by automation may not be able to reskill and upskill quickly enough to adapt, causing an imbalance in the labor market.

In the past decade, we have witnessed the emergence of another trend that is challenging the job-generating growth: the stagnant economic prospect of the middle-class. Though the Western world has experienced tremendous growth in national income over the last 50 years, the gains have been unevenly distributed, and the middle class has not benefited to the same extent as the top and bottom income quartiles. Workers in the middle of the skill distribution saw the steepest decline in earnings during the Great Recession²². Additionally, in all but two OECD countries, the share of middle-skill jobs in the overall labor market

declined between 1995 and 2015, while both high and low-skilled jobs increased²³. This trend not only raises the issue of welfare distribution, but also directly impacts and is impacted by labor market dynamics. On one hand, tasks that used to be performed by middle-class individuals face more competition from automation and telemigration, leaving them either unemployed or accepting lower wage jobs. On the other hand, without a growing and prosperous middle class, demand for goods and services slows, hindering overall economic growth and job creation both domestically and internationally.

Demographic changes also pose a challenge to global growth. Over the next decade, aging populations in China and many developed countries will bring a diminishing demographic dividend as the working-age population shrinks. However, in many developing countries a youth bulge is just entering the workforce. According to the Global Youth Index, only 60% of participants found full-time employment within 12 months after graduation, signaling a risk of youth unemployment²⁴.



22. Mainly based on U.S. data. Brookings, “Seven reasons to worry about the American middle class”, 2018
23. OECD Employment Outlook 2017
24. Global Youth Index Survey, 2018

For policymakers, economic decisions must balance the need for embracing technology and automation with mitigating the potential risks they pose to youth employment. This delicate balancing act requires a future-proof education system that can effectively prepare young people for the emerging labor market, and an enabling and adaptive society more generally.

• Challenge 2: Widening Gap Between Education and Skill Demand

The second challenge arises before individuals enter the workplace. As has always been true, youth must be equipped with adequate skills from the education system. Given the fluid labor market landscape outlined in the previous section, this requirement becomes all the more difficult to meet. Additionally, due to the asymmetry of speed between the pace at which private sector skill requirements and

education systems change, a radically improved institutional mechanism to bridge these two systems is crucial. The Global Youth Index reveals that only 40% of respondents agreed that their education has adequately prepared them for their most recent jobs²⁵. Most countries simply do not have the necessary curriculum, pedagogy, teachers or transitional support from school to society in place to prepare students for what lies ahead. First, formal education institutions suffer from outdated curriculum design and pedagogy that fails to prepare students with the necessary skills in the most effective ways. In terms of foundational skills, besides literacy and numeracy, many countries still lag behind in adding digital, cultural and financial literacy to their mandatory curriculum in secondary and post-secondary education. According to UNESCO, the global average STEM education enrollment ratio at higher

education level is 23%, with countries on the lower end of the spectrum, such as Nigeria, only enrolling 12% students in the field²⁶. [See Chart 3 – STEM enrollment] As for soft skills, students do not receive enough training in many core competencies and character qualities such as critical thinking, communication, leadership and adaptability. For example, less than half of students globally have engaged in teamwork and multiculturalism in their secondary-level education²⁷. A further challenge is the capability mismatch between teachers and the future curriculum. Without prepared teachers, it is almost impossible to build a solid foundation of basic education for the youth population, let alone equip them with essential capabilities for the future. Secondly, the current system is heavily focused on memorization and accreditation.



60%

of the 25,000 youths surveyed across 25 countries have found full-time employment within 12 months after graduation



40%

of the respondents agreed that their education has adequately prepared them for their most recent jobs

25. Ibid
26. UNESCO, Global Youth Index, 2018
27. Global Youth Index, 2018

With the explosion of knowledge and new skills required for the future labor market, less knowledge will be taught in school and more will be acquired through a life-long learning process as specific needs arise at work. However, very few countries currently have a systematic approach to education beyond formal schooling. This separation between learning and working is also reflected in insufficient transitional support between schools and the workplace. Countries such as Germany and Denmark, however, could provide models of ways to encourage apprenticeship and better match skills with jobs.

Lastly, policymakers face a tradeoff between long-term returns from better education and high, short-term investment costs, with no clear metrics

to measure success. Institutional resistance to changes and inertia in education systems could delay or derail long-term efforts to revamp the system. Policymakers facing the challenge of addressing the gap between education and work therefore require both vision and political skills.

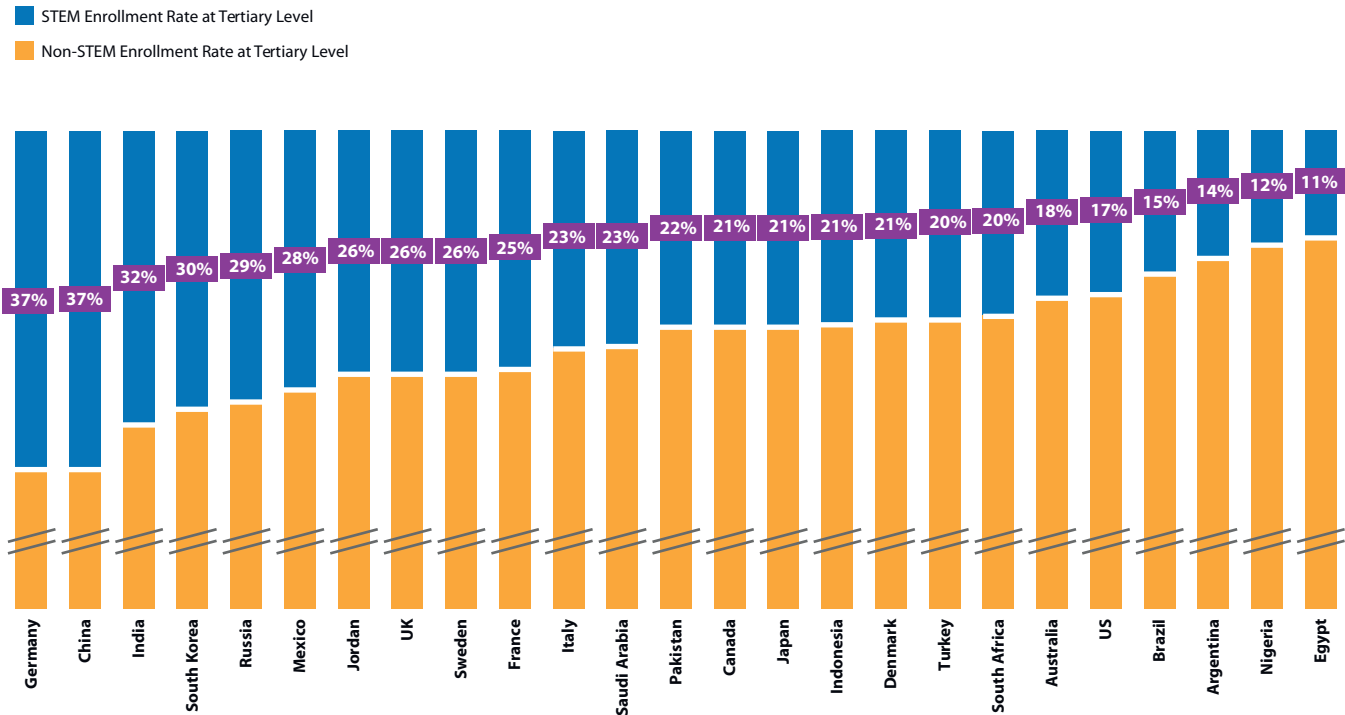
• **Challenge 3: Irreducible Uncertainty**

The third central challenge that must be acknowledged and addressed is the fundamental, and to a significant extent irreducible, uncertainty of the future labor market. In general, future uncertainty is a function of the distance of the time horizon (the characteristics of the 2035 job landscape being more uncertain than those of 2025) and the extent to which human choices are determinative of outcomes.

Human systems are intrinsically more uncertain than physical systems because of the complex and reflexive nature of individual agency. Many intersecting human choices will combine to determine the future of work. These include national political developments and resulting labor policies, changing social norms and expectations, the dynamics of global competition and conflict, the evolution of private sector markets and, perhaps most importantly, technological, social and business model innovation. As multiple new technologies converge in the 4th Industrial Revolution, the landscape of resulting innovations is likely to change at a continuously accelerating rate. As a result, for today's youth whose professional lives will unfold in this context, choosing any single professional pathway and

corresponding skillset will not only be difficult, but intrinsically risky. The same is true for states seeking to “pick winners” among economic sectors. What will be required in both cases is readiness and an adaptive capacity to thrive in rapidly and continuously changing labor market conditions. For individuals, as will be detailed later in this report, it will require new models of lifelong learning and multi-purpose capabilities development. For countries, it will require creating robustly adaptive enabling environments by which volatility can not only be withstood, but also harnessed to create competitive advantage.

Chart 3 - STEM Enrollment Rate at Tertiary Level



25. UNESCO, Global Youth Index, 2018
26. Global Youth Index, 2018



Preparing our Youth and our Societies for a Different Future: Strategic and Policy Levers

A New Role for Government

Perhaps more than any other domain of public policy, preparing citizens and society for the future of work requires deep, comprehensive whole-of-society collaboration. This means a genuine partnership with private sector employers, not just to understand their immediately emerging skill requirements, but to institutionalize a bridge between them and the design of educational and training programs, and much else.



It requires equally close collaboration with educational institutions, labor unions and civil society organizations, all of whom have direct stakes in the policy choices made and unique levers of influence to contribute to them. This reality also implies a new role for government. Although the evolution of government's role will vary significantly by country, several attributes of the required model are likely to apply universally. The first of these is the shift from government as the direct actor and employer of last resort to government as the orchestrator of the enabling environment – referee, rule-setter and incentive manager. The government's role as the orchestrator is especially important, given how many aspects of society impact its youth – either directly or indirectly. Three of the top five rated countries in the Global Youth Index have overarching national youth strategies²⁸. For example Sweden, ranked first in the index overall and on many individual metrics, has been committed to an evidence-based youth policy since 2004²⁹.

This shift is being driven partly by the scale of the fiscal challenges facing many governments, and partly by the advance of technology, which has made it possible to digitally encode rule sets and enforce them through automated monitoring in many cases. Finally, there is a growing realization among policymakers of the power of market forces, and Sweden's reform of its healthcare system is a powerful example. Famous for its provision of a world-class social safety net, Sweden's healthcare services are now provided by private sector entities in a growing number of facilities, which are subject to competitive dynamics, but under rules and monitoring arrangements established by the government. This suggests that policy interventions for the future must increasingly focus on creating enabling conditions (including carefully designed incentives and the use of policies based on behavioral economics or “nudge” frameworks) in which desired outcomes will be realized, rather than relying on direct government action. In particular, it means not reverting to government as the employer of choice. The emerging toolset of policy instruments presented below reflect this underlying shift in the role of government toward orchestrator and referee.

²⁸. Global Youth Index, 2018

²⁹. European Commission, Education, Audiovisual and Culture Executive Agency (EACEA)



Emerging Strategic and Policy Levers: The New Tools of Anticipatory Adaptation

As national policymakers seek to prepare their citizens and societies for the emerging future of work, three categories of policy interventions are particularly fundamental and merit close consideration.

The focus in this paper is on those policies most important for preparing and enabling citizens – particularly the youth demographic – to adapt to a continuously changing labor market. However, two other foundational domains are also essential to building readiness for the future of work. These are the policies that can drive job-generating economic growth, and those by which the enabling environment can be optimized for sustainable job creation and adoption. While these two domains of policy and strategy are of course extremely broad, they include elements of specific relevance to policymakers focused on the future of work given its specific characteristics.

Category 1. Job Generating Growth

For all countries, even those aging most rapidly, the fundamental requirement of readiness for the future of work is an economy that generates jobs – and particularly higher quality jobs – over time. While policy instruments in this area are often described in aggregate, they are best understood in terms of three categories of job creation:

Enduring Growth Sector Development:

This category targets the existing sectors of economic activity that can reliably be expected to grow over the medium to long-term given some combination of two key characteristics. First, they feature secular growth in demand due to underlying demographic patterns. For example, growth in the demand for healthcare can be reliably predicted based largely on the structure of the population pyramid and public health trends. Second, they feature large categories of jobs that are relatively insusceptible to automation. Teaching, for example, is likely to remain significantly immune to wholesale displacement given the specifically human tasks involved and despite the increasing role that

technology will play as a complement to human capabilities. Policy interventions in this category that merit considerations include:

• Direct Public Investment:

If the current capacity of a given enduring growth sector is not sufficient to meet the future demographically-driven demand, direct public investment should be considered. However, this is primarily true only to the extent that market forces by themselves are unlikely to generate the needed capacity, either because of higher upfront investment, thin profit margins or complex social welfare implications. In these circumstances, it may be appropriate for government to consider direct investment to bridge the gap and maximize future job creation potential, for example by, building new hospitals in underserved urban areas that feature secular demographic growth. In evaluating these opportunities, it is essential to ensure that such investments would not crowd out more efficient private sector activities.

• Harnessing the Private Sector:

Given the extent to which most countries retain at least some public sector service provision in industries like healthcare and education, much research has been done to assess the efficiency of the various models. As pointed out in a 2015 UNDP report, service provision is increasingly neither

pure public nor private, but hybrid³⁰. Therefore, harnessing private sector dynamics to fuel growth in sectors of high demand, if properly implemented, is likely to increase labor productivity and alleviate burdens on the government budget. In Sweden, a good example of generous social protection, the government has made it possible for private companies to participate in the delivery of education and healthcare and has seen remarkable results. For example, St. Goran's Hospital, which has been operated by a private company since 1999, is home to doctors and nurses who are incentivized to find methods that improve processes and treatment flows, benefiting both patient outcomes and operational efficiency.³¹

• Aligning Education and Training Policy with Long-term Enduring Sector Growth Potential:

To capture the job creation dynamics of its enduring sectors, countries must build workforces with the skills necessary to perform the relevant jobs. While education policy will be examined in greater depth in the next section of this paper, it merits consideration in this context as a vital means of preparing the population for the most likely domains of job growth. Interventions include everything from awareness campaigns to incentives for citizens to pursue long-term skill development in high growth domains.

30. UNDP Global Centre for Public Service Excellence: "Is the Private Sector more Efficient? A cautionary tale", 2015
31. John Micklethwait and Adrian Wooldridge, "The Fourth Revolution: The Global Race to Reinvent the State", 2014

Adjacent Growth Potential Activation:

This sub-category refers not to any specific sector or industry, but rather to the growth opportunities driven by a country's current economic activities. The conceptual starting point here is Ricardo Hausmann's work on economic complexity, which defines the extent to which technology (and in particular the tacit knowledge or know-how of individuals and teams necessary to implement technology) has diffused in an economy. It is a measure of what a country can do well. Its importance for job-generation policy hinges on the concept of the "adjacent possible": the market and product segments to which a country's existing know-how can be applied either domestically or internationally. [See Chart 4 – Economic Adjacency].

• Encourage Growth into Adjacent Economic Domains:

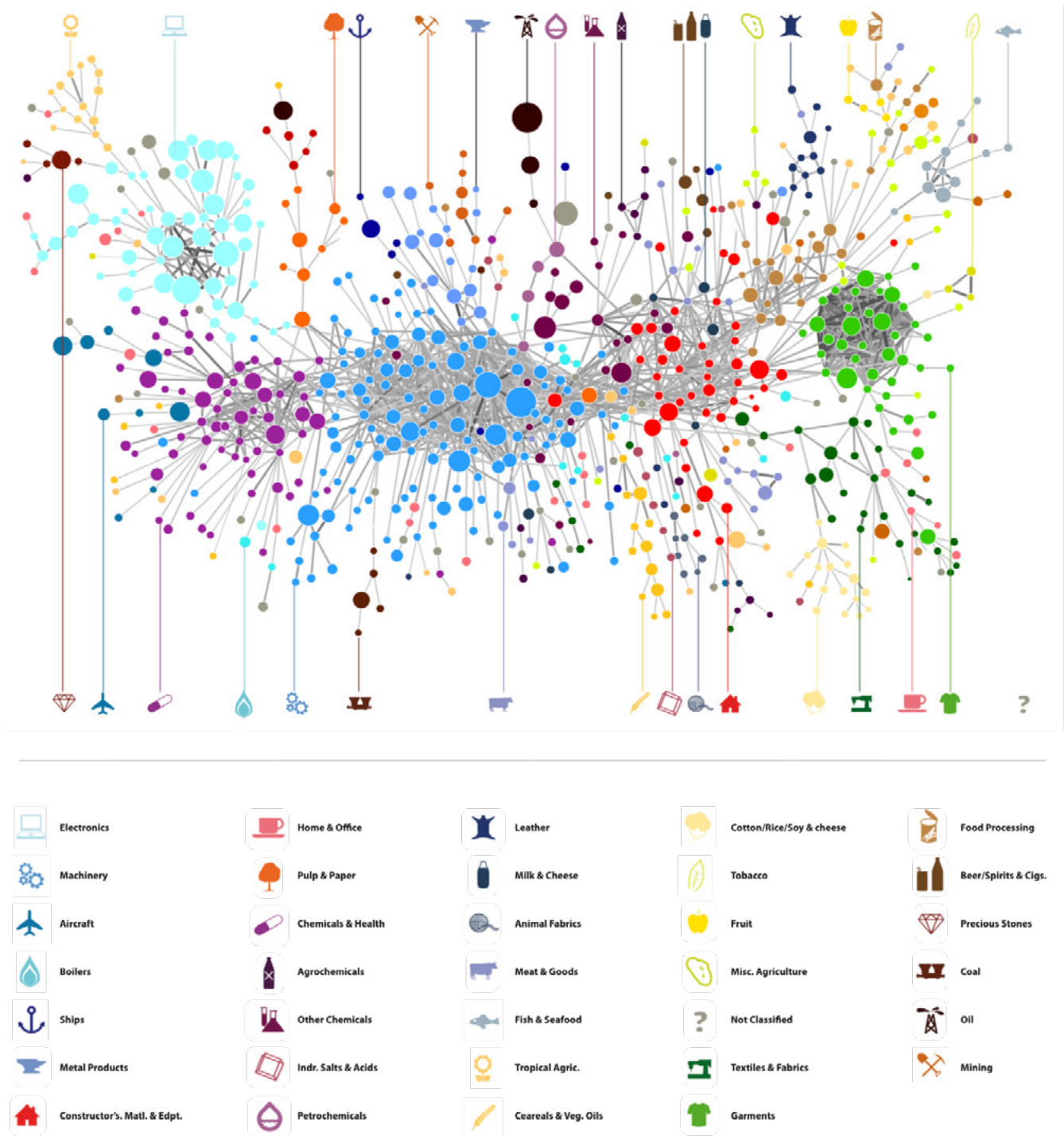
This policy instrument requires first analysis and then intervention. The analysis involves mapping a country's economic complexity and adjacent possible. Based on these maps, policy can center on identifying and addressing any obstacles to realizing the implied growth potential, either domestically or internationally. This can include everything from negotiating trade agreements and ensuring competition, to modest awareness-building campaigns in relevant segments of the economy. What is most critical to policy design in this area is understanding its stark distinction from "picking winners." These interventions must be evidence-based to be of value, grounded in accurate assessment of actual capabilities and adjacencies.

• Cultivate and Attract Complexity:

To the extent that a country's economic complexity is insufficient to generate growth, it can be developed over time through interventions including long-term investments in education and training (as outlined below) and attracting know-how in the form of people and teams with the relevant expertise. Thus, as we are currently seeing in many countries, immigration policy can be reformed to support the expansion of economic complexity.



Chart 4 - Economic Adjacency



Source: The Atlas of Economic Complexity

Innovation-driven Growth Enablement:

This critically important category is focused on maximizing the ability of the economy to develop or make use of innovations and technologies that are net task generating. As Acemoglu and Restrepo emphasize³², the balance between task displacement and task reinstatement varies depending on the technology. However, given that it is not possible to predict where these future job-generating technologies will occur, the imperative for policymakers is to cultivate and activate a fertile environment for innovation. Crucially, policies in this area focus not only on domestic research and development, but also on international technologies that can be harnessed to facilitate job-generating growth.

• Strengthen the Entrepreneurship Ecosystem:

Despite the fact that innovation-driven growth impacts both large and small businesses, start-ups and small businesses tend to require particular policies to support their growth for two reasons. First, SMEs are often the sources of innovation in many major industries, and yet they lack scale and access to low cost financing and complementary services other than their core business offerings, putting them at a disadvantage against large corporates³³. The promotion of entrepreneurship is a central pillar of building an enabling environment as we will outline in below. In this context, for the purpose of maximizing innovation-driven potential job creation, our focus is on targeted policy tools that directly benefit entrepreneurs. All but one of the top ten countries on the Global Youth Index have developed government strategies to promote youth

entrepreneurship, indicating the imperative of cultivating an entrepreneurial ecosystem and, as we have already seen, youth attitudes towards entrepreneurship are largely positive. Among the policy interventions most likely to enable economies to harness this entrepreneurial attitude, those most likely to reliably yield results are efforts to increase access to financing through a broad range of measures and create incentives to form a diverse and accessible set of incubators.³⁴

• Support for R&D for Basic Science:

Public investment in R&D and the design of R&D incentives for the private sector that target basic science are important means for ensuring the continuous discovery that can become the basis for job-creating growth in new domains. For example, throughout the first half of the 20th century, many foundational science research projects initiated for defense and national security purposes were commercialized and propelled job creation. However, the economic returns on R&D investments in these foundational areas are often too uncertain and distant in terms of likely return to generate sufficient market-based investment. Thus, to address this type of market failure and create the public good of a dynamic flow of STEM advances with potential commercial value, governments must consider the full range of policy interventions in this area, including direct, government-executed R&D (particularly in potentially sensitive areas), funded, incentive-driven R&D to ensure the meaningful concentration of resources, and investment in clear, highly functional channels of connectivity from R&D to the commercial sector.

Collaborative Innovation Regulatory Environment:

For companies and individuals to invest in innovations so that they can eventually be commercialized and improve productivity, the expected benefits need to surpass the cost, and the regulatory environment can influence this calculation. In developing countries, where innovations mainly come from appropriating knowledge and production know-how from other regions, sophisticated regulation that lowers the transaction costs of business entry, operations, and exits, and as a result reduces international trade and investment barriers, will be instrumental in promoting innovation-driven growth. Perhaps most important is the need for programs by which governments and private sector technology firms work collaboratively on the design of regulation for emerging technologies in ways that create incentives for foreign direct investment and protect public interests. Additional interventions include reducing the cost of business registration and licensing, and hiring and strengthening the rule of law, particularly with respect to intellectual property rights.

Private Sector Investment Incentives:

One of the central unanswered questions facing economists in recent years is the surprising slowdown in productivity growth. Acemoglu and Restrepo, among others, offer one surprising, but increasingly empirically reliable hypothesis: many investments in automation are much slower than expected to yield productivity gains. This could be a result of the required time to adapt core production processes and train personnel. In some cases, investment in automation is distorted by tax incentives that favor capital investment. Here, the net effect of automation is job displacing because it displaces tasks without increasing, or actually decreasing, productivity³⁵. Therefore, it is vitally important for policymakers to ensure that there are no incentives for counter-productive investments in automation. Rather, by remaining neutral, they can maximize the likelihood that market discipline will limit investments in automation to those that enhance productivity and displace the minimal number of jobs.



32. Daren Acemoglu and Pascual Restrepo, "Automation and New Tasks: The Implications of the Task Content of Production for Labor Demand", 2018
33. World Bank, "Innovation Policy: A Guide for Developing Countries", 2010
34. World Bank

35. Acemoglu and Restrepo, "Automation and New Tasks: The Implications of the Task Content of Production for Labor Demand", 2018



Category 2. Future Ready Youth

In this section we address the ways in which our youth should be prepared to take advantage of future opportunities and address the risks of technology-driven disruption.

Education is the single most important policy domain that can prepare and shape future generations, defining their chances of success in an ever-changing work environment. For individuals, no policy realm holds as much reliable promise as a means of altering their socio-economic status and life trajectory as education. Its role in propelling citizens toward future opportunities has been empirically demonstrated in countless contexts, as each year of education has been shown to increase

an individual's earnings by up to 10%.³⁶ The cumulative effects of this gain then ripple throughout the economy, making education a central component of any development agenda. UNESCO estimates that each additional year of schooling raises average annual GDP growth by 0.37%.³⁷

Formal education provides countries with a direct lever for driving national strategy and influencing strategic outcomes. Not only do individuals and societies benefit from strong investments in education, but failure to deliver here has ramifications that ripple out to negatively impact the economy and social fabric of a nation. These include the erosion of national competitiveness in an ever more knowledge-intensive and disrupted global economic environment.

A number of key policy levers must be emphasized and considered by policymakers:

Revamping the Curriculum:

Curriculum development is at the core of any education reform and impacts several key functions of the education ecosystem. Currently, there is a severe mismatch between the skills developed by most education systems and the skills actually needed in the labor market, an issue that is only likely to be exacerbated if it remains unaddressed. The accelerating pace of technological and workplace change means that time is short and getting shorter. By the time students enter the workforce, their skills are often already obsolete. To meet future skills requirements, the curriculum needs to be designed and updated leveraging cross-sector data and foresight into the occupations of the future. This represents a fundamental shift toward a data-driven curriculum that meets the future needs of the labor market and society.

An effective 21st century curriculum needs to consider and integrate three key elements:

- Basic skills (i.e., literacy, numeracy, STEM skills)
- Soft skills, with particular respect to higher order thinking skills (e.g. critical thinking, fluency of ideas, originality, active learning) and life skills
- Values and civic competencies (e.g., National and global citizenship values, such as sustainability, tolerance and responsibility).

To determine the details of these three elements, the starting point is a strong assessment and understanding of the needs of the individual, society and labor market of the future. It should be noted that the set of required skills is continuously evolving, and this evolution should be reflected in the development of the curriculum itself – these should be planned and take place on a regular basis. A thorough assessment of the required skills for the future is key to align future demand and supply of skills. To this end, experts' views together with data analytics techniques, including machine learning should be adopted to forecast the relevant future skills on a continuous basis and provide the resulting input as a base for curriculum development.

Therefore, a strategic approach to developing the curriculum for a 21st century education system should start from four key considerations:

• Skills Mapping and On-going Curriculum Development:

The continuous evolution of society and labor market necessitates a granular mapping and estimation of future requirements for skills, knowledge and abilities. Leveraging data analytics, future foresight and other techniques, the data generated should serve as the base and provide direction for ongoing curriculum development.

36. UNESCO. 2010. *Education Counts: Towards the Millennium Development Goals. Programme and Meeting Document*, Geneva: UNESCO.
37. Ibid.



• **Balancing Knowledge and Competency-based Approaches:**

The future trend will be to converge toward a balanced model. For example, historically, both Finland and South Korea started from a strong traditional knowledge-based approach and have since taken steps to move towards a more balanced model including competency-based elements. The future of work implies that students will need to be able to think and do at the same time, meaning the focus of the pedagogy will need to evolve from the mere memorization of information to integrating the development and retention of skills relevant for the labor market of the future. South Korea, for example, which ranked second on the Global Youth Index for Education and Skills, revised its national curriculum in 2015 to cultivate creative and integrative learners.³⁸

• **“Smart Integration” across Contents and Platforms:**

The proliferation and fragmentation of content and platforms suggests the need to focus on integration and interoperability. An approach centered on “smart integration” would provide a variety of innovative sources of content, formats and platforms, and maintain control on data, and allow schools, teachers and students to benefit from an integrated ecosystem.

• **A Tailored Partnership Model:**

The strategic value of an education system lies in its ability to attract the best assets to give students and citizens the most advanced learning opportunities. By attracting top content providers through market-driven mechanisms and tapping into the world’s most innovative and creative content and platforms, partnership incentives should be designed to stimulate the co-creation of content, localization of top productions, dedicated R&D (e.g., through innovation grants) and even joint research.

Tailoring Education to the Individual Student:

Traditional education models have been focused on the “average student”³⁹— thus failing to challenge high-performing students and leaving struggling students behind. However, recent findings from behavioral studies show that there is no such thing as an “average” student. In fact, they learn in different ways. In simple terms, this means the current model is not able to leverage the talent present in every student, and the pedagogy must change in the following ways:

• **Discover Potentials in Each Student:**

To fully discover and exploit the potential talent in every student, the pedagogy model needs to be tailored to individual students’ needs and behavior, for example, if they have a predominantly auditory, visual or tactile learning style. With the knowledge, data, technology and learning tools available today, well-trained teachers should be endowed with the decision-making power to work with students on creating learning plans tailored to their most productive learning times, preferred learning styles, and high-engaging topics, thus personalizing learning, achieving better outcomes and “extracting” the maximum level of skills, knowledge and abilities from every individual.

• **Benefiting All Students:**

While research into personalized learning is still in its early stages, a 2017 RAND report found that students on a personalized education program gained about 3 percentile points in mathematics relative to a comparison group of similar students⁴⁰. Most importantly, low-performing and high-performing students all benefitted, showing promise for a system that could replace the under-performing, one-size-fits-all nature of today’s education standards.

Continued Focus on Teachers:

Despite the advent of education technology, teachers will continue to play a central role in the delivery of education and preparation of students for the future of work. This role will also evolve with time – mainly driven by the changing curriculum and pedagogy model, and the use of education technology to assist in the delivery of instruction and augment the teacher’s own impact. Ongoing investment is therefore required to upgrade and refresh teachers’ capabilities, with three areas deserving emphasis:

• **Master the Curriculum:**

Ensuring that teachers have the capability to master the future and changing curriculum.

• **Leverage Pedagogical Approaches:**

Developing teachers’ ability to leverage different pedagogical approaches effectively.

• **Use Education Technology:**

Building teachers’ capacity to use and integrate education technology into the delivery of education.

It is important to note that teachers will also be increasingly required to bring skills relevant in the market. It will no longer be enough to adopt a purely academic approach; instead, teachers will need either direct labor market experience, or be able to augment their teaching with that of industry experts who can help make the education experience more relevant to the labor market. A number of innovative experiments are already underway. For example, New Teach, a UK non-profit organization, aims to recruit people in their 40s and 50s with various career backgrounds to teach at secondary schools to “bring wisdom, experience of the world, perspective and careers advice”.⁴¹



38. UNESCO, “New Education Policies and Practices in South Korea”, 2017
39. Todd Rose, “The End of Average: How We Succeed in a World That Values Sameness”, 2016
40. RAND, “How Does Personalized Learning Affect Student Achievement?”, 2017

41. NowTeach.org



Ensuring Conducive Learning Environment:

Significant investment in the learning environment will be needed to facilitate the changes outlined above and enable the system to prepare students for the future. These three aspects will play a key role:

• Infrastructure:

The schools and educational institutions of the future will need to be designed to facilitate learning and fully engage students. Each space needs to be conceived with the learning experience in mind and match the evolution of pedagogy. For example, as interactive learning becomes more relevant, facilities should be built or re-imagined to satisfy this requirement. By the same token, as teachers and students work together to craft individualized learning plans, educational institutions will need to provide the facilities required (e.g. dedicated labs) to enable students explore their full potential.

• Connectivity and Data:

All school and educational institutions will need to be connected to high-bandwidth internet that enables the use of advanced technology solutions and tools for both administration and learning purposes. Affordable data is essential and public education entities need to work together with public and private telecom providers to ensure it is available. These two aspects are pre-conditions for the effective use of education data and technology to facilitate learning, by enabling access to the ecosystem of tools, content and platforms that will be integrated into the education experience.

• Parent Involvement:

Informal learning (i.e. that outside of a classroom setting) is increasingly recognized as a primary component of education. Parents will therefore need to participate in their children’s education journey and use their experience and knowledge to augment the learning. For example, in South Africa, a simple text message service reminding parents to read with their children on a daily basis showed positive development in the students’ ability to read for meaning. Education entities will need to implement policies to raise parent awareness and increase their involvement in their children’s development.

Facilitating the transition to the labor market:

One of the biggest challenges facing the education system today concerns its relevance to the labor market and its ability to facilitate the transition of students into the work environment. This issue is at the core of the discussion and raises questions around the value of education in general. Why would parents and students invest time, effort and money into education, if the student is not able to find employment after graduation? And what about young people who are already employed but whose skills are becoming quickly obsolete? How can youth – whether students or employed – stay relevant to meet the requirements of the future of work?

• Steering of Young toward Labor Market-Relevant Paths:

Young people today are only partially guided in their choice of study. The result is a mismatch between the supply and demand of labor – for example, many students select to study humanities and other fields that have little, if any, demand from the labor market. This leads to the necessity of re-skilling youth and investing further in terms of time, effort and money (including the inherent opportunity costs). Students need to be more proactively guided and steered toward labor - market relevant paths based on insights into future sectors and occupations. This also includes balancing the choice of higher education vs. technical and vocational

education. The latter tends to have more immediate market relevance, provide job specific skills and ensure a quick return on investment, while leaving space for up-skilling. In this context, education pathways should be structured in a flexible manner, allowing individuals to adjust their path according to changes in the internal and external environment. The transition between school and work can also be facilitated by internship programs. China, the only developing country in the top five of the Global Youth Index, has a particularly high internship participation rate. A majority of Chinese university students now participate in internships prior to graduation⁴², and according to the Global Youth Index, 60% of respondents who had an internship agreed that the experience helped them find their most recent job⁴³. Another successful example is the dual training system implemented in Germany. First formalized through the Vocational Training Act of 1969, this system enables cooperation between SMEs and public vocational schools to combine theories and trainings in a real-life work environment for students.⁴⁴

• Creating a Closer Link between Education Institutions and the Labor Market:

Collaborations and joint projects have been instrumental in ensuring a certain degree of alignment between academic institutions and industry; however so far this has been dominated by the industry viewpoint, rather than

being focused on developing students’ practical skills. Further steps need to be taken to deepen these collaborations and make them a cornerstone of the educational experience. Doing so will result in a strong bridge between theory and practice before potential employees enter the market.

• Encourage Life-long Learning:

In the past, students attained a degree or certification enabling them to stay relevant in the labor market for most of their working life, along with limited professional development. This pattern is undergoing fundamental changes as skill requirements continue to evolve at a rapid pace. As skills become obsolete within shorter time frames, youth will need put ongoing investment into up- and re-skilling to ensure they remain relevant in the labor market. In the same way that education programs will need to continuously be refreshed, policymakers should anticipate upcoming changes in the skills requirements based on data analytics and systematic foresight and design programs that balance the demand and supply of skills, smoothing out uncertainty for the labor force as they do so.



42. Philip Rose, "Internships: Tapping into China's Next Generation of Talent", 2013
43. Global Youth Index Survey, 2018
44. Federal Ministry of Education and Research (BMBF)

Category 3. Adaptive, Enabling Environment

This final category is focused on maximizing the adaptive capacity of the economy as a system. That is, it includes a set of policy instruments with the intent of creating an enabling environment in which citizens, employers and the government itself are able to rapidly and smoothly adapt to both near-term volatility and ever more rapid, longer-term structural change. This adaptive capacity, of course, is most tested in times of adversity and therefore naturally starts with policies designed to protect citizens facing the downside of technological disruption.

Protective:

To understand both the power and ethical importance of effective protective policy, it is useful to consider John Rawls’s “Veil of Ignorance” thought experiment. This involves imaging the set of circumstances one would wish to see if completely ignorant of the position one would be in upon entering that society, with no knowledge of one’s natural abilities, or social and economic status. From the perspective of the 2035 future of work, this experiment makes clear the desirability of an enabling environment that facilitates learning, job transition, social and physical mobility, inclusive access for all and – of course – a functioning social safety net.

• Supportive Programs for the Unemployed:

Fair and accessible programs for those who are out of work are both a means of ensuring basic citizen rights, such as healthcare, shelter and minimum income, and a way of facilitating the reskilling process to place them back into the labor market. These programs are essential to achieving a smooth transition through the structural economic changes brought on by innovations and mitigating the risks of social instability. Specific policy interventions in this domain worthy of consideration include: Universal Adjustment Benefit⁴⁵, which provides career counselling, retraining and upskilling programs for the local labor market, and basic income support; wage insurance for displaced workers; and subsidized employment programs in times of economic downturns or for populations with serious or multiple barriers to employment⁴⁶.

45. Brookings, 2019
46. The Georgetown Center on Poverty and Inequality, “Lessons Learned From 40 Years of Subsidized Employment Programs: A Framework, Review of Models, And Recommendations for Helping Disadvantaged Workers”, 2016



• Safety Net Programs for the Employed:

The provision of basic workers’ rights focused on protecting the employed without protecting specific jobs is one means of building adaptive capacity without distorting market dynamics. Moreover, encouraging employers to commit to better mid-career training and upskilling programs can decrease the probability of unemployment for workers, while the companies themselves usually recapture any investment costs through improved labor productivity. Some detailed policy interventions include incentives for on-the-job, employer-led training and tuition assistance; the enforcement of workplace safety and employee benefits such as paid leave; and automatic individual retirement account enrollment⁴⁷.

Inclusive and Participatory:

Thinking about inclusivity and labor participation in the context of 2035 landscape requires policymakers to identify populations who require additional support to engage in and adapt to the labor market. With the help of technology and a more fluid and flexible employment market, a more inclusive workplace can also tap into new talent pools and opportunities.

• Inclusive Programs for the Marginalized:

A more inclusive work environment means that those who have traditionally been marginalized in the workplace – such as women, the physically and mentally disabled, and minorities – can actively participate in the economy, expanding the working population and stimulating growth. For instance, in the U.S., 68% of the working-age disabled population are not in the workforce, and 3% are unemployed, while the same statistics for the able-bodied population are 22% and 3% respectively⁴⁸. With a more inclusive workplace policy for the disabled, the economy would be able to tap into a talent pool of millions more people. Since many marginalized groups have traditionally been neglected by mainstream labor policies, identifying and prioritizing their needs would be a crucial first step towards expanding inclusiveness in the employment market. Some examples are: direct employment support such as protecting parental leave; supporting re-integration into the labor market after childbirth related leaves; and mandating government agencies to lead inclusive hiring. Meanwhile, indirect regulation to support and enable targeted populations to engage in the labor market could include: investment in girls’ education and training to increase the ratio of female to male NEET rate (an important indicator for evaluating the overall employment situation in the Global Youth Index⁴⁹); and engaging in smart city planning with accessible public and working spaces for people with disabilities such as disability-inclusive transport^{50,51}.

47. Brookings, 2019. Mark Iwry and David C. John, “Pursuing Universal Retirement Security Through Automatic IRAs” (Washington: Brookings Institution, 2009); see also David C. John, “Automatic IRA Builds Retirement Security” (Washington: The Heritage Foundation, 2010)
48. U.S. Bureau of Labor Statistics, 2018
49. Global Youth Index, 2018
50. World Bank: “For Persons with Disabilities, Accessible Transport Provides Pathways to Opportunity”, 2015
51. International Labor Office, “Resource Guide on Gender Issues in Employment and Labour Market Policies”. “Inclusion of People with Disabilities in National Employment Policies”, 2014

Adaptive Capacity:

In the context of the future of work, adaptive capacity refers to a society's systemic ability (defined here to include not only the state and the economy, but also the community and social sector) to anticipate economic shocks and structural changes and respond to them smoothly and effectively. This capacity requires diverse, dynamic markets, a resilient, connective infrastructure, and adaptive governance.

• **Competition Policy:**

The foundation of adaptive economic capacity is economic diversity and dynamism. Diverse, competitive markets are “anti-fragile⁵²” because the competition and frequent, distributed failures within them makes them less susceptible to system risk and vulnerability. Therefore, to prepare society as a whole for a future of work that is to some extent irreducibly uncertain, policies that ensure healthy, rule-based competition are vitally important. Such markets drive innovation and also protect the welfare of consumers and citizens by preserving choice. Cultivating healthy competition is especially important in the

current context, whereby the implications of the market power of digital platforms are not fully understood by policymakers in many countries. To ensure that competition then yields inclusive growth requires governments to monitor the barriers to entry facing micro, small and medium enterprises (MSMEs) in particular. This is especially true in cases where national or local monopolies and oligopolies have slowed down entrepreneurship and innovation⁵³. Specific interventions include: anti-trust regulation; strong, accessible patent protection; and consumer welfare and data privacy protection as a hedge against predatory behavior.

• **Connective Infrastructure:**

The importance of infrastructure as an enabler of economic growth has long been established, with access to physical infrastructures such as roads, irrigation and electricity demonstrated to improve long-term productivity and income levels in macroeconomic studies⁵⁴. However, from the perspective of the future of work in a world being reshaped by the 4th Industrial Revolution, the sophistication of connective, mobility-enhancing infrastructure is now particularly critical



52. Nassim Taleb, *Antifragile: Things That Gain from Disorder*, 2012
53. Jonathan Tepper and Denise Hearn, *The Myth of Capitalism: Monopolies and the Death of Competition*, 2018
54. Asian Development Bank Institute, *The Impacts of Infrastructure in Development: A Selective Survey*, 2015



as it facilitates the link between the demand and supply of skills. For example, adjacency to roads and availability of cheap logistical options can facilitate labor and product mobility. In addition, as more services become virtual, broad access to the digital infrastructure will be crucial in enhancing technology diffusion and enabling labor participation in remote areas⁵⁵. Finally, given the positive externalities associated with infrastructure development, policymakers in countries with infrastructure gaps can use investments in this area to spur near-term employment and drive skills development while building long-term competitiveness and adaptive capacity.

• **Adaptive Governance:**

Finally, adaptive societal capacity requires the state itself to be anticipatory and adaptive. While improving the agility of the state goes far beyond the scope of this report, there are several attributes that are particularly relevant to the future of work. First is the ability to understand the reality of current and emerging economic dynamics. This includes accurate data collection, along with the measurement and analysis of labor market activities and product market dynamics as the basis for evidence-based, proactive policy design and implementation. In addition, to be able to help citizens and society prepare for the future of work, governments must

adapt to specific changes in the job landscape, including those outlined in this report such as the changing landscape of employment models and the growing scale, output and characteristics of the contingent segments of the workforce in the platform economy. One consequence of the common lag in governmental awareness of significant changes, for example, is a weakened ability to capture tax revenues from new employment models. In a world in which firms are increasingly heavy in intangible assets such as ideas and networks – and light on tangible ones, it is becoming much more complex for governments to tax effectively. To develop the capacity for creating adaptive, anticipatory and evidence-based policies requires⁵⁶ capabilities including: quality and composition adjustments in price indices for ICT goods and services and GDP; accounting for the growing use of outsourced services in production; international collaboration to address measurement issues, especially for multinational enterprises; formalized data collection on platform economy workers and contingent jobs; and new indices for tracking the impacts of automation and artificial intelligence.

55. IMF, *Future of Work: Measurement and Policy Challenges*, 2018
56. IMF, *Future of Work: Measurement and Policy Challenges*, 2018

The Case of Saudi Arabia: Workforce Transition Amidst National Transformation

The Kingdom of Saudi Arabia (KSA) is one of the largest economies in the world.

Currently predominantly oil-based, it faces a crucial transformation that will define its future. Among the plethora of challenges at play, job creation is increasingly taking center stage in the Kingdom's economic policy debate. Having one of the youngest populations in the world, enabling its youth to navigate through the changing landscape of work is of crucial importance. In this context, the launch of Saudi Vision 2030 in 2016 was a powerful move to transform the Kingdom's economy and society by investing heavily in its greatest resource: its people.

The Saudi Youth

Saudi Arabia has an exceptionally young population: more than 50% of its citizens are under the age of 25⁵⁷. Its working-age group (15-64) has been steadily increasing since 1980, rising from 53% to 70% of the population in 2015. By 2020, it is projected to reach a peak of 72% and then slowly drop to 66% by 2050⁵⁸.

Today, Saudi Arabia's youth population is more connected and better-educated than ever before, acting as agents of change and contributing to the transformation of the country by driving social progress and inspiring cultural changes. However, youth employment rate remains low compared to other developed countries. Among Saudi youth between the ages of 20 and 24, 16% are classified as NEET – not in education, employment or training⁵⁹.

Given this demographic landscape, it is abundantly clear that Saudi Arabia's youth constitutes a tremendous asset worth investing in, opening the door to unparalleled economic growth. Therefore, the government's commitment to tackling unemployment, diversifying the economy, attracting investments, and supporting talent competitiveness should be coordinated across all government policies.

Saudi Vision 2030: Target and Progress

Saudi Vision 2030 outlined a host of ambitious targets for the labor market, including lowering the unemployment rate from 11.6% to 7%, and increasing female participation from 22% to 30%⁶⁰. Another key focus is cultivating a vibrant society with increasing private sector contribution, and special emphasis on small and medium-sized enterprises (SMEs). The aim is to increase SMEs' contribution to GDP from 20% to 35% by 2030⁶¹. In addition, the shift in the social contract that Vision 2030 outlines requires more than simply enabling Saudi citizens to enter the job market – rather, it envisions Saudi youth becoming active, engaged citizens who take responsibility for their own future in partnership with the government, rather than being heavily dependent upon it.

Much progress has been made since Vision 2030 was launched, and one of the key initiatives is the active pursuit of AI. Recognizing that it, in confluence with other rapidly developing technologies including robotics and the Internet of Things (IoT), will fundamentally transform the workplace and society, Saudi Arabia seeks to be a global leader in AI-related technology application. 66% of the Saudi youth surveyed in the Global Youth Index agree that they see advancements in technology as more of an opportunity than a threat to society in KSA⁶².

50%

of the population are currently under the age of 30

The Kingdom has key advantages in this respect: an interest in long-term planning, the capital and geopolitical stability for implementation, a strong telecommunication infrastructure including rolling out the world's first fifth-generation (5G) mobile networks, and improvements to its private sector business environment.

There are several examples of progress. Saudi Arabia is partnering with leading multinationals such as GE, SAP and Google to develop its technological capacities and train the labor force. Its Ministry of Communications and Information Technology (MCIT) has signed an MoU with Huawei to further develop the company's Saudi innovation center⁶³, while an agreement has been signed with Google to develop five innovation hubs around the country and train local talent in the production of prototypes, mobile application design and artificial intelligence. Finally, the Riyadh municipality has partnered with IBM to implement a series of blockchain technologies in various administrative and economic areas.

Entrepreneurship and female participation are also being encouraged. The introduction of the Small and Medium Enterprises Authority (Monsha'at) reaffirmed the Kingdom's commitment to fostering a powerful startup ecosystem, and

it has also significantly increased the public capital available to support SMEs and start-ups by providing guarantees, funding projects and lowering the overall cost of capital for entrepreneurs. Young Saudis are using new digital platforms such as Instagram and Snapchat to launch their small businesses and reach new markets. These platforms have also allowed women to become a driving force of the start-up scene, and the proportion of Saudi female entrepreneurs grew significantly from 4% in 2007 to 39% in 2017⁶⁴.

Although it is still too early to assess the effectiveness of these combined efforts, it is to be expected that as the digital economy grows, an increasing number of Saudi companies and government entities will need employees with specialist skills in programming, user experience, project management, data science and cyber-security. Employers will also need a talent pool with the complementary skills to work with these new digital services, such as digital marketing and digital sales. Importantly, Saudi Arabia's low labor productivity level suggests that there is a lot of "low hanging fruit" for efficiency gains from automation. If implemented properly, the Kingdom could harness these technologies to improve public-sector efficiency, enhance the quality of citizens' lives, and make the transition to a knowledge-based economy.



57. Only includes Saudi nationals. General Authority for Statistics, KSA

58. United Nations, World Population Prospects – 2017 Revision

59. International Labour Organization, ILOSTAT database.

60. KSA Vision 2030: Strategic Objectives and Vision Realization Programs

61. KSA National Transformation Program Delivery Plan – 2018-2020

62. Global Youth Index Survey, 2018

63. Saudi Ministry of Communications and Information Technology (MCIT), April, 2018.

64. Al-Eqtisadiyah, 2017

6

42%

of Saudi citizens of working age hold a job

20%

of whom are females

Challenges ahead of the Future of Work in Saudi Arabia

As laid out in Vision 2030, the Kingdom needs to shift away from an oil-based, public sector-driven welfare economy that is highly reliant on expatriate employees, to one that is diversified and innovation-driven.

One study shows that meeting these targets will require an increase of 2.5 million in the Saudi workforce (compared with the 1.15 million new jobs that will be created at the current trajectory), coupled with an enormous productivity boost from 0.9% to 5.8% by 2030⁶⁵. The future of work for Saudi Arabia is full of potential, yet key challenges remain.

High Youth Unemployment:

Despite the government's sizeable job creation efforts, the employment ratio is strikingly low: only 42% of Saudi citizens of working age hold a job. Additionally, less than 20% of this group are female, compared with 60 – 80% in advanced economies⁶⁶. Low employment means reduced output, reduced productivity, low FDI and sizeable welfare costs. Moreover, it could also have broader consequences including intergenerational unemployment, a culture of dependency, and family instability. Contributory systemic factors include:

• Heavy Reliance on Public Sector Jobs:

Saudis citizens continue to rely heavily on the public sector as a source of employment, while the private sector is characterized by a high level of expatriate employment. In addition to the opportunity cost of lost government revenue, guaranteed public sector employment has negatively impacted the structure of the economy and weakened Saudis' educational competitiveness. Many of the brightest local talents are drawn towards public sector jobs because of the job security, social status and higher compensations⁶⁷. On the contrary, the private sector players, many still in the nascent stage with fewer competitive positions to offer, have a harder time attracting and retaining talents.

65. KSA Vision 2030: Strategic Objectives and Vision Realization Programs

66. General Authority for Statistics (GaStat)

67. According to an IMF report, public sector wage is on average 1.5 times higher than private sector wage in Saudi Arabia when controlling for skills and education. IMF, "Public Wage Bills in the Middle East and Central Asia, IMF Middle East and Central Asia", 2018

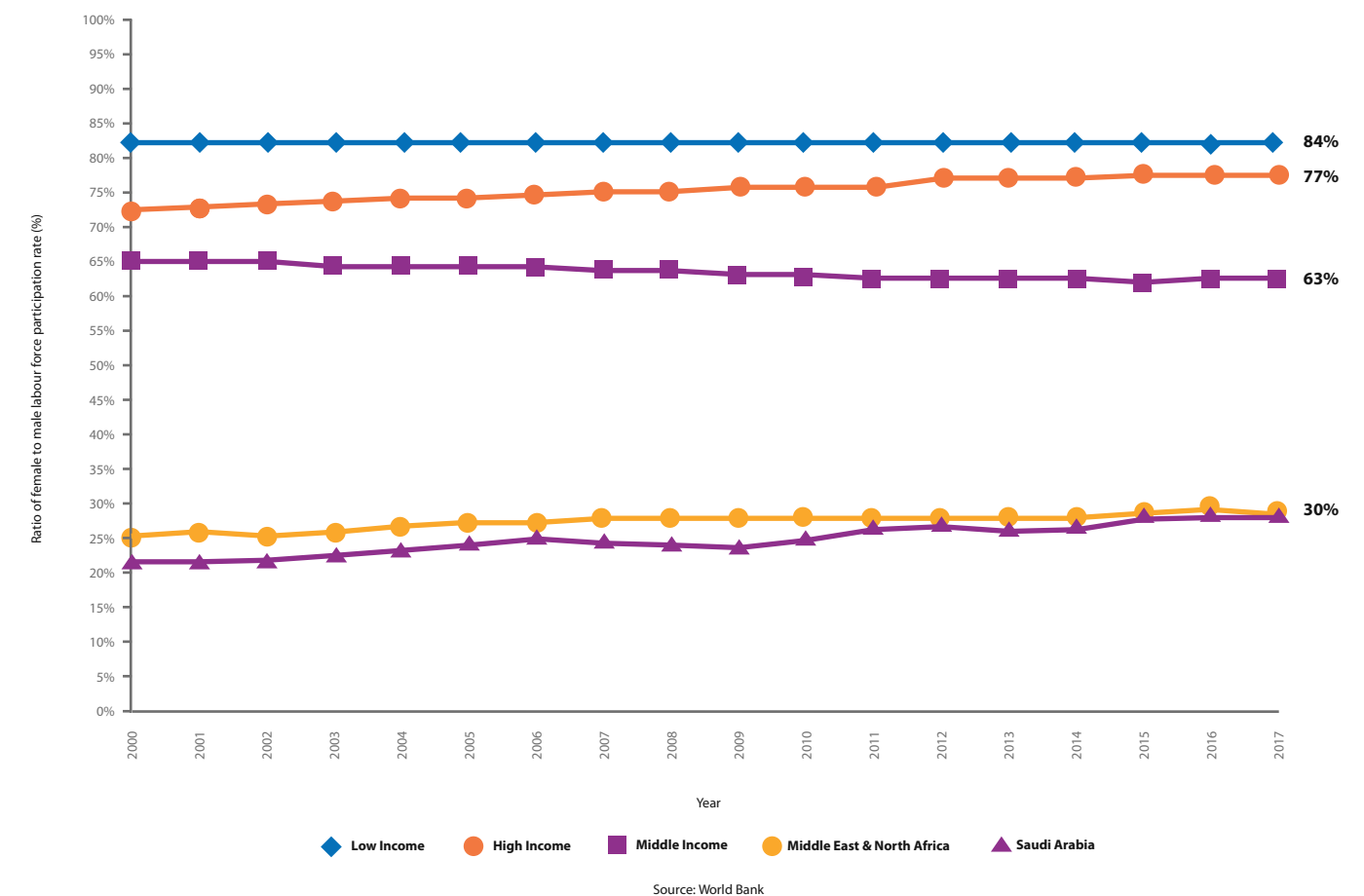
• Ongoing Obstacles for Women in the Workforce:

Women account for the majority of university students in KSA. However, among Saudi females aged 15–24, only 8% are part of the labor force⁶⁸. Historically an untapped labor pool, the future role of females in the workplace has a profound implication for KSA's future working landscape and society overall. [See Chart 5 – Women labor participation in KSA].

• High Career Turnover among High Performers:

Unlike preceding generations who value loyalty and long-term service, high performing Saudi youth are vibrant go-getters, similar to their international peers. With high demand for their skills, they will not hesitate to seize opportunities for advancement, meaning employers must devise innovative employment models and incentives if they are to capture and retain talent within shorter career cycles.

Chart 5 - Women Labor Participation Rate in KSA vs International / Regional Averages



68. International Labour Organization, ILOSTAT database.

Mismatch between Current Skills and Job Market Requirements:

In KSA, the gap between the future-proof skills desired by the labor market and those possessed by its youth population is particularly alarming, and is expected to widen even further if no immediate actions are put in place. The main shortfalls lie in the following areas:

• A Growing Gap in STEM Skills:

When evaluating the skill gap, Saudi policymakers should focus on the types of skills that today’s employers are looking for, as well as those that prospective investors will seek. In both cases, the most obvious gap relates to graduates with science, technology, engineering and math (STEM) skills. To participate in and benefit from the growth of the global digital economy, the Saudi education system must produce many more highly-educated STEM graduates than what it currently offers. Despite ranking relatively high by the STEM enrolment rate (23%)⁶⁹ compared to international benchmarks, KSA, as most countries in the world today, needs a stronger push in developing these skills. [See Chart 6 – Education spend vs results].

• A Gap in Soft Skills:

The skill gap extends far beyond what is taught through the formal education system. Companies are increasingly seeking workers with 21st-century skills including critical thinking, communication and collaboration, so that they can respond quickly to customer and marketplace needs. Historically, the Saudi education sector has been poorly equipped in this respect, due to its rote-learning approach. This gap not only restricts the availability of suitable workers for today’s workplace, but also reduces young people’s resilience and ability to face the changing future landscape. Thankfully, the Saudi Ministry of Education has already taken actions to tackle this issue. Early this year, it was announced that the high school curricula will soon include critical thinking, principles of law and philosophy⁷⁰. In addition, Chinese language will be included at all stage of education, preparing its students to be well-rounded global citizens.

• Broken Skill Matching Mechanisms:

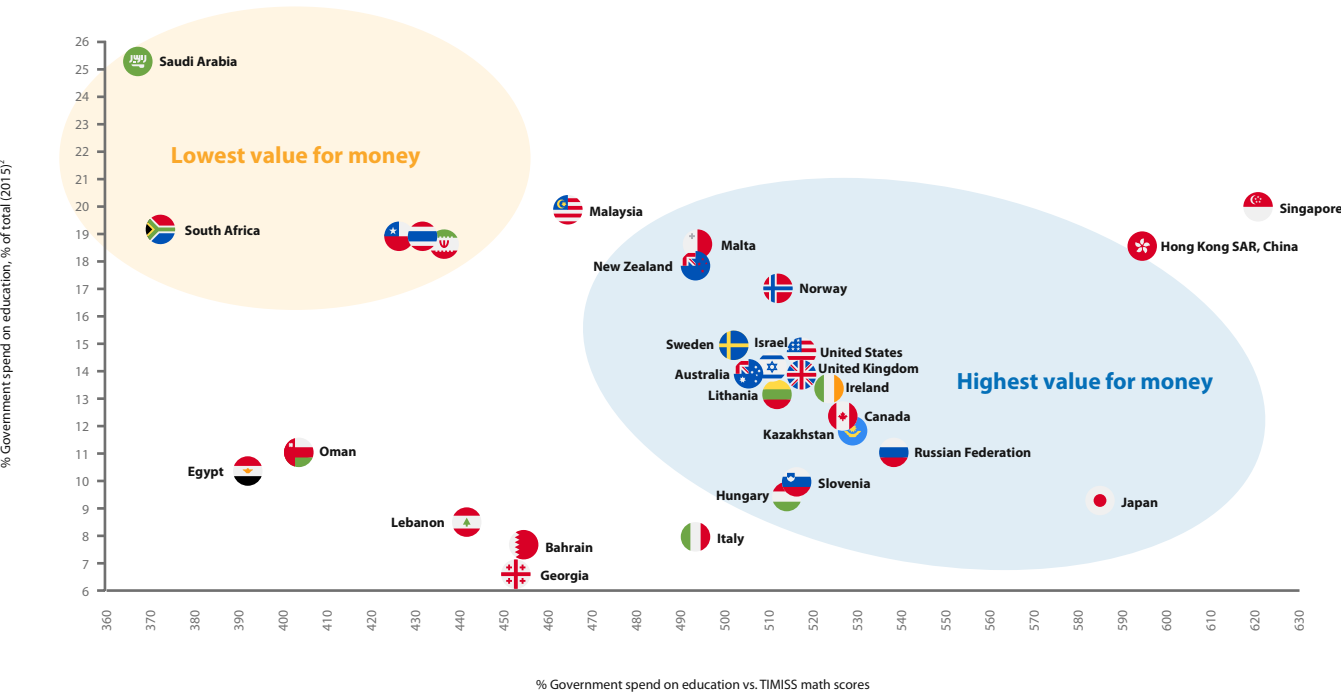
The lack of proper skills only partly explains the mismatch between the demand and supply of talent in KSA. Even for those who possess the competitive skills required in the

workplace, many are either not applying for the roles that could use them, or are not considered viable candidates by employers. This means that an effective skill matching mechanism is missing in the Kingdom.

Given the specific context in Saudi Arabia, it is imperative for policymakers to understand the local labor market trends and challenges in order to inform its targeted policy options in terms of economic growth, education system transformation and social reform.

69. See illustration in the previous section of this report. UNESCO, Global Youth Index, 2018
70. Arab News, “Critical thinking and philosophy to be taught in Saudi schools”, 2019

Chart 6 - Government Spend on Education VS TIMSS Math Scores





Conclusion

The future landscape of work features infinite possibilities of job opportunity for our youth. At the same time, this rapidly emerging future poses challenges and demands swifter adaption than did the labor markets faced by recent previous generations.

For government and private sector leaders and policymakers around the world, preparing their youth and societies for the future of work is a fundamental, whole-society strategic challenge. Given the pace of change suggested by this and many other studies, this challenge is one that requires urgent, concerted action. Our analysis suggests that the most significant impact of the emerging technologies of automation will be to reorder the task composition of jobs, rather than their wholesale displacement. However, in many countries and sectors, widespread displacement will be a significant issue that if unmanaged could jeopardize not only economic performance, but also social cohesion. With multiple dimensions at play, lead government entities must include Ministries of Labor, to optimize labor markets for the rapid changes underway, and Ministries of Education, to prepare youth populations for a dramatically more fluid, uncertain and demanding environment. However, true adaptation will require orchestrated actions beyond these frontline ministries. As outlined in the policy toolset presented in this report, the full spectrum of ministries – including those focused on economic policy and social services – must also play a central role. It is our hope that the framework of policy instruments presented here will provide valuable options and ideas for leaders seeking to design a comprehensive approach to preparing their countries for a future of work that will very soon be upon us – and in many ways already is.

About A.T Kearney

A.T. Kearney is a leading global management consulting firm that delivers immediate impact and growing advantage for its clients. We are passionate problem solvers who excel in collaborating across borders to co-create and realize elegantly simple, practical, and sustainable results. Since 1926, we have been trusted advisors on the most mission-critical issues to the world's leading organizations across all major industries and service sectors. A.T. Kearney has more than 60 offices located in major business centers across the world. From our Middle East offices, A.T. Kearney supports both private and public sector clients as well as nations to excel and prosper by combining our regional expertise and global business insights to achieve results.

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About Misk Global Forum

Misk Global Forum brings young leaders, creators and thinkers together with established global innovators to explore, experience and experiment with ways to meet the challenge of change. It is the flagship global platform of the Misk Foundation, a non-profit philanthropic foundation established by Crown Prince Mohammad bin Salman to discover, develop and empower young people in Saudi Arabia, and beyond to become active participants in the future economy. The forum furthers the foundation's mission internationally through research, initiatives, partnerships and engagements.

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