

Innovation Ecosystem Development: A Necessary Instrument to Escape the Mid-Income Trap

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Introduction

Successful economies, those ranked at the top of global competitiveness, show that coherent and overarching innovations in an economy, society and governance can ensure a revival of economic and societal dynamism. These countries placed innovation as their top priority and steered a decade of research and innovation of all framework conditions, the key inter-dependent elements that determine successful economies and societies.

In contrast, many mid-income countries today are stagnating, after a decade or two of economic growth, and losing competitiveness, while social tensions are rising. Which are the ingredients to launch them on the path of new growth and prosperity for their citizens?

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A Look in the Mirror

In a famous analysis of the origins of the first world war, the historian Christopher Clark describes how the old order in Europe, including the Russian and Ottoman Empires, collapsed through self-delusion of political elites, economic and military short-sightedness, policy incoherence and ideological propaganda in all major countries (Clark 2012).

These characteristics seem not altogether absent today from many mid-income countries, as is testified by increasing tensions in many countries once thought to be a shining new (liberal and social) democracy, economic stagnation or decline, corporatism and corruption, rising inequality, and societal turbulence as a consequence. Among many others, the principal reason for social upheaval that accompanies the mid-income trap may be that it frustrates the rightful hopes of many citizens for a better tomorrow. Instead of continuing reforms that brought them out of the poverty trap in the first place, governments of many mid-income countries favour the status quo and some even stoke tensions to maintain it. History has shown many times that this is counter-productive.

They fail to see that each level of economic development requires its own systemic reforms and they do not maintain a favourable climate for investments, which in turn leads to higher unemployment, particularly if birth rates are not declining sufficiently. This will also lead to the departure of the best minds, a decline in entrepreneurship, capital flight and decreasing foreign direct investment. According to the World Bank, the mid-income trap has many causes, different by country, but primarily results from a lack of investment in science and technology, education and the development of their own innovation ecosystems (World Bank 2011). These are the result of policy failures—a mid-income trap is homemade.

However, even if these conditions were fulfilled, there are other contextual conditions necessary for the outcomes of research to be transformed into new products and services and for these to reach the market. They are in the first place the rule of law, which together with the independency of the judiciary are two key conditions for citizens

and investors to trust in a political system and for an economically efficient allocation of public resources. Equally important are openness and collaboration with a variety of stakeholders in order to ensure creativity and serendipity in the public debate. Social inclusion has also recently been widely recognised as a key ingredient of successful economic transformation (Stiglitz 2012). Moreover, few companies can rely only on the global market as most need a solid home base too, in particular small- and medium-sized enterprises (SMEs).

This outcome of a successful first phase of economic and social modernisation is not inevitable, though it is an indication that public and corporate governance methods require incremental, and sometimes radical, innovation in order to prepare for and achieve the next leap forward. The so-called mid-income trap is a result of innovation failures: strengths and opportunities available or achievable are under-used or not developed because of a failure of systemic innovation. This requires new concepts and methods of governance in the public and private sectors alike. Contrary to neo-liberal economic theory, the role of government in innovation is crucial (Mazzucato 2013).

Ten years from now, these mid-income countries that progressed so well during the last two decades, partly thanks to intelligent policies and partly to globalisation, may be able to look back on a new era of growth and social progress—a time when rapid and continuous innovation changed almost everything, and for the better: the way people live, produce, consume, communicate and participate fully in their own societies and in the world. Like the word ‘progress’ a few decades ago, ‘innovation’ has become a magic word in today’s intellectual debates about global competition, job creation and a resource-efficient economy, balanced public budgets, demographic problems, improved education and public health, climate change consequences, and so on. Even more than in countries already top-ranked for competitiveness, innovation should be the first priority of governments in mid-income countries if they ever want to have a chance to narrow the gap. Given that other countries do not stand still, they will have to learn how to leap-frog ahead, a daunting but feasible challenge, as shown by some newcomers in the top leagues of innovation and competitiveness.

Economic and social innovations result not only from research and new technologies, but also from the right framework conditions for their uptake by entrepreneurs and by the people. The ultimate purpose of research is not a publication or a patent, which are often dormant; it should lead to new products or services and new ways of managing or governing to be meaningful. Universities and research centres can play a key role in this (Thoenig 2016). But it also needs self-critical, creative and holistic thinking, free and open interaction between different stakeholders, and cross-fertilisation between sciences. It is not a linear process—it cannot be planned—but it does require continuous attention to the framework conditions for it to flourish, as well as openness to the world (High Level Group [HLG] on Innovation Policy Management 2013).

A pre-condition for sustainable growth and innovation, often overlooked in eager electoral promises, is budgetary discipline, in order to avoid the death-end of debt-financed growth. It has become clear today that productive capacity and national income before the financial crisis was based too much on public and private debt. Coupled with the lack of oversight of the financial sector, which had been liberalised in a naïve belief in market efficiency, it has in fact led to rising inequality and stagnant welfare for a majority of citizens (Jacobs and Mazzucato 2016). Countries with a relatively weaker economy are likely to suffer more from these conceptual and policy failures than others.

The multiple effects of policy decisions often lead to unforeseen consequences and responses: it is usually more comforting for decision-makers to continue to operate with tested concepts and follow regulatory trajectories set out long ago than to experiment with new ones. Foresight and acting upon it is a widespread weakness in the boards and top management of corporations (Mostovicz et al. 2012). Equally, governments can get into serious political, economic and social trouble, which they can temporarily silence, but will erupt all the more disturbingly later.

A re-think of how to manage the complexities of the economy and society effectively is permanently needed. Specifically, there is a need to scrutinise the inter-dependent consequences of fundamental economic

and societal change such as digitalisation and globalisation continuously (Nägele 2015). Together, these shifts urgently require a redesign of policy and systems in order to promote the well-being of people, and to (re-)gain their trust and credibility, also by business.

Therefore, the free operation of the market of ideas is very important, as is an open connection to the flow of ideas globally. Innovation inevitably requires regular, open dialogue and consultation between stakeholders, who in a globalised world are, and need to be, in contact with peer groups elsewhere to remain up-to-date and creative. A country that isolates itself from contemporary communication technologies and the free flow of creativity, and indeed of criticism, which is the complement of creativity, will never catch up to the best performers.

Effective consultation is organised scepticism, which in turn leads to alignment of perspectives and interests. In an innovation process, constructive criticism ensures more effective problem solving. Therefore, experts with different multi-disciplinary and multi-experience backgrounds, and not just from the mid-income country itself, must be involved regularly in providing the inputs necessary for making decisions that are of high quality and socially acceptable. To do this, innovation ecosystems need to be developed.

The key challenge today is how to strategise and manage the complexity of macro-economic policies, including the interdependency with policies by other countries and the potential external effects of a country's own policies; research and technology developments, including potential modernisation of traditional sectors; sector regulatory frameworks that are technology neutral and stimulate resource efficiency; and societal needs, such as education, health, social protection and stakeholder engagement. It is an illusion to think that highly educated citizens in advanced societies with knowledge of the world will behave towards authority like illiterate farmers once did. Their interactive dynamic requires innovative processes to build competitive advantage out of new societal and ecological needs, demands and technological advances, and this requires continuous and transparent dialogue with all stakeholders.

Innovation ecosystem thinking and methodology helps to adapt to the fundamental and irreversible external changes that have become

apparent since the emergence of the fourth industrial revolution, driven by digitalisation. However, one must accept that innovation comes from a paradoxical process, combining the unknown, unconventional creativity, criticism of current conditions (such as climate degradation or inequality) and rigorous scientific method. Bureaucracy, in contrast, is about stable processes and control in large entities; however, the digital era requires the opposite: strategic flexibility, specific leadership skills and new organisational processes. These should not be limited to the business sector if rapid and cumulative effects are to be achieved: they must equally penetrate universities and research centres and government at all levels, from municipal to state.

It is by considering the limitations of current approaches in new contexts, but also by extracting successful elements of current approaches, that a new, competitive and socially accepted economic architecture can emerge. Thus, it must be part of a culture of innovation to accept experiments and managed risk in order to allow a widening and diversification of innovative products, services or processes and their application. Innovation demands a departure from a legalistic culture of power preservation towards a cooperative and result-oriented culture.

Mid-income countries are not lacking in capacity but they do have a serious problem relating to foresight, coherence of vision and policy, creating cumulative effects, and dysfunctional checks and balances in the governance system due to the political culture, organisational fragmentation, the persistence of multiple barriers to innovation in markets and the absence of a system approach. They often lack the right culture and governance tools to develop an ecosystem of innovation appropriate to the present challenges. As a result, attempts to implement innovation policy show few concrete effects on economic growth and significant research investments are wasted because they do not lead to new products and services in the market.

Therefore, a push is needed towards innovative paradigms and a focus on coaching and mentoring the available capacities to aid the emergence of an ecosystem of innovation in order to succeed in responding to present and future challenges.

The Concept of Innovation Ecosystems

An ecosystem is a complex of naturally interacting organisms, functioning with non-linear dynamics and feedbacks (HLG on Innovation Policy Management 2013). An innovation ecosystem aims to emulate nature in its organisational complexity and create the dynamics, interactions and feedbacks that produce desired outcomes, spin-offs and cumulative effects. Paradoxically, it requires parallel construction and deconstruction and creation of the right framework conditions, which can only be done through a holistic approach. Nevertheless, the effects may be uncertain at the start and appear to be marginal before developing their full potential.

Natural ecosystems evolve under the pressure of contextual change, or perish. Similarly, the creation of an ecosystem of innovation will be required and stimulated by external challenges that threaten the survival of achievements and of desired patterns. This can bring acceptance of the need for innovativeness if accompanied by clear identification and communication of the benefits upon success.

The key objective of developing an ecosystem of innovation is to create value for society, by enhancing the quality of life of its citizens and the competitiveness of its enterprises, through intelligent interaction between a variety of stakeholders, principally economic actors (large and small companies, often operating in symbiosis, and civic society organisations), public governance systems (at all levels), universities and other centres of education and knowledge.

Too often governments in mid-income countries push for development along traditional pathways, overlooking the complexity of a new internal and external economic and social context. Instead of 'courageous thinking outside the box', they continue to muddle through. Corporations that grew up during the first phase of economic modernisation all too often fail to design innovative strategies to position themselves better in global markets, and to learn to compete in the most advanced ones.

Value creation should start from a wide concept of demand and forecasting of known future needs. This can come from the needs

of industry to find solutions to specific problems in their value chain (such as resource efficiency) or from continuously emerging and changing societal needs (such as quality of living). Innovation will also often come through the involvement of stakeholders (co-creation). In certain cases, however, such as in public administrations, push and pull will be required in order to avoid a less efficient use of opportunities or outright opposition to change.

Demand-driven value creation requires permanent creativity, openness and agility, scanning of the global context, scouting for opportunities, and attention to continuities or discontinuities. The emergence of novel concepts or processes, products or services is often the result of out-of-the-box thinking, improvisation, repeated trial and error, and the emergence of new tacit and explicit knowledge until some form of consolidation takes place. Demand-driven value creation sometimes does not even imply a new product, but rather modernisation of existing consumption methods through digitalisation.

Clear and consistent leadership from the top is needed to create the framework conditions to facilitate other actors, primarily companies and centres of knowledge, to develop and manage the dynamic interactions that lead to measurable innovation and added value creation.

The steps in the following sections should be considered to start building an innovation ecosystem that will have a better chance to succeed in delivering results.

Assessment of Paradigm Shifts

To correctly assess deep changes is the first but difficult task in business and government because of a tendency to make comparisons with the past instead of focusing on the future through foresight. Professional foresight is a trans-disciplinary approach that seeks to improve the ability to anticipate, create and manage change in a variety of domains (scientific, technological, environmental, economic, cultural and societal), on a variety of scales (personal, organisational, societal, local, national and global) and through a variety of methods.

Its overarching objective is to permanently and comprehensively establish anticipatory thinking and a reflective handling of uncertainty in government institutions. This requires changes in the culture of an organisation and the processes of communication (Freuding et al. 2013). It is therefore essential to develop a realistic cognitive map, based on an assessment of the interacting developments. This must be done externally, through a network of centres of knowledge.

The resulting scan of innovation challenges for a mid-income country should be formulated to be solution neutral, enabling the emergence of creative ideas, which are the embryonic solutions, the potential impact of which can then be further analysed and used for strategy and scenario development. This will avoid future innovation efforts being determined by tactical considerations. Foresight helps governments to improve political decision-making by taking into account long-term and uncertain developments, deriving strategies for governments from the knowledge and insights acquired. It can be particularly useful to ensure policy coherence and strategy planning. Radical innovations spread to and cross-fertilise with other sectors of the economy; this changes the conditions of social life and inevitably of governance (Perez 1998).

The scientific and technological drivers of the present industrial revolution are multiple and have, just as before, known and unknown interdependent effects. They require deeply innovative governance methods for mentoring and monitoring these developments and for creating the framework conditions to ensure that resulting market developments are a force for the 'common good'. This in turn demands interdependent system changes and—very important to avoid new derailments—new value developments (Dror 2015).

Thinking the Unthinkable

The mid-income trap and economic stagnation cannot be overcome using an incremental approach, but rather only by utilising a radical approach in order to leapfrog and achieve mutation of traditional, early-stage development trajectories. This is not just the case when trying to

catch up in sectors of high innovation and rapid productivity growth, but also in traditional sectors where competitive advantage can be found (Malerba 2004). It is also obvious in public governance, where policies and accumulated rules, which are often outdated, are the main cause of a lack of competitiveness.

Countries must look at their own strengths and weaknesses and not simply try to imitate others (OECD 2007). For example, a high-tech cluster such as Silicon Valley flourishes because of particular contextual conditions that are very difficult or impossible to copy. Mid-income countries should look at their own historic, geopolitical, cultural, economic, research, education, labour market and other conditions and develop their own niche clusters with regional or global reach. Successful innovation clusters are urban or regional focused and internationally networked; therefore, city and regional governments also play an important role. This requires a certain degree of decentralisation, and in large countries a sufficient degree of regional autonomy must exist.

In any governance system there is a risk that the established underlying policy paradigms will dominate critical re-examination in view of fundamental contextual shifts. Therefore, a zero-based approach is needed to respond to the paradigm shifts and to challenge conventional wisdom about who should proceed and how in order to achieve results. The inter-relationship between national, regional and municipal governments, business and centres of knowledge is central to value creation. To achieve a higher degree of innovativeness, there should be more clear distinction between governance functions that are essentially routine and those where innovation is the priority.

Independent Impact Assessment

Following these steps, draft policies and regulations must be based on comprehensive evidence to be effective and be adhered to. A significant effort to ensure continuous independent impact assessments should be made, reviewing whether regulatory trajectories decided long ago have delivered desired outcomes and are therefore in need of change, taking into account feedback from industry and society, new scientific and

technological developments, and effects on competitiveness; it is equally important to deal with rapidly developing technology and new regulatory frameworks.

Independent impact assessment is a very useful instrument to prevent unintended collateral damage related to innovation, embed policies in economic and social realities, and radically improve policy coherence (HLG on Innovation Policy Management 2014). Impact assessments are most useful if carried out independently and continuously at every stage of the innovation process and in collaboration with stakeholders. They could be performed by a network of top research centres selected on the basis of excellence, and not necessarily only located in the relevant country. Such a network would boost research in all disciplines because the complexity of innovation systems requires a multi-disciplinary and multi-perspective approach.

An independent impact assessment institution or mechanism could therefore bring more effective and transparent policy-making, and could help uncover complex, interrelated effects of legislation on the economy and society. Impact assessments are particularly important in avoiding measures in one sector—or a lack of them—creating a domino effect in other sectors and negatively affecting macro-economic conditions.

Clear priorities for impact assessment need to be established upfront, such as policy and sector interfaces, and checking the impact on monetary and macro-economic policy; innovation and creation of a global competitive advantage; employment, research funding, potential outcomes and market access; welfare state mechanisms and their funding; regulatory stability; and long-term investments in many industry sectors. It should also evaluate the effects of rules and their application (or lack of) in other major economies, because this often creates competitive (dis)advantage, and of course the overall potential benefits measured against risks.

Strategic Capability Development

Innovation must primarily be demand driven, though in certain cases, such as public administrations, push and pull may be required in order

to avoid deficient use of opportunities or outright opposition to change. Demand can come from the need of industry to find solutions to specific problems in their value chain (such as resource efficiency, climate change adaptations), from continuously emerging and changing societal needs (such as quality of living, reduction of inequality) or from other elements in the ecosystem.

By focusing on a society's present and future needs, a culture of innovation will create value for business by facilitating new products, services and processes to enter the global market. In fact, value creation in a post-industrial and global economy should be seen as co-creation by key factors such as public authorities, business and academia, and occasionally other constructive stakeholders in the form of public-private partnerships or other collaborative mechanisms.

Sustainable value creation requires permanent strategic agility: openness to (global) context and emerging developments and attentiveness to continuities or discontinuities (Doz and Kosonen 2014). The emergence of novel concepts and products is often the result of improvisation, repeated trial and error, chance, or new tacit or explicit knowledge until some form of consolidation takes place. Innovation is a paradoxical process, combining the unknown, creativity and rigorous scientific method. It requires the opposite attitude from bureaucracy, which is about stable process and control in large entities; if this comes too early in innovation processes, it leads to inertia. Strategic agility requires specific leadership skills and organisational processes and these should not be limited to the business sector as they are also required in the governance sector at all levels.

Ensuring Policy and Strategy Coherence

Coherence is a key ingredient in creating cumulative effects in an innovation ecosystem. It demands an overall perspective to allow for radically new departures. Therefore, coherence cannot be provided with traditional coordination set-ups, which usually serve short-term interests.

Setting quantitative research spending objectives is insufficient when, in parallel, the policy focus is not placed on the long-term perspective

and qualitative targets. In order to tackle these limitations, and to innovate within the policy methodology itself to deliver coherent, mutually enforcing and effective innovation policies, three aspects must be taken into consideration: horizontal coherence (between public administrations), vertical coherence (between international, national and regional actors) and temporal coherence (long-term macro-economic stability).

In this context, the concept of innovation policy mix refers to the various policies relevant to innovation performance and the need for political coordination among multiple agents and governance levels involved in their formulation and implementation. Furthermore, neo-institutional theory has conceptualised the triple helix of university–business–government (Leyersdorf 2012). This model enables an analysis of the different dynamics at stake within and between these actors, which emerge at the national, regional and urban level.

Attention must also be given to de-synchronisation between governments who still act in accordance with national borders and businesses that follow European and global market opportunities. In order to ensure a focus on the mega-issues determined during the assessment phase—and avoid their premature absorption into policy-as-usual—and to create serendipity, an experimental attitude to reality and risk taking in the face of uncertainty, innovation must be coached centrally. It must be an overarching objective to which all others must converge.

Ensuring Stakeholder Engagement

Whatever the model, stakeholder engagement is crucial. To properly assess the paradigm shifts and align the various agendas, it is essential to involve the economic actors alongside the centres of knowledge because they often possess an understanding of market needs that is second to none. This demands development of a deliberation culture and tools that go beyond mechanistic stakeholder consultations in order to bring a shared vision and cooperation during implementation. For this reason, one should add society to the triple helix concept and speak of a quadruple helix (EU Commission 2015).

Research and centuries of experience show that there is a positive correlation between a society's degree of tolerance for the independent, creative and entrepreneurial minded and its economic success. To bring a scientific approach to all forms of risk requires consistent efforts of those in government, business and science to promote these values in the education systems and through the media, and enact reform of rules and accountability (Gretschmann 2016).

In order to align the contrasting—open and hidden—interests of a multitude of stakeholders, it is necessary to develop a learning mindset in all of them. Therefore, cross-disciplinary research and multi-experience inputs, as well as open-mindedness and incentives, and finally tolerant handling of failures, is necessary during the entire process of innovation ecosystem development.

In practice, more is needed: consistent and courageous leadership that is also sensitive to the requirements of a functioning innovation ecosystem and the continuously changing context. Leadership is often assumed yet seldom developed, but the complexity of ecosystem steering requires this. Needless to say, modern leadership and traditional hierarchical thinking do not go together.

Implementation

Clear leadership is also needed to overcome lack of commitment and subsequent fragmentation between traditionally defined policy domains. Once the conceptual phase and its various steps have passed, implementation becomes an issue that is often overlooked, leading to much frustration and ineffectiveness. The relations between different administrative units within government, as much as between them and the outside world, the different interfaces between politicians and civil servants, and, last but not least, capacity problems need to be urgently addressed in order to facilitate the emergence and functioning of an innovation ecosystem.

This requires attention to ensuring equal capabilities throughout governance systems of mid-income countries and a re-think of personnel

policy to ensure the required managerial qualities for a future leap forward. Education, vocational training and executive development in the public and private sector are a key element of success (HLG on Innovation Policy Management 2014).

Improving the role and use of ex-ante and ex-post evaluations can help a lot in improving internal learning, based on final impacts and not input indicators, and is an essential part of effective innovation policy-making. In order to be able to measure and compare the efficiency of policies, quantified targets relating to their implementation are needed.

Regulatory and Bureaucratic Burden Reduction

Innovation ecosystems require movement beyond a culture of regulation and control and towards a culture of mentoring and coaching of all stakeholders. Stewardship tools and coaching are more suited to promoting a culture of innovation and change among various actors than traditional command and control approaches (Kakabadse 2012).

The link between the competitiveness of countries and their regulatory environment is an increasingly important factor to look into when designing and implementing growth strategies. Not only do complex, obsolete, contradictory and sometimes unjustified regulations throw up artificial barriers to industry's research and development (R&D) efforts and end up hindering innovation processes, but they are also becoming a decisive factor for companies when determining the location of their investments in an interconnected economy where supply, production and innovation chains are global.

Rapid technological developments, open and expanding global markets, and ever-increasing access to information mean that regulations have to be under constant review and adapted to keep pace with the fast-moving world and facilitate innovation processes.

Effective regulatory reform has been defined as a "reform that increases private returns on investment by reducing net regulatory risks, costs or both" (World Bank/IFC 2009). The first point to consider is

the notion of 'net', as it underlines the need to change net costs (combination of all costs and risks), which would imply systemic, long-term, top-down and institutionalised strategies. If reform efforts only target selected costs and risk, they tend to be shorter-term, bottom-up and limited in scope. In other words, regulatory innovation must come hand-to-hand with a broader effort to innovate governance structures in order to set the right framework conditions for it to occur.

The second element to consider, deriving from the previous one, is the context for long-term change. Undertaking such deep and strategic reforms is a complex enterprise given the strong forces wanting to maintain status quo, in particular in bureaucracies. This is why certain 'framework' conditions must simultaneously be fulfilled to allow effective change.

Funding and Intellectual Property Protection

The protection of intellectual property (IPR) has a major impact on innovation and the growth of any economy (Greenhalgh and Rogers 2010). Companies in all sectors need to rely on a coherent system of IPR, which provides protection of their non-tangible assets at affordable prices, makes their registration, validation and renewal as simple as possible, and guarantees legal certainty and security. Overall, the protection of intellectual property needs to serve two purposes: protect intangible knowledge and skills from unauthorised exploitation in order to both adequately reward innovative ideas and discoveries and maintain and increase business' competitiveness and provide incentives for further investment in innovative R&D. Therefore, a solid and coherent patent system is necessary in order to guarantee firms the protection of their intellectual property at affordable prices, make the access to, and the process of, patent registration, validation and renewal as smooth, timesaving and economical as possible, and provide them with legal security and certainty through an effective litigation system and rigorous law enforcement against IPR infringement.

Cluster Development

Cluster policies should be based on market- and society-driven needs, but also on the identification of age-old indigenous skills, creativity, equipment, traditions and technologies upon which innovation clusters can rest. The evolution of clusters needs to be ensured from a bottom-up perspective rather than being artificially pushed from a top-down perspective. In particular, the fragmentation of cluster initiatives and funding modes, the limited internationalisation of clusters, and the unintended side effects of policies and regulations counter-productive to industrial cooperation and innovative activities need to be addressed (Arthurs 2009). In this context, the role and leverage of corporate locomotives and the symbiotic relations with SMEs need to be taken into consideration.

Evaluation

Regular peer review, scrutiny of processes and evaluation of achievements, or the lack thereof, by independent multi-stakeholder groups of experts are essential to ensure firmness of purpose and agility of methodologies. Experimenting with fundamentally new methods and abandoning or modifying programmes when they appear not to move fast enough towards tangible results must be a full part of an innovation ecosystem (HLG on Innovation Policy Management 2014).

Tolerance for failure must be included in evaluation approaches, provided the right efforts have been made of course, because without some form of controlled gambling there will not be sufficient innovation. This is a radical departure from the existing bureaucratic culture and requires strong leadership support, transparency and communication with stakeholders.

Evaluation is not only part of constant learning under circumstances of uncertainty, it will also help to develop a more constructive approach to risk management in the broadest sense. Learning capacities and risk acceptance are major characteristics of an innovation

ecosystem. They provide the basis for adjustments and often lead to additional innovativeness, and hence to better value creation and competitive advantage.

Benefits from Research and Innovation

Mid-income countries should be inspired by top performers, but should not try to copy them because they do not have the same systemic strengths. The country systems performing well in relation to innovation and competitiveness have some of the highest R&D expenditures and benefit from strong operational R&D networks, but a simple increase in R&D expenditure will not necessarily lead to growth and more quality jobs (Rasmussen 2016).

Creating the framework conditions in which entrepreneurs, citizens, governments and centres of knowledge regularly interact to deal with complexity through collaboration, competence, competition and communication to achieve concrete solutions, with a focus on people in the real world, is not only a task for public authorities. It also requires companies, and indeed others claiming to be stakeholders, such as universities or civic organisations, to improve the operational quality of their inputs in the policy and regulation debate; develop practical, day-to-day collaboration between all relevant actors in a multi-layered public governance; and seek management methods to work through the many complexities and contradictions in the present regulatory chain in order to build innovative frameworks that integrate multiple stakeholder demands, create alignment and still significantly reduce the burden on the economy (North 1990). This needs to be done without forgetting how to strengthen reputation and social capital (the license to operate) in the rapidly changing non-market context and with key political institutions, in order to ensure proportional regulatory approaches.

As noted previously, an innovation ecosystem model can be achieved through the systematic and radical deepening, widening and completion of traditional policies via the creation of innovative, collaborative governance models and methods. In order to guarantee the functioning of the system, a complete revision and continuous monitoring of the

methods, procedures and output of governance, as well as of the interaction between themselves and with other stakeholders, must be achieved. It requires creative and bold thinking, which is evidence-based and transparent, free from bureaucratic constraints and a one-sided focus on regulation, able to achieve innovative solutions and capable of addressing new challenges as well as developing alignment with stakeholders.

The Worldwide Governance Indicators project constructs aggregate indicators of broad dimensions of governance: accountability; political stability; government effectiveness; regulatory quality; rule of law; and control of corruption (World Bank 2011). The six aggregate indicators are based on 30 underlying data sources reporting the perceptions of governance from a large number of survey respondents and expert assessments worldwide. They show a strong correlation between the rule of law, a low level of corruption, accountable institutions, efficient decision-making and sustainable economic growth.

Just investing in research will not be enough if other framework conditions are not realised simultaneously, such as R&D coherence, development of a comprehensive strategy and reformation of the education system to provide the high-skill workers and top researchers that an advanced economy requires. The autonomy of universities to decide their own strategies is an important element, and so is vocational training through an efficient system of cooperation between business, technical schools and universities (Thoenig 2016).

Innovation and Economic Growth

Fundamentally, the output of an economy can grow by increasing the number of inputs entering the productive process, or by increasing how much output one gets from the same number of inputs.

The Organisation for Economic Co-operation and Development (OECD) has predicted that innovation will be “a crucial determinant of the global competitiveness of nations over the coming decade”. Countries that utilise opportunities offered by globalisation and new technologies—through efficient private sector and effective governance methods—can increase their competitiveness and domestic progress. In

general, successful execution of innovation enables countries to make full use of resources, and by turning innovative ideas into new products and services, they create growth, quality jobs and can address their societal challenges.

Since the mid-1990s many countries have increased their efforts to integrate innovation-based economic growth by boosting jobs in key technological and manufacturing sectors. There is a race for global innovation advantage and for attracting high value-added economic activities. It is important to fully understand the relationship between innovation and the evolution of industries. During its evolution, an industry undergoes a process of transformation that involves knowledge, technologies, earnings, the features and competences of actors, the types of products and processes, and the institutions (Malerba 2005). Countries successfully modernise up to a point, and then find themselves in the mid-income trap because the key drivers, government, business and universities do not sufficiently and rapidly adapt to the requirements of playing in a different league. Institutional inertia and vested interests often prevent reforms and further systemic innovation.

Advancing innovation to the forefront of economic policy necessitates implementation of efficient innovation strategies and modes of funding, reducing regulatory complexity and rigidity, facilitation of industrial cooperation and public–private cooperation, and moving into next-generation industries, which are supportive of a nation’s innovation ecosystem. Innovation has become the most important factor in a country’s ability to thrive in the technology-driven global economy.

R&D Investments and Innovation Performance

Science is closely linked to innovation activities, by not only providing inspiration for business, but also by framing guidance for policy-making. Since the mid-1990s, investments in knowledge have increased more rapidly than investments in equipment and machinery across most OECD countries. The economic crisis has now led to a decline in business and public expenditure on R&D in many (European) countries. It is essential to (re-)create an entrepreneur-friendly environment

to support a significant number of start-ups and new clusters. These need to be nurtured to ensure that as many as possible can scale-up.

Innovation and Employment

Innovation in advanced economies has nearly always been followed by growth but also by shifts of employment, pointing to a positive long-run economic impact. Innovation and entrepreneurship satisfy the twin conditions for a public good: the benefits of entrepreneurial activities spill over in the entire economy; and it is impractical and cost ineffective to collect money from those benefiting from initial entrepreneurial activities. This provides a strong case for using public funds to support and finance the basis of entrepreneurship, i.e. research. After all, it is not just the entrepreneur but the entire society that gain from these activities.

The direct and indirect effects of small business formation accounts for more than half of gross domestic product (GDP) and around 60–80% of the new jobs created in developed countries. A study by the European Union (EU) Commission found that 85% of the net new jobs in Europe between 2002 and 2010 were created by SMEs. Moreover, these have secondary and tertiary employment effects in the economy.

The positive effect of entrepreneurship on economic performance has been referred to as the ‘Schumpeter’ effect. New firms create jobs, leading to a subsequent decrease in unemployment (Rasmussen 2016). Entrepreneurs have a vital role in the early evolution of industries by introducing new products or processes and, in the long-term, enhancing productivity through increasing competition. New entrants in the market also create knowledge regarding what is technically viable and what consumers prefer by introducing variations of existing products and services.

Conclusion

Innovation is much more than research: it requires an overarching and radical approach, which should be rooted in an ecosystem-oriented thinking, to achieve the main goal of innovation policy management—the best living and working conditions for all citizens (Gretschmann and Schepers 2016).

Despite certain variances, comparisons find that the best performing countries in innovation factors are also among the countries with the strongest competitive performance. Evidence also suggests that efforts that countries undertake (their combined inputs) are rewarded in terms of improved innovation outputs and value-creating activities. Although there is no single way to achieve top innovation performance, certain similarities exist among the most innovative countries: efficient governance toolsets, innovation strategies and funding modes for start-up and scale-up, strengths in national research, transparent public–private collaboration and partnerships, and commercialisation of technological knowledge. R&D expenditure and well-targeted business accelerators have a significant impact on research output and quality as well as on companies' growth, job hiring and new-to-market product innovations. However, a simple increase in R&D spending may not necessarily lead to growth and quality jobs creation if other framework conditions are not fulfilled.

The economic impacts provide a strong rationale for a system redesign that reorients policies and funding modes towards fostering the growth of innovative firms and giving innovation a new momentum. Finally, there will be no efficient innovation ecosystem without equal innovation in governance methodologies and tools.

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