



International
Labour
Organization

Understanding Productivity and Productivity Growth

A discussion paper

About

This brief provides a comprehensive exploration of productivity, focusing on labour productivity and its growth as key indicators of economic and social advancement. It clarifies fundamental concepts, detailing the complexities of measuring inputs and outputs through both volume and value approaches, and highlights particular challenges within modern service and digital economies. The paper further introduces the "productivity ecosystem" framework, illustrating how interconnected factors—including infrastructure, human capital, financial systems, and institutional policies—collectively shape national productivity outcomes.

An analysis of Central Asia and the South Caucasus identifies prevalent business obstacles such as high tax rates, limited access to finance, and an inadequately educated workforce. Crucially, the brief reframes the pursuit of a Just Transition and green growth not as a barrier, but as a significant driver for future productivity gains through innovation, new market opportunities, and improved operational efficiency. It concludes that achieving equitable and sustainable development requires proactive national policies, targeted sectoral strategies, and inclusive social dialogue to harness these opportunities while mitigating transition costs for vulnerable groups.

Why Productivity Matters

Productivity is widely used as a way of thinking about economic progress, and is seen as vital for securing social progress too. This note aims to clarify some of the main issues and points of misunderstanding here, and examine the more contentious connection between productivity and environmental issues. But before going back to first principles, let us present a few statistical results that give a snapshot of productivity trends.

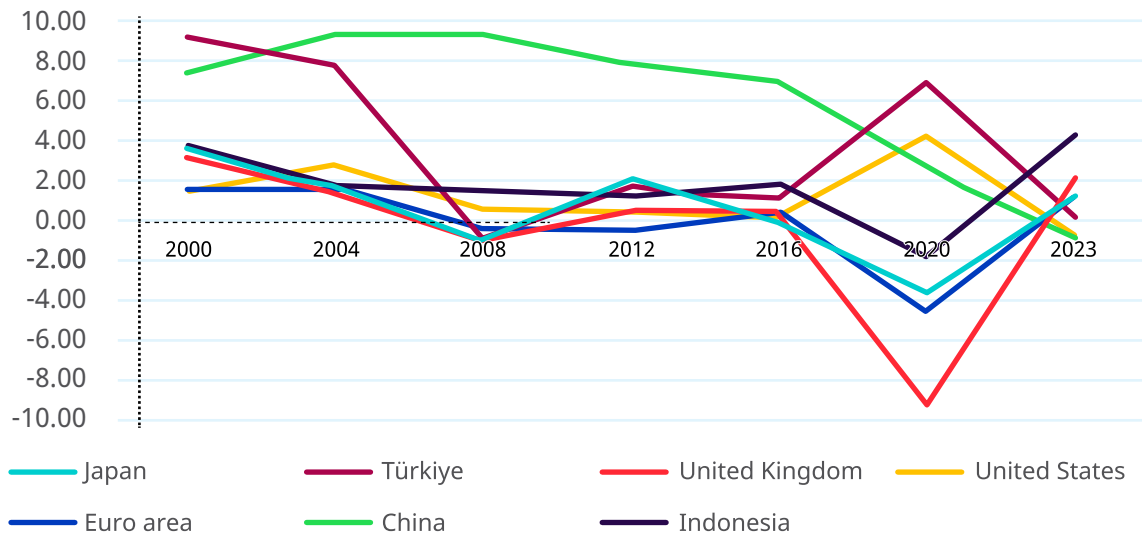
Often when we talk of productivity we are referring to labour productivity; and often the talk about productivity is really focused on productivity growth. While simply counting the number of people employed (including self-employed) is a limited view of labour inputs, it is more readily available than data on the hours of work that they have contributed. Seasonal and part-time labour will be counted on a per capita basis, even though the hours of labour contributed may be very different. Figure 1 thus examines the relationship between GDP and the workforce of selected countries and regions. Productivity is understood as the ratio of outputs (monetised outputs as captured in GDP statistics) and inputs (here, labour). Crucially, it examines annual growth rates in productivity. These growth rates are more directly comparable across countries than would be absolute GDP comparisons.

There are many notable features of these trends over time, which the reader is encouraged to reflect upon. For example, there are persistent differences across countries, though over time some show very different trends to those of others. Do employers and workers have different mindsets about improving productivity in different countries, or are there other features of their economies that are more or less conducive to labour productivity growth?

The swings over time provide clear evidence for external, global factors influencing productivity outcomes in different periods – quite a few countries seem to have been affected by the "Great Recession" of the late 2000s. Productivity growth can be negative – productivity decline: the COVID-19 pandemic is presumably behind the more recent downswing. But in each case some countries seem to be bucking the trend. Readers are invited to consider how far their own experiences map onto these statistics – which are aggregating together the different regions and industries of the countries depicted.

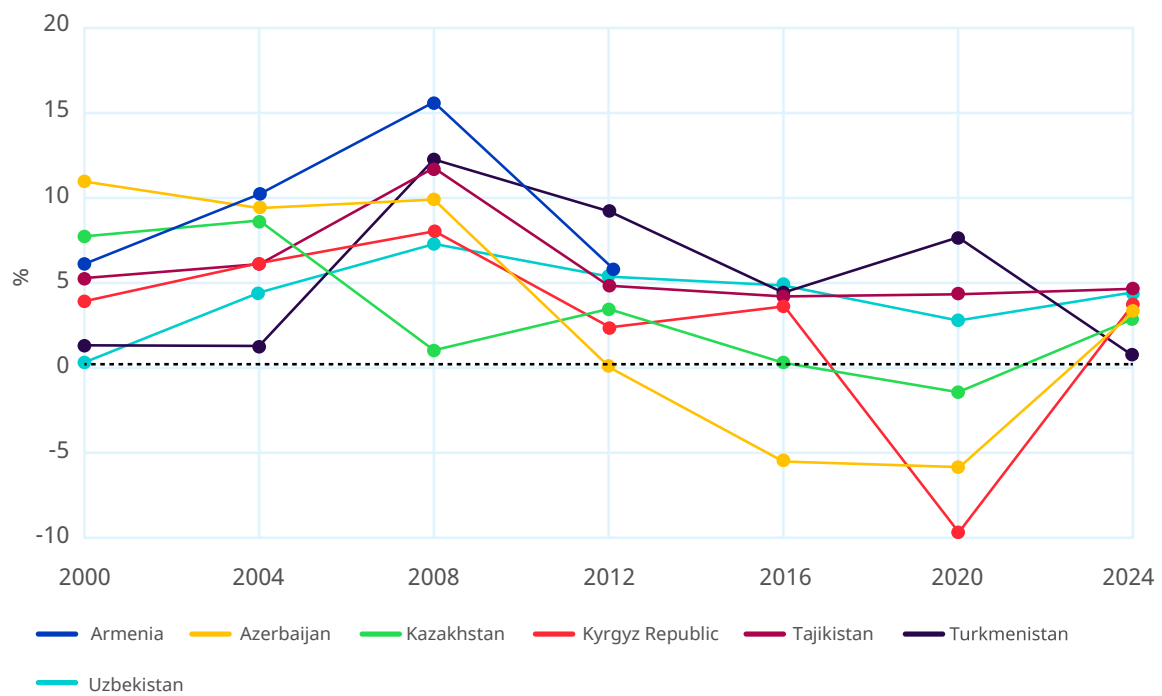
►Figure 1 A measure of Labour Productivity: Annual Growth Rates of GDP per person employed

1.a Selected, mainly high-income, countries



Source: OECD Data Explorer (accessed August 2025) Productivity growth rates

1.b Central Asia and South Caucasus

Source: Asian Development Bank Key Indicators Database (accessed August 2025) at <https://kidb.adb.org/>

Introduction

Productivity essentially concerns the relationship between **Inputs** and **Outputs**. The higher the ratio of Outputs to Inputs, the greater the productivity. If there is more output for the same input, then productivity is higher; if there is less input for the same output, then productivity is higher. This may seem simple enough, but turning the basic idea into something measurable can be very complicated.¹

The idea of productivity is indeed very important, and thus it is applied in many ways. For example, *“Above all else, productivity is an attitude of mind... it is the mentality of progress, of the constant improvement of that which exists... the certainty of being able to do better today than yesterday... is the will to improve on the present situation, no matter how good it may seem... the constant adaptation of economic and social life to changing conditions... the continual effort to apply new techniques and new methods; it is the faith in human progress”*. That quotation, pointing to the importance of the concept, is taken from a Handbook published by ILO in 2008, focused on productivity and

competitiveness in Azerbaijan.² This Handbook is a very useful introduction to the topic: but what is being discussed in the quotation is the “attitude of mind” – or mindset - towards increasing productivity. In reality, a great deal of attention to, and discussion about, productivity really reflects concern with productivity growth. Box A provides basic definitions of relevant terminology for reference: the concepts will be introduced in the text.

Productivity growth is positive when the ratio of Outputs to Inputs increases. The same amount of inputs achieves a larger amount of outputs. Many circumstances can lead to this situation. One common example is when there are purchases of new equipment, meaning that inputs are increased but outputs increase to a greater extent.³ At least that is the intention – in practice the gains in outputs may not happen immediately (it takes time to adapt processes to the new equipment, perhaps). Statisticians are typically interested in productivity growth **rates**, how much productivity increases (or decreases) over a period of time (usually one year, so they are looking at the annual growth rate).

► BOX A – GLOSSARY: Some Basic Definitions of Key Terms

- **Inputs:** The resources used to produce goods and services. (Examples include labour, capital, energy, and raw materials, and also components from which products are assembled.)
- **Outputs:** The goods and services generated from the production process, intended for final or intermediate consumption.
- **Production Process:** The series of coordinated activities that transform inputs into outputs through labour, technology, and organisational methods.
- **Productivity:** The efficiency with which inputs are transformed into outputs in a production process.
- **Labour Productivity:** The amount of output produced per unit of labour input. (Labour inputs may be measured in terms of hours worked or per worker, or in terms of wage bills.)
- **Multifactor Productivity (MFP):** A measure of output relative to a combination of inputs—including labour, capital, and other resources—reflecting overall production efficiency.
- **Productivity Growth:** The increase in productivity over time, indicating improvements in how effectively inputs are used.
- **Productivity Growth Rate:** The percentage change in productivity over a specific period. (This is used to track trends and compare performance across sectors or economies.)
- **Volume Approach** to measuring inputs or outputs: Represents inputs or outputs in physical units, such as hours worked or items produced. (This focuses on quantitative efficiency.)

¹ A very useful guide for the statistically-minded is “Luca Fedi and El Hadj Ezzahid, 2024, “Productivity measurement and analysis: A guidance note”, Geneva: International Labour Office, at: <https://www.ilo.org/publications/productivity-measurement-and-analysis-guidance-note>.

² This is “Azerbaijan: Productivity and competitiveness Handbook for employers”, text by Ilgar Asadov, scientific editor Professor Alakbar Mammadov. It is accessible online at https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed_dialogue/@act_emp/documents/publication/wcms_593313.pdf

³ Purchases of equipment and some other things are treated as investments rather than as things that, like labour, immediately get consumed by the production process. This point is returned to later.

- **Value Approach** to measuring inputs or outputs: Represents inputs or outputs in monetary terms, such as dollars spent or earned. (This should capture both quantity and quality issues, if the latter are reflected in prices; also allows for product mix to be taken into account.)
- **Externalities:** Unintended side effects of economic activity—positive or negative—that affect third parties and are not reflected in market prices.

- **Capital Services:** The flow of productive value provided by physical and intangible capital assets over time, accounting for investment, usage, and depreciation.
- **Productivity Ecosystems:** The interconnected system of institutions, infrastructure, human capital, innovation, and sustainability practices that collectively influence productivity outcomes.

Source: These definitions are based on a series of queries to CoPilot, whose responses have been further edited by the author.

Growth in productivity is generally seen as a core feature of economic development and national competitiveness. In consequence, it attracts a great deal of attention and is widely seen as desirable.⁴ It is important to be aware that often media commentators confuse productivity with productivity growth. They refer to national differences in productivity, when in reality they are referring to data on productivity growth rates.

Inputs and Outputs

Labour productivity is often the focus of discussion among economists, politicians and media commentators. This is particularly important when examining countries or whole economic sectors: it tells us what the workforce is achieving through its efforts. Labour is a critical input into economic activity, is relatively easy to measure and use for international or sectoral comparisons; and of course is closely related to living standards and quality of life. Rising labour productivity is typically taken to signal technological progress, better skills, or improvements in work organisation.

Labour productivity measures the amount of goods or services produced for a given amount of labour input. As we shall often see, actual measurement of labour productivity and productivity growth is not as straightforward as might be thought, especially when attempting to compare industries or countries. Do we measure labour inputs in terms of numbers of workers, number of hours worked over the course of a year, the wages bill? The first two of these are so-called **volume** measures (the absolute amount of the thing we are discussing). In contrast, expressing

things in monetary terms, such as the wages bill, is a **value** measure.

Likewise, output can also be measured in volume terms (as the number of units of a good or service that is produced), or value terms (the market value of these goods and services). Volume measurements can be problematic when firms produce more than one output. They can also run into problems when the goods produced are acquiring new features and capabilities. Furthermore, there are often difficulties when we are dealing with services (what is the unit of service?). But value measures can be affected by changes in market conditions.

Decisions about how the components of productivity are to be measured will result in different estimates, often reflecting subtly different ideas about productivity. Consistent approaches to measuring inputs and outputs are needed to make comparisons. This is important when tracking changes over time in how well economies, industries, or firms are using human effort to generate wealth. Similarly, consistent measurement approaches are necessary when examining differences across countries or sectors.

In making comparisons, we may have little choice about whether value or volume measures can be used, and how these are implemented. Usually the highest quality data come from official statistics. These may be only released in one form, most frequently assessing productivity in terms of value. In other words, inputs and outputs are treated in monetary terms, which should at least capture the economic contribution of productivity change.⁵ Changes in product quality should – in theory – be captured by price rises, though this is far from certain. More importantly, the market

⁴ Arguments for “de-growth” are beginning to be articulated more forcefully, especially by critics of the social costs associated with, and the ecological damage wrought by, our prevailing modes of industrialism.

⁵ When making cross-national comparisons, these estimates may well need to take into account such things as currency conversion rates, which can fluctuate over the course of a year.

prices that can be obtained for a given quantity of output may vary considerably due to factors other than changes in product quality. Many of these factors are outside of the control of the business involved. Prices can be impacted by changes in supply, as related to trade issues for example, or changes in global markets. They can reflect changes in demand - for example, as markets become saturated (e.g. there is a limit to the number of radios that one person might want), or there is competition from other types of product (mobile phones may give access to the same content as radios supply). Huge shifts in productivity as measured in value terms, from market prices, may thus have nothing to do with changes in the efficiency of labour use.

Meanwhile, volume measures may make sense for looking at changes over time, especially when we are considering specific sectors. Volume measures make most sense when the product in question is relatively unchanging. But many goods and services do vary considerably in quality (for example, technological innovation can transform the functionality of many goods – a radio may also be an alarm clock). Simply counting the number of units produced will not capture quality changes. It is not unknown for businesses to claim increases in output by reducing quality controls and allowing more of the units counted (or even sold) to be defective. As noted above, volume measures are also liable to be misleading when a firm is producing more than one type of product.

Though firm-level estimates of labour productivity can be made, the figures that are most often discussed are country- or sector-level ones. Economic policymakers talk more about productivity than do most business managers. Firms and their managers frequently focus on other performance measures (frequently referring to Key Performance Indicators, KPIs). Firms vary considerably in their preferred performance indicators. Firms belonging to different sectors may favour specific sector-related metrics. For example, some retail outlets focus on sales per metre of floor space and some on “footfall”. Some emphasise market share; some emphasise consumer satisfaction or shareholder value. A focus on limiting product defects may be important when quality problems have caused reputational damage. There are many indicators that can be targeted, and managers will often focus on one or other indicator of these. Growth

in labour productivity may well result from their efforts – but this is not always going to be the case. For instance, improved product quality may even result in fewer units of output being achieved for a given amount of labour input. Likewise, investment in innovation may not immediately show improvements in volume productivity.⁶

Labour productivity may be difficult to measure, but it is easy to understand. Economists and other commentators now often use estimates of **total factor productivity** (or MFP, **multifactor productivity**⁷) to compare countries, and sometimes to compare sectors. This has the intuitively appealing feature of using a combined measure of all inputs (capital, energy, and technology, as well as labour) into the production process. But there are several reasons to be cautious about placing too much emphasis on MFP.

One set of issues concerns the treatment of investments, which may be made at one point in time but provide inputs over a lengthy period. Capital goods are what the firm purchases, but these goods are treated as if over time they are delivering capital services to the purchasing firm. Thus, the inputs to production processes are raw materials (or other component elements of the product), labour, plus capital services. Other intangible assets may also be treated as investments, and there has been some debate about treatment of Research and Development (R&D) expenditure, and purchases of software and business services – should these be seen as immediately being consumed or as investments that provide services over time? When investments are providing services, the statistics will require assumptions about how far the assets depreciate over time. Which can vary across different sorts of asset – and in reality be disrupted by events that render them more or less useful. For example, innovations in equipment may make existing systems obsolete, though in theory they could continue to be used for a long period.

Calculating the value of inputs in MFP analysis is usually done on the assumption that we are dealing with competitive markets. The competitive markets of economic theory are an idealisation of real life. For example, technological innovation can often disrupt these assumptions by creating “technology rents” around temporary monopolies. MFP estimates are based on macroeconomic input-output data, which are valuable tools. But their use

⁶ This is the root of the “productivity paradox” that was noted when the first generations of microelectronics-based computers were first taken up at a large scale – computers were evident everywhere, except in the productivity statistics! A similar phenomenon may now be underway in Western economies at the moment, when there is high investment in Artificial Intelligence but controversy about whether this is having the expected economic impact.

⁷ TFP tends to be used more by academics, MFP by policy organisations such as the OECD.

here runs into the difficulties mentioned above. It requires assumptions about the depreciation of capital (something that varies considerably across sectors and over time); there are also questions about whether and how intangible assets can be incorporated. Estimates based on historic input-output data may be rendered rapidly redundant by technological change.

One moral of this discussion is that it is almost always unwise to rely on a single indicator to guide decisions. Managers who use several KPIs to assess and guide performance are implicitly recognising this principle. Economic performance can be assessed in various ways. Labour productivity estimates are among the most intelligible of the different approaches to performance; but even here we face problems of interpretation. These problems may be growing, as our economies change. Use of modern technology may well mean that comparing inputs and outputs over time is problematic, as shown by the case of computer technology: \$1000 can purchase technologies with functionalities (speed, memory, connectivity, etc) that would have cost at least \$10,000, or even over \$100,000, in the year 2000. (Whether we are using computers ten or a hundred times more effectively today than we were 25 years ago is more debatable!) Furthermore, the increasingly powerful hardware requires software to operate it usefully, and more and more its network communications become critical features. The "Information Economy", then, creates several sets of problems for productivity measurement.

So, too, does the Service Economy – the growing share of employment and value-added coming from service sectors of the economy (the so-called tertiary sectors, following the primary sector of extractive industries like mining, and agriculture, forestry and fishing) and the secondary sector (mainly manufacturing and construction). Services can also be provided to consumers and other businesses by firms in primary and secondary sectors: farms can sell their products directly to consumers, manufacturers can provide training and aftersales support. "Servicisation" is the phenomenon whereby a primary or secondary sector business moves towards providing more services in its portfolio, even including selling the capital service rather than the good itself – thus a purchaser may buy use of the product rather than ownership of the product itself. Leasing has been practised for a long time, but new business models

are appearing here, and some observers see these as potentially contributing to more environment-friendly, "circular" economies.

Service productivity (growth) has long been another contentious topic (as has services innovation – until this century it was common to write off services as inherently unproductive and non-innovative)⁸. One reason for this being problematic is the difficulty often encountered in counting the number of "units" of service produced. How much service is generated by a set of transactions in a wholesale or retail business? (Do we need to take the number – or the value – of the goods traded into account?) In the case of such trade services, the purchaser may not even be aware of what they are implicitly being charged for the service involved in supplying them with the object(s) purchased.

Even the amounts paid to service suppliers may be questionable. Many professional services bill by the hour of their staff. Labour costs are the major determinant of prices, and thus prices may increase solely because professionals are being paid more. Public services that are paid from taxation or similar mechanisms are equally problematic, with no market prices to provide an output measure. Traditionally, public service productivity was treated with a simplistic input-equals-output approach and there was no assessment of efficiency gains or quality improvements. This skews national productivity estimates downwards. More recently efforts have been made to capture efficiency and quality with activity-based measures (medical treatments, educational achievements, etc). Many questions remain, however.

Another significant feature of service economies is that many consumer services (and some professional and public services) are **coproduced**. The consumers/users⁹ of services are often required to make inputs themselves into the production process. Sometimes consumer inputs are part of a desirable service experience – think of entertainment and sports services, or tourism, that require user inputs. Some people actually enjoy shopping. But other inputs are (often) actually unpriced costs for consumers/users. They are expected to do things that might have been done in the past by service employees – such as selecting, transporting, packing, and assisting

⁸ This is reminiscent of the situation at the dawn of the industrial era, when many observers took a "physiocratic" stance, arguing that agriculture was the true source of value, with industrial goods and services merely circulating the wealth that it created. This was displaced by perspectives that placed manufacturing in a central role, with most services – especially public services – seen as mere consumption.

⁹ Users can be firms (or employees of the firms) acquiring business services.

in creating billing processes for purchases, as in supermarkets.

One route to greater service productivity (as experienced by the service supplier) is for innovations to involve such consumer self-service.¹⁰ Some tasks are no longer undertaken by the service supplier, whose labour costs may thus drop. The consumer work is not counted as part of the (labour) input. Nor does this work feature in the (pricing of) the output. As societies become more service-based, issues such as this mean that we should be even more cautious in using productivity data. Productivity data still provide insights into trends in evermore complex economies: but they need to be interpreted with these complexities in mind.

Externalities

A further issue needs to be considered when discussing productivity. This extends beyond the factory gate, the shop counter, or the office desk. It concerns what are known as “externalities”.

Externalities are side-effects of production that have traditionally not been priced into transactions. Many of these are environmental in nature. Environmental externalities include, for example, pollution and waste, carbon emissions, resource depletion and damage to biological ecosystems. Many environmental externalities are also social externalities, since things like air pollution affect the quality of life (and, indeed the health) or neighbouring communities. Numerous social impacts may be created for the workforce or local communities – health and safety issues are just one set of factors, which have over the years often been trigger for industrial action and disputes, legal and political protests. But even decisions to reduce or end operations in one site may lead to major negative impacts on that community. There were positive externalities associated directly with the output and the wages that are paid. Beyond these, jobs may provide workforce training and social benefits.¹¹ Industrial locations may trigger infrastructure development and attract investment.

Externalities are increasingly being taken into account in policymaking. This is especially the

case where efforts are being made to shift to decarbonisation. Despite this, externalities are rarely taken into account when measuring GDP or sectoral outputs. This may not be a problem in the short-term. But increases in productivity do not necessarily mean increased resilience. What are in effect hidden costs may be imposed on natural environments, communities and on future generations.

The idea of externalities involves the impacts of businesses’ production processes on the outside world, beyond the narrow considerations of productivity. Likewise, the outside world can have a big impact on how production processes function, and how productive they actually are. Recent studies have demonstrated that working under heat stress can severely damage the productivity of individual workers and whole workplaces.¹² Alongside the biological ecosystem, analysts are now talking about the “Productivity Ecosystem”. Similar features of the two sorts of ecosystem include: interdependent entities (organisms and species in one case, firms and organisations in the other) that interact and evolve together, developing special roles in the whole. They exist in a landscape of some kind, where resources are processed and transformed (energy from the sun, financial flows). There is liable to be both competition and symbiosis, there can be niches where different conditions pertain, the whole system should be resilient against shocks (although extreme shocks can be destructive).

Productivity Ecosystems

Naturally, the performance of a business will have much to do with the organisation and operation of that business. What is the division of labour in the business? how are tasks allocated to specific (sets of) workers? how is the workflow composed and how smoothly does it operate? are people working as individuals or in teams and with what degree of autonomy? what are the quality control processes?, what type of supervision is involved? what are working conditions in terms of health and safety and workforce culture (e.g., is there bullying)? These and many more questions can be asked; the answers will all have bearings on productivity – and on features such as the gender

¹⁰ It must be stressed that there are many other routes to service innovation. For example, the service supplier may organise work differently – introducing paraprofessionals into the division of labour, taking over more routine tasks and freeing up professionals to devote more effort to the more complex tasks. And of course, many service firms are intensive adopters of new information technologies, including, now, Artificial Intelligence.

¹¹ There is an extensive body of research on the sociopsychological impacts of unemployment: beyond the financial costs of being unemployed, in industrial societies, where employment is a major source of social contacts, status and purpose.

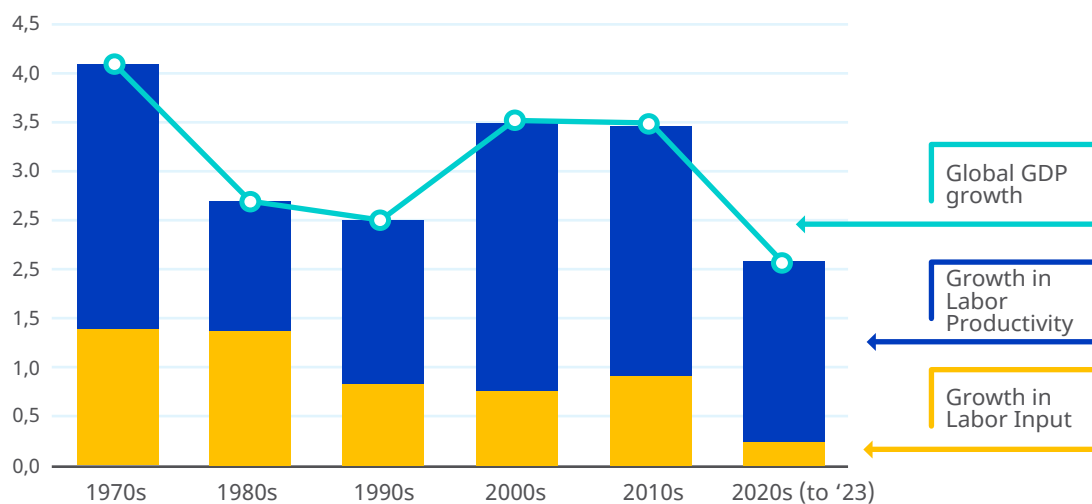
¹² See WHO/WMO (2925) Climate change and workplace heat stress. at <https://www.who.int/publications/i/item/9789240099814>

composition of different parts of the business, the skills that are required and the jobs that are created, and so on. While the performance of individual firms may have a great deal to do with their managers and management decisions (what is their productivity mindset?), the striking differences that happen across countries and regions in terms of productivity (growth) tell

us that the wider productivity ecosystem is a strong influence on performance. See Figure 2 for illustrative data on differences over time, and across groups of countries, in labour productivity growth. (Here the measures used for G20 countries are based on estimates of hours of labour input, while the Central Asia/South Caucasus country data in Figure 3 just feature people employed).

► **Figure 2: Illustrative Data on Productivity Growth over time, and in different sets of G20 countries.**

2.a Trends in G20 over several decades: comparing growth rates of GDP, Labour productivity and labour input.



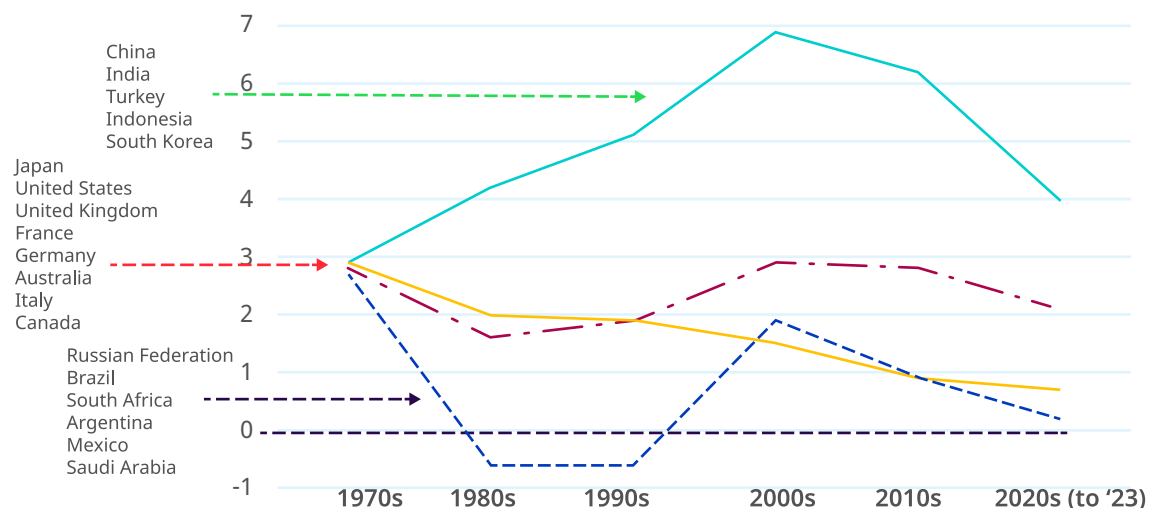
Source: Bart van Ark and Dirk Pilat (2024)

"Productivity drivers and pro-productivity policies: G20 economies, India and South Korea" Indian Economic Review 59 (Suppl 1) S95-S121

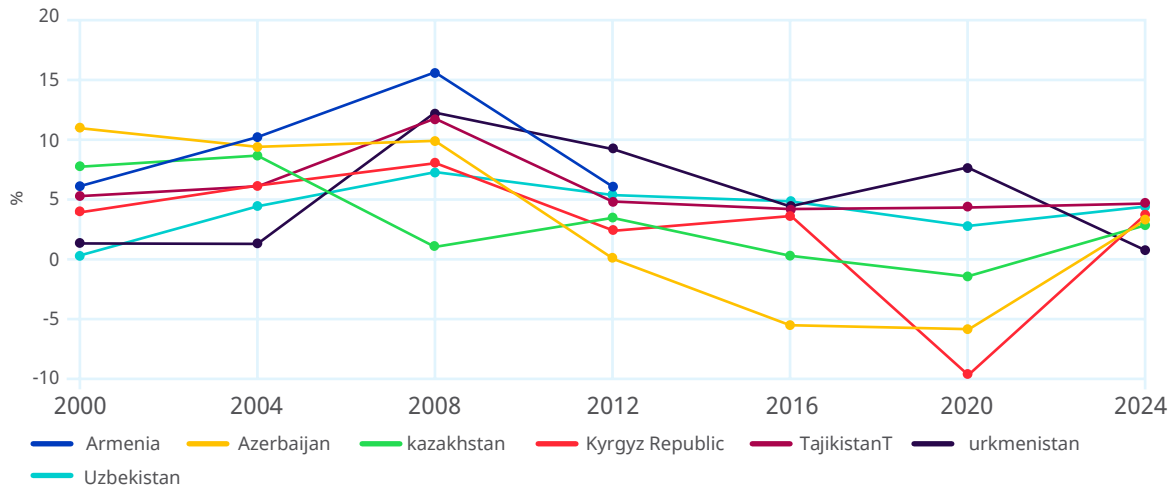
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2.b Trends in different sets of G20 countries: labour productivity growth rates

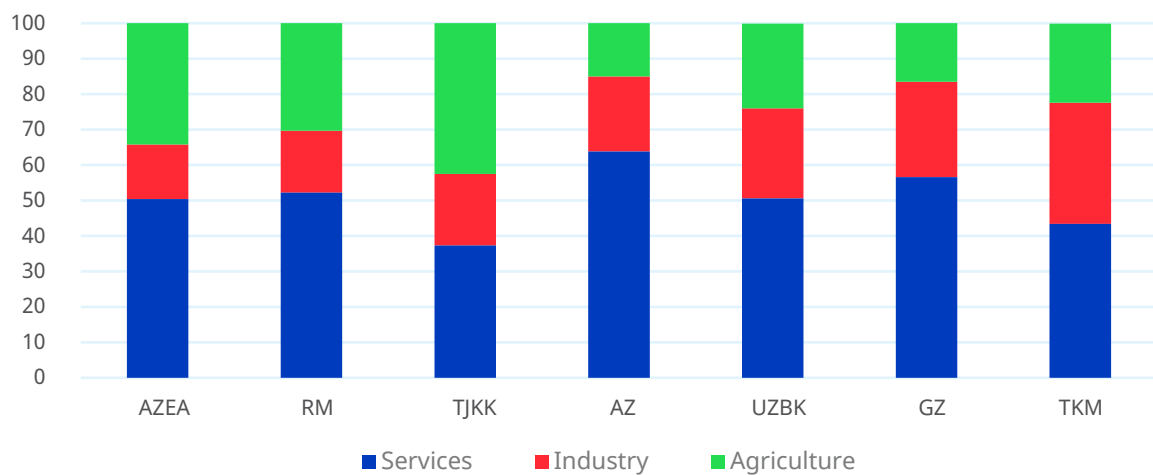


Source: based on data in Van Ark and Pilat (2024).

► **Figure 3: A Rough estimate of Trends in Labour Productivity across Selected Countries****Annual Growth Rate of Real GDP per Employed Person**

Source: Key Indicators Database at <https://kidb.adb.org/>

Note: There are substantial variations in industrial structure and levels of employment across countries (hours worked per employee, and wage levels, are also liable to vary). An exemplary relevant comparison is featured below.

Share of Workforce in Broad Sectors, 2021

Source: ILO (2023) "Central Asia and South Caucasus: The Employment–Enterprises–Climate Nexus"

Note: ordered from left to right in terms of share of workforce employed in "industry".

ARM = Armenia; AZE = Azerbaijan; KAZ = Kazakhstan; KGZ = Kyrgyzstan; TJK = Tajikistan; TKM = Turkmenistan; and UZB = Uzbekistan.

The broad trends are very unlikely simply to reflect differences in productivity mindset. Varying external circumstances may well influence the mindset in an optimistic or pessimistic direction. But also, mindsets will surely influence how firms and individuals respond to the varying circumstances in which businesses and people find themselves.

The firm-level is clearly a central part of the productivity phenomenon. Management mindset is part of this, but strategies, actions and organisational arrangements are the manifestations of this mindset along with a host of other influences as well. Accordingly much attention has been directed to such matters as management practices and quality control standards.

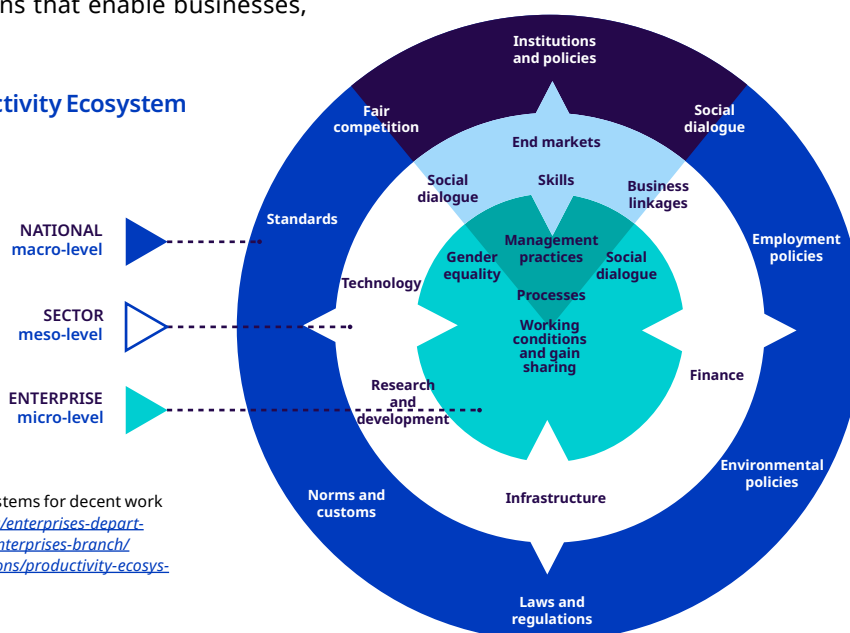
The firm is responsible for the production process that transforms inputs into outputs. Inputs, of course, are mainly accessed from outside of the business/ Outputs have to be channelled through the world outside the business, too. The production process itself is influenced by the external world in which it is situated – for a very basic example, by weather conditions. Furthermore, some features of the external world that are critical to productivity may be affected by the business. This is especially the case when a business is organised on a large scale, or places high demands upon the natural environment on local infrastructure.

The term “productivity ecosystem” refers to the collection of conditions that enable businesses,

workers, and institutions to be collectively productive, so that an entire economy (or geographic subregion, or sector¹³) generates value and economic output, and can continue to do so – hopefully, increasingly effectively. Figure 4 reproduces a graphical illustration of the notion employed by the ILO.

Labour productivity, of course, involves one critical input: a **workforce** that is capable of undertaking the labour required by the production process, at the time it is required.¹⁴ Lack of potential employees with appropriate skills and competences can restrict productivity and impede productivity growth. In some circumstances, firms may consider that investments in training are of limited value, because skilled workers would be in such demand that it would be hard to retain them. Public education/training facilities can play substantial roles in a productivity ecosystem. Immigration policies may help address skill gaps or demographic challenges, and emigration policies may address “brain drains”. Other aspects of human capital are also vital: population health and fitness are liable to be important, for instance, and not only for physical labour. Attitudes to work (and to such features of working arrangements as gender disparities) and to responsibilities beyond the workplace) are cultural features of considerable significance.

► Figure 4: The Productivity Ecosystem



Source: ILO “Productivity ecosystems for decent work approach” at <https://www.ilo.org/enterprises-department/micro-small-and-medium-enterprises-branch/productivity-and-working-conditions/productivity-ecosystems-decent-work>

13 Some features of a national productivity ecosystem can be highly sector-dependent. For example, sectors often require very specific skills (while some require a large volume of “low-skill” workers, some are very closely tied to specific locations where there are particular natural resources, while others are potentially highly mobile; government regulations may be far more stringent in some sectors than in others.

14 Some work is inherently seasonal, especially in agriculture and tourism. This may deter potential employees who need to support themselves and their families all year round. Night shifts, and unpredictable working hours, may rule out some jobs for some potential employees, or render working lives precarious or limiting to family quality of life.

Physical Infrastructure also plays a vital role in productivity. **Transport** networks facilitate the movement of raw materials, goods and people, and disruptions can impact inputs to production and distribution of output. Delays can seriously damage the operation of supply chains, workflows and market development. Travel to work may be an issue affecting the availability and capabilities of the workforce. **Energy** infrastructure - reliable power supplies - and availability of **water** and/or other resources are often vital for agriculture, manufacturing and services. Modern **telecommunications** infrastructures enable digital commerce, knowledge of developments in market conditions and weather forecasts, remote access to services, and use of advanced technologies.

Knowledge resources may also be an important feature of the ecosystem. Adequate provision of business services, access to universities, business schools and research and technology transfer institutions is particularly beneficial to firms seeking innovation-based productivity improvements. Sharing of knowledge about best practices and access to support services is a feature of effective productivity ecosystems. It can help reduce the problem of productivity gains (and other improvements, such a reduction of energy use or environmental damage) being confined to a few firms or regions.

Conditions for new businesses, meanwhile, are another key issue. New businesses may play a substantial role in increasing sectoral productivity levels, both by introducing new methods and applying new equipment, and by challenging incumbents to up their game. Bureaucratic obstacles to business start-ups and lack of enthusiasm from banks and other sources of finance can hinder this. New businesses may be supported by science and industry parks, incubators, and facilities for supporting start-ups.

Financial resources are another component of a well-functioning ecosystem, and not just for new businesses. Access to appropriate financing enables businesses of all sorts to invest in productivity-enhancing technologies and expansion. This may involve government and/or private financing, and a host of different arrangements may coexist.

Many other factors may play a role in productivity ecosystems. How far does criminality and corruption impede business? How responsive are public authorities? Is there a problem with informal “sector” competition undercutting the prices of legitimate tax-paying and regulation-aware firms?

Issues such as these also vary across countries (and regions) and over time.

The key point is that the socioeconomic context can either support or hinder productivity improvement. Investments in Human Capital and Physical Infrastructure, improving management skills and businesses’ access to knowledge and finance, and similar measures, can promote long-term upgrading of this context – though some of these measures may require the long term to be effective. These and other systemic interventions may be key to sustained progress. And progress means taking into account the fact that business operations have externalities, and some of these may affect the external context. For example, firms can contribute to nurturing human resources, and promoting greater gender equality. They can contribute to remediating or damaging natural resources, such as water supplies, for example. The Just Transition will only become a reality if the productivity ecosystem is conducive to management choices that favour sustainable growth.

Figure 3 presents, alongside the data on rates of growth of the GDP to people employed ratio (an estimate of labour productivity growth), one example of data on the economies of the Central Asia/South Caucasus region. Among the notable features of these data are: (1) In only one of these countries (Turkmenistan) did employment in “industry” constitute more than a third of the workforce in 2021 (and this was only just over 33%). (2) In 5 of the 7 countries, the service sector took the largest share of the employees, and in 5 of the 7 it used more than half of the workforce. (3) The country with the largest services share, Kazakhstan, had the smallest share in agriculture. (4) In contrast in only one country was agriculture the largest employer, with over 40% of the workforce – this was the country (Tajikistan) with the smallest share of services employment.

These last two items of information rather neatly reflect the “march through the sectors” that is used to describe a common pattern in the course of economic development. Pre-industrial societies were mainly characterised by a mainly agricultural workforce; typically industrialisation was reflected in relative shrinkage of this sector and expansion of the industrial workforce – and finally the service economy features large share of the workforce in service industries (note – not in the domestic service that was characteristic of earlier societies).

The differences in industrial structure are bound to impinge upon the countries’ responses to developments in the global economy. They will also affect the productivity and productivity growth estimates, since sectors typically differ in

value-added per employee. But other factors are liable to shape the productivity ecosystem and its outcomes.

Barriers to Growth

In addition to making inferences based on issues such as industrial structure, it is possible to examine survey data that ask about factors constraining business performance. Enterprise Surveys are conducted by the World Bank and its partners across all geographic regions – practically all countries are covered, ideally every 3 years. The most recent data for Central Asian/South Caucasus countries come from surveys conducted in 2024.

Data are generated from samples of firms with 5 or more employees in the “non-agricultural, formal, private economy” ((thus no microbusinesses or informal economy businesses are included)). Three size groups are used to categorise firms: 5 to 19 (small), 20 to 99 (medium), and 100 or more employees (large). The focus is manufacturing and (most) private service industries.¹⁵

The surveys cover numerous issues – firm structure (e.g. age, female employment) and performance (e.g. employment and sales growth), and experience and perceptions of the business environment (e.g. reliability of electricity supply, access to finance, views on obstacles to business). The full results are available in the form of tables for statistical analysis (using the program STATA), and summary information is presented in a set of **Country Reports** which are drawn on below. These Reports (published in 2025¹⁶) include 2024 data for Azerbaijan, Kazakhstan, Kyrgyz Republic (data for 2023), Tajikistan, Turkmenistan, and Uzbekistan. (Material is also available for Armenia, Georgia, Turkiye, and many other countries in Asia and other continents.)

There is no precise measure of productivity presented in the Country Reports. We have data on number of employees – and some further details of workforce characteristics. But the report does not present data on salaries, or on sales. (Data on the total annual cost of labour including wages, salaries, bonuses, social security payments, and on

sales in Local Currency Units are captured in the raw data set. In principle labour productivity could be calculated from these figures.) . The Country Reports do include estimates of both employment and sales growth (as %) over the last 3-year period. This allows estimates of **labour productivity growth**. If sales growth is more extensive than employment growth, then this indicates of positive productivity growth. (As usual, caution is required in interpreting the data . For example, prices may be changing, with revenue therefore moving in different ways than material output levels.)

The item with higher growth rate is highlighted for each country, in Figure 2. Three countries have reports of higher growth rates in sales (AZE, KAZ, and UZB), three in employment (KYR, TAJ and TUR). Double-digit employment growth rates feature in two cases (AZE and TAJ) and double-digit sales growth rates in four (AZE, KAZ, TAJ and UZB).

The World Bank Enterprise Survey reports do not ask explicitly about obstacles to productivity growth. However, a list of features of the business environment is presented to respondents, who are asked to say “which one currently represents the biggest obstacle faced by this establishment”. This seems to be a reasonable starting point for considering perceptions of barriers to productivity and productivity growth. It is, however, rather a crude indicator, since businesses might have a difficult decision to make in selecting which of a number of perceived obstacles is really the most important one.

Table 1 displays data on obstacles for different countries (note that it does not examine the circumstances for firms of different types and in different regions, where some experiences may well vary substantially). Obstacles to business that are reported by more than 10% of respondents are highlighted, and obstacles reported by over 20% of respondents are also marked in bold. None of the obstacles receives 10% or more selections in all countries, but some obstacles receive more frequent citations than others. In particular **tax rates** are cited by more than 20% in four of the countries, and more than 30% in two) and **access to finance** by more than 10% in five of the six (but only one of these exceeds 20%, and in AZE

¹⁵ Firms that are 100% state-owned are not covered; nor are education, health care and financial services. Also excluded are primary sectors (agriculture, fishing etc., mining and extractive industries). The sample sizes are rather small (in the hundreds, typically), which means that detailed statistical analysis at a country level is problematic, and comparisons across countries should be treated with caution.

¹⁶ See <https://www.enterprisesurveys.org/en/about-us>. The WBES website provides data on the bodies that conducted the surveys in each country, the regions of the countries covered, and other such details.

Links to the country reports all begin with

<https://www.enterprisesurveys.org/content/dam/enterprisesurveys/documents/country/> and then continue with specifying the country: Azerbaijan-2024.pdf; Kazakhstan-2024.pdf; Kyrgyz-Republic-2023.pdf; Tajikistan-2024.pdf; Turkmenistan-2024.pdf; Uzbekistan-2024.pdf.

only 8.4% refer to this). **Inadequately educated workforce** is frequently cited (by more than 10% in four of the six) and particularly in TKM. TKM displayed 31.6% stressing Inadequately educated

workforce; and notably it also displayed 26.2% for access to finance – the highest level of citation of this factor Inadequately educated workforce barely registers in TJK (3.9%).

► **Table 1: Growth and Obstacles - Key Results for World Bank Enterprise Surveys.**

	AZE	KAZ	KYR	TAJ	TUR	UZB
Growth (%)						
Annual employment	16.6	9.1	9.1	17.8	8.4	5.0
Real annual sales	19.3	12.8	7.7	11.7	4.2	10.0
Biggest Obstacle						
Access to finance	8.4	16.7	11.0	19.2	26.2	11.8
Access to land	4.1	1.2	1.9	4.2	4.6	7.1
Business licenses and permits	7.5	8.1	2.0	1.0	2.0	8.8
Corruption	0.2	8.4	13.5	3.5	11.6	9.1
Courts	0.3	0.5	2.9	0.2	0.0	2.0
Crime, theft and disorder	0.1	1.9	1.8	1.5	3.2	3.2
Customs and trade regulations	0.5	5.1	2.2	1.7	1.2	3.7
Electricity	1.9	8.6	8.9	14.3	2.3	9.5
Inadequately educated workforce	9.1	14	10.4	3.9	31.6	10.5
Labor regulations	3.9	0.4	0.0	0.0	0.0	1.1
Political instability	1.2	1.8	20.4	2.7	0.0	0.9
Practices of the informal sector	16.3	6.9	7.1	6.9	8.4	2.8
Tax administration	3.4	0.9	10.3	4.0	0.0	4.0
Tax rates	39.6	17.6	5.8	36.9	0.3	23.9
Transportation	3.5	7.8	1.7	0.0	8.5	1.5

Relating these perceptions of obstacles to the growth data reported in the WBES, a couple of results can be singled out. First, the two countries where sales growth was higher than employment growth (AZE and UZB) are ones where tax rates were often cited as key obstacles (along with TJK, where employment growth was higher). Second, TKM displays relatively low levels of growth in both sales and employment, and features particularly high frequencies of Inadequately educated workforce and access to finance being reported as main obstacles. Third, KGZ also displays relatively low levels of growth in both sales and employment, and is unusual in having political instability appear as a significant obstacle (by over 20% of respondents). The interpretation of such results – not least how far they represent temporary

circumstances as opposed to longstanding phenomena – will require local knowledge.

Growth Opportunities and Green Growth

It has been common to think of efforts to move towards more sustainable development – to a Just Transition – as being liable to have negative impacts on productivity and productivity growth. Long-term ecological and social resilience may be achieved but the immediate impacts of the changes involved in early stages of the transition may be problematic for workers and employers.

Many of the investments required for the move to sustainability and a Just Transition, require upfront

costs but have long gestation periods before their benefits become apparent. The investments may involve expenditure on new or upgraded infrastructure, R&D and other innovation efforts, and retraining costs. Simultaneously changes in regulations, certifications, and reporting requirements can divert resources (and management attention – probably especially in SMEs) from an emphasis on innovation and operational efficiency. Existing business models and supply chains may be disrupted, while new jobs may require different sets of skills and working arrangements, and be created in locations that are distant from where old jobs are being displaced. It is quite possible that vulnerable groups (e.g. informal workers, older employees, and people in rural or low-income areas) are least likely to benefit from new job creation, and that displaced workers suffer long-term disadvantage.

Challenges such as these are commonly encountered when socioeconomic transitions are taking place. Immediate problems of declining activities, businesses, occupations, and the like are balanced against growing opportunities associated with emerging practice. Furthermore, ongoing climate change (weather, glacier melt and other impacts on agriculture, construction, food and water security, etc.) is already demanding substantial adaptation of economic activities and ways of life more generally. While this means that change is necessarily underway, some of the pressures here are liable to drive action toward short-term “solutions” that hinder longer-term transition.

Proactive policies are required to mitigate the costs of transition (especially where they fall upon the most vulnerable) - and to promote the rapid growth and wide embedding of new practices and the value they create. Social dialogue may be vital in helping identify and build support for solutions to the problems of transition. Rather than adopting a top-down approach, plans and policies can take local and grassroots knowledge into account, alongside appraisal of good practice elsewhere and insights derived from up-to-date research.

A shift to “greener” products and processes can actually stimulate increased productivity, in Central Asian and other economies. This is likely to happen more rapidly when business strategies and government policies seek to achieve this goal. A number of features come into play. **Innovation and Efficiency** gains are associated with many green technologies, especially those that involve less wasteful use of resources. These

can reduce operational costs (together with reducing dependencies on volatile commodity markets, leading to more stable and sustainable growth) and increasing productivity. At the same time, many of these technologies, by reducing pollution and improving environmental quality, promote better **Health and Well-being** outcomes for workers and communities. (Healthier workers are generally more productive and have lower absenteeism.) There are **Market Opportunities** associated with global demand for sustainable and environmentally friendly products. By moving towards greener production, firms can tap into new markets and consumer segments, enhancing their competitiveness. They can position themselves as leaders and preferred partners in global supply chains, adopting green practices that match emerging (and generally stricter) international sustainability regulations and standards. Green initiatives may also attract **investment and financing** to modernise and expand operations, from international organizations and environmentally conscious investors.

Specific technology choices will naturally vary across countries (and regions within them), and across economic sectors; the cost-benefit ratios may well look very different for firms of different sizes. With these provisos in mind, some broad options can be outlined.

Given the centrality of decarbonisation to a Just Transition, innovation (new or improved organisation, processes and products) concerning **energy** production, distribution, storage and use is a recurrent theme in what follows. Increasing the supply and availability of alternative power systems to those based on fossil fuels, and increasing the efficiency of remaining fossil fuel-based systems, are both required. Alternative energy sources include solar, wind, hydro and deep geothermal sources (and there may be reserves of “white hydrogen” to exploit).

Many of the capabilities developed around oil/gas/coal industries may be applied to these new power sources. For example, expertise and skills around subsurface geology and pressure systems can be directly applicable to carbon sequestration and geothermal energy production. Engineering skills could be applied to large-scale project execution, and to compliance with regulatory and safety requirements, such as are relevant to large-scale renewable energy systems. Fossil fuel power plants will often have grid infrastructure developed around them, so these locations may

be suitable for one or other renewable power source. The skills of power plant operators can be applied to managing renewable systems, including grid balancing, reliability and load-following. More controversially, there may be scope for retrofitting natural gas pipelines to carry green hydrogen or biomethane. Garages can be hubs for electric vehicle recharging, as well as repair and maintenance operations. But there is bound to be legacy plant and infrastructure that is obsolescent (in some cases, remediation and reclamation are important areas for policy).

Alternative energy sources reduce reliance on ageing fossil infrastructure and lower energy costs over time; costs of some of these technologies (especially solar) have been falling dramatically. Some (e.g. small-scale hydro) can enable power supply in remote regions, and help support community resilience. Solar power supply (solar panels) can be combined with farming (e.g. of shade-tolerant crops and shade-loving animals) to boost the productivity of land resources.

The main storage systems currently available involve batteries, a technology which itself is rapidly evolving. “Greening” of freight corridors is liable to be based on battery-based vehicles and electrified rail systems, though fuel cells and hydrogen-based power is a competing (but more novel) technological opportunity. Both batteries and fuel cells may coexist as storage techniques in their own niches. Electricity will of course be vital for digital technologies, which can enable productivity improvements across the economy.

In addition to energy issues, **water** is a prime natural resource contributing to the productivity ecosystem. The future availability and use of water will be affected by climate change impacts and adaptation strategies. More efficient water use can reduce pumping costs. Improved water use in agriculture (such as drip and sprinkler irrigation) can improve agricultural productivity and combat desertification. Drought-resistant crops may be required where there looks to be long-term reduction in rainfall or water available from glaciers, etc. Open canal systems can be re-engineered to reduce loss through evaporation and seepage. Glacier melt is a serious issue in some areas, and measures such as reforestation may take time to improve matters. Better management of groundwater (including new reservoirs) and of water allocation (via digital monitoring) can help ensure reliability of supplies and long-term availability. Where it comes to glacier lakes, improved monitoring efforts are important,

and flooding risks also require management. Shifts away from fossil fuel use for pumping and distribution can be accomplished via solar and electrified water systems; some hydropower systems may become less viable as a result of glacier melt.

Various “green” products have potential for expansion of both domestic and export markets – and productivity increases may be gained through economies of scale in expanding markets, as well as by offering more value-added products. Some of these products are energy-related – green hydrogen and hydroelectricity for example, and some are highly material – for example rare earth elements needed for electronics and solar technologies. (Though note that much effort is going into finding alternatives to these critical materials.) Agricultural products may find niche markets for organic food and textiles (and cosmetic and medical products?). Less tangible exports include eco-tourism, and knowledge-intensive services. The latter include consultancy – probably for other countries in Central Asia and neighbouring regions – in such areas as environmental impact assessment, renewable energy technology choice, and other business and policy challenges associated with sustainability and the Just Transition.

No single “magic bullet” will by itself accomplish the Just Transition, although fundamental large-scale shifts away from fossil fuels are critical. Since dependency on these power sources has been a central part of South Caucasus and Central Asian economies, these shifts are bound to be complicated and involve a protracted period of transition. Achieving ongoing productivity growth during and after this transition process will require national, sectoral, and enterprise-level change. Geopolitics, demographics and climate change make change at all of these levels inescapable in any case. The challenge is to shape these changes in ways that are both equitable and productive.

At a national level, the goal must be to advance and align policies and regulations related to employment, wages, gender equality, decarbonisation and markets for “green” products, R&D, finance and infrastructure. Education and skills development will need to take into account changing workforce requirements. Active labour market policies are crucial for supporting workers through transitions, where there is bound to be much turbulence in the nature and location of employment opportunities. Industrial and sectoral policies can stimulate demand,

investment, and support the development of green products and services. This will include both new business linkages and improvements in the environmental and employment performance of existing businesses. Inclusive social dialogue at the sectoral level helps in shaping gender-responsive and equitable policies. At the enterprise level, in inclusive social dialogue at the sectoral level helps in shaping gender-responsive and equitable policies. This collaborative approach aims to facilitate the meeting of the needs of both employers and workers during the transition. At the firm level, there will be requirements for organisational and management capacity development and awareness raising, not least among SMEs and entrepreneurs.

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Appendices

Annex 1: Further Reading

Several references are provided in footnotes. Additionally, among useful ILO publications on productivity, the following are particularly relevant to this note:

- ILO, 2015, *Productivity Improvement and the Role of Trade Unions*.
https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---actrav/documents/publication/wcms_425982.pdf
- ILO, 2020, *Driving up Productivity: A guide for Employer and Business Membership Organizations*.
https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---act_emp/documents/publication/wcms_758749.pdf
- ILO (Marina Ramkissoon), 2020, *National Productivity Organizations: Repositioning for Relevance and Impact*.
https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/---sro-port_of_spain/documents/publication/wcms_762768.pdf
- ILO, 2022, ILO Governing Body discussion on productivity ecosystems for decent work: *Ninth item on the agenda INS Promoting productivity ecosystems for decent work* (GB.346/INS/9)
https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40ed_norm/%40relconf/documents/meetingdocument/wcms_857576.pdf

Among the sources drawn on for the discussion on Green Growth are:

- Development Asia, 2023, *Improving Central Asia's Climate Resilience through the Water-Agriculture-Energy Nexus*
<https://development.asia/summary/improving-central-asias-climate-resilience-through-water-agriculture-energy-nexus>
- DRIFT, 2022, *The X-Curve Toolkit: a sense-making tool for system change*. The Dutch Research Institute For Transitions. Rotterdam, The Netherlands.
<https://drift.eur.nl/en/publications/toolkit/>
- EMBER, 2024, *Green energy corridors for Central Asia and the Caucasus*
<https://ember-energy.org/latest-insights/green-energy-corridors-for-central-asia-and-the-caucasus/>
- ESCAP 2024 *Harnessing Innovative Technologies to Advance Green Transformation for Sustainable Development in North and Central Asia*
<https://www.unescap.org/sites/default/d8files/event-documents/Meeting%20Report%20EGM%20SONCA-final-external.pdf>
- J P S Luna and I Miles (2023) *Policy Report on KIBS for the Basque Country* Bilbao: iKERKETAK Ekonomiaz, 2023/1
https://www.euskadi.eus/contenidos/informacion/ikerketak_ekonomiaz/es_publica/adjuntos/IKERKETAK-2023-I-KIBS.-ING.pdf
- UNDP 2022 *A checklist for inclusive and green development in Central Asia*
<https://www.undp.org/eurasia/blog/checklist-inclusive-green-development>
- Eurasian Research Institute 2024, *COP29 Decisions and Central Asia: A Roadmap for Green Transformation* Khoca Akhmet Yassawi Kazakh-Turkish International University
<https://www.eurasian-research.org/publication/cop29-decisions-and-central-asia-a-roadmap-for-green-transformation/>
- UNIDO, 2025 *Irrigation Equipment Production in Central Asia: Industrializing the Water Sector*
<https://www.unido.org/sites/default/files/unido-publications/2025-03/Irrigation%20Equipment%20Production%20in%20Central%20Asia%20-%20Industrializing%20the%20Water%20Sector.pdf>
- World Bank, 2020, *Tackling the impact of job displacement through public policies*,
<https://www.worldbank.org/en/news/feature/2020/10/20/tackling-the-impact-of-job-displacement-through-public-policies>

Annex 2: Questions for Further Discussion

- 1. National Policy Alignment for Green Growth:** At a national level, what specific policy adjustments are needed in areas such as employment, wages, gender equality, and research and development (R&D) to support both productivity growth and decarbonisation efforts in our economies, especially considering their existing dependencies on fossil fuels?
- 2. Addressing Business Obstacles:** Survey data has indicated that tax rates, access to finance, and an inadequately educated workforce are significant obstacles for businesses in our countries. How can national governments, in dialogue with employers' and workers' organizations, develop targeted policy reforms to alleviate these barriers, and foster environments conducive to productivity growth and decent work?
- 3. Human Capital Development for Future Jobs:** Given the identified challenge of an "inadequately educated workforce" and the new skill demands anticipated during a Just Transition, how can tripartite partners collaborate to reform and adapt education and vocational training systems

to equip the Central Asian workforce with the skills needed for emerging green and productive industries?

4. **Strengthening Social Dialogue:** How can inclusive social dialogue at the national and sectoral levels be strengthened to effectively identify and build support for solutions to the complex problems of a Just Transition? How can these ensure that policies are gender-responsive and equitable?
5. **Sectoral Diversification and Green Investment:** Considering varied industrial structures (some Central Asian countries rely heavily on services or agriculture, for example), what might be specific industrial and sectoral policies that can stimulate demand for, and investment in, “green” products and services, promoting both new businesses and environmental performance within existing businesses?
6. **Mitigating Transition Costs for Vulnerable Groups:** The transition to sustainability may impose immediate costs and disruptions - particularly on vulnerable groups such as informal workers, older employees, and those in rural areas. What proactive policies and support mechanisms, developed through social dialogue, can be implemented to mitigate these costs and ensure that new job creation benefits all segments of the workforce, leaving no one behind?
7. **Enterprise-Level Innovation and Capacity Building:** How can capacity development and awareness-raising efforts be most effectively targeted at small and medium-sized enterprises (SMEs) and entrepreneurs to encourage their adoption of innovative practices, cleaner technologies, and improved management processes that enhance productivity and contribute to decarbonisation?
8. **Internalizing Environmental and Social Externalities:** Environmental and social externalities (e.g., pollution, resource depletion) are critical impacts that are often not captured in traditional productivity measurements. What mechanisms can be put in place at national, sectoral, and enterprise levels to better account for and actively reduce these negative impacts of production processes and supply chains?
9. **Improving Access to Finance for Green Transition:** Access to finance is frequently cited as an obstacle for business performance. Can new or improved financial instruments and related policy reforms be implemented to improve access to capital, especially for SMEs, and can they specifically fund investments in the green technologies required for a Just Transition?
10. **Data and Measurement for Informed Policy-making:** How can we improve the quality, consistency and speed of production of productivity data needed to inform national, sectoral, and enterprise-level policies for sustained productivity growth and an equitable Just Transition? What is the scope for developing and applying measures that are disaggregated by sector, firm size, etc., that shed light on gender issues and the informal economy?