

## 4 Reigniting productivity growth

### Main points

- Productivity growth is the key driver of real wage growth and rising living standards over the long term, but it has been slowing around the world, and in Australia, since the mid-2000s.
- Our productivity challenge is also changing. We need to leverage these changes as opportunities to drive future productivity growth by:
  - delivering quality improvements in service delivery, particularly the care and support sector
  - harnessing the opportunities of the transformation to net zero
  - increasing the adoption of new digital and advanced technologies.
- This will require a greater focus on investment in human capital growth, increased technology diffusion and adoption across the economy, and greater levels of economic dynamism to help allocate resources more efficiently.
- The Government is taking action to boost productivity through a five pillar productivity agenda.

### 4.1 Our objective is to reignite productivity growth

Productivity growth is the key driver of improvements in living standards over the long term. Labour productivity – the quantity of goods and services produced per hour of work – has been the most important source of real income growth in Australia over the past 30 years and is projected to remain the most important source in the future.<sup>1</sup> Improving productivity also lowers prices, increases the range and quality of goods and services for consumers, and grows profits for businesses.

However, since the mid-2000s, productivity growth has slowed in Australia and in other advanced economies. Australia's productivity growth over the decade to 2020 was the slowest in 60 years.<sup>2</sup> This lower productivity growth has contributed to slower real wage growth (discussed in Chapter 3). Turning this trend around will be critical to achieving full employment, strong and sustainable real wage growth, and boosting living standards over time.

While several long-standing factors have contributed to the productivity slowdown, including reduced dynamism and competitive pressures, and slower technological innovation and diffusion, we also face new and emerging headwinds due to changes in our industrial base.<sup>3</sup> How well we respond to, and position, for these changes will increasingly influence our future productivity. Improving the quality and productivity of the care and support economy will become even more important as the sector grows. Climate change creates headwinds as changes in temperature, climate and natural hazards weigh on productivity growth, but the net zero transformation also creates new opportunities to support firm innovation, improve production processes, and leverage productivity in new clean energy



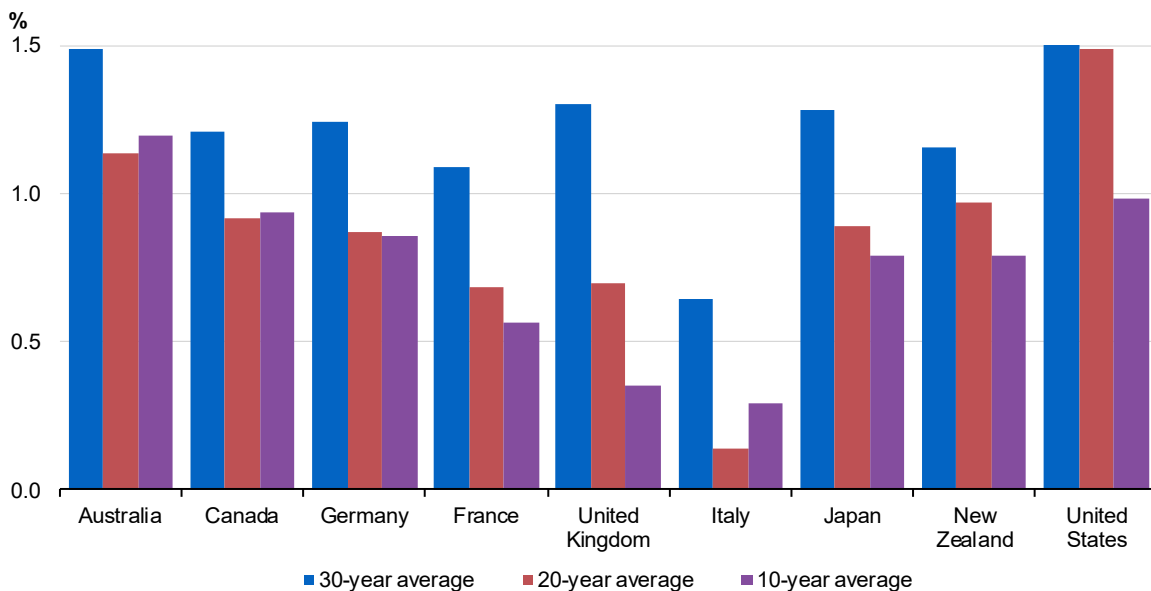
industries. However, it will take time to establish high-productivity clean energy industries. Increased adoption of digital and advanced technologies also has the potential to drive significant gains through changes in how we work, deliver higher-quality care and support services, and facilitate a smooth transformation to net zero.

People need to be at the centre of this response. To reignite productivity growth and promote job security and strong, sustainable wage growth, Australia needs to invest in people and technology. This means better equipping workers and businesses with the skills and knowledge to adopt technological advances and adapt to change, and creating conditions that support dynamism and the diffusion of innovation. This will be particularly important in the growing care and support economy and the transformation to net zero, and to grow advanced manufacturing and achieve more value-adding from a broader and deeper industrial base.

### 4.1.1 Recent trends in Australia’s productivity growth

Productivity growth in Australia has slowed over the past decade. The average productivity growth over the past 30 years was around 1.5 per cent while the 20-year average has slowed to around 1.2 per cent.<sup>4</sup> This has contributed to lower wage growth. Australia is not alone in experiencing a slowdown in productivity, suggesting some common global factors are at play (Chart 4.1). This slowdown in productivity growth has also been broad-based across sectors of the economy.<sup>5</sup>

Chart 4.1 International productivity growth



Note: Averages calculated to 2021.

Source: Treasury; OECD GDP per hour worked, 2023.



## Diffusion of technology and innovative practices

The slowdown in productivity growth in Australia partially reflects slower diffusion of innovation and uptake of technology. While productivity growth has slowed across most advanced economies, Australian firms lag the most productive firms globally, and that gap has been widening over recent decades. The productivity of firms at the global frontier increased by an estimated 60 per cent between 2002 and 2016, while the productivity of firms at Australia's productivity frontier only increased by 25 per cent over the same period.<sup>6</sup> This suggests that Australian firms have slowed the rate at which they adopt innovative technologies and approaches, which is consistent with declining business investment as a share of GDP in Australia.

The decline in productivity growth can largely be attributed to a reduction in the overall efficiency with which labour and capital are used together – also known as multifactor productivity (MFP). This means there is an opportunity to deliver productivity gains by improving how our workforce makes use of new technology and machines, underscoring the potential for future gains from increased uptake and better use of new technologies.

Competitive pressures can improve productivity growth through the entry of new firms that are more likely to adopt and invest in newer technologies, and through incumbent firms being forced to improve their production processes or exit the market. The widening productivity gap has been larger in the services sector and less pronounced in the manufacturing sector (Chart 4.2 and Chart 4.3). This suggests that Australian firms, particularly in the services sector, have been slower to adopt cutting-edge technologies and processes, potentially driven by declining dynamism and competitive pressures.<sup>7</sup>

Chart 4.2 Labour productivity dispersion services sector

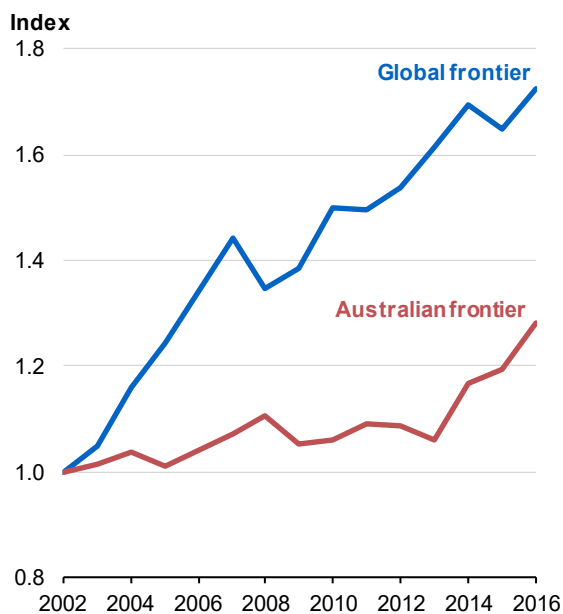
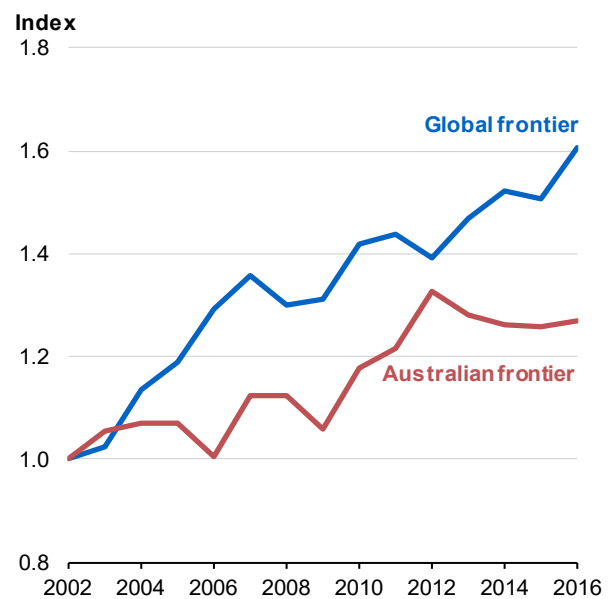


Chart 4.3 Labour productivity dispersion – manufacturing sector



Source: Treasury.

Note: The frontier is defined as the top five per cent of high-productivity firms for each year.

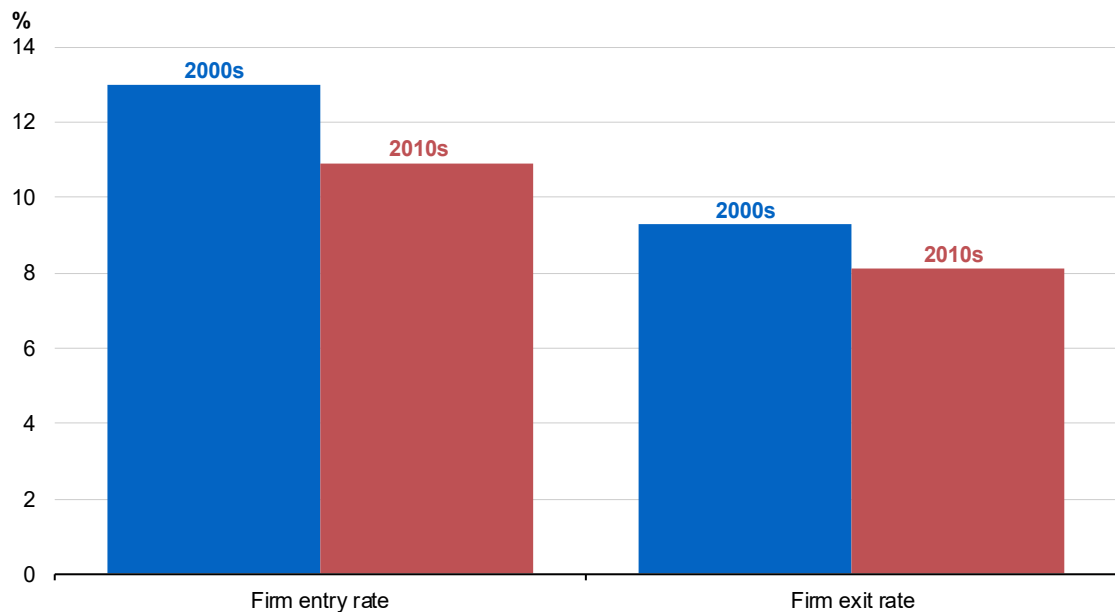


## Dynamism and competition

Boosting dynamism and competition in the economy will be important for reversing slowing productivity growth. Dynamism refers to innovation, adaptation, and growth within an economy and reflects the ability to generate new business opportunities, efficiently allocate resources and adapt to changing circumstances. It can boost productivity growth, lower prices, promote choice and innovation, and raise wages. However, dynamism has declined in Australia resulting in a slower reallocation of resources to more productive firms and tasks, weighing on aggregate productivity growth and wage growth.<sup>8</sup>

Declining firm entry and exit rates are important indicators of declining dynamism (Chart 4.4).<sup>9</sup> New firms breathe life into the economy, by innovating and being more likely to adopt new technologies. While the exit of incumbents that do not respond to this competition can be difficult for the people affected, the firms that go out of business tend to be less profitable and productive. Firm exit allows both labour and capital resources to move to more productive firms, increasing productivity. Australian industries with higher firm entry and exit rates have been found to converge faster to the global productivity frontier.<sup>10</sup>

Chart 4.4 Employing firm entry and exit rates



Source: Treasury; ABS Counts of Australian Business data; ABS Labour Force microdata.

Increasing industry concentration and firm mark-ups also point to declining dynamism in Australia. In 2018–19, the largest four firms in each industry made up around 43 per cent of total industry sales on average.<sup>11</sup> Firm mark-ups have increased by around five per cent on average since the mid-2000s.<sup>12</sup> These trends are symptomatic of declining competitive pressures which have also contributed to slowing investment growth, and the slower pace of labour and capital reallocation towards higher productivity firms.<sup>13</sup>



## 4.2 A range of factors will drive future productivity growth

Australia's productivity has been built up through investments in physical capital stock, human capital and the diversity and dynamism of our industries. To reignite productivity growth, business investment will need to increase and workforce capabilities will need to improve in ways that respond to the changing shape and nature of the economy.

Investments in physical capital are expected to continue to drive Australia's productivity potential. About two-thirds of labour productivity growth since the early 1970s has been due to capital deepening.<sup>14</sup> This is because when the amount and quality of capital available to workers increases, they are generally able to produce more per hour worked. As the industrial mix changes, investment in growing industries and effective adoption of new technologies, including robotics and digital technologies, will be essential.

There is also significant scope to boost the skills of the workforce, enabling businesses to work more efficiently, to complete high value-add tasks and innovate. In particular, the education system does not equip all Australians with foundational capabilities in literacy, numeracy and digital skills. Improvements to the quality and equity of the education system can make a significant contribution to the stock of human capital, and position people to invest in relevant skills throughout their careers. Migration is not a substitute for investing in the skills of Australians but can play a key role connecting Australia with global best practices and complementing the skills of the existing workforce.

Continual improvement in the effectiveness and ingenuity of businesses can enable Australia to get more out of these investments over time. Innovation, the diffusion of best practices and the adoption of new technologies will contribute to these gains. Dynamic and competitive markets allow highly productive firms and industries to grow, amplifying the impact of firm-level productivity gains. A wide range of factors contributes to establishing these market conditions, including effective regulation and tax and financial systems, integration with global markets and efficient provision of public infrastructure. We must continue to build on this success by investing more in our people and technology, while pursuing reforms to improve competition in the Australian economy and encourage greater uptake of new and innovative ways of work.

Realising our productivity potential will require finding approaches to promote these enduring drivers of productivity growth in ways that will be effective in Australia's current economic circumstances. This will require responding to the opportunities presented by the changing economic structure, and tailoring efforts to boost investments in physical capital, skills and innovation to the prevailing challenges in these areas.

### 4.2.1 Maximising opportunities from our changing industrial base

The productivity challenges and opportunities that we will face in the future will be different to what we have seen in the past. Improving productivity in the large and growing services sector will be increasingly important, as it will have an outsized impact on Australia's overall productivity outcome (Chart 4.5). But beyond this, the changes underway in the economy, like the potential to generate low-cost renewable energy, also present new avenues to improve productivity. Rather than simply repeating previous waves of reforms, Australia's productivity agenda needs to respond to current economic circumstances and identify modern strategies to advance enduring policy goals.

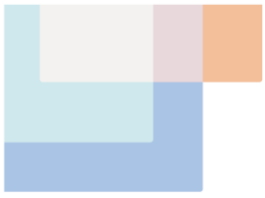
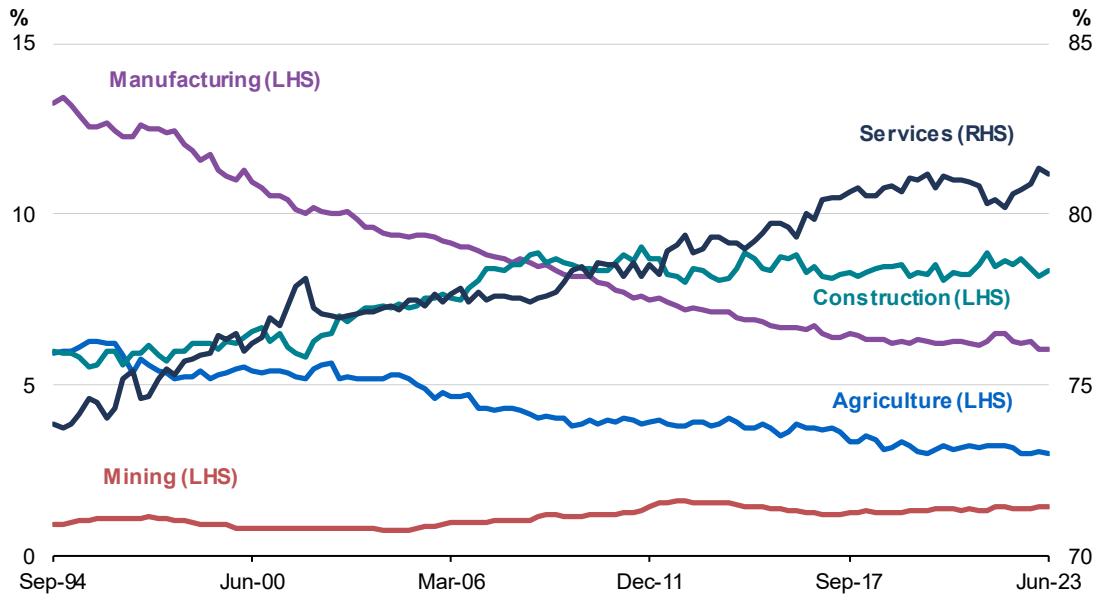


Chart 4.5 Share of total employment by industry



Source: Treasury; ABS Labour Account Australia, June 2023.

## Productivity gains from better-quality care and support services

The growth in the care and support economy, including its workforce, will make improving productivity in this sector more important for national productivity growth. However, achieving productivity gains in the services sector, particularly in non-market services such as care and support, has been difficult historically. Innovative approaches and technology that change models of care can improve both patient outcomes and productivity.

These technological opportunities take many forms. They include reducing the time carers need to spend on administrative tasks, allowing them to focus on the irreplaceable human aspect of care work. Technology can also increase choice and access to care and support such as facilitating in-home aged care and online consultations for those that prefer this form of care. Further, it can widen access to care and monitoring for people living in regional and remote Australia, while not compromising on fair wages and high-quality care.

Productivity improvements in the care and support services sector can also be driven by increased adoption of innovative work practices. Innovation can take the form of better models of care and support, and best practice processes and techniques. For example, coordination and integration of primary care services can improve health outcomes and reduce costs by preventing unnecessary hospitalisations. Regulatory settings in the care and support sector are vital for ensuring quality of care and efficient administration of these standards can improve opportunities for innovation and quality service delivery.

Increasing the quality of care and support services is also likely to be a key source of productivity growth in the future. Improved mixes of staff, qualifications and skills offer the opportunity to deliver better outcomes for patients. However, delivering productivity gains through improved life outcomes and quality aren't easily measured.



## Harnessing opportunities from the net zero transformation

The economic transformation involved in achieving net zero will accelerate investment in innovation, capital and communities, creating new opportunities for productivity growth. In addition to reducing emissions, transitioning the economy towards renewable energy has the potential to lower costs for many business activities and households.

As new industries emerge and global trade patterns are reset, there is also a significant opportunity for Australia to diversify its industries, move up value chains and build new strengths in clean energy industries. Growing new industries in green metals, clean energy exports, and critical minerals presents opportunities to boost productivity growth. The acceleration of clean energy businesses may also increase competition, support the diffusion of green technology, and increase dynamism.

The energy transformation, together with industrial decarbonisation, will require significant investment that could improve Australia's international competitiveness. Australia has the potential to harness mineral reserves and abundant sources of renewable energy to supply critical minerals, hydrogen and green metals needed for modern, sustainable economies and to materially affect global climate trajectories. The Australian Industry Energy Transitions Initiative estimates that an additional \$225 billion of investment is required by 2050, above business-as-usual levels, to transition the energy system to renewable generation and decarbonise heavy industries. Ensuring markets and investors are well-informed about the financial risks and opportunities presented by climate change and about the impact of investments on the climate will better place them to finance this investment.

## Improved adoption of digital and advanced technology

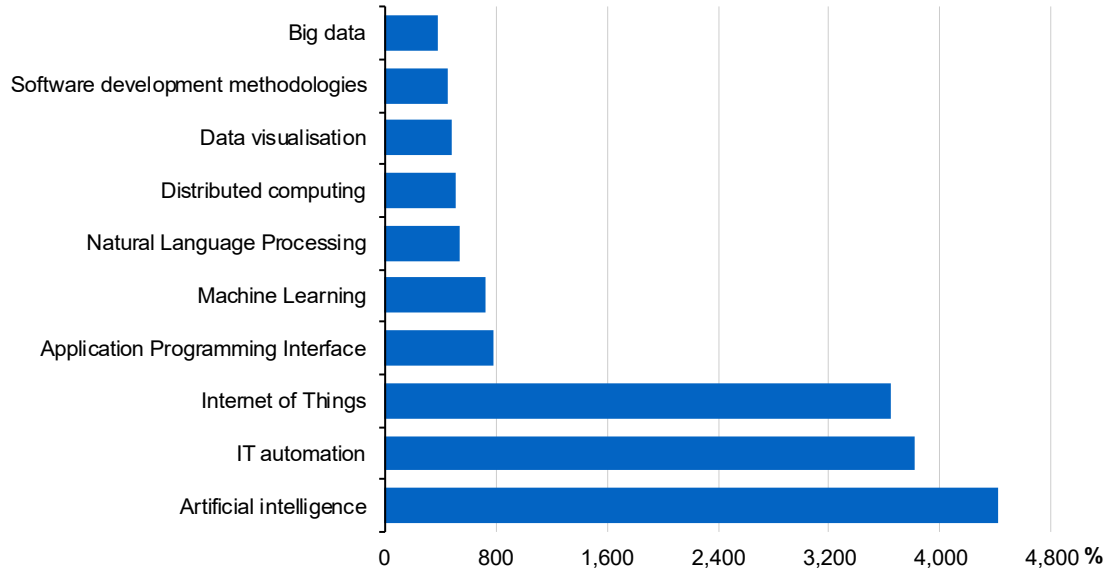
The ongoing technological and digital transformation of the economy presents an opportunity to target investments at areas of workforce shortages, ensuring businesses are connected to best practices and workers are being trained to use new technology. Harnessing new technology will have significant potential to improve Australia's productivity performance. New technologies can reduce business costs, allow workers to focus on higher-value tasks, and improve product quality and consumer choice.

Productivity improvement for most businesses involves the wider adoption of established, even dated, technologies and practices. New-to-the-world innovation is performed by only 1 to 2 per cent of Australian firms.<sup>15</sup> For the remaining 98 per cent, the adoption and diffusion of innovation is the key to driving productivity growth. Investment in broad-based adoption of these technologies and equipping workers with the skills required to work with these technologies is key to realising this opportunity for productivity growth.

We are already witnessing businesses beginning to make this transformation. Since 2013 there has been considerable growth in demand in the Australian labour market for advanced digital skills related to artificial intelligence (AI), IT automation and the internet-connected physical infrastructure which makes up the internet of things (Chart 4.6). Notably, these technologies can be applied in ways that enhance the capabilities of workers or automate repetitive or time-consuming tasks, rather than replace jobs. This will allow workers to focus on activities with significantly higher value add such as problem-solving, interpersonal and other non-routine tasks. They also improve connectivity between regions, providing opportunities for collaboration and knowledge spillovers regardless of location.



Chart 4.6 Growth of demand for advanced digital skills in Australia between 2013 and 2020



Source: National Skills Commission, State of Australia's Skills 2021: now and into the future, 2021.

## 4.2.2 The role of capital investment in labour productivity growth

Investments in new assets such as machinery, buildings, software, and new technologies are an important driver of productivity growth and higher real wages. High productivity businesses in Australia have more capital per worker and pay higher average real wages than lower productivity businesses.<sup>16</sup> Historically, industries like agriculture have achieved step changes in productivity through effective adoption of heavy machinery and other technologies (Box 4.1). Going forward, a broader range of new technologies, as well as the need to modernise existing facilities and expand assets, mean that capital investment will continue to play a key role in driving productivity growth.

### Recent trends in business investment

Australia currently has a low level of business investment as a share of GDP compared with other OECD countries.<sup>17</sup> Investment in mining peaked around 2012–13 and has since declined as construction of projects has been completed. Chart 4.7 shows that growth in non-mining investment has declined from the mid-2000s and stagnated over the past decade. More recently, non-mining investment has grown strongly as firms expand capacity. Over the 2010s, the decline in non-mining investment occurred despite declines in interest rates following the Global Financial Crisis (GFC) and the end of the mining boom, which would be expected to have freed up capital for non-mining investment. Not only has investment declined as a share of GDP, but the decline has been larger among more productive firms, meaning capital has also been allocated less productively.<sup>18</sup>





Chart 4.7 Non-mining business investment



Source: Treasury; ABS Australian National Accounts: National Income, Expenditure and Product, June 2023.

Low investment is likely to reflect a range of factors including perceptions of risk and the degree of market power enjoyed by some firms. The market risk premium – the additional return investors demand from borrowers for taking on more risk – has increased in Australia, particularly since the GFC.<sup>19</sup> This means that for each dollar invested post-GFC, investors are assessing that they require a higher rate of return to compensate for risk. The decline in investment has also been driven in part by a long-term decline in competitive pressures. The increasing market power of some firms has muted their incentives to invest and grow their capital stock, and to innovate and adopt new technologies.<sup>20</sup> More work is needed to understand why competitive pressures may be declining and whether this reflects competition policy or other frictions.

The net zero transformation will require significant investment. The Australian Energy Market Operator has estimated that annual electricity consumption from the grid will double by 2050 as transport, heating, cooking and industrial processes are electrified while 60 per cent of current coal generation exits by 2030.<sup>21</sup> To achieve world-leading green industries, a substantial increase in infrastructure and machinery to provide capital-intensive clean energy will be needed. Delayed action could reduce the competitiveness of some of Australia’s industries, given the scale of direct clean energy technology investment in other jurisdictions. Boosting investment will require strong macroeconomic management, a competitive and dynamic economy, clear and stable policy, effective tax and financial systems, and a skilled workforce.



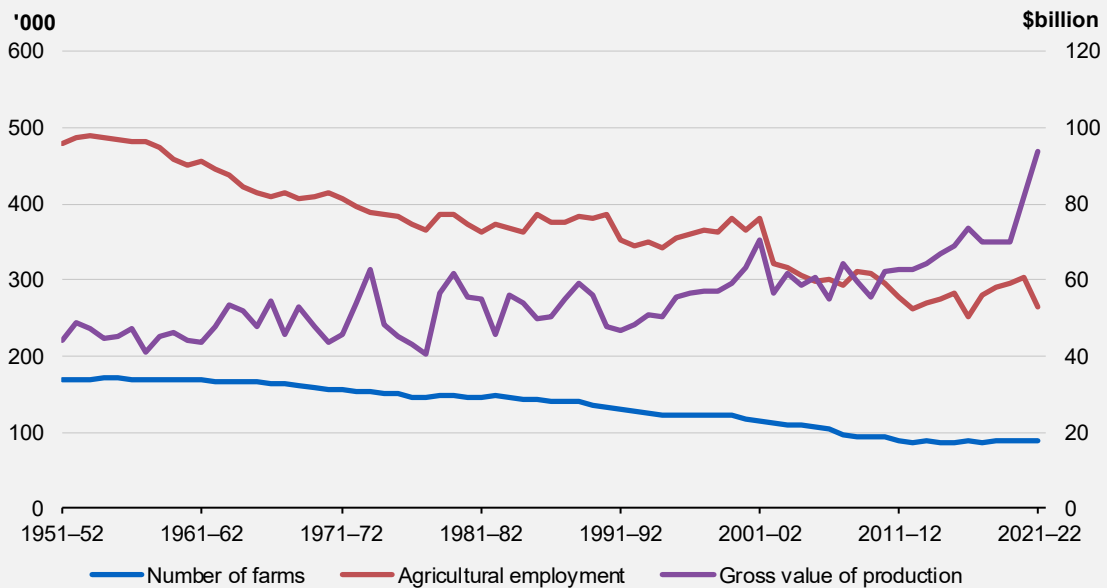
### Box 4.1 Increasing worker productivity in the agriculture sector

The transformation of the agriculture sector, using technology to augment work and help workers perform their role better, is an example for how other industries can adapt to persistent worker shortages.

Technological progress, underpinned by public and private investment in research and development, has been a key driver of long-term productivity growth in agriculture. This has enabled the sector to deliver a strong productivity performance over the past 20 years, while adapting to significant shifts in the size, composition and characteristics of the agricultural workforce. The gross value of agricultural production has increased significantly while the number of farms has declined, and average farm size has increased (Chart 4.8). This corresponds with international trends, with the United States experiencing a similar transition.

Australia’s agriculture sector is a model for how industries can adapt to shifts in labour markets over the long term. Other industries are likely to experience similar pressures over the coming decades, notably the care and support sector. The agriculture sector’s experience is that a productivity-focused response with strong capital investment can smooth this adjustment.

Chart 4.8 Agricultural and farm economic indicators



Source: ABARES; ABS Labour Force, Australia; ABS Agricultural Commodities.

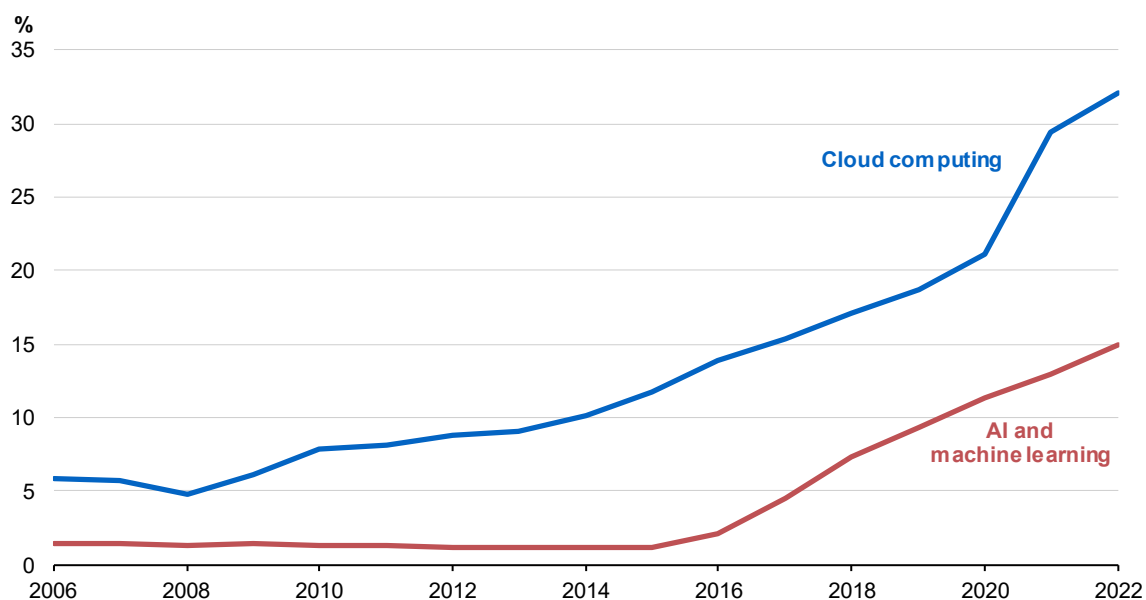
### Opportunities presented by new technologies

The adoption and diffusion of new technologies are important mechanisms to support widespread productivity growth. New technologies can reduce business production and transportation costs and improve product quality and consumer choice, particularly in the services sector. The benefits of adopting new technologies are pronounced for small businesses. Between 2015 and 2017, small businesses that accelerated technology adoption grew revenue by 3.5 percentage points and employment by 5.2 percentage points per year faster than other small businesses.<sup>22</sup>



Although adoption of technology is important for productivity growth, it takes time for productivity benefits to be realised. In the short term, technologies have tended to underperform against expectations. However, this can reverse in the long term. After the invention of the steam engine, it took decades for the first railway lines to be laid. It took many years again before factories were revamped to take advantage of electricity.<sup>23</sup> Today there is a range of emerging technologies such as AI, augmented reality, blockchain, biotechnologies, quantum technologies and robotics. Although these new technologies may have limited applications now, their impact over the next decade may be profound. This will be particularly true in the net zero transformation as emerging technologies transform both global and Australian energy systems. AI and robotics may also have important applications for Australia's changing industry mix and future of work as uptake increases (Chart 4.9).

**Chart 4.9 Share of firms reporting use of cloud computing and AI and machine learning**



Source: RBA, RFINITIV.

Digital technology and data use in Australia has steadily increased for most of the past decade. In 2020, more than 70 per cent of Australian businesses with 10 or more employees had purchased cloud computing services.<sup>24</sup> However, the uptake of more advanced digital technologies such as AI has lagged most other developed economies. An industry environment characterised by high digital adoption rates is associated with higher MFP growth in the average firm.<sup>25</sup>

One way to support the dissemination of technology is through encouraging greater competition. A competitive business environment helps rapidly diffuse digital innovations across the economy, allowing businesses with middling productivity to move towards the frontier.<sup>26</sup> Competition policy can also ensure that the benefits of digital and data innovations are shared widely across the community.

Governments have a key role in facilitating the uptake of new technologies. Infrastructure such as the NBN is a key enabler for the diffusion and adoption of new technologies and promotes productivity growth. Switching from the outdated copper wire network to high-speed broadband delivered by fibre or cable-based technology has been found to support firms to become more productive.<sup>27</sup>



Building the digital and data skills needed to operate new technologies will also be critical. Governments will work to ensure digital and computational thinking skills are embedded throughout all stages of education. Cyber security and the ethical use of technology and data will also be core to building trust and confidence through the technological and digital transformation.

The effect of the technological and digital transformation on productivity growth will also have important implications for lower-skilled workers. Upskilling and reskilling workers into higher productivity occupations and industries will be important to smooth the impacts of this transformation, and is discussed further in Chapter 5.

### Making workplaces safer and more efficient with robotics and automation

Robotic and automation technologies have the potential to provide significant economic, social and environmental benefits for Australia. These technologies can help address national challenges, revitalise Australian industries such as manufacturing, and provide safe and fulfilling opportunities for Australian workers.

Productivity gains from robotics and automation technologies have shifted demand away from routine tasks. In the post-war era, agricultural and manufacturing labourers engaging in routine manual work and clerks engaging in routine cognitive work, saw their labour productivity increase, aided by the adoption of new technologies.<sup>28</sup> As a result, employment growth has been concentrated in non-routine work which is less likely to be automated.

The use of robotics and automation technologies has made workplaces safer and more productive. Routine manual tasks often require repetitive physical labour such as lifting, pushing, pulling or carrying. Manual tasks can become hazardous when done with repetitive or sustained force, or if the movement is repetitive and requires a sustained or awkward posture.<sup>29</sup> Work-related injuries and illness cost the Australian economy \$28.6 billion per year between 2008 and 2018.<sup>30</sup> The use of robotics and automation technologies can reduce the risk and incidence of work-related injury and illness, and contribute to greater productivity. A key example of this is in the mining sector. Australia's world-leading adoption of whole-of-system automation solutions in mining has improved safety for workers by reducing exposure to dangerous environments and the need for people to perform unsafe tasks.<sup>31</sup> Between 2005–06 and 2021–22, the rate of work-related injury or illness in the mining industry fell from 86 per 1,000 employed people to 32 per 1,000 employed people.<sup>32</sup>

Robotics and automation technologies have the potential to boost productivity and safety in Australia's fastest growing industry, health care and social assistance. This industry has been slow to reduce work-related injuries and illnesses.<sup>33</sup> Collaborative robotics can reduce the physical burden on the care and support workforce and minimise the risks of work-related injuries and illness.

### From IT to AI: changing the way workers engage with knowledge-based work

Advanced digital technologies can empower workers to be more productive at work by making it easier to access and process information, make decisions and complete administrative tasks. For example, real time AI-generated suggestions for how to respond to customer queries have been found to increase worker productivity and support newer and less-skilled workers to communicate more like high-skill workers.<sup>34</sup> Similarly, generative language models, like ChatGPT, have also been found to improve productivity in mid-level professional writing tasks by 37 per cent.<sup>35</sup>

Effective integration of new technologies into workplaces can increase worker productivity and support overall jobs growth. AI can also expand market opportunities, increasing what a business can produce and achieve, for example using data analytics to reach new customers. AI has the potential to add significant value to the Australian economy, with estimates ranging from \$45 billion to



\$115 billion annually by 2030, generating demand in the economy and the need for high-skilled workers.<sup>36</sup>

The impact of advanced digital technologies will vary significantly across occupations and skill levels. Technological advancements have resulted in the shift towards non-routine tasks (Chart 1.4). Digital technologies have been able to perform routine cognitive tasks such as those performed in clerical jobs and routine manual tasks like operating basic machinery. These routine tasks are more prevalent in lower-skill occupations which have seen slower employment growth over the last few decades. However, technological advancements like automation are expected to disrupt some tasks of most occupations, rather than automating entire roles.<sup>37</sup> The future workforce will therefore need higher levels of ongoing education and on-the-job training to ensure technology complements our workforce in performing higher-skilled and higher-productivity tasks.

The evolution of technology such as AI could have even wider impacts on the tasks and occupations in the economy. There are examples of emerging technologies complementing workers in the delivery of non-routine cognitive tasks. This will change the occupations affected by technological advances, expanding to more service roles. For example, new technologies provide the potential for radiographers who perform x-rays and other medical imaging to leverage AI to complete preliminary assessments of imagery. In the future, AI could support radiographers to provide faster results to patients and free up doctors to focus on more specialised tasks.<sup>38</sup>

Investing in technologies that improve labour productivity in areas of demand, such as the care and support economy, will be critical to grow productivity and the economy. In order for this new technology to complement the workforce, people will need the right skills to be able to adapt and adopt AI tools effectively. Additionally, training will be required for people to move into adjacent roles that leverage their broader skills in different tasks. Policy settings will need to support business and individuals to engage with and leverage these technologies and develop complementary skills. This includes ensuring training, infrastructure, equipment, and occupational licensing keeps pace with technological change.

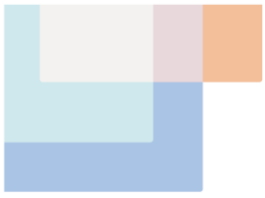
### 4.2.3 Building our human capital

Building human capital is core to how people adapt to the future of work and respond to change in the labour market. It is the skills, knowledge, experiences, and capability of the workforce. It improves people's prospects for a secure, fairly paid job, supports productivity growth and lifts the potential of our economy. Human capital accumulation requires an investment in people to build up not just technical skills and knowledge but also the core transferable skills needed to be resilient and adaptable through structural change.

The future labour market will need more highly skilled people to meet our rising demand for quality care and support, to harness the technological and digital transformation, and to support our net zero transformation. Human capital is particularly important for the services sector and will become increasingly important for future productivity growth as that sector continues to grow.

#### Skills and knowledge acquisition underpins human capital

Education and training are central to building human capital and lifting productivity growth. People with higher levels of educational attainment engage with the labour market more, have better outcomes and earn more on average than those with lower levels of education.<sup>39</sup> Education and training provides people with the skills and knowledge they need to perform tasks efficiently and effectively, with secondary and tertiary education found to improve general cognitive performance.<sup>40</sup>

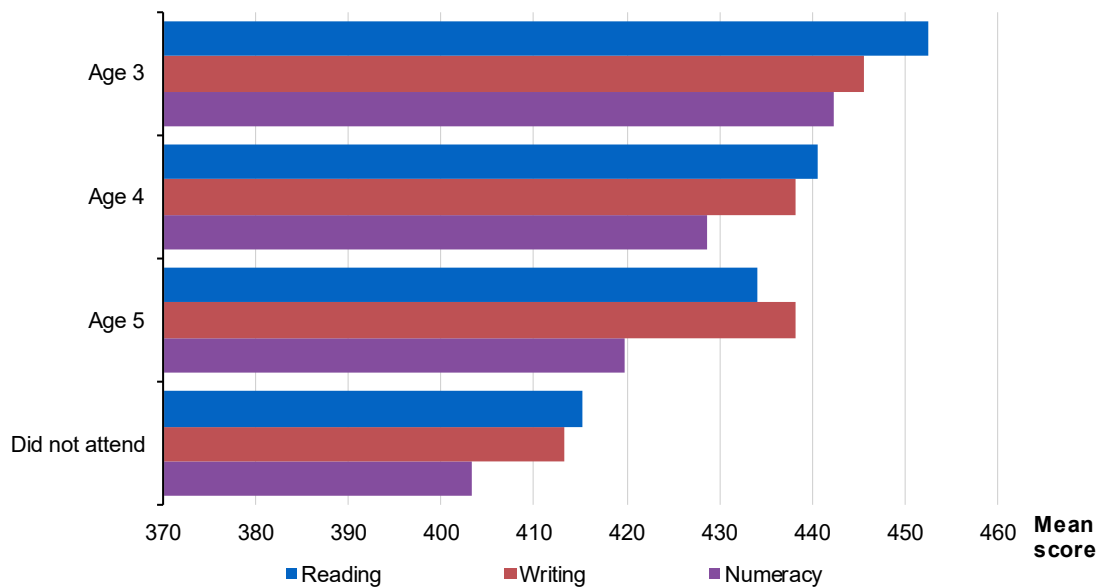


Increasing the skills of workers in median-productivity firms up to the skills of workers in firms on the productivity frontier could close the productivity gap between these firms by 19 per cent.<sup>41</sup>

Building skills and knowledge through education and training also has indirect benefits to productivity by allowing people to be able to realise the productivity gains of other investments in technology and innovative work practices. Increasing the supply of educated workers can lead to greater levels of innovative activity from firms, and education increases the success of entrepreneurs.<sup>42</sup> Adoption of technology is just as important as new-to-the-world innovation, and workers with adaptable skills are more likely to adopt new technologies and support the diffusion of innovation.<sup>43</sup>

Foundation skills make a critical contribution to productivity. Language, literacy, numeracy and digital literacy, as well as employability skills like creative thinking, problem solving, communication, creativity and teamwork, are all important for enabling productive workplaces. However, not all students are achieving to expectations across these critical areas, with one in three students not meeting NAPLAN expectations in numeracy, reading and writing in 2023.<sup>44</sup> Gaps in educational achievement begin even before children start school. Preschool attendance has been found to have a significant relationship with Year 3 NAPLAN scores (Chart 4.10).<sup>45</sup> Accessible, high-quality early childhood education and care can therefore have a positive impact on long-term productivity.

**Chart 4.10 Mean Year 3 NAPLAN scores for selected domains by age started in preschool**



Source: Treasury; NCVET Longitudinal Surveys of Australian Youth.

Improving tertiary education attainment is also essential for meeting skills needs and enabling Australian businesses to lift productivity growth. Tertiary education builds more specific skills that are required to perform effectively in the labour market and will become increasingly important as skill-biased technological change continues. A high-quality formal education also sets people up to be more productive throughout their lifetime. Educated workers are more likely to participate in further formal and informal on-the-job training, maintaining and improving their skills and productivity over the life course. Getting the people with the right skills for the future economy requires more people to complete tertiary education (discussed in Chapter 5).



A high-quality and more equitable education system will lift the level of human capital in the economy, growing the number of students going into the tertiary system and ultimately contributing to stronger productivity growth. This journey starts early, with the quality of education received early in life having long-term influences on productivity. Improving education outcomes is the first step in ensuring the pipeline of our future workforce. This also includes addressing gendered education outcomes to reduce industry gender segregation (discussed in Chapter 3).

## Investing in people and their capabilities through employment services

Employment services also play an important role in building capability and broadening opportunities by connecting job seekers with relevant work experiences, training opportunities and support. There is a significant mismatch between the qualification levels demanded by employers and those possessed by job seekers. The most common barrier for job seekers is an education level below Year 12 attainment. Among job seekers accessing Workforce Australia, this education barrier affected 37 per cent of all job seekers, 43 per cent of youth, mature-age people and people with disability, and 54 per cent of Aboriginal and Torres Strait Islander people.<sup>46</sup> Employment services, alongside foundation skills programs, can help to improve the capabilities of those who were not supported through the education system. The broader barriers faced by job seekers are diverse and discussed further in Chapter 6.

Demand for foundation skills programs is not limited to job seekers. One in five adult Australians have low literacy skills, numeracy skills, or both.<sup>47</sup> Around 40 per cent of callers to the Reading Writing Hotline in 2019–20 were already in employment and 38 per cent of callers were from regional and remote areas despite only making up around 27 per cent of the population at the time.<sup>48</sup> Broad access to foundation skills programs, separate to employment services, can improve the general capabilities and productivity of the workforce.

## Migration that supports productivity growth

Skilled migration can support productivity growth by complementing the skills of the domestic workforce, improving connections to international markets and transferring global best practices. Australian firms find more innovative ideas from their own workers than from any other source.<sup>49</sup> Employing skilled migrants brings in knowledge and ideas, including to small businesses. Given the most technologically advanced firms in the world are overseas, this avenue is important for adopting innovation and improving productivity. Migrants have also been found to be more entrepreneurial than non-migrants, and high-skilled migration has a positive effect on patenting activity.<sup>50</sup>

Migration is not a substitute for investing in the skills of Australians, but a well-targeted skilled migration program can have positive productivity benefits for Australian workers, businesses and across the economy. There is an opportunity to enhance the migration system to boost productivity in Australia.



#### 4.2.4 Promoting innovation in workplaces

In addition to investing in Australia's physical and human capital, productivity growth can be advanced by promoting innovation, diffusion of best practices and improved managerial capabilities.

Significant basic research and innovation occurs in Australia each year, especially through Australian universities, with 85 per cent of Australian research rated at or above world standard.<sup>51</sup> Despite Australia's strength in research, Australia underperforms in achieving translation outcomes. Australia ranks last in the OECD for business collaboration on innovation with higher education or government institutions and only 33 per cent of university research income came from industry in 2021.<sup>52</sup>

The diffusion of new and established technologies and ideas across the economy represents a significant opportunity to increase productivity. The widening gap between Australian firms and the productivity frontier implies that there are gains to be made from adopting existing technologies and processes. However, in the two years to 30 June 2021, 60 per cent of Australian businesses did not introduce a new process and almost 80 per cent did not introduce any significant new good or service.<sup>53</sup> Given the need to balance day-to-day operations, firms, particularly small businesses, may find it challenging to innovate and position themselves for the future.

Another factor in innovation diffusion is management capability. Firms using advanced management practices have been shown to be more productive across a broad range of countries.<sup>54</sup> In Australia, there is a significant positive association between management capabilities and labour productivity, supply chain management and export performance. However, a composite score of overall management capability among Australian businesses shows capabilities are relatively low.<sup>55</sup> Across a range of firm characteristics and managerial capability metrics, Australian firms consistently underperform against US firms.<sup>56</sup> In the manufacturing industry, lower levels of management capability could account for half of the productivity gap between Australia and the United States.<sup>57</sup>

Global networks, migration and ongoing workplace training can facilitate the translation of international best practices to Australia. Links with overseas firms through partnerships, trade, foreign direct investment and migration provide Australian businesses with access to information and ideas about innovation from the global frontier. Global connections can improve Australian innovation diffusion through direct investment in firms and research and development, knowledge spillovers from multinational corporations to domestic firms, and spillovers to competing firms in the same industry as those connected to global networks.<sup>58</sup>

Australia can improve the diffusion of innovative practices. Governments can use policy to facilitate investments and diffusion of innovation, but business will also have to proactively identify and adopt these new practices. There are opportunities for Australia if we can improve management practices to support adoption of innovative practices, better harness our research strengths and improve targeting of migrants to support productivity spillovers.





## 4.3 Productivity agenda

Our future labour market requires investment in people to grow their skills and abilities. Equipping workers with the right skills while ensuring business and workers are dynamic and resilient enough to respond to shifts within the economy is key to driving productivity growth. It also supports innovation and adoption of new technology and practices. Without the right skills and knowledge, mismatches will occur and both our labour and capital resources will be inefficiently allocated. Investment in people needs to start early and continue throughout a person's lifetime. This is at the heart of the Government's approach to lifting productivity.

Increased adoption of new and advanced technology will also complement the skills of workers in the workplace. Digital skills, AI, clean energy and emerging technology are a means to more productive workplaces and better paying, more rewarding work. The Government is focused on ensuring Australia attracts and adopts new capital and cutting edge technology, and applies it in a manner which complements workers and helps them lift their own productivity.

Finally, a more dynamic economy, in which workers are supported to move into high productivity industries, and where they are most needed and will receive the most reward for their skills, and where emerging businesses can employ the workers they need, is central to part of reigniting productivity growth in Australia.

The Government has a broad-based agenda to boost productivity, which consists of five pillars:

- Creating a more dynamic and resilient economy
- Building a skilled and adaptable workforce
- Harnessing data and digital technology
- Delivering quality care more efficiently
- Investing in cheaper, cleaner energy and the net zero transformation.

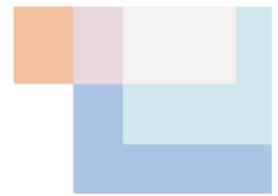
This is discussed further in the Roadmap.



## Endnotes

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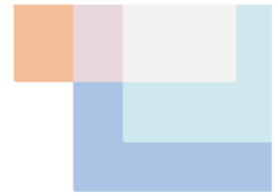
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