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**THE OECD INNOVATION STRATEGY: DRAFT POLICY PRINCIPLES**

*This document contains a first draft of the OECD Innovation Strategy Policy Principles. These principles will be further developed over the coming months and complemented with more detailed policy guidance that can help underpin the development and implementation of effective, whole-of-government policies for innovation.*

*This document is submitted for discussion.*

Miriam Koreen, Tel: +33 1 45 24 81 41; Email: [miriam.koreen@oecd.org](mailto:miriam.koreen@oecd.org)

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## FOREWORD

1. In 2007, Ministers called upon the OECD to develop a strategy to strengthen the contribution of innovation to key economic and social objectives. The OECD Innovation Strategy seeks to harness innovation for stronger and more sustainable growth and development, and to help address increasingly urgent issues such as climate change, health, food security and poverty that depend on stronger innovation and new forms of international collaboration.

2. Innovation has long been viewed as central to economic performance and social progress, and recent evidence has confirmed the links between innovation and growth. The actual and perceived importance of each facet of innovation may differ across countries, depending on factors such as resource endowments, industrial structure, and culture. In recent years, the notion of innovation has broadened. In particular, awareness has grown that innovation is not only about technology, but that other forms of innovation – for example organisational changes, marketing and design – also make important contributions to productivity growth and value creation. This also reflects a growing appreciation of the interaction between – and complementary nature of – technological and other forms of innovation, particularly in terms of wider application and adoption of innovations.

3. Building on these findings and wide-ranging new analysis, the OECD Innovation Strategy embraces a broader notion of innovation involving a range of diverse actors, processes and settings.

4. This document sets out the OECD Innovation Strategy's Policy Principles to help bring this vision to reality. It provides a set of broad and flexible principles that can be tailored to country specificities and challenges, such as the level of economic development, economic structure and institutional setting. These principles will be further developed over the coming months and complemented with more detailed policy guidance that can help underpin the development and implementation of effective, whole-of-government policies for innovation.

## THE OECD INNOVATION STRATEGY: DRAFT POLICY PRINCIPLES

1. Citizens today expect more from governments to ensure their prosperity and well-being. Yet society is facing a set of unprecedented and diverse challenges. The effects of the economic downturn will be felt around the globe for years to come. Lagging productivity growth was already a serious threat to prosperity and competitiveness in many countries, and the economic crisis has only imposed a stronger imperative on countries to find new and more sustainable sources of growth. Effective policies to harness innovation and channel it for human progress are urgently needed.

2. In addition, many of today's pressing challenges know no borders and cannot be tackled by a single country. The ability to address increasingly urgent issues such as climate change, health, food security and poverty therefore depends on stronger innovation and new forms of international collaboration. Global challenges require collective and innovation-driven responses.

3. There have been huge strides in broadening the benefits of innovation. A new medical treatment or vaccine that saves millions of lives, a new smart-phone that makes doing business less costly and staying in touch with family easier, the widespread use of existing technologies for new purposes – all these breakthroughs should ultimately improve the well-being of people. What is more, today people can access, exchange and amplify knowledge at a unprecedented scale through the Internet. And that knowledge is developed and deployed in new ways in the workplace, and by consumers themselves, who can influence the direction of innovation.

4. Yet the policy frameworks for innovation have not kept sufficient pace with changes in the global economy and the transformation of innovation processes. The origins of the current crisis – financial sector innovations where systemic risk went largely unchecked – is only one case in point. In the aftermath of the crisis, society – including business – is looking to governments to create policy mechanisms that encourage experimentation, but provide safety nets for failure. Policy must help channel innovation towards uses that make life better for individuals, businesses and society at large.

5. Innovation today is often about reaping the benefits of globalisation. Yet while the networks may be global, the nodes of innovation – clusters of expertise – continue to be local. Balancing these global and local forces is a fundamental issue that policy makers have to address, given that many policies are geographically rooted.

6. The time has come to develop a strategic approach to fostering innovation to achieve the core objectives of public policy. The OECD Innovation Strategy advances this common goal. It takes a broad, system-wide approach to innovation, bringing together policies and principles in a mutually supportive manner. It recognises the fundamental role of people – in both the public and private spheres – and framework conditions, operating within an interconnected world where markets are more sophisticated and demanding than ever before. The Strategy does not aim to provide a one-size-fit-all, linear approach to address all problems. Rather, its message is that with a mobilising vision – and the ambition to achieve it through policy coherence and effective coordination – governments can help improve economic performance, address global challenges and enhance welfare. With the right set of policies in place, innovation will result in win-win outcomes and greater well-being both at the national and global levels.

### **Empowering people to innovate**

7. People are at the heart of innovation. Innovation relies on a highly skilled labour force, not only for high-technology and research sectors, but in all sectors of the economy and society. Moreover, more networked innovation processes enable a much larger participation in the innovation process, opening it beyond the realm of corporate R&D laboratories to users, suppliers, workers and consumers in the public, business, academic and non-profit sectors. Tapping into people throughout the economy and society provides new ideas, knowledge and capabilities, and enhances the influence of market demand on innovation. Policies need to reflect this broader engagement and must enable people throughout the innovation system to participate in, and draw benefits from, innovation.

### ***Fostering skills for an innovative workplace***

8. While traditional scientific, technological, engineering and mathematical skills are essential for producing innovations and providing an absorptive capacity to understand and apply various technologies, innovation can come from a wide range of people. Those involved in the innovation process need skills that equip them to communicate and work in complex problem-solving teams. Innovation also involves the capacity to learn, adapt, or to retrain, particularly following the introduction of radically new products and processes. Therefore, it is important to ensure that educational institutions, as well as vocational education and training programmes, equip younger people and graduates with flexible and broad skill sets to accommodate the changing nature of innovation, beyond basic literacy and numeracy skills.

9. Education systems have a broad role to play in terms of supporting innovation because a knowledge-based society relies on a highly qualified and flexible labour force in all sectors of the economy and society. Innovation requires the capacity to continually learn and upgrade skills, and much of this takes place on the job. Emphasis is increasingly placed on capabilities for adapting and combining multi-disciplinary knowledge, performing complex problem solving, addressing knowledge management and business management challenges, and engaging and cooperating at an international level. Moreover, a country's industrial structure also has a bearing on the different types of human capital and so the mix of skills needed varies by industry and changes over time. Policy needs to foster change and innovation within the education and training systems and the workplace that enable life-long learning.

10. Innovation also relies on the ability of workers to participate in, and benefit from, the innovation process in their own workplace. There is growing evidence that how work is organised and managed plays an important role in innovation and in providing returns to investments in innovation. For example, work practices such as team work, employee involvement and training, are typically associated with more innovation, and notably in-house innovation – the common element being a greater degree of responsibility and discretion of individual workers regarding the content of their work. European studies show systems that allow labour market mobility, accompanied by active labour market policies that enable training and support people transitioning between jobs, are associated with higher levels of discretion and higher levels of in-house innovation.

### ***Tapping into global talent***

11. Increasingly, talent can be sourced from around the globe. Virtual networks and international mobility of people contribute to the creation and diffusion of knowledge, both codified but especially tacit knowledge. Some emerging economies have also benefited from a large and well-educated diaspora that has helped enhance their own innovation and growth via return migration, venture capital and knowledge flows to the home country. There are a number of things governments can do to encourage this circulation of knowledge, keeping in mind the need to avoid aggravating shortages of certain categories of skilled professionals in sending countries. For example, investing in public research to build absorptive capacity,

opening labour market access to foreign students for further training, and making the tax regime attractive for mobile skilled workers can foster the circulation of talent. For their part, sending countries can put into place policies and support measures (*e.g.* fellowships) that provide opportunities for expatriate researchers to re-enter the academic and private labour markets.

12. At the same time, mobility policy must have realistic goals. Family connections, housing markets and available jobs for spouses, as well as cultural and language differences, will continue to place upper bounds on mobility. The impact of mobility policy will also be tempered if the overall economic policy environment is not conducive to the creation, diffusion and use of knowledge.

***Enabling individuals to participate in innovation***

13. Enabled by new technologies, users and consumers play a growing role in the innovation process and often drive demand for new goods and services. Tapping into this source of ideas helps firms test new ideas, offers a potentially important new source of innovation and can help orient the innovation effort towards the needs of society. As deregulation advances in areas as diverse as energy and communications, as demand for services grows, as populations age, and as ICTs place more power and responsibilities on end users, consumers need to be equipped with the skills needed to make smart market decisions for innovative products that appear as bundles, individually tailored versions or have rapidly changing characteristics. The Internet has played a significant role in obtaining rapid consumer feedback to improve new products on the market, allowing firms to adjust quality and features on goods and services.

**Policy principle #1**

**Education and training systems should equip people with the foundations to learn and develop the broad range of skills needed for innovation in all of its forms, and with the flexibility to upgrade skills and adapt to changing market conditions. To foster an innovative workplace, ensure that employment regulations facilitate efficient organisational change. Enable consumers to be active participants in the innovation process.**

**Improve educational outcomes of disadvantaged children.** Despite unprecedented growth in educational attainment in OECD countries there is still a considerable share of children who do not complete upper secondary education or leave schools with poor literacy and numeracy skills. This core phase of education is fundamental for laying the foundations for other social, economic and educational outcomes including the ability to work and contribute to innovation as an adult. Having at least some secondary education helps in the participation in further learning and training. While virtually all young people in OECD countries have access to at least 12 years of formal education, policy makers need to devise mechanisms to ensure solid educational foundations are universal.

**Equip people with skills for innovation.** Policy makers need to ensure that education and training systems are adaptable and can evolve to accommodate the changing nature of innovation since the mix of jobs will continue to change and the demands of the future are uncertain. This will require curricula and pedagogies that enable students to develop the capacity to learn new skills throughout their lives. Renewed emphasis has to be placed on skills such as critical thinking, creativity, self-confidence, communication, and team working, in addition to domain-specific and linguistic skills. Policy should also strengthen the development of human resources to take full advantage of information and communications technologies.

**Reform tertiary education systems.** Tertiary education systems need to enhance access, improve quality and operate efficiently. Public authorities should empower tertiary education institutions to become catalysts for innovation, notably in their local and regional settings. Institutions should have considerable room for manoeuvre while reserving the steering role for government. Plans for empowering institutions may include legislation permitting institutions to be established as self-governing legal entities,

in the form of foundations or not-for-profit corporations. The tertiary sector also needs to retain sufficient diversity so it can respond to future needs in the innovation system. A first priority for countries should be to develop a comprehensive and coherent vision for the future of tertiary education.

**Connect vocational education and training to the world of work.** This requires a good balance between occupationally specific skills that meet employers' needs, and generic transferable skills that provide graduates with a platform for lifelong learning, mobility and changes during their working career. A number of policy options are needed, including engaging employers and unions in curriculum development, sharing the costs beyond secondary level among government, employers and students, improving vocational teaching and training, adopting national assessment to underpin quality and consistency and ensuring workplace training is of good quality.

**Enable international mobility of the highly skilled.** Policies on mobility should aim to support knowledge flows and the creation of enduring linkages and networks across countries. Cross-border higher education should continue to be promoted as a means to build international networks of knowledge. Migration regimes for the highly skilled should be efficient, transparent and simple, and enable movement on a short-term or circular basis. Policy makers should consider whether tax policy adjustments could improve the attractiveness of their country to mobile skilled workers. Policy should also seek to support ongoing connections to nationals abroad. These policies need to be coherent with the wider migration agenda, and also with countries' efforts in the development and aid arena, so as to contribute to the effective management of migration overall.

**Foster innovative workplaces.** Employee involvement and effective labour-management relationships and practices help foster creativity and innovation and raise productivity. It is important to ensure that employment regulations foster efficient organisational change. Learning and interaction within firms is important for their innovation performance. While many decisions about how human resources are used and developed are the subject of firms' individual human resource management policies, governments may be able to shape national institutions to support higher levels of employee learning and discretion in the workplace.

**Enable consumers to be active participants in the innovation process.** Consumer policy can improve the functioning of markets by helping to equip consumers (citizens and firms) to be active participants in the innovation process. Consumer policy regimes and consumer education are needed to ensure that confident consumers can make informed choices, strengthening competition between businesses.

### *Unleashing innovation in the public sector*

14. Government not only plays the role of "rule setter", but is increasingly a central innovation actor who must innovate in the delivery of public services. Demographic pressures, burgeoning demands, higher public expectations and ever-tighter fiscal constraints due to the financial crisis mean that the public sector is seeking innovative solutions to enhance productivity, quality and equitable access to its services, contain costs and boost public satisfaction. The "innovation imperative" is therefore equally strong for the public sector itself, particularly as government has taken on new roles in the provision of finance and services.

15. Governments need to create an environment that gives room for innovation in public services. While some innovation principles for the business sector can be applied to the public sector, some of its specificities need to be acknowledged, for example its obligation to balance multiple public objectives. Knowledge management practices such as measuring and monitoring of activities and outcomes of public services, feedback and assessment mechanisms for decision makers, and the development of an evidence base, are key to innovation in the public sector. Government also needs to empower public agencies to make effective use of innovative tools or practices. Investment in new approaches and new technologies can help solve problems and improve how services are designed and delivered by increasing responsiveness, saving time and money and improving transparency.

16. Public-private partnerships (P/PPs) can also help to enhance the value for money of public services, improve their delivery and share risks and costs. Market mechanisms within the public sector are also being used to give more freedom to innovate to public agencies, for example in health or education. These mechanisms have been used by many governments since the 1990s, with differing degrees of success, and a range of lessons learned can now be identified to help make such arrangements effective in improving service delivery and fostering innovation. Given that sub-national governments account for more than two-thirds of public investment in OECD countries, they should be encouraged to play a stronger role in promoting innovation in public service delivery.

17. Public organisations are a major source of information, an increasing amount of which is digitised or produced in digital form and can be re-used in innovative ways for significant economic and social benefit – creating a platform or resource for innovation.

#### **Policy principle #2**

**Foster innovation in the public sector at all levels of government to enhance the delivery of public services, improve efficiency, coverage and equity, and reduce costs.**

**Develop coherent innovation frameworks for the public sector.** Governments need to articulate systemic innovation strategies for their main public services, such as education or health, that go beyond the funding of small pilot or experimental programmes. Communities of practice and other networks should be encouraged as has been the case in the health sector in the past decades. Management practices in the public sector should be conducive to and give incentives for innovation, especially in human resources management.

**Design data systems for innovation.** Data systems that allow the linking of outcomes to resources and use of these resources can support innovation in the public sector and inform policy making. Measuring innovation in the public sector can help inform policy making and contribute to a more innovative culture.

**Embrace e-government.** A one-stop shop for government information and services and an initial focus on areas where there is a strong need for and value in improved government services can help in making the transition to a more user-focused government.

**Engage in high-quality public-private partnerships.** Public-private partnerships based on established good practices, such as affordability, value for money, risk sharing, competition and transparency, can help in strengthening public sector innovation. They also require sufficient capacity of the public sector to create, manage and evaluate P/PPs.

**Turn public information into a resource for innovation.** Openness of public information should be the default rule as a way to eliminate exclusive arrangements and allow innovative commercial and non-commercial re-use. Unnecessary restrictions on the ways in which information can be accessed, used, re-used, combined or shared should be removed.

#### **Anchoring the foundations for innovation**

##### ***Providing the conditions for innovation to flourish***

18. In order for people to participate in – and benefit from – innovation, the foundations for innovative activity must be sound. A conducive policy environment which enables innovation to thrive, built around core “framework conditions” – sound macro-economic policy, competition, regulatory policies, openness to international trade and investment, tax and financial systems – is a fundamental building block of an effective innovation strategy. As such, it is an essential precondition for many other policies to strengthen innovation.



19. Indeed, these factors have gained importance in recent years in the context of globalisation, as businesses and capital become more mobile and seek the most favourable environments. Reaping the benefits of innovation at the national, regional and local level increasingly requires that governments and other stakeholders make the investments and policy reforms that provide innovators with an excellent environment to engage in innovation. The quality of framework conditions, human capital, research and communications infrastructure, as well as the size and quality of the local markets are among the key factors that help economies attract investment in innovation.

20. Poor framework conditions reduce the incentives to invest in innovation, hinder the flow of knowledge and technology and, consequently, reduce the overall efficiency of innovation efforts. Anti-competitive product market regulations have a strong negative impact on innovation. Openness to trade and foreign investment fosters competition and allows knowledge to flow across borders. Regulatory reform enables new entrants to challenge incumbent firms, offer new goods and services, and tap into new areas of demand that may not be explored by existing firms. Regulatory reform may also help increase the size of markets that can be exploited, which helps firms reap economies of scale and scope in innovation. A supportive tax policy also plays an important role in creating incentives for innovation. A systemic approach is therefore needed, which addresses the interactions between framework conditions – and potential tradeoffs – particularly where they intersect with more targeted policies to foster innovation.

21. A lack of well-functioning markets for innovations can be a particularly important systemic problem that needs to be overcome. Markets for climate change and energy technologies, for example, remain poorly developed as the full costs of climate change are not reflected in market prices and firms are not provided with the appropriate incentives to innovate. In other cases, inappropriate regulations may prevent firms from developing innovative solutions. In the pharmaceutical sector for example, price caps on drugs that prevent firms from recuperating their investment could undermine new drug development. In the case of energy-saving products (*e.g.* light bulbs), different product market regulations raise the costs for manufacturers, possibly leading to sub-standard products in markets with weaker regulations, or consumer loss in the form of higher prices.

22. Governments can play a role in fostering markets for innovations, in particular where stronger innovation will meet key public goals. The challenge is to ensure that incentives to foster innovation do not come at the cost of other public objectives. The decision making process on such trade-offs therefore requires a systemic approach.

### Policy principle #3

**Ensure that framework conditions are sound, conducive to innovation and mutually reinforcing.**

**Ensure macro-economic stability.** A sound macroeconomic framework supports investment in innovation through low and stable rates of inflation and by reducing the level and volatility of real interest rates. High and stable rates of output growth provide better conditions for business firms to pursue activities with a medium to long-term time horizon such as investment in R&D or demanding forms of product, process and organisational innovation.

**Foster competition.** Open and competitive markets are essential drivers of innovation. Considerable scope remains within OECD countries and at the international level to open markets to competition. Eliminating anticompetitive product market regulation is a powerful way to stimulate investment in innovation; the OECD has designed a toolkit to help governments in this area.

**Open markets to trade and investment.** Increasing services trade openness, reducing border protection for merchandise trade and maintaining the international framework for IPR, including TRIPS, helps foster innovation. The conclusion of the WTO's Doha Development Agenda, including improved market access

for goods and services, is an important instrument in this regard. Governments should also consider the development of cooperative approaches with foreign investors to attract FDI and extract benefits from FDI for local development.

**Develop a regulatory environment that fosters innovation.** Regulation which meets the OECD's Guiding Principles of Regulatory Quality and Performance, along with the use of market-based policy measures, can ensure that potential innovators are given the right incentives to develop and diffuse those technologies which meet social objectives at least cost. Existing regulations should be regularly reviewed and the impact of new regulations assessed, to ensure that they meet quality and performance standards.

**Adopt tax policies which are conducive to long-term growth and innovation.** To encourage innovation and the diffusion of innovative processes, policy should ensure that the tax system is not impeding investment in innovation, such as the purchase or licensing of tangible and intangible capital, employment of skilled workers and access to finance. Depending on a country's tax mix, policy makers are encouraged to shift away from corporate income tax towards taxes on consumption and immovable property.

**Foster markets for innovations.** Getting prices right and reforming regulations can help foster markets for innovation. Governments should also consider the use of other instruments to support the innovation cycle, including regulations, standards and public procurement. Such policies may be effective in specific markets, in particular where the government plays a lead role as a large consumer. Such policies are not without risks as they may distort the market and harm competition, and should be well designed so that they are as efficient as possible and do not unduly distort competition. The OECD Principles for Integrity in Public Procurement can help ensure good governance.

### *Fostering a dynamic business sector*

23. The contribution of enterprises to innovation is crucial, and a dynamic business sector is a key source and channel of both technological and non-technological innovation. New companies are created to exploit technological or commercial opportunities which have been neglected by more established companies and bring them to market. A policy environment that fosters the start-up and growth of new firms is therefore critical to allow innovation to flourish.

24. An environment conducive to high-growth firms in particular – so-called gazelles – is needed, as they account for much of the job creation and dynamism of knowledge-based economies. These firms often face particular growth challenges such as in finding markets and partners abroad, raising substantial finance and modifying management practices. Policies that address these issues can often have a substantial economic benefit.

25. While entry and growth of new firms is important, so is their adaptability to changes in the economy and their ability to exit when necessary. New enterprises drive a large number of obsolete firms out of the market and often do not survive for long themselves. Evidence from OECD countries suggests that between 20% and 40% of entering firms fail within their first two years of life. The reallocation of resources to more efficient and innovative firms is key to innovation and economic growth.

26. Entrepreneurship in existing firms is crucial too: empirical evidence shows that well-managed firms excel in productivity, profitability and sales growth. Rewarding successful managers and enhancing training of entrepreneurs and managers are among the approaches that governments can follow to improve entrepreneurship within firms. Yet there are many important constraints to the expansion of innovative firms, ranging from financing constraints to the availability of information on market and collaboration opportunities and investment in human capital.

27. Entrepreneurship is not solely a profit-seeking enterprise: it can also help provide innovative solutions to unsolved social problems. The phenomenon of social entrepreneurship is developing at a fast pace in many countries, and often goes hand-in-hand with social innovation. Given its important social benefits, the activity deserves stronger public attention and more appropriate institutional arrangements.

28. Governments can help invigorate the business sector through the use public procurement. Indeed, they spend large shares of their revenues to contract out services from private firms. Innovation can decrease the costs of these services and have large benefits for society. This is even more important as large shares of contracting out take place in sectors with relatively high societal returns in terms of innovation such as the health, education or defence sectors.

#### Policy principle #4

##### **Foster a dynamic business sector and a culture of healthy risk-taking and creative activity.**

**Reduce red tape and the cost of firm creation and failure.** Both firm creation and destruction are indispensable for the experimentation process necessary for the development of new technologies and markets. Simplifying and reducing start-up regulations and administrative burdens can reduce the barriers to entry. Since firms entering the market may know little about their chances to survive, costly exit also discourages firms from entering the market. Bankruptcy laws can be made less punitive to entrepreneurs and should offer more favourable conditions for the survival and restructuring of ailing businesses in certain countries.

**Review tax systems to ensure they do not impede entrepreneurship.** Personal income tax, corporate income tax and social security contributions play an important role in decisions to move from dependent employment to establishing a business, and in the structure of such businesses (incorporated or unincorporated). Changes which provide more neutral tax treatment should be considered.

**Enable structural change.** Exit, in particular of large companies, can also prove difficult in economies where the scope for reallocation of resources is limited. Labour market policies should provide the flexibility and mobility that is needed to enable reallocation of resources from declining to innovative firms, and they should provide the support needed for life-long learning and the reskilling of workers who change jobs, as well as training opportunities for all.

**Lift obstacles to high-growth firms.** Low regulatory barriers can help ensure that gazelles and other high-growth firms don't spend the capital needed to support their growth on overcoming bureaucratic obstacles. Policy should address administrative, social and tax requirements that tend to rise with the size of the company, as these increase the cost of growth. This effect is further amplified when public support depends on firm size. Support with a strong focus on innovation, allocated on the basis of firm age, has been experimented in some countries and seems to be effective.

**Improve public services for entrepreneurs.** A simple and unified approach to government services is of great value. Governments should provide a "one-stop shop" approach, that concentrates all services in one location, or a "no-wrong-door" approach, where entrepreneurs will always be oriented towards the appropriate public service.

**Foster entrepreneurial education and managerial training.** Entrepreneurship relies on skills and attitudes that can be fostered from an early age through entrepreneurial education, as well as specific entrepreneurship and managerial training programmes. Governments should ensure that education and training systems equip people with entrepreneurial and managerial skills and should encourage a positive attitude towards entrepreneurship.

**Target innovative practices in government procurement.** When contracting out goods and services to be produced by the private sector, governments can foster more innovative practices, and support wider

goals through innovation in society. To ensure success, it is necessary that governments develop appropriate procurement policies and strengthen their capacity to make efficient and innovative procurement decisions.

**Improve the institutional framework for social enterprises.** An appropriate enabling environment is needed to support the development of the social enterprises sector. The impact of prevalent legal, financial and fiscal frameworks on social enterprises should be reviewed and unnecessary obstacles identified and removed. Capacity building, skills development programmes and networks for social entrepreneurs are also required.

### **Investing in innovation and reaping its returns**

29. Innovation requires a wide array of public and private investments: for infrastructure and networks that support innovation, as well as for R&D and other “intangibles”. However, private investment in innovation may be below a socially optimal level, mainly because returns are uncertain or the innovator cannot appropriate all the benefits of their investment. In some cases, private investment may not occur at all, especially in areas such as basic science, where the outputs often take considerable time to emerge and are not immediately marketable. Government therefore plays an important role in fostering investment in innovation, both public and private.

#### ***Investing in long-term research***

30. Although business funds a greater share of global R&D in comparison to government, public support for longer-term fundamental research in universities and public research organisations remains critical. It is key to developing new scientific and technological knowledge and the human capital that can lead to innovations to benefit the economy and society. By nature, this type of research has a long time horizon and uncertain returns. Indeed, while business continues to invest in some basic research, it continues to rely on public research for many of the seeds that can trigger innovation. This is also the case for pre-competitive and mission-oriented research, where the costs for firms are considered too high and governments seek to address public policy objectives such as health, energy security or defence. Governments may wish to consider funding mechanisms which promote multidisciplinary research (*e.g.*, across scientific fields and across ministry lines, along which budgets are usually allocated).

### **Policy Principle #5**

**Provide sufficient investment in an effective public research system and improve the governance of research institutions.**

Research institutions and higher education institutions should be governed in a way that enhances excellence, with better linkages to other innovation actors and stakeholders. This may include restructuring the institutional mechanisms for financing public research, to better facilitate funding of multidisciplinary research and of research that responds to user needs. It may also involve tying some funding more closely to societal objectives and missions such as sustainability and global challenges.

Governments should adapt mechanisms for financing research, for example by balancing competitively awarded project funding with other forms of funding, and giving greater autonomy to universities and public research organisations, enabling them to enhance quality.

***Mobilising private funding for innovation***

31. A further concern for governments in the financing of innovation has been “gaps” in capital markets, particularly the market for high-risk capital, which allows investors to pass along investments that have matured, re-liquify their assets and seek new investment opportunities. Investment in innovation carries uncertainty and risk, and often untried business models, and some countries lack instruments for providing funding to such projects. Traditional bank finance is of limited relevance to start-up or young innovative firms; instead, investors look to provide risk capital through equity and quasi-equity products, where they assume high risks but may also reap high rewards. On the other hand, bank finance tends to be critical in the vast majority of firms, particularly for technology upgrading (which is one of the main types of innovation).

32. Furthermore, innovation entails investment aimed at producing new knowledge and using it in various applications. It results from the interaction of a range of complementary assets which include research and development (R&D), but also software, skills, design, marketing and new organisational structures – many of which are essential for reaping the productivity gains and efficiencies from new technologies. These “intangible” assets are strategic factors for value creation by firms. Improved reporting of these assets would assist enterprises engaged in innovative activity, for example by enabling them to have better access to debt and equity finance. Competition in financial markets already encourages companies to improve their reporting and managerial practices for intellectual assets. However, best practices have not been widely disseminated across companies and jurisdictions. Likewise, the balanced tax treatment of private R&D can encourage this activity while ensuring that profits on the exploitation of R&D are taxed appropriately.

33. To address market failures, most governments have put in place specific, more targeted measures to encourage innovation, including tax relief for R&D, grants and public-private partnerships. Recent developments in this area aim at applying more market-friendly approaches that encourage competitive selection of investments that are likely to have the highest social return. This has been accompanied by a move away from unspecific, single-firm, project-based grants, to more sophisticated designs, in parallel with a rise in R&D tax incentives. Several governments are streamlining public support schemes with a view to increasing focus, delivery and impact. Public-private partnerships (P/PPs) are one example of market-friendly focusing devices that can offer a framework for the public and the private sectors to join forces in areas in which they have complementary interests but cannot act as efficiently alone.

**Policy principle #6**

**Mobilise private funding for innovation, by fostering well-functioning financial markets and easing access to finance for new firms, in particular for early stages of innovation. Encourage the diffusion of best practices in the reporting of intangible investments and develop market-friendly approaches to support innovation.**

**Foster well-developed financial markets.** Reform of financial markets needs to encourage a better balance between the search for return and prudence with regard to risk. Well-functioning venture capital markets and the securitisation of innovation-related assets (e.g. intellectual property) are key sources of finance for many innovative start-ups.

**Ease the access to finance for new and innovative small firms,** both with respect to debt (which is the prevalent source of external funding among all enterprises, including innovative ones) and equity finance. This is particularly important in the current crisis context.

**Address possible tax impediments to risk-taking.** Asymmetric tax treatment of gains and losses, as well as potential tax distortions which discourage business incorporation, may discourage healthy risk-

taking and stifle innovative business activity. Treatment of capital gains and losses realised on shares issued by innovative companies should be balanced so as to encourage equity investment in these firms.

**Support early-stage financing for innovation** as well as networks for venture capital and business angels. Seed capital and start-up financing such as business angel funds play a key role in enabling entrepreneurial individuals to turn new ideas into new products. Having access to these sources can provide more than just funding – they also help start-ups to develop as businesses, providing advice and potentially on-the-ground management expertise.

**Encourage the diffusion of best practices in financial reporting.** Governments need to encourage the diffusion of best practices already pioneered by advanced firms. Given the wide range of intellectual assets held by firms in different industries, and the comparatively early stage of development of reporting frameworks, the approach to improved disclosure should remain principles-based. This should contribute to making financial markets more efficient and improve the ability of firms to secure funding at lower cost.

**Develop market-friendly approaches to support business innovation that has high social returns.** Support for business innovation has a role in getting the business sector more actively involved in innovation, particularly where it helps meet public goals. Such support should be well-designed and market-friendly, based on competitive selection criteria, and regularly evaluated to ensure it is efficient.

### *Developing the knowledge infrastructure for innovation*

34. The capacity for innovation is dependent on the provision of sound and resilient scientific and technological infrastructure as well as on sophisticated platforms bundling technologies such as information and communications technologies (ICTs), biotechnologies and genomics, nanotechnologies, and others for an increasing number of breakthrough innovations. The Internet is a key example of a radical, general-purpose platform that has changed the conditions for innovation.

35. To foster innovation, policy should strengthen and enable the multiple platforms for innovation (infrastructure, ICTs, life sciences, engineering and others). It should also favour the joining up of different platforms and networks across industries for value creation and social progress.

#### **Policy principle #7**

**Ensure that a modern and reliable knowledge infrastructure that supports innovation is in place, accompanied by the regulatory frameworks which support open access to networks and competition in the market. Create a suitable policy and regulatory environment that allows for the responsible development of technologies and their convergence.**

**Promote ICTs as general purpose platforms for innovation and knowledge sharing.**

- **Uphold the open, free, decentralised and dynamic nature of the Internet.** Develop technical standards that enable it to expand and contribute to innovation, based on interoperability, participation and ease of access.
- **Foster the development of next-generation broadband networks and their use for innovation.** These provide a platform for the development and diffusion of smart infrastructures (energy, health, transport, education). Governments need to recognise this symbiotic relationship and ensure that broadband is universally available, allowing other sectors to leverage the infrastructure in developing other platforms and enabling the development of digital content. Such investments must be accompanied by regulatory frameworks which support open access to networks and competition in the market. Promote the use of the Internet and other ICT networks by all communities, as well as the creation of local content.

- **Integrate “smart” ICT solutions in physical infrastructure.** Governments should foster the integration of ICT investments into physical infrastructure investments, such as buildings, roads, transportation systems, health and electricity grids, allowing them to be “smart” and save energy, improve safety and adapt to new ideas. These infrastructures can also lower the barriers to entrepreneurial activities and provide means for the efficient and “green” delivery of energy, mobility and important social services – training, job search and networking.

**Foster the benefits of life sciences.** Policy should ensure that adequate infrastructural support is provided to foster sharing of and value creation from genomics and biological research. The regulatory environment for science should be flexible and not too burdensome, while protecting health, environmental safety and privacy.

**Enable the convergence of platforms.** New technologies are being combined into new innovation platforms joining many basic technologies. Although the precise uses of these platforms are not yet certain, policy makers should create a suitable policy and regulatory environment that allows for their responsible development, and ensure that inappropriate barriers to the convergence of technologies are avoided. In addition to regulations, publicly brokered technology platforms (e.g. industry led technology platforms, technology road-mapping initiatives) and consortia can bring public research, industry and civil society groups together to address challenges such as financing, infrastructure, and the risk and public acceptance of technology.

### *Making the most of knowledge*

36. The complexity of engaging in innovation – in particular at the frontier – has risen. Increasingly, innovations are achieved through the convergence of different realms and technologies (e.g. social sciences, microelectronics, engineering and life science technologies). Such innovations promise new added value but are risky, since business models are uncertain, costs are high and new potential competitors emerge in a very fluid business environment.

37. Thanks to decades of trade and investment liberalisation, markets have become more globalised, opening new opportunities, as well as intensifying the level of competition. Product life cycles have also shortened or are under pressure – owing to more intense and global competition and continued technological progress. This is forcing companies to innovate more quickly and develop goods and services more efficiently.

38. Innovators themselves have also narrowed their focus to those elements where they believe they have a competitive advantage. Confronted with intense global competition and rising R&D costs, companies are increasingly collaborating with external partners, notably suppliers and customers, but also public research organisations. The aim is to stay abreast of developments, expand their market reach, tap into a larger base of ideas and technology and get new goods or services to market before their competitors. These networks and ecosystems are increasingly global and involve both public and private research actors. Yet while the networks are increasingly global, they are built on local clusters of expertise. Making the most of knowledge depends on tapping into this expertise.

39. A range of countries have launched initiatives to link the public research base with foreign sources of knowledge, including via the internationalisation of higher education and public research organisations, allowing foreign firms and research institutions to participate in national research programmes under certain conditions. This raises the importance of ensuring regulations and enforcement of intellectual property rights (IPRs) in the context of international R&D partnerships.

40. As this practice of more collaborative innovation has spread, new forms of knowledge sharing and exchange between firms, individuals and institutions have grown. These collaborations are giving rise

to knowledge networks and markets. Using a number of different mechanisms and platforms, users and suppliers can pool or trade data, information, contacts and know-how. Innovative markets are still under development (patent auctions, funds, etc.) and policy may help address the lack of information on transactions and prices, ensure competition in markets that are often highly concentrated, and support standards development that can help improve the valuation of IP.

41. Knowledge is the key prerequisite for progress and value creation. Protection and enforcement of intellectual assets – most often codified as IPRs – are essential to ensuring investment in innovation, including international investment, which is particularly sensitive to the protection of intellectual property (IP). IPRs must be enforced and implemented in ways that minimise the potential for abuses and that respect the role of competition in stimulating innovation. At the same time, innovation is increasingly not only about the ownership and protection of IPRs, but also about its use as an intellectual asset to create value. Collaborative experiences under development rely on alternative mechanisms, like data sharing, open source, and others which, depending on the technological and economic context, can be very efficient in promoting innovation. Hence fostering knowledge networks and markets, licensing and other collaborative mechanisms may involve both commercial and non-commercial exchanges of knowledge and IPRs.

#### **Policy principle #8**

**Facilitate knowledge flows and foster the development of networks and markets which enable the creation, circulation and diffusion of knowledge.**

**Promote knowledge transfers.** Policy should remove barriers and regulations that limit the effective interaction between universities, firms and public laboratories and foster collaborative arrangements. For example, the mobility of researchers could be enhanced through reforms which make pensions portable across institutions. Policies on mutual recognition of degrees and qualifications should continue to be developed to facilitate the continued cross-border mobility of tertiary students and researchers. Regulations that govern public-private partnerships (P/PPs) should ensure sufficient autonomy and flexibility in the management and financing P/PPs. In addition, providing clear rules and training for technology transfer personnel is essential. Similarly, ensuring that researchers, public research institutions and higher education institutions have incentives and opportunities for collaborating with industry is important. In this context, research performance evaluation criteria should be adjusted to reflect the multiple missions of research institutions, including knowledge transfer where appropriate.

**Encourage value creation from intellectual assets.** Policies should encourage the use of and value creation from IPRs and non-IPR based mechanisms. A variety of collaborative mechanisms can facilitate access and use of protected and unprotected knowledge. This may require a differentiated regime which takes into account the specificities of particular sectors.

**Foster knowledge markets.** Policies should foster the development of “knowledge markets and networks” for both commercial and non-commercial exchanges. This will require improving market transparency and competition, and supporting standards development that can improve the valuation of IP.

**Protect and enforce intellectual property rights.** Adequate protection of IPRs provides important incentives to innovation, investment and trade.

**Ensure that patent systems promote innovation.** Co-operation between institutions with responsibility for patents systems and competition authorities should be strengthened, in order to ensure that patents are granted only to inventions with statutory conformity (so called “patent quality”), that patenting procedures are not abused and that patents are not used anti-competitively.



**Ensure an effective copyright regime.** Combine the enforcement of copyrights with innovative approaches which provide creators and rights holders with incentives to create and disseminate works in a manner that fosters creativity and meets users' needs.

**Foster participation in global networks** – To foster the development of cross-border networks, governments should consider opening up national public (support) programmes for foreign-owned firms. Such arrangements should ideally be based on reciprocity and supported by open markets. Likewise, the tax structure should enable cross-border transfers of intellectual property, both outbound and inbound, for example through a network of tax treaties, or flexible “foreign tax credit” rules designed to avoid double taxation of foreign income. Cross-country differences in regulation and commercial law (regarding notably licensing contracts) should also be reviewed from the perspective of facilitating cross-boundary deals.

### Applying innovation to address global challenges

42. A collaborative and global approach is needed to harness innovation to tackle key social and environmental challenges. The ability to address increasingly urgent issues such as climate change, health, food security and poverty indeed depends on stronger innovation and new forms of international collaboration. Different global challenges naturally call for a variety of approaches to support scientific and technical co-operation. Nevertheless, some common strategies are emerging which can accelerate the discovery and diffusion of innovation-driven solutions.

43. Proven co-operation strategies include joint investment in basic research; mapping of R&D needs; technology transfer initiatives; scholarships and fellowships for international researchers and students. But more concerted approaches are needed to accelerate technology development and diffusion by combining comparative strengths of different countries. This can help create economies of scale, reduce redundancies, pool budgets and create a common pool of knowledge, *e.g.* for the pre-competitive stages of research, which can be utilised by all firms and countries involved in technology development.

44. Addressing global challenges also requires the wide diffusion of technologies and innovative solutions. Developing countries, in particular, need access to technologies and an incentive to adopt them. Removing barriers that affect the transfer of technologies, including trade and investment barriers, is particularly important. In certain cases, other approaches may be needed too, *e.g.* encouraging and forging arrangements that grant free user rights of unutilised patents for development purposes, and facilitating the availability of critical technologies needed to address specific challenges facing developing countries, such as food security, infectious disease, and water and sanitation.

45. Enabling developing countries to generate their own innovations and solutions is also important. A good example is innovation to combat neglected infectious diseases. Since 2000, a number of important policy mechanisms have been introduced to spur health innovation for the developing world, including: advanced market commitments, Public Private Product Development Partnerships (PPDPs), patent buyouts, etc. Designed correctly, a combination of such push and pull mechanisms can facilitate the development of solutions aimed at the needs of developing countries.

46. Non-governmental and philanthropic organisations play an increasingly important role in addressing global challenges, such as health, access to water, or economic development. They typically have greater flexibility than governments and businesses and can bring the voice of consumers and stakeholders to bear on some of today's grand challenges. In some areas, such as health, philanthropic organisations (such as the Bill and Melinda Gates Foundation) play a key role in supporting research. They often influence government priorities by making their own research priorities highly visible so as to influence public choices.

**Policy principle #9**

**Improve international scientific and technological co-operation and technology transfer, including through the development of international mechanisms to finance innovation and share costs.**

**Improve international science and technology co-operation.** Proven co-operation strategies include joint investment in basic and pre-competitive research; mapping of R&D needs; technology transfer initiatives; and scholarships and fellowships for international researchers and students. But the current global challenges require more concerted approaches to accelerate technology development and diffusion that can help create economies of scale, reduce redundancies, and create a common pool of knowledge, e.g. for the pre-competitive stages of research. This may also involve mechanisms to share costs across countries and actors and engage in joint investments, such as the International Energy Agency's "Energy Technology Agreements".

**Foster international technology transfer,** e.g. by removing trade barriers that limit technology transfer across borders, as well as by developing mechanisms that enhance technology transfer (e.g. voluntary patent pools and other collaborative mechanisms for reducing transaction costs to use IP). Multilateral agreements can also be used to encourage technology transfer, allowing for the realisation of public objectives at least-cost (e.g. the Clean Development Mechanism). Academic partnerships and cross-border higher education can also facilitate technology transfers between universities, and lead to spillovers in the local innovation system.

**Use new financing mechanisms (e.g. risk sharing) to provide incentives for global and local innovations that can help address global challenges.** New modes of financing and managing innovation borrowed from the venture capital sector are being used by philanthropies and foundations to raise funding for research projects around global challenges. International public-private partnerships are another tool used by governments to address financing gaps in the areas of infrastructure, research or technology development.

**Develop the appropriate international platforms and fora to support the mobilisation of innovation for global challenges.** International technology platforms and consortia, bringing together firms and national governments, can help address issues, such as standard-setting and technological deployment, that arise when developing innovative solutions to problems that cross markets and borders.

**Increase the involvement of the private sector, non-governmental organisations, philanthropic organisations** and other stakeholders in the prioritisation and delivery of science and innovation and in the development of policies to address global challenges.

***Tackling climate change through innovation***

47. Climate change is one of the biggest challenges of our time, and one which can only be solved collectively. Innovation can reduce the economic costs of climate change by putting economies on growth paths that are cleaner and produce fewer greenhouse gases. This requires major progress in development and deployment of new technologies. Better use of existing knowledge and technologies, across sectoral boundaries, also offers important opportunities to address this and other global challenges.

48. A wide range of policy actions will be needed to mobilise innovation to address climate change. Setting a price for carbon emissions (both fiscal measures such as a carbon tax and through cap-and-trade mechanisms for polluting industries) and the provision of targeted R&D support for mitigation technologies by governments can be particularly effective in inciting innovation in climate change mitigation technologies. Encouraging a wide range of eco-innovations throughout the economy can further enhance efficiency in resource use and help in developing more sustainable production and consumption. More generally, in order to encourage innovation, it is important to provide a stable and long-term policy horizon for investors. This is particularly important for "breakthrough" technologies with a long planning horizon.

### Policy principle #10

**Provide a stable policy regime which provides flexibility and incentives to address global challenges through innovation, and encourages invention and the adoption of cost-effective and environmentally friendly technologies.**

**Use economic instruments to get prices right.** Better pricing will be one of the best triggers for the development and diffusion of green technologies and new forms of sustainable production and consumption. Tax policies or other economic instruments can provide such a signal and can foster markets for new innovative solutions in areas where there are important externalities. Removing environmentally harmful subsidies also provides a powerful incentive in the case of climate change. Ensure that long-term research and innovation measures provide complementary support where markets do not provide solutions.

**Use policies which give the private sector incentives to identify the most promising means of addressing environmental problems through innovation.** This will involve providing a flexible policy regime which encourages innovators to “search” for the most innovative technologies and solutions, and adopters to invest in cost-effective technologies.

**Target policy instruments as directly as possible to the policy objective.** This will ensure that resources are devoted to finding the solutions to the problems themselves, rather than some indirect “proxy”. For instance, a tax on carbon will be more effective at inducing optimal innovation paths than a tax on fuel use.

**Provide stable policy signals.** Since many of the investments needed to address climate change involve significant up-front investments, it is important to give potential innovators (and adopters) a stable and credible long-term policy horizon in order to bear the risk of undertaking such investments.

### *Mobilising innovation for development*

49. Likewise, innovation must be better mobilised to propel development and prosperity in the poorest regions of the world. Low-income countries face greater difficulties in mobilising foreign direct investment, trade and human capital, which are needed to make innovation the engine of development. Not only are there barriers such as poor framework conditions, and limited human and social capital for producing, disseminating and using knowledge, there is also limited capacity in policy making for innovation. Frameworks and policies for innovation deserve greater attention in these countries, along with support from partner and donor countries.

50. It is important to encourage innovation in all of its forms, as well as to adapt existing technologies to address local social and economic needs. Particularly in many poor rural-based economies, farmers (and particularly women), the informal sector, small and medium-sized enterprises, and research centres do not interact in ways that accelerate the move beyond low value-added subsistence agriculture. It is essential to develop mechanisms that can add value to unprocessed raw materials, and promote value chains across diverse sectors related to food such as horticulture, processing, packaging, storage, transportation, safety, distribution systems and exports. In addition, providing affordable access to communications technologies is vital to access knowledge, trigger local innovations, and boost rural development beyond agriculture

51. Stimulating entrepreneurship and facilitating private sector development in developing countries should be high on the agenda, as they can promote the autonomy needed to turn opportunity into prosperity. These are important factors in developing capability, which need carefully tailored incentives and risk-sharing mechanisms supported by government. Donors can play a critical role in supporting

priority setting, but also in terms of operations and implementation. To make this happen, links between development policy and policies for innovation – and coherence between the two – need to be strengthened.

#### Policy principle #11

**To spur innovation as a tool for development, strengthen the foundations for innovation in low-income countries, including affordable access to modern technologies. Foster entrepreneurship, including in the informal economy, and enable entrepreneurs to experiment, invest and expand creative economic activities, particularly around agriculture.**

**Strengthen the foundations for innovation in low-income countries.** Policies should focus on enhancing educational attainment and strengthening framework conditions. Improving rural productivity also requires significant investments in basic infrastructure including transportation, rural energy, and irrigation.

**Foster entrepreneurship and agricultural productivity as drivers of innovation and poverty reduction.** Low-income countries, with support from donors, should seek to transform agriculture into a modern sector through a locally adapted approach where entrepreneurship, agricultural productivity, and value addition become drivers of poverty reduction and green growth. This entails linking research, university teaching, training, extension work, production, processing, packaging, safety standards, infrastructure, distribution systems, marketing, and exports in value chains. Policies should take account of the important role of women as drivers of growth in these economies, as well as the role played by the informal economy.

**Enable the use of ICTs as a key tool for innovation.** Policies should urgently address the need for affordable access to communications services for individuals, as well as broadband Internet connectivity for centres of learning, such as universities and technical colleges. Policy should support the creation of good land registration systems using digital technology to ensure land ownership or mobile banking that secures financial transactions, thereby boosting investments in agriculture and businesses. In this context, OECD countries could accelerate the transfer of ICT technology and intellectual property rights to low-income countries by pursuing policy coherence for development.

#### Improving the governance of policies for innovation

52. Innovation is increasingly central to addressing social, economic and environmental challenges. Putting innovation at the heart of government policies requires governments to develop a clear vision on the public policy goals it wishes to achieve with innovation. Common goals include enhancing economic growth and productivity, diversifying the economic structure and addressing social or global challenges. Developing such a vision often involves a wide range of stakeholders, to ensure that the goals are widely shared and supported by society.

53. The governance of policies for innovation is also crucial. An effective approach to innovation relies on policy coordination at the local, regional, national and international levels, and across a wide range of actors and government ministries – Science & Technology, Finance, Trade, Competition, Communication, Environment, Health, Regional Development, Foreign Affairs, Employment, Education, Transport, etc. In most cases, this implies involvement at the highest levels of governments to ensure that policies for innovation help achieve the main goals of society, along with effective institutional arrangements.

54. Yet, achieving co-ordination and coherence is a difficult challenge. Coherence involves not only co-ordination of simultaneous policy actions, but also an evaluation of their possible interactions with policies aimed at other objectives. For example, supporting the growth of young dynamic firms requires close coordination between innovation and entrepreneurship policies. Likewise, a closer integration of policies fostering innovation and a cleaner environment can help guide economies towards greater sustainability. In many cases, policies for innovation remain compartmentalised in different departments and agencies that face obstacles to co-operation. Many countries are moving towards a system in which responsibilities for policies for innovation are shared between the centre and the regions, with national governments often establishing frameworks, while regions work closer to the market.

55. The decision-making process is therefore crucial to balance the innovation needs of various actors in society, including businesses and citizens, ensure the effectiveness and sustainability of innovation policies. The budget process, as one of the main decision-making tools in government, can help focus and develop effective innovation policies. Multi-year budgeting can help develop a long term vision on innovation and secure funds on a multi-year basis, while performance budgeting can help put the goals of policies for innovation and their costs in the perspective of other policy goals of government.

56. Society is increasingly involved in decision making about innovation. Consumer demand is more urgently and immediately felt than ever before, as is societal demand for solutions to global and local challenges. Likewise, in many countries, the public is demanding a role in decisions relating to the adoption of new technologies, particularly when these challenge strongly-held values. Early-stage engagement with the public can play a key role in the acceptance of innovations, and can influence the applications derived from new technologies. And civil society's expectations for the good governance of innovation have heightened in the wake of the economic crisis. These multiple societal dimensions need to be better internalised in the development of policies that underpin innovation. Involving business in strategic priority setting of public research, for example through university board participation or industry/university councils and other public/private interfaces, can help improve accountability and relevance of research to the business sector.

57. In developing their policies, governments should also consider the need to adapt to evolution in the innovation process over time. Putting in place mechanisms that enable learning and policy development can help ensure that government is effective and efficient in meeting the needs of society in the field of innovation. Regular evaluation (*ex ante* and *ex post*) is important to ensure policies and instruments meet objectives and to provide feedback to policy design. Promoting coherence across ministries (and between regional and central government) through formal and systemic means (*e.g.* committees, councils) can help reduce the duplication, multiplication and incompatibility of innovation policy measures observed in some countries.

#### **Policy principle #12**

**Ensure policy coherence by treating innovation as a central component of government policy, with strong leadership at the highest political levels. Enable regional and local actors to foster innovation, while ensuring coordination across regions and with national efforts. Foster evidence-based decision making and policy accountability by recognising measurement as central to the innovation agenda.**

**Ensure policy coherence.** A whole-of-government approach to policies for innovation requires stable platforms for coordinating actions, a focus on policies with a medium and long-term perspective, and attention from policy makers at the highest level. It also involves coherence and complementarity between the local, regional and national levels.

**Enable innovation at the regional level.** National policy should enable regional actors to foster innovation in their own context, building on local strengths and established frameworks. Regional policies may help capture positive externalities by improving the efficiency with which partners interact and share knowledge and by strengthening their relationships. Regions may be able to work closer to the “market” by targeting locally-based stakeholders such as research and higher education institutions, specific sectors or types of firms.

**Involve stakeholders in policy development.** The growing range of stakeholders in the innovation process and the growing impact that innovation has on society increasingly requires the involvement of stakeholders in shaping policies for innovation. This can help to develop a shared vision of goals and can make policies more effective in meeting societal demands.

**Evaluate policies and improve their effectiveness.** Evaluation of policies is essential to enhance the effectiveness and efficiency of policies to foster innovation. Effective evaluation is also key for the legitimacy and credibility of government intervention in innovation processes. Improved approaches and methods for evaluation, including full transparency, are required to capture the broadening of innovation, as is better feedback of evaluation into the policy making process.

**Improve the measurement of innovation.** A better evidence base for policies to foster innovation will require progress on a wide range of measurements to capture investment in intangible assets, measure outputs and impacts and understand the process of innovation. Such efforts will require investments to enhance data infrastructure and linkages (see Box 1).

### *Improving the measurement of innovation*

58. Improving the measurement of innovation is critical for policy making. Sound measurement and evidence help policy makers evaluate the efficiency of their policies and spending, assess the contribution of innovation to achieving social and economic objectives and legitimise public intervention by enhancing public accountability. Yet, the current measures of innovation fall short and do not adequately take account of the key role that innovation plays in today’s economy. There is a need to go beyond aggregate numbers or indices, which do not adequately reflect the diversity and linkages surrounding innovation actors and processes.

59. The OECD and the research community are working to develop a new set of indicators to examine the broader notion of innovation and its link to economic performance and growth. This will require linking existing data sources and better use of internationally comparable data at the level of the firm, the individual and the organisation; additional collection; as well as a better understanding of currently unmeasured factors in the innovation process.

#### **Box 1. A Measurement Agenda for Innovation**

Improving the measures of innovation is critical for policy making and evaluation, and for promoting innovation in businesses, the public sector and society at large. The OECD and the research community are working to develop a new set of indicators to examine the broader notion of innovation – going beyond R&D – and its impact on economic and social performance. This will enable a better assessment a nation’s innovation potential; help provide a more accurate picture of the strengths and weaknesses in a country’s innovation system; and provide new tools for policy making and evaluation. Key actions for advancing the measurement agenda for innovation include:

**Measure investment in innovation.** Innovation results from a range of investments that go beyond R&D, such as software, training and new organisational structures, that now account for 5 to 12% of GDP. Measuring these investments is key to recognising that innovation is central to economic growth.

**Enhance the statistical infrastructure to measure innovation determinants and impacts.** A wide range of official statistics is already being produced and can be better exploited to measure the determinants and impacts of innovation. Turning this information into a valuable resource for policy will require improvements in data infrastructures, improved linkages between data sources and improved access to such data so they can be better explored.

**Measure innovation in the public sector.** With the public sector under pressure to improve service delivery and outcomes, and reduce costs, measuring public sector innovation and outcomes is critical. Measurement approaches developed for the business sector need to be clarified and redefined to apply to the public sector.

**Measure the outcomes of innovation.** To ensure that innovation is contributing to well-being and progress, there is a need to measure the economic and social impacts of innovation, such as its contribution to sustainability or to addressing a range of global challenges.

**Address new factors and drivers of innovation:** By nature, innovation implies new ways of creating value. Understanding the new dimensions of innovation will require flexible and adapted measurement tools. Emerging areas which require better measurement include user-driven innovation, enabling technologies, and innovation in the workplace.

### **The way forward: Implementing the policy principles**

60. Together, the broad principles outlined here provide a cross-cutting strategy for the development of policies that make innovation work for people and help meet the major challenges of the 21<sup>st</sup> century. They can be applied in different contexts and settings, taking account of specific strengths and needs. There are many challenges to this holistic approach, and the OECD is prepared to help governments and international groupings (*e.g.* G20, G8, and others) use these principles in the design of their approaches to finding national and global solutions through innovation. The Innovation Strategy will also contribute to the development of the OECD's Green Growth Strategy, requested by Ministers in 2009, and the OECD Project on Measuring the Progress of Societies. Implementing the OECD Innovation Strategy Principles will be an ongoing and evolving process, which will benefit from peer learning and an exchange of experiences for which the OECD is renowned.

61. In the coming months, the OECD will be developing a framework which provides operational advice and guidance to countries as they seek to implement the Principles, modelled on the approach used in the OECD's *Policy Framework for Investment*. It will also provide a compendium of indicators which can help monitor developments in the innovation landscape and implementation of the Principles by governments. The OECD also continues to stand ready to provide more targeted support to countries, through its participation in dedicated seminars, interministerial meetings, or in-depth national reviews of innovation policy.

## **Box 2. The OECD Innovation Strategy Policy Principles**

### **Empowering people to innovate**

1. Education and training systems should equip people with the foundations to learn and develop the broad range of skills needed for innovation in all of its forms, and with the flexibility to upgrade skills and adapt to changing market conditions. To foster an innovative workplace, ensure that employment regulations facilitate efficient organisational change. Enable consumers to be active participants in the innovation process.
2. Foster innovation in the public sector at all levels of government to enhance the delivery of public services, improve efficiency, coverage and equity, and reduce costs.

### **Anchoring the foundations of innovation**

3. Ensure that framework conditions are sound, conducive to innovation and mutually reinforcing.
4. Foster a dynamic business sector and a culture of healthy risk-taking and creative activity.

### **Investing in innovation and reaping its returns**

5. Provide sufficient investment in an effective public research system and improve the governance of research institutions.
6. Mobilise private funding for innovation, by fostering well-functioning financial markets and easing access to finance for new firms, in particular for early stages of innovation. Encourage the diffusion of best practices in the reporting of intangible investments and develop market-friendly approaches to support innovation.
7. Ensure that a modern and reliable knowledge infrastructure that supports innovation is in place, accompanied by the regulatory frameworks which support open access to networks and competition in the market. Create a suitable policy and regulatory environment that allows for the responsible development of technologies and their convergence.
8. Facilitate knowledge flows and foster the development of networks and markets which enable the creation, circulation and diffusion of knowledge.

### **Applying innovation to address global challenges**

9. Improve international scientific and technological co-operation and technology transfer, including through the development of international mechanisms to finance innovation and share costs.
10. Provide a stable policy regime which provides flexibility and incentives to address global challenges through innovation, and encourages invention and the adoption of cost-effective and environmentally friendly technologies.
11. To spur innovation as a tool for development, strengthen the foundations for innovation in low-income countries, including affordable access to modern technologies. Foster entrepreneurship, including in the informal economy, and enable entrepreneurs to experiment, invest and expand creative economic activities, particularly around agriculture.

### **Improving the governance of policies for innovation**

12. Ensure policy coherence by treating innovation as a central component of government policy, with strong leadership at the highest political levels. Enable regional and local actors to foster innovation, while ensuring coordination across regions and with national efforts. Foster evidence-based decision making and policy accountability by recognising measurement as central to the innovation agenda.