

T20 Recommendations Report

Economy, Employment, and Education in the Digital Age

Policy Needs for Shaping the Digital Economy Era

Work in Progress

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About this Report

This Recommendations Report contains Policy Briefs addressing the policy priorities of the G20. These policy priorities were reflected in the research agenda of the T20, the official think tank network advising the G20, which has produced research-based Policy Briefs containing recommendations for decision-makers.

This report provides a repository and categorization of the T20 Policy Briefs and additional relevant literature. It also provides information about the relevant G20 commitments (forthcoming). The report can be used by future T20 Task Forces to set up a research agenda, which builds upon the past efforts of the T20 network.

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1. Introduction

The digital transformation is putting the global economy on a new track. Intelligent tools, networks, platforms, artificial intelligence and ongoing automation and robotics bring new economic opportunities, such as new ways of doing business, new industries, new jobs, and new solutions for the delivery of public goods that promise better living standards. At the same time, they create transitory as well as more fundamental challenges for individuals, societies, businesses, and governments. They will change business models, social interactions, competition and market structures, patterns of comparative advantage, skill needs, or the organization of work, and may further limit the room for maneuver of national policy. The promise and opportunities of the digital transformation will only fully materialize, if appropriate complementary policy frameworks are put in place at a global and national level. Policy actions are needed to harness the opportunities and ensure the benefits are shared by all.

This Task Force has analyzed some of the major drivers reshaping the global economy and defined a global and national policy agenda for developing the digital economy in a sustainable and inclusive way, promoting both economic and social development. Its ongoing work shall support governments in assuring expanding real incomes and livelihoods of their citizens in equitable and sustainable communities.

The Report is structured along six major policy areas:

- a. Digital Platform Economy – Safeguarding functioning markets and sustainable intermediation
- b. Artificial Intelligence – Understanding the promise and limitations of AI
- c. Employment – Ensuring quality jobs in the digital age
- d. Data Flows and Cybersecurity – Policies to protect openness in a global economy
- e. Education – Educational Reforms Needed in the Digital Age
- f. Digital Value Creation – Measurement and taxation of the digital economy

2. Suggested Issues for Research

The following topics have been suggested by members of the [Council for Global Problem-Solving \(CGP\)](#):

Centre for Economic and Financial Research (CEFIR)

- Banks and Fintech - challenges to banking system in the digital age.
- Digital currencies - friend or foe for an economy?
- Big Tech - taxation and regulation of global tech companies.
- Privacy - protecting the right to privacy in the digital age.
- Digital Distractions - technology and attention deficit in school and workplace.

Economic Policy Research Foundation of Turkey (TEPAV)

- How to safeguard individual data?
- Reforms to raise the level of digital literacy and creative capacity
- Understanding value added in the digital economy

Elcano Royal Institute

Apart from what you say

- AI: From principles (G20) to design. Human centered technology: beyond the principles, how to apply it.
- Avoiding the Fragmentation of Internet
- Permanent education: the role of states and businesses
- The digital economy and AI in countries with low technological development.

G20 Research Group

- How digitalization, AI and the Internet of Things (IOT) can help secure the SDGs
- How digitalization, AI & IOT can harm and help control climate change

OECD, Policy Studies Branch

- Cross-border governance of digital identity.
- Digital gaps and the role of public procurement.
- Ensuring AI has a positive, human-centric impact on the labour market.
- Tackling gaps in digital skills.

- Strengthening adult learning systems.
- Addressing the rise in market concentration in the digital economy.

3. Issues and Policy Briefs

A. The Digital Platform Economy – Safeguarding functioning markets and sustainable social and economic intermediation

Challenge

The economy is increasingly restructured by digital platforms of various types, with prominent examples being Amazon (primarily retail), AirBnB (rooms), Uber (rides), or Upwork (labour). Digital platforms are becoming influential intermediaries in organizing the economy, and even social life. They are restructuring the organization of markets, institutions and power and force the reorganization of ever larger segments of the global economy. They also introduce new arrangements for value creation and, at the same time, determine the structure of the multi-sided markets they create.

Established global governance and regulatory approaches are not fully reflecting this new organizational reality. Understanding how the platform economy works and what its structural impact on the economy is highly important for the G20 given the platform economy's pervasiveness, cross-border nature and the limitations of current economic and policy models in capturing their impact on market outcomes.

Addressing the broader strategic policy challenges of the platform era is urgent. Therefore, the work of the T20 Task Force should put one particular focus on the implications of the platform economy, including competition policy, data governance and infrastructure.

The Policy Briefs in this section address various aspects of the platform economy, and discuss how the new digital economic model changes the relationship between society and economy.

Policy Briefs / Literature

[Transformation of Economic and Social Institutions for a New Era of Self-employment in High-income Countries](#)

T20 Policy Brief: G20 Japan

Reiko Kanda (NIRA)

Platforms now exist that allow large number of individuals to register and accept work as self-employed workers. The self-employed in highincome countries are generally not subject to the provisions of labor laws, and in many cases their social security benefits are inadequate. As a result, they are exposed to economic risks such as income fluctuation. In order to respond to this situation, it will be necessary to reconfigure institutional arrangements including labor laws, tax laws and social security laws to provide systems that are neutral in relation to forms of employment, and to enable the self-employed to receive the same treatment as employees.

[How to Promote Worker Wellbeing in the Platform Economy in the Global South](#)

T20 Policy Brief: G20 Japan

Urvashi Aneja (Tandem Research)
Krish Chetty (HSRC)
Ramiro Albrieu (CIPPEC)
Martin Rapetti (CIPPEC)

The growth of the platform economy is creating new opportunities and efficiencies in G20 economies. However, gig-work can often be precarious, with reduced access to formal social protection mechanisms. This poses unique opportunities and challenges for many G20 countries, where a large section of the workforce is engaged in informal work across both the unorganised and organised sectors of the economy. For the sustained and inclusive growth of the platform economy, the wellbeing of workers must be prioritized. Drawing on research undertaken in India, South Africa and Argentina, this policy brief outlines strategies for governments (G20), industries and unions (B20 and L20) and civil society (C20) to safeguard and enhance worker well-being in the platform economy

[New Opportunities in the Platform Economy: On-ramps to Formalization in the Global South](#)

T20 Policy Brief: G20 Japan

Gregory Randolph (JustJobs Network, JJN)
Hernan Galperin (Future of Work in the Global South, FoWiGS)

As the platform economy expands at exponential rates, policymakers in the Global South have a unique opportunity to translate the aggregation of workers through digital platforms into a more formalized labor market – with both opportunities for revenue collection and higher quality employment. Realizing this opportunity requires a collaborative ‘co-regulation’ approach, with information-sharing between governments and firms; updated systems of labor market data collection; development of context-appropriate categories of employment; and proactive approaches to taxation and social protection provision.

[Delivering Workforce Productivity Growth](#)

T20 Policy Brief: G20 Japan

Bhushan Sethi (PwC US)
Justine Brown (PwC UK)
Jenna Jackson (PwC US)

Despite large-scale technological investment, workforce productivity growth remains low. Organisations face an evolving business environment with the competitive pressures of building trust and seeking efficiency and profitability. Maximising the productivity benefits of technology is not just a case of the right investment strategy, it requires the right human skills via a motivated workforce. Policy makers should focus on four imperatives: rethink productivity measurement to account for societal benefits; accelerate technology adoption; drive workforce reskilling; and promote effective people management practices.

[A New Social Contract for the Digital Age](#)

T20 Policy Brief: G20 Argentina

Mihir Sharma

Terri Chapman

Samir Saran

Digital transformations are rapidly altering the nature of work, models of employment, contracts, regulations and protections. Increasingly, the responsibilities of the state are becoming the obligations of, and a business case for, the private sector. This devolution of ‘governance responsibility’ is happening at a rapid pace. In many locations, this coincides with the decentralization of political power to local administrations. A new social contract between citizens, consumers, employees, the state, and enterprise is needed to delineate a new understanding around rights, responsibilities and entitlements. As a step towards defining such a contract, we set out seven norms for defining these relationships in the digital age.

[Work and Value Creation in the Platform Economy](#)

Research in the Sociology of Work, Vol. 33, pp. 13-41

Martin Kenney

John Zysman

The emergence of the platform economy is reorganizing work, employment and value creation. We argue that the digital platforms are fracturing work itself as the places and types of work are being reorganized into a myriad of platform organized work arrangements with workplaces being potentially anywhere with Internet connectivity. We differ from most traditional narratives that focus solely upon either work displacement, a single type of platform-organized value-creating activity, or David Weil’s concentration solely upon the workplace. We recognize that even as some work is replaced, other work is being transformed; new work and old work in new arrangements is being created and recreated. Our taxonomy begins with the workers employed directly by the platform and its contractors. We then introduce the category, platform-mediated work, which we divide into three groups: marketplaces such as Amazon; in-person service provision such as Uber and Airbnb; and remote service provision such as Upwork. The next category, “platform-mediated content creation,” is complex. We identify three groups of activities: consignment content creators that include services such as the app stores, YouTube, and Amazon Self-Publishing; non-platform organization content producers, which refers to the enormous number of workers occupied with creating and maintaining websites; user-generated content is the non-compensated value creation that ranges from content uploaded to Facebook, Instagram etc. to reviews on sites such as Yelp! It is only when work and value creation is considered in all of these platform-based manifestations that we can understand the ultimate dimensions of the platform economy and comprehensively understand its implications for work.

[Beyond Hype and Despair: Developing Healthy Communities in the Era of Intelligent Tools](#)

White Paper

John Zysman,
Martin Kenney,
Laura Tyson

There is much we do not know and cannot know about the socioeconomic impacts of intelligent machines. The impacts will be driven by business strategies that differ by sector and country. “Good jobs” strategies are possible. It is important to identify and strengthen the factors, including policies that encourage them. Demographics will certainly affect the outcomes. Powerfully and importantly, the narratives about the benefits and costs of the technologies will affect the speed and breadth of the deployment of intelligent tools.

Learning to Save the Future: Rethinking Education and Work in an Era of Digital Capitalism

Book

Alexander J. Means

Mainstream economists and Silicon Valley entrepreneurs claim that unfettered capitalism and digital technology can unlock a future of unbounded prosperity, create endless high paying jobs, and solve the world's vast social and ecological problems. Realizing this future of abundance purportedly rests in the transformation of human potential into innovative human capital through new 21st century forms of education. In this new book Alex Means challenges this view. Stagnating economic growth and runaway inequality have emerged as the 'normal' condition of advanced capitalism. Simultaneously, there has been a worldwide educational expansion and a growing surplus of college-educated workers relative to their demand in the world economy. This surplus is complicated by an emerging digital revolution driven by artificial intelligence and machine learning that generates worker displacing innovations and immaterial forms of labor and valorization. Learning to Save the Future argues that rather than fostering mass intellectuality, educational development is being constrained by a value structure subordinated to 21st century capitalism and technology. Human capabilities from creativity, design, engineering, to communication are conceived narrowly as human capital, valued in terms of economic productivity and growth. Similarly, global problems such as the erosion of employment and climate change are conceived as educational problems to be addressed through business solutions and the digitalization of education. This thought-provoking account provides a cognitive map of this condition, offering alternatives through critical analyses of education and political economy, technology and labor, creativity and value, power and ecology.

Further Readings

Cutolo, D. and Kenney, M. 2019. The Emergence of Platform-Dependent Entrepreneurs: Power Asymmetries, Risk, and Uncertainty. BRIE Working Paper 2019-3,

- Cabral, L., Peitz, M., & Wright, J. (2019). Introduction to Special Issue on Platforms. *Journal of Economics & Management Strategy*, 28(1), 3-4.
- Crémer, J., Montjoye, Y.-A., Schweitzer, H., (2019) Competition policy for the Digital Era. EUROPEAN COMMISSION Directorate-General for Competition
- Khan, L.M. (2016) Amazon's Antitrust Paradox, 126 *Yale L.J.* Available at: <https://digitalcommons.law.yale.edu/ylj/vol126/iss3/3>
- Kenney, Martin & Zysman, John. (2016). The Rise of the Platform Economy. *Issues in science and technology*. 32. 61-69.
- Kenney, Martin & Zysman, John. (2018). Work and Value Creation in the Platform Economy. BRIE Working Paper 2018-4
- Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). *Platform revolution: how networked markets are transforming the economy and how to make them work for you*. WW Norton & Company.
- Rahman, K. Sabeel, & Thelen, K. (2019). The Rise of the Platform Business Model and the Transformation of Twenty-First-Century Capitalism. *Politics & Society*, 47(2), 177-204.
- Schweitzer, H., Haucap, J., Kerber, W. & Welker, R. (2018) Modernising the Law on Abuse of Market Power: Report for the Federal Ministry for Economic Affairs and Energy (Germany)
- Srnicek, N. (2017). *Platform Capitalism*. New York: John Wiley & Sons.
- Zysman, J. (2019) Platform-Dependent Entrepreneurs as Private Regulators in the Platform Economy BRIE Working Paper 2019-5

B. Artificial Intelligence – Understanding the promise and limitations of AI

Challenge

Artificial Intelligence (AI) has become a prominent cornerstone of the strategic policy discussion across G20 countries. Within the past two years most countries have defined national strategies covering a broad range of relevant policy areas and announcing very significant investments in scientific research, skills development, subsidies and industrial policy frameworks as well as data policy and digital infrastructure. Most strategies also address the need to advance the policy discussion around ethics, inclusion and the impact on labor markets.

Much of the strategy discussion is driven by competitive national views focusing on AI as a strategic technology that allows nations to gain comparative advantages in global economic competition as well as military power.

At the same time, there is increasing evidence that these policy approaches are overstating the real technological capabilities of AI. Most of the current applications of AI are confined to very narrow fields of application based on advances in machine learning, a greater availability of data and increasing computing powers. Yet, even narrow AI has powerful economic implications and has significant social and political implications, for example, as an amplifier of social, economic and cultural inequalities that are represented in the data used to train AI models.

Understanding what AI can do and cannot do, and what its global policy implications are, is important for G20 countries. Therefore, the T20 Working Group should provide an evidence-based assessment of the state of technological development of AI, its current and potential future policy implications and an analysis of the implications of current national policies for global cooperation.

The Policy Briefs in this section focus on the possible impact of AI on work and labour markets.

Policy Briefs / Literature

[The economics of artificial intelligence: Implications for the future of work](#)

ILO Research Paper

Ekkehard Ernst

Rossana Merola

Daniel Samaan

The current wave of technological change based on advancements in artificial intelligence (AI) has created widespread fear of job losses and further rises in inequality. This paper discusses the rationale for these fears, highlighting the specific nature of AI and comparing previous waves of automation and robotization with the current advancements made possible by a wide-spread adoption of AI. It argues that large opportunities in terms of increases in productivity can ensue, including for developing countries, given the vastly reduced costs of capital that some applications have demonstrated and the potential for productivity increases,

especially among the low-skilled. At the same time, risks in the form of further increases in inequality need to be addressed if the benefits from AI-based technological progress are to be broadly shared. For this, skills policy is necessary but not sufficient. In addition, new forms of regulating the digital economy are called for that prevent further rises in market concentration, ensure proper data protection and privacy and help share the benefits of productivity growth through a combination of profit sharing, (digital) capital taxation and a reduction in working time. The paper calls for a moderately optimistic outlook on the opportunities and risks from artificial intelligence, provided policy-makers and social partners take the particular characteristics of these new technologies into account.

[How is new technology changing job design? : machines' ability to perform cognitive, physical, and social tasks is accelerating, dramatically changing jobs and labor markets](#)

2017. IZA World of Labor

Michael Gibbs

The information technology revolution has had dramatic effects on jobs and the labor market. Many routine and manual tasks have been automated, replacing workers. By contrast, new technologies complement non-routine, cognitive, and social tasks, making work in such tasks more productive. These effects have polarized labor markets: While low-skill jobs have stagnated, there are fewer and lower paid jobs for middle-skill workers, and higher pay for high-skill workers, increasing wage inequality. Advances in artificial intelligence may be accelerating computers' ability to perform cognitive tasks, heightening concerns about automation of even high-skill jobs.

[Artificial intelligence can transform the economy,](#)

2018. Op-Ed Washington Post

Erik Brynjolfsson

After half a century of hype and false starts, artificial intelligence may finally be starting to transform the U.S. economy. An example is machine translation, as we found when analyzing eBay's deployment in 2014 of an AI-based tool that learned to translate by digesting millions of lines of eBay data and data from the Web. The aim is to allow eBay sellers and buyers in different countries to more easily connect with one another. The tool detects the location of an eBay user's Internet Protocol address in, say, a Spanish-speaking country and automatically translates the English title of the eBay offering. After eBay unveiled its English-Spanish translator for search queries and item titles, exports on eBay from the United States to Latin America increased by more than 17 percent. Other language pairs produced similarly significant gains. But the machine-learning tool is imperfect — it doesn't translate the entire description of an eBay offering. Refinements would almost certainly drive even larger increases. [...]

Further readings

<https://oecd-opsi.org/projects/ai/strategies/>

OECD (2019), *Artificial Intelligence in Society*, OECD Publishing, Paris, <https://doi.org/10.1787/eedfee77-en>.

https://www.rand.org/pubs/research_reports/RR1478.html

<https://medium.com/@Zelros/a-brief-history-of-machine-learning-models-explainability-f1c3301be9dc>

C. Employment – Ensuring quality jobs in the digital age

Challenge

The ongoing automation of tasks will substitute human labour. Other emerging technologies, such as AI or intelligent tools will change how we work and require new skills. The possibilities will also change comparative advantages and, hence, reshape global value chains. The deployment of technology will, however, depend on local circumstances incl. workforce skills, costs and demographics. The Policy Briefs in this section deal with possible labour market and education policy responses to ensure quality jobs in the light of technological transformations.

Policy Briefs / Literature

Automation / changes in labour-intensive production / global value chains

[The G20 and the Reskilling Effort to Bring the Fourth Industrial Revolution to Emerging countries. Some Insights from Latin America](#)

T20 Policy Brief: G20 Japan

Ramiro Albrieu (CIPPEC)

Martin Rapetti (CIPPEC)

Fueled by major disruptions in the technological landscape, a process of Schumpeterian creative destruction is underway. In the Argentine presidency, the G20 affirmed that it was fully committed to deliver the policy responses and international cooperation that will help ensure that the benefits of the technological transformation are widely shared. A special focus was put in considering individual country circumstances when analyzing challenges and benefits – particularly in emerging economies. In this policy brief, we build country-specific data from three G20 countries –and other countries- to ask to what extent Latin America is ready to reap the benefits of this revolution.

[Industrialization and Growth in Digital Age: Disruptions and Opportunities for Employment Led Growth in Asia and Africa](#)

T20 Policy Brief: G20 Japan

Anita Prakash (Economic Research Institute for ASEAN and East Asia)

The digital economy will affect the patterns and geographical location of industries, employment and economic growth. Structural transformation and employment generation policies in developing Asia and Africa must understand, prepare and respond to these changes. Investments in industrialization and manufacturing will continue to drive an employment led growth. Countries can address the opportunities and disruptions arising in the employment sector through development strategies that focus on technology aided industrialization, education and training, skill development and trade facilitation. G20 can support these efforts by offering the right ecology of international cooperation and

coordinated policy response to trade and investment facilitation, education and human resource development and social policies.

[Growth and Jobs by Investing in Sustainable Special Economic Zones](#)

Global Solutions Journal 1(1), pp. 32-37.

Dennis Görlich

Achieving environmentally and socially sustainable economic growth is a major challenge faced by the G20 countries. One avenue to achieve growth (but potentially disregarding environmental and social sustainability) is written down in the Antalya Action Plan that was ratified by the G20 Heads of State in 2015: “Boosting quality investment, especially in infrastructure, is a top priority for the G20, in an environment of investment and infrastructure shortfalls.” The text says further that infrastructure investment should help lift medium-term growth, reduce inequalities and improve productivity. Yet, it remains open what types of infrastructure investment are meant to be done. What should be considered quality investment? How can it reduce inequalities? Can we make sure that the investments are sustainable in the sense of environmental and social sustainability? And how can environmental and social sustainability be ensured in a world where value chains are globalized?

[Technological Innovation and the Future of Work: A View From the South](#)

T20 Policy Brief: G20 Argentina

Antje Uhlig

Martín Rapetti

Ramiro Abrieu

Vikrom Mathur

Urvashi Aneja

Krish Chetty

A global narrative about technological change and the future of work is emerging. It states that technological innovation will be pervasive across the world, and the impacts on labor markets will be deep but largely transitory. Will the future of work look the same everywhere? On the one hand, evidence points to developing countries lagging behind in terms of technological diffusion and the re-skilling of their current and future workers. This could exacerbate development gaps with respect to advanced countries as has happened in previous technological “revolutions”. On the other, structural factors that are country-specific -such as demographics, factor endowments, gender gaps- may cause new technologies to have different impacts on labor markets. We believe that the menu of policy options that the G20 is developing should ideally start with country-specific diagnoses taking into account these structural factors. However, given that this may be unreachable in the short run, we recommend to start monitoring the trends in technological adoption and skills development in each G20 country. For this, more and better data is needed.

[Harnessing the opportunities of inclusive technologies in a global economy](#)

T20 Policy Brief: G20 Argentina

Ana Inés Basco
Belisario de Azevedo
Gustavo Belizu

In this policy brief INTAL-IDB proposes that G20 countries endorse and facilitate the creation of a T20 digital platform for Accelerating the Jobs of the Future. In a world driven by a new wave of technological change, the platform would revalue the role of think tanks, research institutions and knowledge hubs to move the global agenda in an issue of central importance for the future of society: the creation of the jobs of the future. Building on and complementing existing experiences, the T20 platform would be a digital hub for producing knowledge, informing policies and connecting potential partners to accelerate the jobs of the future, within the context of an increasing integrated global economy. It would also contribute to the development of consensual views among the research community, allowing to discard extreme visions about the jobs of the future, dispelling both overly optimistic visions with no evidence base and unwarranted fears.

[A Future of Work that Works for Women](#)

T20 Policy Brief: G20 Argentina

Jose Florito (CIPPEC)
Margarita Beneke de Sanfeliu (FUSADES)
Urvashi Aneja (Tandem Research)

Future of Work debate has been more centered on robots than on workers. The excessive focus on automation and technology's potential displacement of jobs has neglected other trends that are also re-shaping the labor market as we know it. Digitalization and the gig economy, demographic changes and the associated care crisis, and the demand of new skills are equally important and will have a major impact on how we understand and carry out work. Critically, evidence suggests that these trends have specific implications for gender equality and women's empowerment. The contribution of this brief is to place a gender lens on the future of work debate, highlighting what is known – as well as remaining data gaps – and make firm policy proposals.

[The Future of Jobs and Growth: Making the Digital Revolution Work for the Many](#)

T20 Policy Brief: G20 Germany

Carl Benedikt Frey

As the pace of automation is picking up, the challenge for governments is to make the digital revolution inclusive by helping workers shift into new and better paid jobs. This report has identified three complementary approaches for achieving this. First, governments must

support the reallocation process by providing additional incentives for businesses to invest for new job creation, while reducing existing legal barriers to job mobility. Second, G20 members should help facilitate the relocation process. Because new jobs often emerge in different locations from the ones where jobs are made redundant, and low-skilled workers often do not have the financial means to move, relocation vouchers should be introduced for workers moving from contracting to expanding regions. Finally, education remains critical to ensure that workers have the right skills to take on future jobs. Fortunately, digital technology offers the potential of giving people access to the best education regardless of their location. G20 members should introduce national online learning platforms to be adopted by all schools, allowing all children to have equal access to quality education. To facilitate the learning process, teachers should take on the role of tutors, working with students interactively to achieve their learning objectives. In addition, for workers that see their skills made redundant by technology later in their careers, approaches to lifelong learning must be developed. Together with industry and professional bodies, governments should create modular approaches to education for different career paths, allowing workers to constantly update their skills.

[Accelerating Labour Market Transformation](#)

T20 Policy Brief: G20 Germany

Harald Kayser (PwC Germany)

Michael Ey (PwC Germany)

Peter Gerdemann (PwC Germany)

Naveen Srivatsav(PwC Germany)

Joachim Müller(PwC Germany)

Dr. Sinem Kuz (PwC Germany)

Dr. Frank Navrade(PwC Germany)

Nina Pannewick (PwC Germany)

Mohamed Sayed (Heuro Labs)

Digitization is driving massive labour market transformation across the globe. This policy brief looks at the effects of automation on businesses, current workforces and communities especially in developed nations and suggests interventions to tackle the unprecedented challenges. Even though complexity and exponential developments in the world can be daunting and counter-intuitive, the authors suggest that policymakers resist the urge to tread carefully and instead actively accelerate this transformation, even if partially blindfolded. Immediate and ripple effects, some likely to have negative impact in the short to mid-term, are inevitable. However, the net long-term benefits for society are compelling. Freeing up resources at community and regional levels will be paramount to solving challenges beyond pure technology-driven disruption – i.e. aging populations, climate change and ending poverty, whose windows of opportunity are rapidly closing. If critical velocity can be achieved, digitization and automation can be turned into key drivers for prosperity worldwide instead of being a mere threat.

[The robot in the window seat](#)

Peter Buell Hirsch

Journal of Business Strategy, Vol. 38 No. 4, pp. 47-51

The purpose of this paper is to point to some emerging workplace issues relating to the increasing collaboration between human and robot workers. As the number of human workers shrinks and that of robots increases, how will this change the dynamics of the workplace and human worker motivation? The approach of this paper is to examine recent academic, business and media writings on the subject of artificial intelligence and robotics in the workplace to identify gaps in our understanding of the new hybrid work environment. What the author has found is that although there are numerous voices expressing concerns about the replacement of human workers by robots, there has not as yet been a substantive study of the impact on human workers of sharing their work life with robots in this environment.

The Second Machine Age

Book

Erik Brynjolfsson

Andrew McAfee

In recent years, Google's autonomous cars have logged thousands of miles on American highways and IBM's Watson trounced the best human Jeopardy! players. Digital technologies—with hardware, software, and networks at their core—will in the near future diagnose diseases more accurately than doctors can, apply enormous data sets to transform retailing, and accomplish many tasks once considered uniquely human. In *The Second Machine Age* MIT's Erik Brynjolfsson and Andrew McAfee—two thinkers at the forefront of their field—reveal the forces driving the reinvention of our lives and our economy. As the full impact of digital technologies is felt, we will realize immense bounty in the form of dazzling personal technology, advanced infrastructure, and near-boundless access to the cultural items that enrich our lives. [...]

[Robots worldwide: The impact of automation on employment and trade](#)

ILO Report

Francesco Carbonero

Ekkehard Ernst

Enzo Weber

The impact of robots on employment and trade is a highly discussed topic in the academic and public debates. Particularly, there are concerns that automation may threaten jobs in emerging countries given the erosion of the labour cost advantage. We provide evidence on the effects of robots on worldwide employment, including emerging economies. To instrument the use of robots, we introduce an index of technical progress, defined as the ability of robots to carry out different tasks. Robots turn out to have a statistically significant negative impact on worldwide employment. While it is small in developed countries, for emerging economies it

amounts to -14% between 2005 and 2014. Furthermore, we assess cross-country effects, finding that robots in developed countries decrease off-shoring just as employment in

D. Data Flows and Cybersecurity – Policies to protect openness in a global economy

Challenge

Data are at the core of the digital economy. While they enable new business models and increasingly drive market structure, they cannot simply be treated as a commodity. This makes it hard for policy-makers and scholars to find the adequate policy responses balancing innovation, privacy and liberty.

With digital infrastructure and data becoming central to economic activity, adequate security measures must be developed to protect them. By nature, digital infrastructure is global and hence, cyber security is an important issue for international policy coordination at the G20 level.

Policy Briefs / Literature

[Building on the Hamburg Statement and the G20 Roadmap for Digitalization: toward a G20 framework for artificial intelligence in the workplace](#)

T20 Policy Brief: G20 Argentina

Paul Twomey

Building on the 2017 Hamburg Statement and the G20 Roadmap for Digitalization, this paper recommends a G20 framework for artificial intelligence in the workplace. It proposes high level principles for such a framework for G-20 governments to enable the smoother, internationally broader and more socially acceptable introduction of big data and AI. The principles are dedicated to the work space. It summarises the main issues behind the framework principles. It also suggests two paths towards adoption of a G-20 framework for artificial intelligence in the workplace.

[G20 safeguards vulnerabilities of digital economy, with financial sector focus](#)

T20 Policy Brief: G20 Germany

Barry Carin (Centre for International Governance Innovation (CIGI))

The G20 can ensure a secure, resilient, sustainable and responsible digital economy, especially in the financial sector, by removing vulnerabilities in Internet infrastructure, encouraging cross-border cooperation, providing guidance to telecommunications regulators and implementing norms regarding cyber-attacks

[Toward A Global Norm Against Manipulating the Integrity of Financial Data](#)

T20 Policy Brief: G20 Germany

Tim Maurer (Carnegie Endowment for International Peace)

Steven Nyikos (Carnegie Endowment for International Peace)

The financial crisis that erupted in 2007 highlighted how important trust is for the global system and how fragile it can be. The 2016 Bangladesh central bank cyber incident exposed a new threat to financial stability and the unprecedented scale of the risk that malicious cyber actors pose to financial institutions.[i] Beyond theft, using cyber operations to manipulate the integrity of data, in particular, poses a distinct and greater set of systemic risks than other forms of financial coercion. The complex and interdependent character of the financial system and its transcendence of physical and national boundaries mean that manipulating the integrity of financial institutions' data can, intentionally and/or unintentionally, threaten financial stability and the stability of the international system. Importantly, unlike the 2007–2008 global crisis, this risk exists independent of the underlying economic fundamentals and will only increase as more and more governments make cashless economies an explicit goal.[ii] On March 18, 2017, the G20 finance ministers and central bank governors recognized this risk in their communiqué highlighting that “The malicious use of Information and Communication Technologies (ICT) could disrupt financial services crucial to both national and international financial systems, undermine security and confidence and endanger financial stability.”

E. Education - Educational Reforms Needed in the Digital Age

Challenge

The pace of job turnover is expected to accelerate in the digital age. The workforce requires appropriate education that equips it with the competences to adapt successfully to changing demands for employment (life-long learning). It also requires strengthening social protection programs to support retraining by individuals and policies to promote increased flexibility in job markets.

At the same time, new technology will affect the way education can be delivered. Students can access lectures from top universities in the world, while interactive learning can be implemented with robots.

Developments of Fintech will require increasing sophistication on the part of households and firms to make appropriate use of them, which points to the need for greater financial education aimed at different target groups. All of these will require additional fiscal resources.

The possible role played by vocational training and how it can be adapted to the needs of the digital economy should become a focus area for the Task Force in the future.

[adapted from: 2019 Japan T20, Description Task Force 7]

Policy Briefs / Literature

Vocational Training

[Rethinking Pathways to Employment: Technical and Vocational Training for The Digital Age](#)

T20 Policy Brief: G20 Japan

Romina Bandura (Center for Strategic and International Studies – CSIS)

Paul Grainger (University College London – UCL)

Technical and vocational education and training (TVET) generally suffers from low status and is regarded as inferior to academic study. Moreover, TVET institutions, which were established to be authoritative in knowledge and skills, need to adapt to an environment where the knowledge flow is reversed, with skills increasingly being generated within economic activities. Technology is also changing the kind of skills required by employers. A new relationship between educator and employer must be established for effective, high profile TVET and workbased learning programs. We propose a B20-L20-T20 collaboration and a G20 database on TVET to promote best practices.

Life-Long Learning

[Leaving No One Behind: Measuring the Multidimensionality of Digital Literacy in the Age of AI and other Transformative Technologies](#)

T20 Policy Brief: G20 Japan

Angela C. Lyons (University of Illinois at Urbana-Champaign)
Josephine Kass-Hanna (Saint Joseph University of Beirut)
Alessia Zucchetti (Center for Research - Ceibal Foundation)
Cristóbal Cobo (Center for Research - Ceibal Foundation)

To ensure that no one is left behind in today's fast-changing world driven by technological advancement, it is critical for global citizens of all ages and socioeconomic backgrounds to have a set of digital skills to live, work, learn, and participate in modern society. This brief emphasizes the need for a holistic framework encompassing technical and socioemotional dimensions to formulate 21st century skills targets and pave the way for tangible outcomes in the workplace and beyond. Standardized assessment tools are essential to consistently measure digital literacy, identify gaps and track progress towards narrowing them, especially for the most vulnerable populations.

[Bridging the Gap Between Digital Skills and Employability for Vulnerable Populations](#)

T20 Policy Brief: G20 Japan

Angela C. Lyons (University of Illinois at Urbana-Champaign)
Alessia Zucchetti (Center for Research - Ceibal Foundation)
Josephine Kass-Hanna (Saint Joseph University of Beirut)
Cristóbal Cobo (Center for Research - Ceibal Foundation)

While digital technologies are spreading rapidly, mismatches in desired digital skills between education and industry pose an ongoing challenge for the future of work. Some segments of the population are illprepared to fill jobs that will require at least a basic set of digital skills. With rapid technological advancement, traditional and emerging learning deficits can put them at greater socio-economic risk by exacerbating inequalities and unemployment. This brief provides recommendations to bridge the digital skills divide and foster the employability of those vulnerable populations, which can lead ultimately to larger macroeconomic outcomes such as poverty reduction, income growth, and economic empowerment.

[Lifelong Learning and Education Policies to Capture Digital Gains](#)

T20 Policy Brief: G20 Japan

Cyn-Young Park (Asian Development Bank)

Rapid technological innovations are transforming the world of work. In many G20 countries, employment is shifting towards jobs that require high-level cognitive and socio-emotional skills, while highly routine jobs are being automated or offshored to varying degrees. Today's skills will not match tomorrow's jobs and newly acquired skills may quickly become obsolete. As the concept of future jobs and careers becomes increasingly fluid, more emphasis will be on lifelong learning to keep up with changes in technology and maintain flexibility in skills. This brief discusses policy options for lifelong learning, target groups, and education in information and communication technology.

[Adult Training in the Digital Age](#)

T20 Policy Brief: G20 Germany

Eckhardt Bode

Robert Gold

Digital technologies will both create new jobs and replace existing ones. To cope with increasing labor market dynamics in the digital age, workers will have to become more mobile across jobs, occupations, and industries. The relative importance of their job-specific skills will decrease while that of their general skills applicable to various occupations will increase. The G20 should establish national adult training programs that focus on improving workers' general skills, specifically their theoretical, non-cognitive, and digital skills. These general skills will enable workers to work with technology instead of competing with it, thereby increasing their job mobility and employability.

[Evaluating options for funding and financing post-compulsory education \(T20 Policy Brief\)](#)

T20 Policy Brief: G20 Argentina

Mick Fletcher

Paul Grainger

Technological change and other challenges have inspired many countries to seek new approaches to funding and financing post-compulsory education and there is a growing body of evidence on the efficacy of specific approaches in particular circumstances. It is not easy for policymakers to learn from the experience of other countries however and a risk that mistakes will be expensively and wastefully repeated. This paper proposes a way to develop a trans-national resource that would enable those responsible for this sector rapidly to identify those approaches to funding and financing that might be most appropriate to their circumstances.

[Redesigning education landscapes for the future of work: third-space literacies and alternative learning models](#)

T20 Policy Brief: G20 Argentina

Alessia Zucchetti

Axel Rivas

Cristóbal Cobo

Technology-driven transformations are redefining the role of education, the value of knowledge and skills. Non-formal learning, third-space literacies and alternative mechanisms for certification are emerging throughout the world, aiming to prepare youth for entering the job market. If non-formal mechanisms continue to expand, the role of the State, other actors and the G20 in education also need to be reassessed. This includes dimensions such as regional and global articulation, regulation, certification of non-formal education, among others. The scope of the policy brief is to provide recommendations to bridge the gap between schooling, learning and employability at a global scale.

[It takes more than a village. Effective Early Childhood Development, Education and Care services require competent systems](#)

T20 Policy Brief: G20 Argentina

Alejandra Cardini

Mathias Urban

Rita Flórez Romero

There is a global consensus about the importance of high quality early childhood development, education and care (ECDEC) programmes. Increasingly, the systemic characteristics of early childhood programmes are recognised by policy makers and international bodies. This ‘systemic turn’ has created new challenges. Education, primary healthcare, nutrition, children’s rights, social cohesion, equality and other aspects that contribute to the ECDEC system are often grounded in different, and not necessarily matching, conceptualisations, understandings, terminologies and accepted practices. Bringing them together in a Competent System (Urban et al, 2012) requires coordinated approaches to governance, resourcing, professional preparation, and evaluation that embrace complexity.

Funding Education

[Financing Quality and Equitable Education in LATAM](#)

T20 Policy Brief: G20 Argentina

Alejandra Cardini

Bárbara Flores

Javier González

Santiago Cueto

Education learning outcomes in low and middle-income countries are still insufficient and unequally distributed. Several factors are behind this situation, many of which relate to education funding: low absolute expenditure per student; increasing gaps in spending levels between developed and developing countries; unequal distribution of key education inputs; inefficient use of pedagogical resources and low levels of innovation; inadequate political economy frameworks, in which rich individuals are incentivised to opt out of an already weakened public sector. Recommendations to deal with these problems are presented in order to provide not only more investment, but also a more effective and equitable use of resources.

[Transforming Education Financing for Inclusive, Equitable and Quality Learning Outcomes for the 2030/SDG4 Agenda](#)

T20 Policy Brief: G20 Argentina

Kazuhiro Yoshida

Shinichiro Tanaka

Yasushi Hirosato

Education in developing countries faces the daunting responsibility of trying to enact realistic policies and strategies, while keeping to the principles and targets of SDG4 and the demands of Results-Based Financing. The education agenda demands ambitious and transformative changes that require significantly more financial resources and many related efforts to achieve learning outcomes. However, there is insufficient knowledge on how to achieve these goals, and we have yet to come up with more effective modalities and mechanisms for aid. This brief presents pitfalls that await these countries and partners and proposes possible policy actions and corresponding measures.

Technology in Education

Fostering Human Dimension of the Digital Education

T20 Policy Brief: G20 Japan

Ilya Kiriya (Faculty of communication, media and design, National Research University Higher School of Economics)

In contemporary attitudes of new digital technology role in education there is a domination of technological determinism, in other words – the belief that new technologies of education and learning are able to solve all main problems of the education in the contemporary world such as poverty, limited access to the education, huge inequalities. Actually we are facing the challenge to add some human dimension into such beliefs and humanize the technology in order to understand more complex nature of the digital education and implement more sustainable policies contributing to the protection of diversity, public good character of the education, its cultural role etc.

Financial Education

The Need to Promote Digital Financial Literacy for the Digital Age

T20 Policy Brief: G20 Japan

Peter J. Morgan (Asian Development Bank Institute)

Bihong Huang (Asian Development Bank Institute)

Long Q. Trinh (Asian Development Bank Institute)

Digital financial literacy (DFL) is likely to become an increasingly important aspect of education for the Digital Age. The development of the ‘gig’ economy means that individuals will become more responsible for their own financial planning, including for retirement. Consumers will need to have increasing financial sophistication to make effective use of financial technology (fintech) products and avoid fraud and costly mistakes. G20 countries need to agree on a standardized definition of digital financial literacy, design tools to assess it, and develop strategies and programs to promote digital financial education, including special programs for vulnerable groups.

F. Digital Value Creation – Measurement and taxation of the digital economy

Challenge

The digital economy is difficult to capture with our standard statistical measures: market power becomes unrelated to price increases, trade is digital, occupational borders are increasingly blurred, employment relationships may be non-standard. The G20 should call for adequate and harmonized statistics that will enable it to better understand the developments of the digital economy.

Taxation in the platform economy should also be addressed by the T20 Task Force. At the Meeting of Finance Ministers in Japan, the G20 committed to a “Programme of Work to Develop a Consensus Solution to the Tax Challenges Arising from the Digitalisation of the Economy” to be finalized in 2020.

Policy Briefs / Literature

Ariel Coremberg (University of Buenos Aires (UBA))

Beatriz Nofal (Eco-Axis Research)

Luca Sartorio (Universidad Torcuato de Tella)

[Data, Measurement and Initiatives for Inclusive Digitalization and Future of Work \(T20 Policy Brief\)](#)

As the pace of digitalization and automation accelerates globally, and more disruptive innovations in machine learning, artificial intelligence and robotics are expected, new data sources and measurement tools are needed to complement existing valuable statistics and administrative data. This is necessary to better understand the impact of technological change on the labor market and the economy and better inform policy decisions for inclusive people centered growth. In accordance with G20 Roadmap for Digitalisation (2017), points 10, 5 and 7, we propose to: i) track technological developments globally in a multidisciplinary and coordinated fashion; ii) develop new methods of measurement for the digital economy; iii) harmonize occupational taxonomies and develop new sources of data and indicators at the international level; iv) Build International Collaborative Platforms for Digital Skills and the Digital Transformation of SMES.

4. G20 Commitments and Initiatives

-- to be added --

5. The T20 Task Forces on Digital Economy over Time

T20 Saudi Arabia 2020: Economy, Employment, and Education in the Digital Age

Task Force Description

The task force will recommend policies to reform education, and provide opportunities for training and entrepreneurship by addressing the digital continuum within the changing labor market, challenges raised by the platform economy, and the implications affecting the young. It will create a global governance framework for data flows and artificial intelligence while illuminating the impacts of artificial intelligence and technological disruption on employment and workplaces. The proposals will highlight the digital gender gap, and initiatives available to develop practical and self-sustaining solutions to reduce cyber security risks and threats, and enhance data privacy. Motivated by the growing need to humanize technology, these recommendations will provide concrete and sustainable policy measures that maintain individuality, respect confidentiality, and encourage inclusion in the digital age.

Task Force Priorities

- Training and education in and for the digital age
- The impacts of artificial intelligence and technological disruption on employment and workplaces
- Entrepreneurship in the digital age
- The changing labor market and challenges for the young
- Addressing the digital gender gap
- Reforming education; and the role of early learning
- Addressing challenges raised by the platform economy
- Cyber security risks, threats, and data privacy
- Global governance framework for data flows and artificial intelligence

Lead Co-Chair

- Heidi Alaskary

T20 Japan 2019: The Future of Work and Education for the Digital Age

Task Force Description

Several major technological transformations (e.g., artificial intelligence or AI, fintech, the Internet of Things, Industry 4.0) are putting the global economy on a new track. They will bring immense economic opportunities, such as new ways of doing business, new industries, new and better jobs, higher GDP growth, and better living standards. At the same time, they will create challenges for individuals, businesses, and governments. They are likely to change business models, patterns of comparative advantage, skill needs, the organization of work, and may further limit the room for maneuver of national policy. Policy actions are needed to harness the opportunities and ensure the benefits are shared by all. This Task Force will make recommendations on how to achieve well-balanced labor markets capable of matching the supply of and demand for skills in an environment of rapidly changing technology while

reducing inequalities and promoting economic and social development. It also aims to provide policy advice to develop educational systems that promote equal opportunities, lifelong learning, and financial literacy. Finally, it aims to make recommendations in the areas of data security, so that the digital economy can be harnessed effectively to greatly improve prosperity and inclusiveness.

Lead Co-Chair

- Peter Morgan, Asian Development Bank Institute (ADBI)

Co-Chairs

- Alejandra Cardini, Center for the Implementation of Public Policies Promoting Equity and Growth (CIPPEC)
- Dennis Görlich, Kiel Institute for the World Economy (IfW)
- Martín Rapetti, Center for the Implementation of Public Policies Promoting Equity and Growth (CIPPEC)
- Paul Twomey, Centre for International Governance Innovation (CIGI)
- Kazuhiro Yoshida, Center for the Study of International Cooperation in Education (CICE), Hiroshima University

T20 Argentina 2018: The Future of Work and Education for the Digital Age

Task Force Description

to be added

Co-Chairs

- Alejandra Cardini, Center for the Implementation of Public Policies Promoting Equity and Growth (CIPPEC)
- Dennis Görlich, Kiel Institute for the World Economy (IfW)
- Fen Osler Hampson, Center for International Governance Innovation (CIGI)
- Martín Rapetti, Center for the Implementation of Public Policies Promoting Equity and Growth (CIPPEC)
- Jeffrey Sachs, Columbia University
- Samir Saran, Observer Research Foundation (ORF)

T20 Germany 2017: Digital Economy

Task Force Description

Several technological transformations (e.g. the Internet of Things, advanced manufacturing or technology-enabled platforms) put the global economy on a new track. They are likely to change business models, patterns of comparative advantage, skill needs, the organisation of work and may further limit the room of manoeuvre of national policy.

If G20 leaders take the right steps in the areas of data security, skill acquisition, infrastructure investment and tax cooperation, the digital economy can vastly improve prosperity and inclusiveness. This task force will make recommendation to that end.

Co-Chairs

- He Fan, RDCY Renmin University of China/ HSBC Business School
- Dennis Görlich, Kiel Institute for the World Economy (IfW)
- Fen Osler Hampson, Centre for International Governance Innovation (CIGI)
- Samir Saran, Observer Research Foundation (ORF)