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Boosting employment through innovation

How can we implement the enabling environment for technological change?

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Abstract

As the world edges towards the fourth industrial revolution, the impact of technological innovation on labour markets has come into sharper focus. Recent commentary has focused on potential challenges arising from the increasing role of artificial intelligence and automation in the workplace. However, the history of revolutionary change provides good reason for optimism: over the past two centuries, technological innovation has raised living standards and generated more jobs than it has destroyed. With increasing uncertainty in the global economy, innovation is now more important than ever before for creating new markets, generating employment, and overcoming economic stagnation. This paper examines the enabling environment for technological change and provides policy recommendations to bridge the divide between countries that are at the forefront of innovation and those that remain further behind. To ensure that new growth and employment opportunities arising from such change are inclusive, the paper also highlights approaches for managing short-

term labour market dislocation effects associated with the application of new technologies in the workplace.

Guiding questions

- What are the major challenges that countries currently face in stimulating innovation?
- Where are the opportunities to boost the share of private sector research and development in developing countries?
- Which partnerships can help to bridge the divide between countries that are at the forefront of technological innovation and those that are further behind?
- Could a Commonwealth Innovation Awards scheme be a feasible option for promoting innovation within the Commonwealth?

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1. Introduction

The impact of technological change on labour markets has been long-debated. However, at the onset of the fourth industrial revolution, the question has re-emerged with urgency. The fast pace of innovation and the rise of new technologies – *inter alia*, automation, 3D printing, machine-learning, augmented reality, virtual reality, driverless transport, drones, and the internet of things – are underpinning concerns that the digital revolution could radically alter occupational profiles, eliminating more jobs than it creates.

Where London's 'black cab' drivers, for instance, once held a comparative advantage, and could command premiums by committing streets to memory, new systems, such as Uber, have lowered fares and reduced passenger waiting times by harnessing innovations in mobile telephony and navigation. Such changes have not come without contention. Protest and lobby movements from workers in the transportation sector have swelled in recent years, and have targeted measures to help cab drivers remain competitive.

Battles such as these have played out during each industrial revolution. Yet the available body of empirical evidence indicates that short-term labour displacement, arising from technological change, has been more than offset by the expansion of labour markets in the long-term. This is because, during each era of revolutionary change, innovation has stimulated output, created new industries, and reduced the prices of goods and services². In the case of London's black cabs, far from threatening the livelihoods of drivers, ride-hailing apps have expanded the taxi sector and generated fresh opportunities for employment (Fox, 2016).

With sluggish growth and increasing uncertainty in the global economy, innovation could be the catalytic force needed to spur economic activity and stimulate labour markets. G20 innovation strategies, increasing research and development (R&D) expenditure in emerging economies, and a growing portfolio of innovation in the developing world all indicate increased momentum for innovation-led growth. However, not all countries are presently well-positioned to take forward this agenda.

This paper develops policy recommendations to bridge the divide between countries that are at the forefront of innovation and those that remain further behind. To ensure that new growth and employment opportunities are inclusive, the paper also highlights approaches for managing short-term labour market dislocation effects associated with the application of new technologies in the workplace.

The remainder of the paper is structured as follows. Section 2 reviews the history of the technological unemployment concept, including the underlying economic theories and the empirical evidence to date on the impact of technological innovation on labour markets. Section 3 focuses on the enabling environment for innovation, and establishes a typology to characterise the range of interventions that governments are currently pursuing to stimulate technological change. Section 4 introduces policy proposals to bridge the innovation divide. Section 5 outlines strategies for managing short-term labour dislocation effects arising from technological change. Subsequently, the paper concludes with a summary of its main findings and recommendations for policy makers.

2. Technological change: A thorn or a rose for labour markets?

Since at least the invention of the wheel in 3500 BC, the impact of technological innovation on labour markets has been a topic of passionate debate and protest (Woirol, 1996). In Japan, just three years after the creation of the rickshaw, the use of *palanquins* – wheel-less carriages for the transportation of people, consisting of a large box carried by anywhere between two and six bearers – ceased almost entirely (*New Scientist*, 2016). In England, during the second half of the 18th century, the development of weaving machines radically transformed the preparation and spinning of cotton and wool, giving rise to the *Luddite movement*.³ The Luddites, a group of highly skilled handloom weavers, famously protested against the mechanisation of the British textile industry by setting fire to textile mills and destroying over one thousand automated looms and knitting frames (Marchant et al., 2011).

² The majority of studies that have been undertaken on the employment effects of technological change find that innovation creates more jobs than it destroys in the long-run. For an overview of these studies, see Vivarelli (2015).

³ <http://www.heritage-explorer.co.uk/file/he/content/upload/11797.pdf>

Such revolutionary change and opposition provided the primary motivation for the work of 19th century classical economists on the links between technological change and labour markets.⁴ Out of this body of deductive thought, two competing economic theories emerged.

Proponents of *labour compensation effects* reasoned that technological change would result only in short-run labour displacement. The logic ran as follows: by lowering the cost of production of goods and services, technological change would boost real incomes and consumer expenditure. To meet rising consumer demand, firms would, in turn, absorb displaced labour. Any cost reductions not automatically passed onto consumers would generate extra profits for entrepreneurs, and could be used to increase their own consumption, or to expand the pool of investable capital.

Proponents of *labour displacement effects*, instead, asserted that labour-saving technologies could aggravate unemployment pressures in the long-run if:

- 1) the amount of work in an economy is fixed;⁵
- 2) real incomes and consumer expenditure do not increase alongside innovation; and
- 3) the markets for technology-driven expansions in output are limited.

Ultimately, economic theory offers no straightforward answers on the labour impacts of technological change, because displacement and compensation mechanisms are interrelated and influenced by the competitiveness of markets.⁶ Empirical evidence has, therefore, taken the centre stage in explaining the relationship between innovation and employment. For the most part, the available body of evidence, spanning the first industrial revolution to the present, indicates a positive long-run relationship between innovation and employment,⁷ especially when R&D has been focused on product rather than process innovation.⁸

3. The role of government in securing the enabling environment for innovation

The range of interventions that governments are currently pursuing to enhance the enabling environment for technological change can be captured under four areas:

- 1) public sector R&D;
- 2) support for private sector R&D;
- 3) investments into the wider economy; and
- 4) the co-ordination of innovation clusters.

Public sector R&D

Public sector R&D takes place in the higher education sector (i.e. government-funded research executed in universities) and through public research institutions, such as national innovation laboratories (OECD, 2011).

The majority of R&D activities in both developing and emerging economies remain government-funded, reflecting the role of scientific research in supporting state-driven economic 'catch-up' and the development of technological capabilities (Mazzoleni and Nelson, 2007). In China and other emerging economies, where the state is the primary investor in technological change, moral hazard risks associated with state-driven innovation, such as anti-competitive practices stemming from the monopoly power of state-owned enterprises (SOEs), have been managed through the creation of multiple SOEs that are obliged to compete among themselves (PwC, 2010). In most developed countries, the picture is inverted: public sector R&D has been declining since 2008, with government support, instead, targeted at consolidating the pull factors for private sector innovation (OECD, 2016).

⁴Until the advent of the industrial revolution, empirical evidence was scarce, and the debate largely took place between 19th century classical economists. See, for example, the works of J.B. Say, Karl Marx, John Stuart Mill, Thomas Robert Malthus, David Ricardo, etc.

⁵The so-called 'lump of labour' hypothesis has come to be widely regarded as a fallacy. See Walker (2007).

⁶Under imperfect market structures, such as oligopolies, for example, cost reductions arising from technological change are not automatically passed onto consumers.

⁷For a comprehensive overview of the macroeconomic and microeconomic studies that have been undertaken on the employment effects of technological change, see Vivarelli (2015).

⁸Some theoretical arguments describing the potential for negative labour market effects in the long-run have been borne out. For example, although technological advances over the past two centuries have coincided with rising living standards, real wages have stagnated over the past five decades, while income inequality has widened. However, the drivers of these trends are diverse. Factors such as globalisation, increased international migration, and commodity price volatility have also played a major role. Dani Rodrik's *Has Globalization Gone Too Far?* (1997) notably places greater weight on globalisation than technological change in explaining rising income inequality and labour displacement. Rodrik sees wage stagnation and rising job insecurity as the result of increasing competition between labourers in the developed and the developing world.

Figure 1: Commonwealth R&D expenditure (% GDP)*, 2011



Source: UNESCO Institute for Statistics.

Note: * Includes public and private R&D expenditure

Support for private sector R&D

State support for private sector innovation includes various legal/regulatory frameworks to create a conducive environment for investment, and 'market distortions' to alter the cost of R&D.

On the legal and regulatory side, in the countries that have been most successful in fostering technological change, business leaders have often emphasised the importance of intellectual property rights.⁹ Other pertinent reforms include legislation to ease the hiring of skilled immigrants (Jones, 2012) and regulations facilitating both technology and knowledge transfers (UNCTAD, 2014).

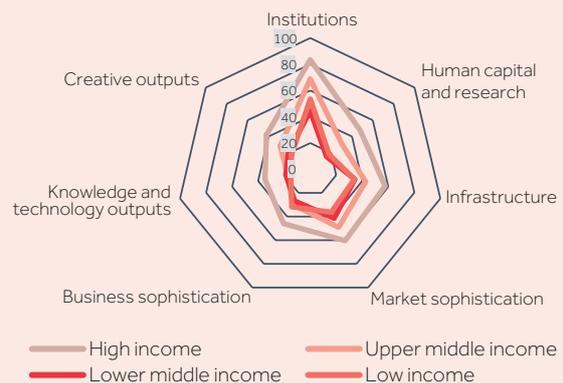
To alter the cost of research and investment into innovation, developed countries have established several incentive mechanisms. These include: direct subsidisation to promote strategically important industries;¹⁰ indirect subsidies, through the provision of tax incentives; R&D grants; grants and loans for capital investment; and venture capital and private equity support. Tax holidays and income tax exemptions have also been on the rise in many low-income countries, in response to increased competition within the international tax landscape (IMF et al., 2015).

Investment into the wider economy

Governments are also providing *indirect* support for innovation through several channels:

- 1) the reorientation of the education sector, in order to cultivate the skillsets required for the digital age;¹¹
- 2) the expansion of employee training programmes to support a resilient and responsive labour force;¹²
- 3) investments in information and communication technology (ICT) infrastructure to boost productivity, support economic activity, and maximise spill-over effects between economic sectors (Broadband Commission for Sustainable Development, 2016); and
- 4) the consolidation of digital governance strategies, in the context of growing international cyber-security challenges. Over the past decade, the latter, for example, has been reflected in a significant surge of national laws and legal protections related to encryption technologies, as well as reward-based competitions to assist governments in their efforts to identify cyber-security weaknesses.

Figure 2: The enabling environment for innovation in the Commonwealth, 2017



Source: Global Innovation Index 2017; income classification according to the World Bank's List of Economies, June 2017.

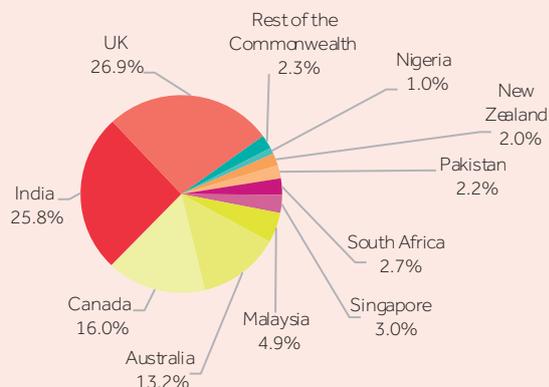
⁹Patents have driven increases in firm productivity (Bloom and van Reenen, 2002), while the adoption of patent laws in countries without such laws has influenced existing patterns of comparative advantage between countries (Moser, 2005).

¹⁰The 2010 HM Treasury and Department for Business, Innovation and Skills Growth Review outlined the need for the UK Government to put the 'private sector first when making decisions on tax, regulation and spending' in order to establish a 'new approach to growth' and 'promote economic dynamism' (HM Treasury and BIS, 2010).

¹¹For example, Canada's 2017 Innovation and Skills Plan enables workers receiving unemployment benefit support (Employment Insurance (EI)) to pursue training programmes without losing their EI. The Plan also places a focus on work-integrated learning programmes for students to gain work experience, and the expansion of digital skills training for youth (kindergarten to Grade 12) through a CA\$50 million investment over the next two years.

¹²Canada's 2017 Innovation and Skills Plan expands 'federal support through the Labour Market Transfer Agreements by \$2.7 billion over six years' with the aim of helping workers 'upgrade their skills, gain experience or get help to start their own business. It also means more support, like employment counselling to help them plan their careers'.

Figure 3: Share of published scientific and technical journal articles in the Commonwealth, 2013



Source: National Science Foundation, Science and Engineering Indicators.

Co-ordination of innovation clusters

Lastly, to generate employment, increase competitiveness and create value, many countries are now taking steps to co-ordinate stakeholders within their national innovation ecosystems; consolidate state innovation frameworks; and establish innovation clusters, in which R&D activity is catalysed through close co-operation and knowledge-sharing between the business community, the education sector and government agencies. G20 countries have, in addition, committed to enhancing synergies and promoting co-operation between national innovation systems. These efforts will be anchored through a G20 innovation forum, in which members can discuss best practices related to innovation policies. Box 1 provides a case study on the role of the US government in positioning Silicon Valley as a leading innovation super-cluster.

4. Closing the divide between innovators and non-innovators: How can we take the global innovation agenda forward?

The preceding section established the differing set of interventions that governments in developed and developing countries are pursuing to stimulate innovation. In advanced economies, government support is targeted at consolidating the pull factors for private sector R&D. Such efforts include the establishment of copyright laws to safeguard intellectual property rights; financial

Box 1: The role of the US government in establishing Silicon Valley

Silicon Valley began to take form in the midst of the Second World War. Contracts from the US Department of Defense saw the emergence of research companies, rather than purely academic research institutions. The federal government began to channel record-breaking sums of money into scientific R&D. In 1941 alone, almost \$5 billion (in 2013 dollars) was allocated to radar development.

The foundation of various public institutions (including the Defense Advanced Research Projects Agency, the Small Business Innovation Research programme and the National Science Foundation) anchored the role of the US government as a strategic investor in Silicon Valley.

By the mid-1950s, the US government aimed to broaden the parameters of its support for Silicon Valley. As well as being the Valley's largest research customer, the government established dedicated programmes to incentivise the participation of risk capital investors in Silicon Valley innovation projects. The Small Business Administration, set up in 1958 and still active today, established a match funding programme to capture investment from venture capitalists. Through this scheme, the SBA provided \$2 for every \$1 invested.

Further incentives were introduced in the late 1970s, as Cold War tensions began to grow. These were aimed at expanding the financing available for supporting scientific innovation in Silicon Valley. For example, in 1978 the government pursued tax and pension fund reforms, with cuts to capital gains taxes and new directives permitting pension funds to invest in venture funds.

Today, the US government continues to act as the Valley's majority shareholder. Despite tightened federal budgets after the financial crisis, the US National Institute of Health, for instance, channelled \$31 billion into biomedical research, catalysing ground-breaking research in the pharmaceutical industry.

Sources: Mohammed (2013); Golomb (2014); Mazzucato (2015).

incentives to assist key firms and industries; investments into the education sector to expedite the transition from industrial to knowledge-based economies; and the development of innovation clusters to catalyse R&D, through the closer integration of government agencies, businesses, and higher education institutions.

In both developing and emerging economies, the state presently represents the primary investor into innovation. However, in order to provide the capital, knowledge base, and risk-taking capacity necessary for galvanizing technological change and growth, efforts to augment the contribution of the private sector to innovation will now be critical. Many Commonwealth developing nations are working towards this objective by establishing incentives to attract foreign direct investment and portfolio investment; developing frameworks to leverage non-traditional sources of finance, such as crowd-funding; and investing into different economic sectors to enhance the absorptive capacity for technology development and diffusion.

Despite these efforts, a number of challenges in these countries are continuing to restrict the contribution of the private sector to innovation. These include: political and economic instability; exchange rate volatility; underdeveloped physical infrastructure; legal and regulatory deficiencies; brain drain; restricted markets for new products; and poor quality higher education institutions (Sull et al., 2004).

International co-operation to catalyse innovation

Through co-ordinated action, new development partnerships, knowledge-sharing platforms and strengthened global economic governance, the international community can supplement the initiatives that developing countries are undertaking to boost innovation in several areas. These interventions, as outlined below, would not only be beneficial for developing countries, in helping them to overcome the current barriers to private sector R&D; they would also provide dividends for advanced countries by catalysing growth and stimulating labour markets in the developing world, generating new capital and technologies to realise development goals, and, in the long-run, reducing the aid burden.

- 1) **Deepening linkages in the higher education sector:** Greater collaboration between education institutions in developed and developing countries, via the expansion of research exchange programmes, would be mutually beneficial in building expertise to support scientific R&D, and generating opportunities for sustained capacity-building. In addition, enhanced higher education linkages can play a critical role in facilitating investigation into topics of global concern. Japan's Science and Technology Research Partnership for Sustainable Development (SATREPS) provides a pertinent example of this form of collaboration: through partnerships between researchers in Japan and their counterparts in developing countries, SATREPS undertakes research on disaster prevention and the resolution of global-scale environmental issues.¹³
- 2) **Establishing provisions in global development rules to enable developing countries to support strategically important industries and firms:** Subsidies to the private sector are fundamental in supporting R&D activities and the development of new products, but currently fall into the amber-light grouping of the World Trade Organization (WTO) Agreement on Subsidies and Countervailing Measures. This generates 'innovation risk' – the risk that new products, developed with state backing, could be subject to unilateral countervailing duties, or dispute settlement and trade sanctions (Kharas, 2013). Countries seeking to strategically position domestic industries and stimulate technological innovation have had to tread a careful line, in order to keep within WTO rules. This has often led to the development of industrial policies that are based on taxation schemes, rather than targeted subsidisation measures. Brazil's Inovar-Auto programme, for example, is designed to bolster innovation and output in the Brazilian automotive industry. It requires car manufacturers to invest in meeting fuel efficiency standards, or face higher excise taxes and import tariffs on domestic sales (*The Economist*, 2013). With growing international tax competition, such tax-based industrial policies are unlikely to be a practical option for many smaller developing nations. Global development frameworks could aim to offer special provisions for such

¹³https://www.jst.go.jp/global/english/area_of_research.html

countries, to support them in establishing targeted financial incentives for nascent and/or strategically important industries and firms that have the potential to drive technological change.

3) **Placing innovation at the heart of**

development co-operation: New financial technologies, such as M-PESA, have underscored the role that development co-operation can play in catalysing innovation in the developing world. M-PESA's development was supported by intellectual and financial contributions from the UK Department of International Development (DFID), the private sector (Vodafone) and the Central Bank of Kenya. It has been a game-changer in Kenya, handling approximately 70 per cent of the money flowing through the economy. In addition, 19 million Kenyans use the technology to transfer money to their families (even though only seven million Kenyans currently have a bank account). It is considered by DFID to be one of the best ever investments for UK aid (Phillips, 2015). Placing innovation at the heart of development co-operation could open the door for similar success stories.

4) **Building knowledge-sharing platforms for**

innovation: Local knowledge hubs, in which members of the technology community can convene and establish networks, have played a key role in the accumulation of expertise in developing countries. The most successful of these have catalysed regional technology growth. Nairobi's iHub, for example, provides business support services, mentorship, and workshops on product development. By facilitating partnerships between technology entrepreneurs, designers, researchers and venture capitalists, iHub has been the home to almost 200 technology start-ups in Africa since its inception in 2010 (Shapshak, 2016). The international community can aim to replicate and extend such platforms, to create avenues for entrepreneurial and technical knowledge-sharing between innovation leaders and countries that presently lack the necessary infrastructure, financial resources, and expert networks for stimulating innovation.

5) **The reform of competition laws to accelerate the transfer of cutting-edge technologies to developing countries:**

The role of international technology transfers (ITTs) in promoting economic development is well established, and developing countries have sought to expand ITTs through national frameworks and international agreements (Hoekman et al., 2005). Since 2010, when the UN Framework Convention on Climate Change established a Technology Mechanism to facilitate technology transfer for climate change mitigation and adaptation¹⁴, the international dialogue on ITTs has been centred on advancing the diffusion of climate technologies. In other sectors, however, progress has been slower, and restrictive policies on ITTs have proven detrimental to the achievement of development goals. The high prices of critical pharmaceuticals in developing countries, for example, are an often-cited consequence of excessive rigidity in intellectual property protection regimes. The WTO Trade-Related Aspects of Intellectual Property Rights Agreement defines the minimum standards for the protection of intellectual property and incorporates safeguards to alleviate potential adverse effects of patents. However, in practice, the question remains as to whether such safeguards are satisfactory; indeed, many developing countries have struggled to understand how they can practically be harnessed (T'Hoen, 2003). Efforts to expand technology transfers to capacity-constrained countries will need to be anchored through a review of the effectiveness and flexibilities of existing global frameworks governing ITTs.

¹⁴<http://unfccc.int/technology/items/2681.php>

5. Managing short-term dislocation effects from innovation

Although there are clear long-term gains from innovation, revolutionary change has often generated significant labour market disruption in the short-term. The digital revolution is likely to follow this pattern, with occupational profiles changing considerably in sectors such as transportation, manufacturing, and retail (PwC, 2017).

Workers at risk of losing their jobs will require new skills to survive and adapt. Government intervention in at least four areas can help to ensure that new growth and employment opportunities are inclusive, and that all citizens, particularly displaced workers, benefit:

- 1) **Anticipating labour market evolution:** National efforts to forecast the trajectory of domestic labour markets will be integral in identifying the types of jobs that are likely to be replaced; the industries that are most at risk; the avenues for new employment growth; the skillsets that will be needed for the future; and emerging labour market trends, such as the rise of self-employed and part-time workers. An understanding of these factors will underpin government efforts to introduce targeted strategies for managing worker displacement.
- 2) **Modernising worker training programmes:** Worker retraining programmes are offered in several countries to help displaced workers upskill and access new employment opportunities.¹⁵ However, many of these schemes were devised several decades ago,¹⁶ and have failed to keep pace with changes in the labour market (McConnell et al., 2016). Where necessary, a comprehensive evaluation of worker retraining programmes should be undertaken to ensure that they are promoting relevant skillsets for the digital era.
- 3) **Matching the supply and demand for skills:** Linked to the preceding point, mismatches between workers' skills and jobs have become more pronounced since the global financial crisis, with many employers registering difficulties in acquiring suitably skilled workers. Efforts to address the underlying factors behind this trend, which include uncompetitive wages, unattractive working conditions, and poor recruitment policies (Global Agenda Council on Employment, 2014), will be necessary to reduce skills mismatches. In addition, the expansion of apprenticeships and traineeships in high-growth industries could play a supplementary role in promoting skills development and aiding skills matching efforts, by generating opportunities for applied work-based learning.
- 4) **Reorienting the education sector for the digital era:** Building up the necessary human capital for progressing science, technology and innovation will require increased support for technical and practical subjects. Such subjects have not typically been viewed as 'core' to the curriculum, and have suffered from underinvestment. In the UK, for instance, a recent poll of teachers conducted by the Association of School and College Leaders found that design and technology courses have been axed from the curriculum of almost half of UK schools in the past year alone (Turner, 2017). Some countries have introduced national initiatives to correct such imbalances. The 'Educate to Innovate' programme, for example, launched under the Obama Administration in 2008, was intended to build up the intellectual capital necessary for progressing innovation, through investments in science, technology, engineering, and mathematics. The expansion of such programmes would play a vital long-term role in consolidating domestic innovation expertise and capacity.

¹⁵According to the Government Accountability Office (GAO), for example, US federal agencies spent \$18 billion, in fiscal year 2009, to administer 47 employment and training programmes. See GAO (2011).

¹⁶<https://www.doleta.gov/regs/statutes/wialaw.txt>

6. Conclusion

During each era of revolutionary change, technological innovation has stimulated output, created new industries, and reduced the prices of goods and services. Today, with sluggish growth and increasing uncertainty in the global economy, innovation could represent the catalytic force needed to spur economic activity, enhance competitiveness, and stimulate labour markets.

To determine how the global innovation agenda can be practically taken forward, this paper has examined the interventions that governments are pursuing to stimulate technological change, and has provided a set of policy recommendations to bridge the divide between countries that are currently at the forefront of innovation and those that remain further behind.

In particular, closing the 'innovation divide' will hinge on efforts to augment the role of the private sector in developing countries, where the state currently represents the primary investor into innovation. This would play a central role in providing the capital, knowledge base, and risk-taking capacity necessary for galvanizing technological change and growth.

Many Commonwealth developing nations are working towards this objective by establishing incentives to attract various sources of external finance. But, despite these efforts, a number of challenges, such as underdeveloped physical infrastructure and brain drain, are continuing to restrict the contribution of the private sector to innovation.

This paper calls for the international community to play a greater role in supplementing the initiatives that developing countries are undertaking to boost innovation, through co-ordinated action, new development partnerships, knowledge-sharing platforms and strengthened economic governance. These interventions would not only be beneficial for developing countries, in helping them to overcome the current barriers to private sector R&D; they also would provide dividends for advanced countries by catalysing growth and stimulating labour markets in the developing world, generating new capital and technologies to realise development goals, and, in the long-run, reducing the aid burden.

Five key areas are identified for international action

- 1) deepening linkages in the higher education sector;
- 2) establishing provisions in global development rules to enable developing countries to support strategically important industries and firms;
- 3) placing innovation at the heart of development co-operation;
- 4) building international knowledge-sharing platforms for innovation; and
- 5) the reform of competition laws to accelerate the transfer of cutting-edge technologies to developing countries.

Lastly, although there are clear long-term gains from innovation, short-term labour market disruption has been a recurring by-product of revolutionary change. The digital revolution is likely to follow this pattern. Workers at risk of losing their jobs will require new skills to survive and adapt. Accordingly, as well as securing an enabling environment for technological change, efforts to take the global innovation agenda forward must include policies to mitigate labour dislocation effects in the short-term.

This paper recommends government intervention in the following labour market areas to ensure that new growth and employment opportunities are inclusive, and that all citizens, particularly displaced workers, benefit:

- 1) national efforts to forecast the trajectory of domestic labour markets, to facilitate the introduction of targeted strategies for managing worker displacement;
- 2) the modernisation of worker training programmes to help displaced workers upskill and access new employment opportunities;
- 3) initiatives to match the supply and demand for skills; and
- 4) the re-orientation of the education sector to cultivate the skillsets required for the digital era.

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