



# A Habitat for Entrepreneurship: Creating a Culture of Innovation

Trilogue Salzburg  
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Background Paper



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## Overview

This Background Paper will address how to create habitats for entrepreneurship that promote a culture of innovation and shared value, meaning an environment in which sustainable corporations and societies can flourish together. Modern, dynamic economies rely on innovative businesses to ensure economic stability and growth, as well as social progress and welfare. Both the environment in which entrepreneurs operate and the philosophy they follow to guide their work have a tremendous impact on the quality and volume of innovation that reaches the marketplace.

Diminishing resources and active civil societies have seen economic well-being and social well-being agendas converge. A once purely economic bottom line has been replaced in management reports with a more comprehensive assessment of enterprises' impact on the environment and on societies. Just as the "beyond GDP" debate for measuring economic success has taken into consideration social progress, a debate mirroring this framework has evolved in and around the private sector. The idea of creating shared value (CSV) through enterprise demonstrates the dovetail relationship between long-term competitive advantages and solving social problems. Both understanding the evidence base for what kind of business equates to sustainable, "good" business and expanding that empirical base are important. Corporate sustainability has become directly correlated with the well-being of more than just economic shareholders. Companies that do not understand the wider impacts of their operations and the needs of societies as a whole can lose out on consumer confidence, reputation and revenue in the longer run.

While policy makers are responsible for establishing a legal framework and the necessary infrastructure for innovation to take root, individuals and companies develop new ideas and grow these into popular goods and services. The entrepreneur's ability to convert new ideas into successful innovation is also highly influenced by psychological factors and the environment in which the entrepreneur operates.

Against this backdrop, the Trilogue Salzburg 2014 convenes political and corporate decision makers, artists and think tank representatives. Five original pieces of research on entrepreneurship and innovation were commissioned to prepare for the Trilogue Salzburg and are contained in this Background Paper. The authors tackle this year's conference topic, **A Habitat for Entrepreneurship: Creating a Culture of Innovation**, from a number of perspectives – ranging from macroeconomics, to enterprise level dynamics, to the individual perspective.

The first article, **Healthy Habitats for Entrepreneurship**, is designed to further the discussion on entrepreneurship and innovation. It creates a new framework for rethinking the relationship between these two issues and suggests how policy makers and civil society alike can create mutually reinforcing habitats for entrepreneurship. This article also distills a set of key takeaways from the four following documents.

**Benchmarking Innovation and Entrepreneurship in Selected OECD and BRICS Countries** highlights the economic and social importance of innovation and entrepreneurship and shows that over the last decade Brazil, Russia, India, China and South Africa have undergone a remarkable process of economic convergence with OECD economies. The authors conclude with a number of general remarks on how to strengthen innovation and entrepreneurship.

How entrepreneurial conditions can be established to foster entrepreneurial behavior and innovations at an individual or corporate level is the main focus of **Innovative Entrepreneurs and Companies – What Does it Mean for Societies?** This article develops appropriate instruments for enhancing entrepreneurial activities at each level. The challenges and countervailing measures lead to recommendations for national governments and companies.

The article **Enemies of Innovation – How to Improve Organizational Success and to Create Innovative Ecosystems?** analyzes Vienna, Berlin, London, Dublin, Silicon Valley, Shanghai and Tel Aviv based on their attractiveness to start-ups in order to address the question of how cities or regions can become centers of innovation and progress. It illustrates the influence of talent hubs that have a critical mass of expertise and know-how.

The fifth research paper focuses on the **Psychology of Entrepreneurship** in order to understand the psychological underpinnings of key entrepreneurial activities. The author describes several biological, neuropsychological and psychological facts about entrepreneurs and the implications those facts have for entrepreneurship.

The Background Paper is designed to hone in on the two issues that will be addressed during the conference sessions, namely **Art and Culture of Entrepreneurship: What type of spirit are we looking for?** and **A New Paradigm of Innovation: Which environment and conditions do we have to develop?** Both these sessions drive toward devising recommendations for how governments, enterprises and civil societies can create healthy habitats for entrepreneurship that promote a culture of innovation and shared value.

## Healthy Habitats for Entrepreneurship

Christal Morehouse | Martin Spilker

### I Introduction

Entrepreneurs are shaping economic and social change around the globe. Increasingly, economic competitiveness, social cohesion and the quality of life are co-determined by the businesses rooted in communities. Quality of life, jobs, productivity, innovation, sustainability, economic growth and life chances hang in the balance of which businesses exist, which enterprises are created, where they are established and how they are run. Healthy habitats for entrepreneurship for a culture of innovation and shared value should foster not only a good return on investment and economic success, but also social cohesion and sustainable development. They should aim at maximizing a bottom line that accounts for both financial and non-financial outcomes of their enterprise. For example, the bottom line should consider social and employee-related aspects, respect for human rights, environmental matters, anti-corruption issues, and workforce diversity. Such a bottom line will be referred to as a “genuine bottom line” in this paper.

Just as the beyond GDP debate for measuring economic success has taken into consideration social progress, a debate mirroring this framework has evolved in and around the private sector. The idea of *creating shared value* (CSV) through enterprise (Porter and Kramer 2006), demonstrates the dovetail relationship between long-term competitive advantages and solving social problems. In today’s world socially and environmentally irresponsible businesses don’t fare well economically in the long-term. Calculating the bottom line of business and (even the economic) value of companies goes beyond revenue and profits. Companies that do not understand the wider impacts of their operations and the needs of societies as a whole can lose out on consumer confidence, reputation and revenue in the longer run. The concept of “corporate sustainability,” meaning “the capacity of companies and organizations to remain productive over time and to safeguard their potential for long-term maintenance of profitability” (DVFA and efas 2014), increasingly depends on their positive interaction with, and impact on, society and the environment. Creating shared value through enterprise and investment is about companies looking beyond the shortest pathways to immediate profits. It requires businesses to innovate, troubleshoot and connect with communities. Businesses are increasingly moving from being stakeholder-driven to being transparent, accountable partners to societies that value sustainability.

In this paper healthy habitats for entrepreneurship for a culture of innovation and shared value refer to situations in which:

- legal and social environments are conducive to innovation and sustainable growth, and
- maximizing the genuine bottom line is a key aim of businesses.

Such healthy habitats rely on a complex set of interactions that can be thought of in three dimensions:

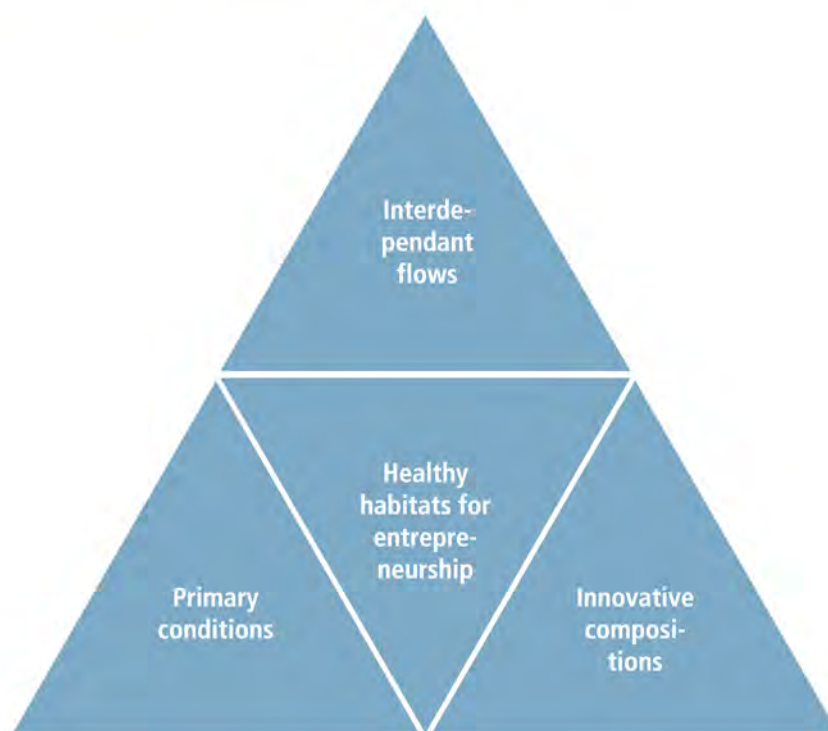
- **Interdependent flows:** This refers to the interactions between businesses and societies as a whole. Positive interdependent flows exist when businesses create shared value, and relationships between businesses and greater society foster innovation.
- **Primary conditions:** This refers to the legal framework in which businesses operate. Tax and subsidy regulations, access to capital, simplicity of bureaucratic procedures for



establishing and expanding businesses, and employers' access to talent are part of this dimension.

- **Innovative compositions:** This refers to the way businesses are organized internally. An enterprise's capacity to innovate is determined in large part by company culture, management and talent diversity.

#### Healthy habitats for entrepreneurship for a culture of innovation and shared value



Source: Authors.

This framework is not meant to be comprehensive, but to include key policy issues, corporate culture elements and business-community interaction that heavily influence the outcomes of entrepreneurship.

This paper answers the key question: how can governments, enterprises and societies create healthy habitats for entrepreneurship for a culture of innovation and shared value in light of their converging interests regarding sustainable economic and social well-being. It offers a vision for a healthy habitat for entrepreneurship that takes a holistic societal approach to understanding how entrepreneurship can become an integral part of social and economic vitality in a rapidly changing world. Drawing from the Trilogue Salzburg background papers, this paper looks at key data and trends from which this new concept was extrapolated. It concludes with recommendations that foster healthy habitats for entrepreneurship for a culture of innovation and shared value, which help sustain vibrant economies and societies.

## II Interdependent flows: Tackling social challenges as a core strategy

Interdependent flows form the pinnacle of the healthy habitats triangle. As Europe approaches a demographic tipping point, and its working-age population begins to contract (United Nations

2000), innovation as a key driver of economic growth becomes increasingly important. In the future, increases in productivity and ingenuity in respect to products, services and production will co-determine social and economic well-being. The educated human capital needed to drive knowledge-based societies take increasingly long to develop, and some natural resources are becoming increasingly scarce. In the context of prosperous, innovative societies and enterprises, many divisions between what is good for enterprise and what is advantageous for communities are deteriorating. Consumers and businesses lead and follow in the pursuit of long-term and sustainable prosperity. Innovative businesses are creating products consumers never imagined or demanded that enhance people's abilities to communicate, collaborate and innovate further. Smartphones and apps are just examples of this. Civil society is also demanding more accountability and responsibility from businesses regarding the conditions under which products are produced, as well as the environmental cost of production and terms-of-trade (for goods produced abroad).

Good business is the sum of many parts. Increasingly, revenue and profits are seen as one of several key outcomes that contribute to a business' total value, and as only one component of securing its continued success. The concept of creating shared value sets out three ways in which companies can be in "the black" (Shared Value Initiative 2014):

- "Reconceiving products and markets – Companies can meet social needs while better serving existing markets, accessing new ones, or lowering costs through innovation.
- Redefining productivity in the value chain – Companies can improve the quality, quantity, cost, and reliability of inputs and distribution while they simultaneously act as a steward for essential natural resources and drive economic and social development.
- Enabling local cluster development – Companies do not operate in isolation from their surroundings. To compete and thrive, for example, they need reliable local suppliers, a functioning infrastructure of roads and telecommunications, access to talent, and an effective and predictable legal system."

As political, social and economic leaders interpret trends and analyze forecasts, whole-of-society interests and business interest have increasingly begun to align. This is particularly true in economically, politically and socially secure contexts, and in contexts in which technological and product innovation are norms. The private sector has recognized a business interest in creating shared value at a time when:

- natural resource depletion has become an international concern,
- people around the world are widely communicating and are concerned about social needs that are not being met, and
- the level of skills required to create innovation rise, making such human resources scarce, even if labor as such remains abundant globally.

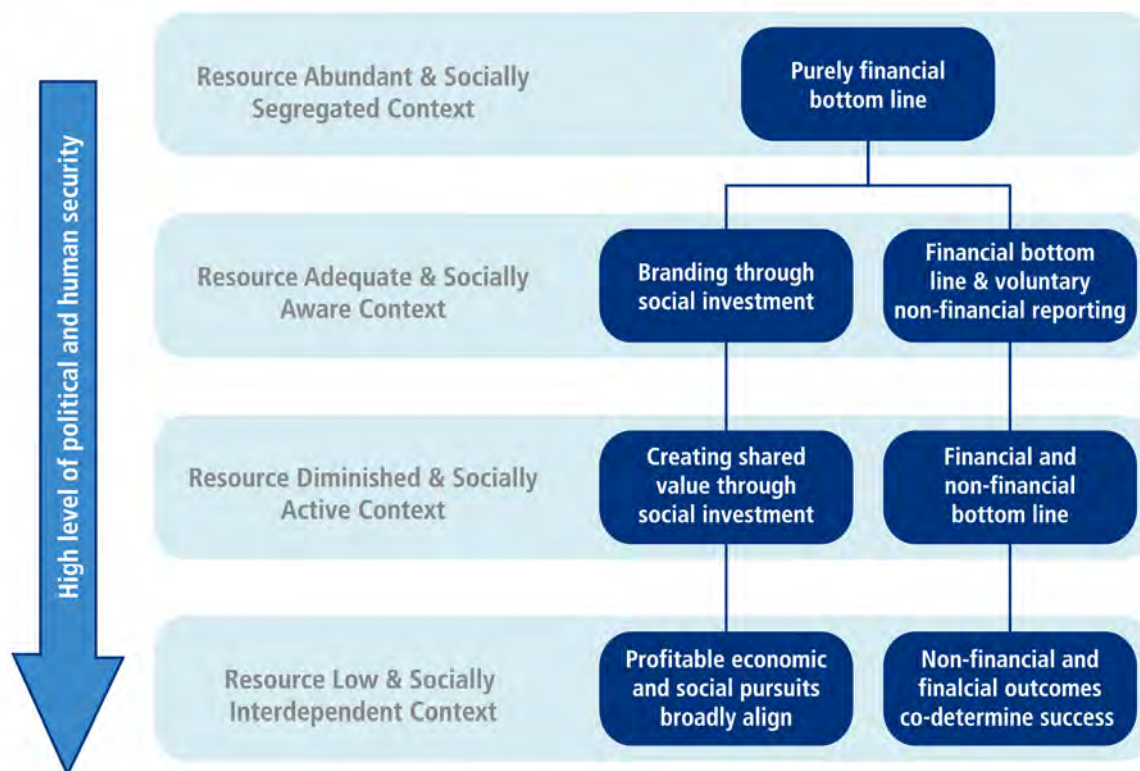
Simultaneously, civil society is becoming more active and interested in purchasing power, consumer decisions and job choices. One might label such a context of converging whole-of-society and business interests as "unified rationalism."<sup>1</sup> Common interest for sustainable prosperity mesh with rational decisions about what to produce, sell and consume, as well as the conditions under which "value" is undisputedly created. Value can only be undisputedly created when the value of what is produced is higher than the resources (natural and human) expended to produce

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<sup>1</sup> This term is unrelated to "economic rationalism."

goods and services. Unified rationalism is “unified” in its common concern for sustainable businesses and long-term prosperity. It is “rational” in its accounting of genuine financial and non-financial outcomes of enterprise. Regardless of how one defines such thinking, action along these lines is taking root around the globe, particularly in more developed settings, in which the basic needs of populations are being met and there is a high level of human security. Its continued development is dependent on political stability, human security and a critical mass of resource security. In absence of these and in a context of fear, both “unity” and “rationalism” (as described in the context of this paper) will likely not be possible.

#### Moving towards a genuine bottom line



Resource low refers to a situation in which an efficient and fair distribution of resources will satisfy the need for them. The arrow indicates the increasing relevance of security as resources become more scarce.

Source: Authors.

The interdependence of whole-of-society and enterprise additionally takes the form of employer to employee relationships. The changing nature of these relationships will be explored more fully later in this paper. The connection can be broadly described here as co-determined. Employers rely on the talented *individuals* they engage to create the ideas that lead to innovative products and services. Corporate culture plays a significant role in making the most of skills and talent in enterprises.

In the digital age, the power to “own” the means of production is widely distributed. Single entrepreneurs with great ideas lead industries, with companies trailing them. In other words, we have entered an age in which people, their ideas and their talent define enterprises, add value and co-determine which businesses will succeed, as never before. The growing mesh of business, social and economic interests for sustainable growth and prosperity can be thought of as a “melting pot for sustainable well-being.” We are just at the beginning of this emerging trend.

Tracking and understanding this development in the way companies increasingly see sustainable well-being as an integral part of doing profitable business is important in order to foster it. The EU has already identified smart, sustainable and inclusive growth as part of the Europe 2020 strategy. And a number of indicators and indices have emerged that track both macro-level economic developments and company-level trends that go beyond the bottom line of GDP, or purely financial profits, and look at the sustainable well-being of societies and enterprises. A few such macroeconomic initiatives are the:

- Human Development Index,
- European Quality of Life Survey,
- Happiness Index,
- Social Progress Index and
- OECD's Better Life Initiative.

For example, at the macro-economic level the OECD's Better Life Initiative has produced guidelines for measuring subjective well-being. It "aims to measure society's progress across eleven domains of well-being, ranging from income, jobs, health, skills and housing, through to civic engagement and the environment. Subjective well-being – i.e. how people think about and experience their lives – is an important component of this overall framework" (OECD 2013). The Third European Quality of Life Survey found that "the strongest predictors of well-being [in EU member states] were material deprivation, health, work–life balance and lack of time, and satisfaction with public services" (Eurofound 2013).

At the company-level annual management reports are the most prevalent benchmark of non-financial indicators, yet individual company reports are not aggregated and measured against each other. A number of standards and guidelines exist for social accounting, auditing and reporting. A notable initiative that has emerged is the Shared Value Initiative (SVI), which was created in the fall of 2012 at the Clinton Global Initiative. It "serves as a global knowledge and learning hub for companies and other stakeholders in SV strategies of practice" (Sharedvalue 2014).

Standard reporting procedures that go beyond the traditional bottom line of financial indicators for a company's success are slowly becoming standardized internationally. For example, on April 15, 2014, the European Parliament adopted the directive on disclosure of non-financial and diversity information by certain large companies and groups (European Commission 2014). This directive has its roots in the EU's corporate social responsibility strategy (European Commission 2011). The EU understands corporate social responsibility as companies taking responsibility for their impact on society. According to the EU directive on disclosure of non-financial and diversity information, "companies concerned will need to disclose information on policies, risks and outcomes as regards environmental matters, social and employee-related aspects, respect for human rights, anti-corruption and bribery issues, and diversity in their board of directors" (European Commission 2014). Companies with more than 500 employees will be obligated to comply.

Additionally, the World Bank Enterprise Surveys, "provide firm-level data from over 135,000 establishments in 135 countries."<sup>2</sup> The surveys give insights into the quality of the business environment internationally. The Gallup world poll allows for some additional insights relevant to well-being and enterprise.

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<sup>2</sup> <http://www.enterprisesurveys.org/>

The Bertelsmann Stiftung has launched creating a Corporate Responsibility Index (CRI), which aims to benchmark how corporate responsibility is managed in companies in Germany and to identify good practice in this area. It also aims to distill recommendations for how enterprises can improve their corporate responsibility engagements.<sup>3</sup> The index was published in 2014 for the first time.

### **Recommendations**

#### **Raise awareness about creating shared value in communities**

In a century yet unmarked by political philosophies and at a time when individualism is the dominant “-ism” in much of the developed world, it is important to raise awareness about the mutual responsibilities and interests shared by enterprise and the whole-of-society. This calls for better communication between civil society, governments and businesses concerning the needs communities have for investment and trouble-shooting the challenges they face. It also calls for enterprises to increase their interaction and exchange with local communities.

#### **Expand and interlink the evidence-base regarding sustainable economic and social well-being**

Sustainable well-being is currently measured by various indices, using a range of data and is measured at different economic levels (from individual companies to national economies to international contexts). Understanding what fosters progress towards sustainable economic and social well-being and which policies can accelerate such developments are becoming increasingly important to businesses and societies alike, as natural resources become more scarce and knowledge-economies require high-levels of slow-to-acquire-skills to fuel their enterprises. Therefore, both understanding the evidence base for what kind of business equates to sustainable, “good” business and expanding that empirical base are important. Such information can help enterprises, policy makers and communities alike observe how companies impact societies and vice versa, so they can work together to increase the genuine bottom line.

### **III Primary conditions: Fostering entrepreneurship in order to secure long-term social well-being**

Primary conditions form one foundation of the healthy habitats triangle. What defined German literature and art in the late 18<sup>th</sup> century, *Sturm and Drang*, could describe the dynamic nature of today’s rapidly changing global business landscapes, driven by technology and emerging markets. Entrepreneurs are a major force of economic and social change. In general, they think globally and seek out favorable conditions in which to operate. Where enterprises set up business, where they hire labor and where their supply chains are located impact employment levels and economies. Therefore, the ease of setting up and expanding business is an important ingredient of creating healthy habitats for entrepreneurship for a culture of innovation and shared value. Various indices and benchmarks attempt to measure the attractiveness of various economies around the world for doing business. For example, the Doing Business report contains 11 indicator clusters and covers 185 economies; it “provides objective measures of business regulations and their enforcement” and gauges these issues for small and medium-size companies (World Bank 2013). The 11 indicators are: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. In the “Ease of Doing Business” composite ranking for 2014, Singapore, Hong Kong, New Zealand, the US and Denmark topped the charts. Germany was

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<sup>3</sup> <http://www.cr-index.de/cri.html#ziele>

ranked 21<sup>st</sup> and Austria 30<sup>th</sup> worldwide, placing them comfortably among the top 20% of places to do business easily.<sup>4</sup>

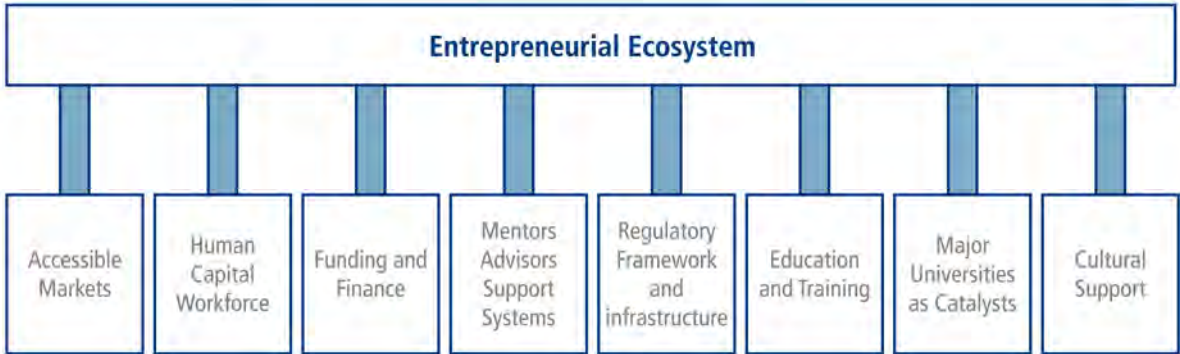
Ease of Doing Business Ranking 2014

Economy	Ease of Doing Business Rank	Economy	Ease of Doing Business Rank
Singapore	1	Taiwan, China	16
Hong Kong SAR, China	2	Lithuania	17
New Zealand	3	Thailand	18
United States	4	Canada	19
Denmark	5	Mauritius	20
Malaysia	6	Germany	21
Korea, Rep.	7	Estonia	22
Georgia	8	United Arab Emirates	23
Norway	9	Latvia	24
United Kingdom	10	Macedonia, FYR	25
Australia	11	Saudi Arabia	26
Finland	12	Japan	27
Iceland	13	Netherlands	28
Sweden	14	Switzerland	29
Ireland	15	Austria	30

Source: DVFA and Efas. Key Performance Indicators for Environmental, Social & Governance Issues. Frankfurt, 2014.

Approaching the issue from the perspective of entrepreneurs and early-stage companies, the World Economic Forum’s report Entrepreneurial Ecosystems Around the Globe and Company Growth Dynamics identified eight pillars that make up the “Entrepreneurial Ecosystem.” These are accessible markets; human capital workforce; funding and finance; mentors/advisors, support systems, regulatory framework and infrastructure; education and training; major universities as catalysts; and cultural support (World Economic Forum 2013). For each of these indicators the report defined data clusters that could benchmark each “pillar” for select cities, countries and regions. The report surveyed two groups of individuals in its analysis: individuals with extensive experience in early-stage companies, and founders and senior executives from 43 early-stage companies (World Economic Forum 2013).

Entrepreneurial Ecosystem



Source: World Economic Forum. Entrepreneurial Ecosystems Around the Globe and Company Growth Dynamics. Report Summary for the Annual Meeting of the New Champions 2013. Davos 2013.

<sup>4</sup> <http://www.doingbusiness.org/rankings>

The World Economic Forum's report concluded that regarding the availability of these eight "inputs" to enterprise, North America (minus Mexico), led by Silicon Valley, had the most favorable entrepreneurial ecosystem. Europe placed second regionally, followed by Australia and New Zealand in equal measure. The Middle East and Africa were fourth and Asia placed fifth. South America, Central America and Mexico came in last.

Start-ups have become a formidable force in the economic prosperity of economies. OECD data covering the first decade of this century have shown that in 15 countries "young businesses aged less than five years are the main source of new jobs" (OECD 2007). Looking at young businesses and particularly from a city perspective, several cities around the world have developed strategies to create entrepreneurial ecosystems and to attract start-ups. For example, Vienna has become a hub for young businesses. AustrianStartups<sup>5</sup> has fostered a vibrant community and ecosystem in Austria, and especially in Vienna, for entrepreneurs and new businesses. The Austrian Angel Investors Association and funds such as Speedinvest, or the Vienna-based incubator i5invest, have made more capital and funding available to entrepreneurs in Austria. The Viennese Pioneers Festival brings together start-ups, entrepreneurs and investors, and it raises the profile of such activity among the general population, as well as among policy makers. And the Austrian Wirtschaftsservice GmbH has set up a number of support initiatives for young companies in the country (Göllner and Kainz 2014). Berlin is another such city example. It is home to Rocket Internet, the world's largest internet incubator with a reference portfolio of over 100 companies (Göllner and Kainz 2014).<sup>6</sup> Rocket Internet refers to Berlin as "Europe's Silicon Valley."<sup>7</sup> Soundcloud, a music-sharing platform that has an estimated value of approximately \$700 million, is also Berlin-based. However, attracting capital is difficult in the country according to the German Startup Monitor 2013: "70 percent of all start-ups questioned state that obtaining venture capital is challenging in Berlin" (Göllner and Kainz 2014).

Both Austria and Germany offer relatively good entrepreneurial ecosystems, yet some policy fine-tuning could benefit both countries. One indication that start-ups still face too many barriers in these countries when compared to others is that many other countries outperform Germany and Austria in the "starting a business" indicator in the Doing Business Index for 2014: Germany was ranked 111<sup>th</sup> and Austria 138<sup>th</sup> (DVFA and Efas 2014).

In general, major product market regulation reforms in Europe took place over two decades ago. In international comparison, a few regulatory issues could be optimized in several OECD countries. For example, Germany is a country with complex regulatory procedures as compared with OECD countries, and the country "may be in need of an overhaul of their business license and permit system, which scores relatively poorly also when compared with that of some BRICS countries" (OECD 2007). Additionally, the access entrepreneurs have to funding could be improved: "According to the European Commission's Eurobarometer on Entrepreneurship, [access to funding] hinders 21 percent of all Europeans from becoming entrepreneurs" (Morner 2014).

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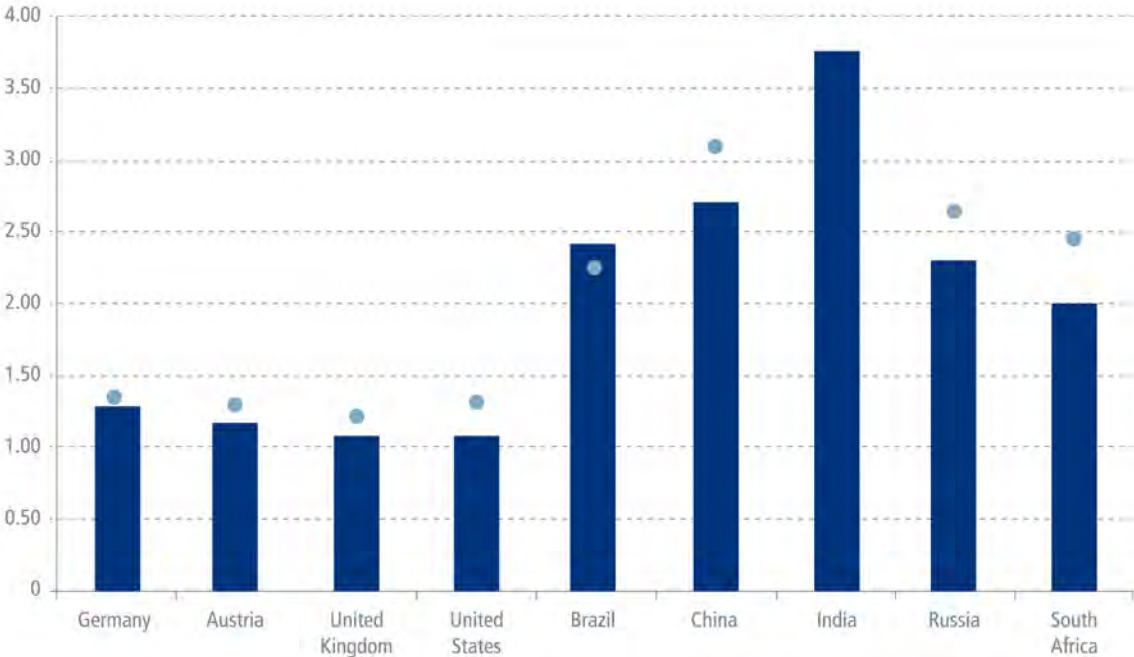
<sup>5</sup> AustrianStartups is a non-profit platform of, by and for the Austrian start-up community to increase its visibility and strengthen the entrepreneurial ecosystem. See: <http://www.austrianstartups.com/about-us/>

<sup>6</sup> See also: <http://www.rocket-internet.de/about-us>

<sup>7</sup> <http://www.rocket-internet.de/about-us>

Product market regulation (PMR) index, 2013 and 2008

Index value (0=most competitive; 6=least competitive)



The OECD Indicators of Product Market Regulation (PMR) are a comprehensive and internationally-comparable set of indicators that measure the degree to which policies promote or inhibit competition in areas of the product market where competition is viable. They measure the economy-wide regulatory and market environments in 34 OECD countries in (or around) 1998, 2003, 2008 and 2013, and in another set of non-OECD countries in 2013. They are consistent across time and countries. The indicators cover formal regulations in the following areas: state control of business enterprises; legal and administrative barriers to entrepreneurship; barriers to international trade and investment. Not all data are available for all countries for all years. Values for the United States refer to 2008 and 2003 respectively. Values for India are only available for 2008.

■ 2013 ■ 2008

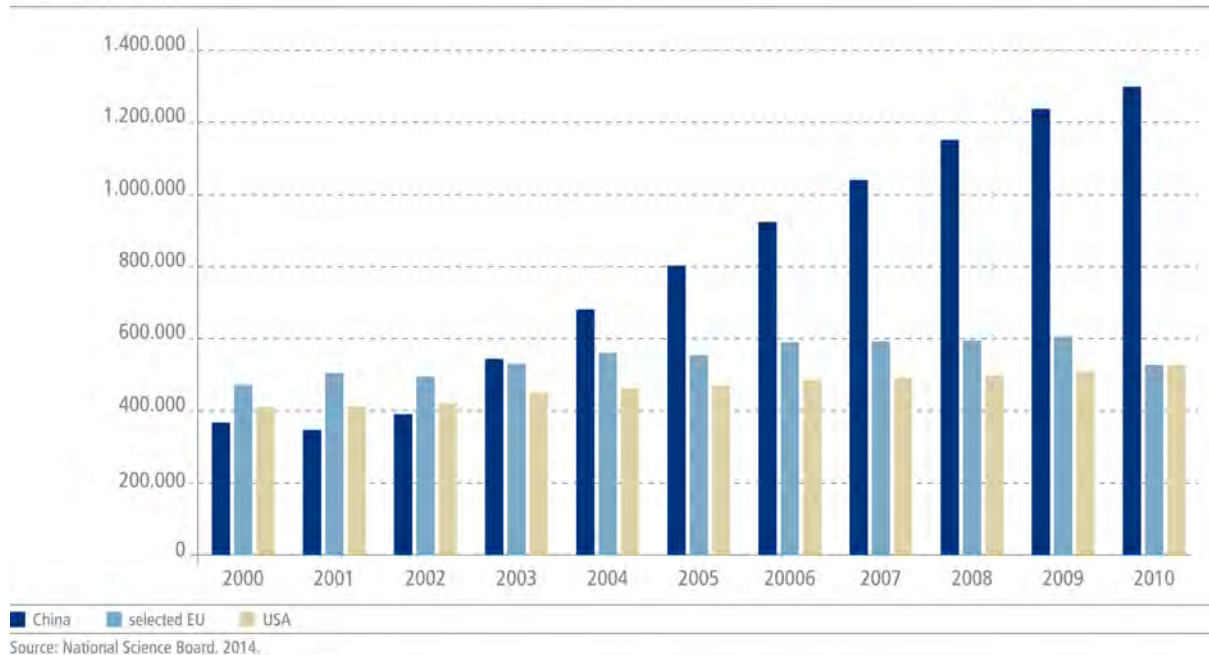
Source: OECD. Development Centre, Poverty Reduction and Social Development, Migration and the Brain Drain Phenomenon. Paris. 2007.

Beyond the availability of capital and regulatory issues, one of the major challenges businesses face is access to the kind of skills that drive innovation, jobs and growth. In the current economic climate, these are entrepreneurial talents, as well as science and engineering skills. And although there has been growth in the number of graduates in these areas, the global distribution of this talent is tipping toward China. The Science and Engineering Indicators 2014 report estimates that 5.5 million first university degrees in science and engineering were earned around the globe in 2010. The distribution of these degrees among regions was uneven: “Almost a quarter of those degrees were conferred in China (24 percent), 17 percent in the EU and 10 percent in the United States” (National Science Board 2014). The rate of increase in these types of degrees in the past decade has been strong in both the EU and the US, but only if one compares these regions to the world without China. For example, Germany doubled the number of science and engineering graduates between 2000 and 2010, from 67,000 to 139,000. The US grew its first-degree science and engineering holder cohort from 399,000 to 525,000. In the same period China more than tripled its stock of such first degree holders, from 359,000 to 1,300,000 degrees (National Science Board 2014). The rapid skill pool upgrade in science and engineering is historically unprecedented. This strong skill growth has to do with the share of students that opt for such studies: “Whereas 5 percent of all bachelor’s degrees awarded in the United States were in engineering, 31 percent of such degrees in China were in this field” (National Science Board 2014). China is likely to maintain its newly established position as the world’s leading source of new science and engineering graduates.



### Total numbers of first university degrees in science and engineering, 2000-2010

EU data from countries producing the largest cohorts: Germany, France, Italy, Spain, Poland and the UK. There is no data available for France for 2010



Employers in the United States anticipate talent shortages in areas like computer science. Initiatives like code.org, “a non-profit dedicated to expanding participation in computer science by making it available in more schools, and increasing participation by women and underrepresented students of color,”<sup>8</sup> are drawing attention to sectoral talent gaps and making an effort to remedy these. For example, they point out that there will be one million more computer science jobs than students by 2020.<sup>9</sup> The initiative reports that nine out of 10 schools in the US don’t even offer computer programming classes.

Additionally, entrepreneurship education is an area in which a high return on investment can be achieved in Europe: “Surveys suggest that between 15 percent and 20 percent of students who participate in a minicompany program in school will later start their own company” (Morner 2014). Yet such education remains relatively rare in schools around the globe.

<sup>8</sup> <http://code.org/about>

<sup>9</sup> <http://code.org/stats>

## **Recommendations**<sup>10</sup>

### **Foster entrepreneurial culture and skills in the population**

With entrepreneurship at a premium, it is important for policy to engender a culture and attitudes that are conducive to business creation. For example, the education system, the media and business support organizations can help foster entrepreneurial motivations. Similarly, adequate entrepreneurship skills – which include small business management skills, strategic skills and entrepreneurial traits – can help new entrepreneurs to succeed. This implies the need for a change in the curriculum, methodologies, structures and strategies in education and training systems to better import these skills.

### **Design adequate business financing policies**

Lack of external finance is one of the major problems affecting business innovation and entrepreneurship development. The problem is especially exacerbated in small and innovative enterprises. Small enterprises lack collateral and financial reporting that meets the standards required by banks. Innovative enterprises may paradoxically be considered more exposed to risks and uncertainty than non-innovative enterprises. Governments need to design policies that ease access to finance for innovative firms.

### **Make sure business regulations are not burdensome for business start-up and expansion**

Sound regulatory policy is essential to avoid excessive and burdensome regulations that impede business start-up and innovation. Importantly, unneeded regulations and inconsistency in the way regulations are applied are especially problematic for new and small firms, which have limited human and financial resources to deal with administrative requirements. Regulatory impact assessment can help gauge whether the benefits of regulations justify the costs.

Bankruptcy laws should not be punitive or prevent unsuccessful entrepreneurs from trying again. Evidence shows, in fact, that serial entrepreneurs are often the ones able to create fast-growing companies since, like any other job, business ownership also benefits from experience. At the same time, reforms in this direction should take possible cases of moral hazard into account.

## **IV Innovative compositions: Investing in the DNA of businesses**

Innovative compositions form the other foundation of the healthy habitats triangle. The DNA of a business can be thought of its internal structure and talent makeup. The way enterprises are organized and run have a huge impact on the outcomes of their investment. Efficiency and creativity can at times become tradeoffs; research and development take time and money, but when done well can allow companies to stay in business and be profitable. Perhaps counterintuitive, risk-taking can be the best recipe for securing long-term stability for companies that operate in dynamic environments, especially for long-standing businesses that may see products – that have been on the market for long periods of time – in limited demand.

Especially long-standing and established companies face the challenge of inertia; they may have attained a satisfactory performance level, but they must never “rest” there. The constant evaluation of their own behavior and the behaviors of their competitors causes stress on company leadership and staff. Competing in global markets means inventing and innovating, rather than making incremental improvements on existing products and services. The demands an enterprise faces can best be met if the internal composition of the enterprise is conducive to making the most of the

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<sup>10</sup> See Marchese and Thompson 2014.

talent it employs and if this talent is in an environment in which the sum of its interactions is greater than what each person could achieve on his or her own. Enterprises today must *invite disruption* into their operations; they must find ways to channel this disruption into innovation and to bring great ideas to market.

The jury is “in” regarding ways in which enterprises can enhance creativity and innovation from within. The prescription for enhancing innovation in companies amounts to a relatively clear set of targets, such as:

- foster creative thinking,
- open internal communication (including horizontal, non-hierarchical interaction),
- optimize cognitive distance (employ a pool of diverse thinkers),
- recognize and support intrinsic motivation,
- increase interdisciplinary teamwork,
- develop a culture of common knowledge and co-creation,
- allow for some self-organization,
- include external partners in some innovation processes,
- hire a complementary talent pool and a critical mass of “intrapreneurs”<sup>11</sup>, as well as
- empower a leadership that operates non-hierarchically and is open to taking smart risks, etc.

Perhaps the biggest challenge in sculpting enterprises into “forms” that have the internal structures and cultures (the DNA) that make the most of talent, as well as incubate, accelerate and implement innovation, is that for some employees innovation can be played as a zero-sum game. In particularly bad cases, introducing innovators into an enterprise can become a lose-lose proposition, in which creativity and motivation of the management and staff are mutually destroyed in an effort to prevent the withdrawal of hierarchical privileges, demotion or loss of “social standing.” The consequences of an “autoimmune” reaction to innovation, in which a company attacks and destroys itself from within, could be “fatal” for it, and detrimental to all its employees.

Managing the “social shifts” that thought leaders can incur on internal social orders is an important part of fostering innovation: “It is naïve to believe that management always has enough knowledge to adequately instruct and supervise innovative activities” (Morner 2014). In long-established, hierarchical company cultures, this means that fostering innovation can lead to internal winners and losers, even though, in total, innovation is not a zero-sum game, and should be a win-win proposition. But because of the power shifts innovators can cause within companies, barriers to innovation can be hard to identify and remove; the barriers may indeed be upheld by some employees who see themselves as potential “losers” in light of such innovations.

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<sup>11</sup> Intrapreneurs is a term given to those who seek challenges and opportunities deliberately and on their own initiative.

The innovation-leadership dilemma in hierarchical organizations

		Relevance of new ideas to an enterprise	
		Applicable creativity	Irrelevant inspiration
Idea "originator"	Entitled decision maker (high ideas conductivity)	<ul style="list-style-type: none"> <li>● High probability of idea-application and innovation</li> </ul>	<ul style="list-style-type: none"> <li>● Risk of spending resources on peripheral idea</li> <li>● Risk of hierarchical disruption</li> </ul>
	De facto thought leader without decision making powers (low ideas conductivity)	<ul style="list-style-type: none"> <li>● Risk of idea being lost, or falsely attributed</li> <li>● Risk of hierarchical disruption</li> </ul>	<ul style="list-style-type: none"> <li>● High probability that ideas will (rightly) not be pursued</li> </ul>

Hierarchical disruption refers to a power struggle, in which the role of the entitled decision maker is explicitly or implicitly put in question and negatively impacts operations.  
 Source: Authors.

The degree of hierarchy needed in organizations will vary, yet “heterarchy is necessary to involve all members of a company – independent of their position – into the knowledge generation of the company” (Pöppel 2014). Heterarchical structure could help avoid the negative outcomes of those described in the “innovation-leadership dilemma.”

Another major challenge is fostering “ideas diversity,” which is also referred to as cognitive distance. In other words, when companies become hubs for like-thinkers, they are likely to create lower levels of innovation; talking to ten people who have similar ideas is not much different than talking to one person. Ideas diversity is of particular importance in human resource planning and in executive compositions.

**Recommendation**

**Get out of innovation’s way and make the most of talent**

Fostering entrepreneurship in companies is as much about removing barriers to innovation as it is about creating the right incentives. Understanding the talent one employs and constructing company DNA that is innovation-friendly is key to fostering innovation from within enterprises.

## V Conclusions

Healthy habitats rely on a complex set of interactions that can be thought of in three dimensions:

- **Interdependent flows:** This refers to the interactions between businesses and societies as a whole. Positive interdependent flows exist when businesses create shared value, and relationships between businesses and greater society foster innovation.
- **Primary conditions:** This refers to the legal framework in which businesses operate. Tax and subsidy regulations, access to capital, simplicity of bureaucratic procedures for establishing and expanding businesses and employers' access to talent are part of this dimension.
- **Innovative compositions:** This refers to the way businesses are organized internally. An enterprise's capacity to innovate is determined in large part by company culture, management and talent diversity.

This paper has explored ways in which societies, governments and businesses can foster healthy habitats for entrepreneurship for a culture of innovation and shared value. The recommendations distilled from this analysis can be thought of in terms of policy recommendations and calls for action.

## VI Policy recommendations<sup>12</sup>

### Foster entrepreneurial culture and skills in the population

With entrepreneurship at a premium, it is important for policy to engender a culture and attitudes that are conducive to business creation. For example, the education system, the media and business support organizations can help foster entrepreneurial motivations. Similarly adequate entrepreneurship skills – which include small business management skills, strategic skills and entrepreneurial traits – can help new entrepreneurs to succeed. This implies the need for a change in the curriculum, methodologies, structures and strategies in education and training systems to better import these skills.

### Design adequate business financing policies

Lack of external finance is one of the major problems affecting business innovation and entrepreneurship development. The problem is especially exacerbated in small and innovative enterprises. Small enterprises lack collateral and financial reporting that meets the standards required by banks. Innovative enterprises may paradoxically be considered more exposed to risks and uncertainty than non-innovative enterprises. Governments need to design policies that ease access to finance for innovative firms.

### Make sure business regulations are not burdensome for business start-up and expansion

Sound regulatory policy is essential to avoid excessive and burdensome regulations that impede starting up businesses and innovation. It is important to note that, unneeded regulations and inconsistency in the way regulations are applied are especially heavy for new and small firms, which have restrained human and financial resources to deal with administrative requirements. Regulatory impact assessment can help gauge whether the benefits of regulations justify the costs.

Bankruptcy laws should not be punitive or prevent unsuccessful entrepreneurs from trying again. Evidence shows, in fact, that serial entrepreneurs are often those able to set out fast-growing

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<sup>12</sup> See Marchese and Thompson 2014.

companies since, like any other job, business ownership also benefits from experience. At the same time, reforms in this direction should be wary of possible cases of moral hazard.

## **VII Calls for action**

### **Raise awareness about creating shared value in communities**

In a century yet unmarked by political philosophies and at a time when individualism is the dominant “-ism” in much of the developed world, it is important to raise awareness about the mutual responsibilities and interests shared by enterprise and the whole-of-society. This calls for better communication between civil society, governments and businesses concerning the needs communities have for investment and trouble-shooting the challenges they face. It also calls for enterprises to increase their interaction and exchange with local communities.

### **Expand and interlink the evidence-base regarding sustainable economic and social well-being**

Sustainable well-being is currently measured by various indices, using a range of data and is measured at different economic levels (from individual companies to national economies to international contexts). Understanding what fosters progress towards sustainable economic and social well-being and which policies can accelerate such developments are becoming increasingly important to businesses and societies alike, as natural resources become more scarce and knowledge-economies require high-levels of slow-to-acquire-skills to fuel their enterprises. Therefore, both understanding the evidence base for what kind of business equates to sustainable, “good” business and expanding that empirical base are important. Such information can help enterprises, policy makers and communities alike observe how companies impact societies and vice versa, so they can work together to increase the genuine bottom line.

### **Get out of innovation’s way and make the most of talent**

Fostering entrepreneurship in companies is about as much about removing barriers to innovation as it is to creating the right incentives. Understanding the talent one employs and constructing company DNA that is innovation-friendly is key to fostering innovation from within enterprises.

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## Benchmarking Innovation and Entrepreneurship in Selected OECD and BRICS Countries

Marco Marchese | Stuart Thompson<sup>1</sup>

### I The economic and social importance of innovation and entrepreneurship

Innovation is a key driver of economic growth. This is especially true for advanced economies, where stagnating or declining populations narrow the scope for labor input to influence long-term economic growth. However, innovation is also relevant for emerging countries such as the BRICS (Brazil, Russia, India, China and South Africa)<sup>2</sup>, as investment in physical capital (e.g. machinery and equipment) faces diminishing returns and natural resources are “naturally” limited. If emerging economies are to improve labor productivity and accelerate economic convergence with the OECD area, they also need to invest more intensively in R&D and other forms of innovation. It is, for example, not surprising, that among the BRICS China is the country which has both invested the most in R&D and which has brought faster and further than any other BRICS member the process of economic convergence with the richest economies.

Innovation is fundamental not only to drive productivity growth but also to address global and social challenges, such as climate change and ageing populations. Market failures limit investments in the innovations needed to address these challenges. Governments can correct this by using the levers of tax policy – for example, through pricing carbon emissions and removing environmentally harmful subsidies – and by taking the lead and carrying out research in areas that are too uncertain and risky for firms to invest in.

The scale and complexity of global challenges means that they need to be addressed at the international level. This is possible today because, thanks to globalization, the innovation process has become increasingly collaborative across countries, economic sectors, and disciplinary fields. Clean energy technologies are a case in point (see Figure “The innovation-science link in clean technologies, 2000-2009), as patents in this technology field draw on scientific research from a range of disciplines, including material science, chemistry and physics.

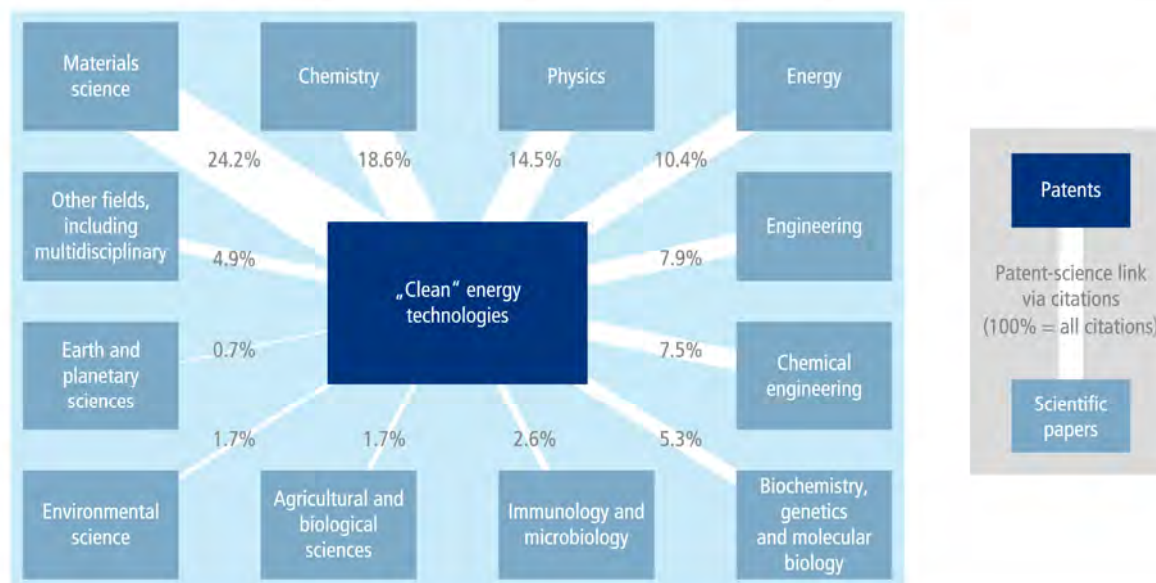
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<sup>1</sup> This paper has been prepared by Marco Marchese and Stuart Thompson of the OECD Centre for Entrepreneurship, SMEs and Local Development (CFE) with comments and inputs from Jonathan Potter of the CFE and Caroline Paunov of the OECD Directorate for Science, Technology and Industry (STI).

<sup>2</sup> Further information on these countries is available in the country pages of the OECD-World Bank Innovation Policy Platform: <http://www.innovationpolicyplatform.org/>

### The innovation-science link in clean energy technologies, 2000-2009

Share of scientific fields cited in total non-patent literature cited in patents for "clean" energy technologies



Source: OECD. OECD Science, Technology and Industry Scoreboard. OECD Publishing, Paris. 2011.

This makes the business innovation process different from the past, when it was the exclusive domain of corporate R&D labs, and stresses the importance of knowledge networks, especially for innovation among new and small firms; what has sometimes been termed "innovative entrepreneurship". Major sources of innovative entrepreneurship have, therefore, become formal and informal partnerships among similar-sized businesses; buyer-supplier relationships between large firms and SMEs; universities and research organizations through, technology licensing agreements, collaborative research and consultancies; governments, through intermediary organizations such as technology centers and incubators; and even consumers, through the growing role of the Internet, which allows for feedback on products and services. These changes have led analysts to talk of innovation in terms of an open process.

Collaborative and multidisciplinary innovation has grown in parallel with the rise of non-technological innovation, including innovations in the fields of marketing and organizational processes. Non-technological innovation is especially important in the services sector, and this has in turn resulted in an enlargement of the nature and scope of innovation policies. Investments in intangible assets<sup>3</sup> – which are closely related to non-technological innovation – have spurred growth in many OECD economies, since they have increasing returns to scale in production and generate knowledge spillovers that benefit the economy as a whole (OECD 2013a).<sup>4</sup>

<sup>3</sup> Intangible assets include R&D, but also other forms of innovative property (e.g. copyrights and designs), computerized information (e.g. software and databases), and economic competences (e.g. worker training, branding, market research and management consulting).

<sup>4</sup> Increasing returns mean that the costs incurred in producing knowledge is not re-incurred when re-using it. This is what makes investments in intangible assets different from investments in physical capital.

## Future radical innovations: the “greening” role of nanotechnologies

### What is it

One could describe green nanotechnology as a foundation for products and processes that are safe and have a low net environmental impact, being energy efficient, reducing waste, lessening greenhouse gas emissions and using renewable materials. Green nanotechnology can be seen as supporting the development of sustainable solutions to address global issues such as energy shortages and scarcity of clean water and being present in environmentally-sustainable manufacturing processes.

### Why it is important

Nanotechnology is an emerging technology and has a variety of possible applications, a large proportion of which will require further funding for pre-competitive research and development. Green nanotechnology is linked to other concepts such as green chemistry and sustainable and green engineering and manufacturing. Green nanotechnology can have multiple roles and impacts across the whole value chain of a product and can be of an enabling nature, being used as a tool to further support technology or product development. For example, nanotechnology can play bring key functionality to a product (e.g. nanotechnology-enabled batteries) or enable more sustainable manufacturing processes without the final product containing any nano-materials.

### Trends

The following areas can be seen as important applications of green nanotechnology:

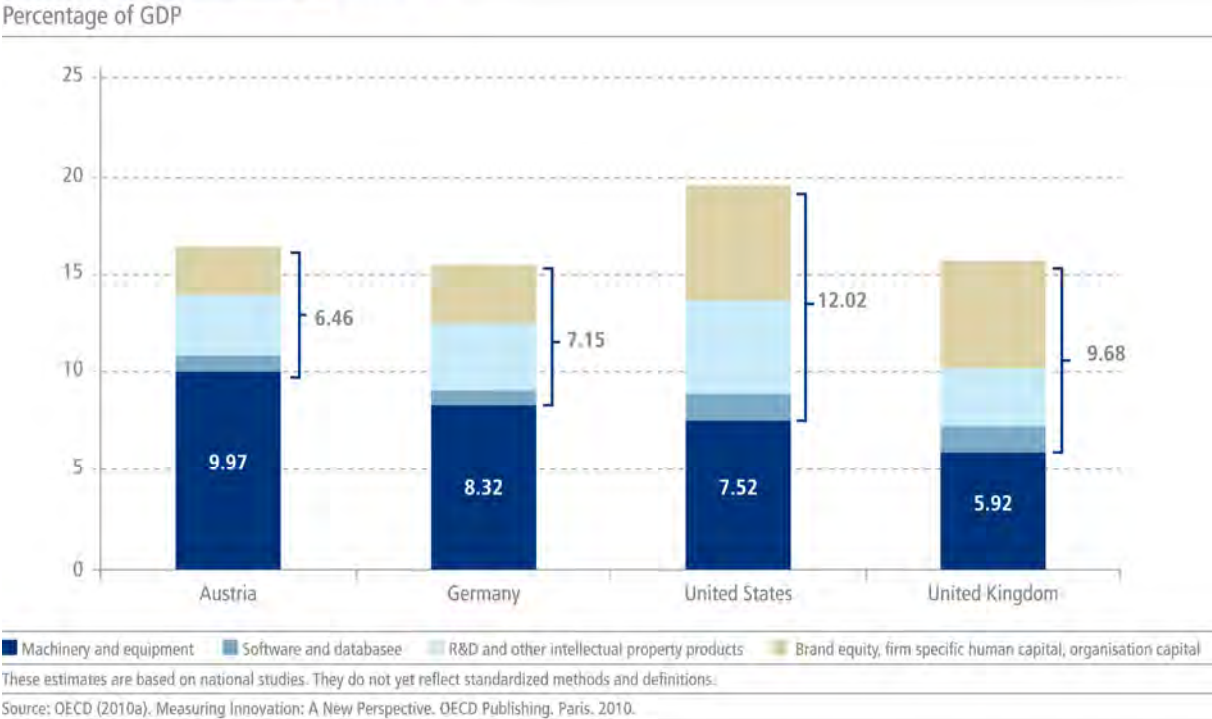
- *Solar cells* become more efficient as they get smaller and solar energy is a renewable resource. Nanotechnology is already used to provide improved performance coatings for photovoltaic (PV) and solar thermal panels. Hydrophobic and self-cleaning properties can combine to create more efficient solar panels, especially during inclement weather. PV covered with nanotechnology coatings could therefore stay cleaner for longer to ensure maximum energy efficiency is maintained.
- Nanotechnology offers the potential of novel nano-materials for the *treatment of surface water*, groundwater and wastewater contaminated by toxic metal ions, organic and inorganic solutes and microorganisms. Due to their unique activity toward contaminants, many nano-materials are under active research and development for use in water treatment.

### Policy Challenges

The key policy challenges in developing nanotechnology for green innovation are similar to those for any emerging technology: finding appropriate ways to ease the connection between research and development and commercialisation. Key areas for policy intervention include: a) continued investment in research and development; b) diminishing and sharing the costs of the development and commercialisation of green nanotechnology, including examination of external risks such as environmental health and safety, and ethical and social issues; c) support to prototyping and pilot manufacturing, noting that for impact on major environmental and societal challenges, nanotechnology will have to be manufactured and used in high volumes; d) promoting better links between public and private research in the field; e) design of demand-side policies supporting the development and commercialisation of nanotechnology for global challenges. This would include area where there is considerable uncertainty about market perspectives and customer/user demand.

Evidence from the European Union and the United States shows that business investment in intangible assets accounts for between 20% and 27% of average labor productivity growth. Interestingly, over the period 1995-2010, business spending in non-R&D forms of intangible assets increased more than investments in R&D in the United States, from 8.5% to 11.2% of value added compared with from 2.3% to 2.4% of value added (OECD 2013a). In some OECD countries, such as the United States and the United Kingdom, where innovation in the services sector is especially relevant, investments in intangible assets have even overtaken in importance investments in physical capital. In other countries, such as Germany and Austria, where manufacturing still contributes to a considerable portion of employment, investments in intangible assets account for a smaller, but growing, share of GDP than investments in physical capital.

**Investments in fixed and intangible assets, 2006**



The fact that innovation has become increasingly collaborative and non-technological has increased the scope of new and small firms to engage in innovation activities by reducing their structural disadvantage related to the lack of economies of scale. This is especially true in knowledge-intensive sectors, where the contribution of new and small firms to radical innovations has often been recognized (Baumol 2002). Increasing incomes worldwide and the consequent rise of market niches have further enhanced the scope of innovative entrepreneurship and accelerated the shift from a “managed economy” to an “entrepreneurial economy” where the role of new and small firms in innovation and economic development has grown in importance.

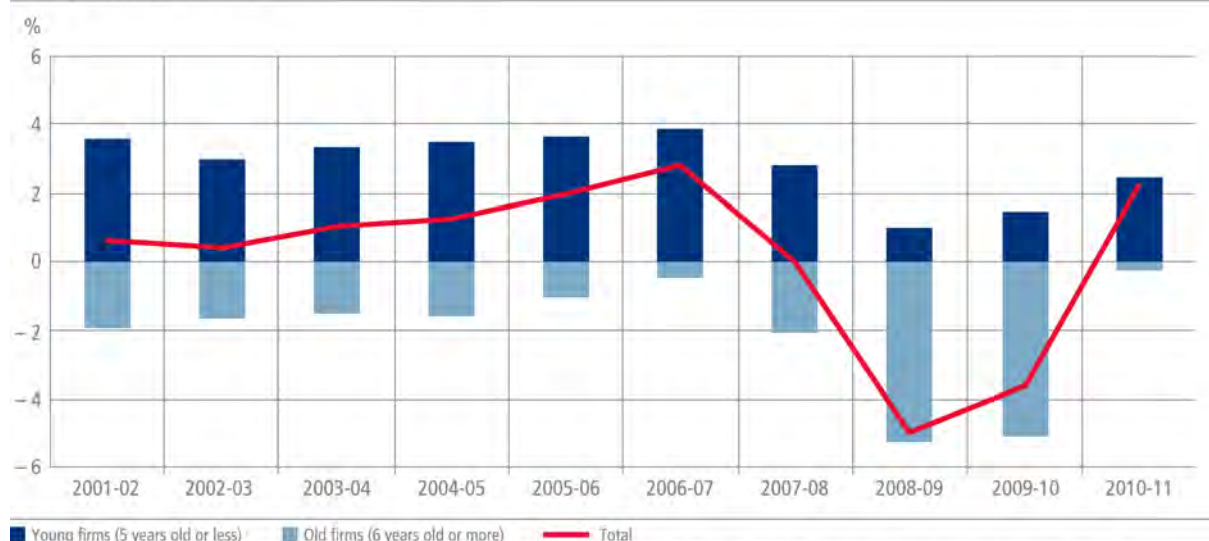
The way new business start-ups contribute to growth is precisely through competition and innovation. New enterprises place competitive pressure on incumbent companies, which are obliged to innovate if they are to survive. On the whole, these dynamics improve the allocation of resources in the economy by forcing less efficient firms out of the market. Entrepreneurship also contributes to innovation and growth through another channel, which is knowledge spillovers generated but not exploited by incumbent companies. Because incumbent companies prioritize the commercialization of existing products and technologies, they leave unused knowledge that is harnessed by entrepreneurs to enter new or established markets (Acs et al. 2009).

Theory is supported by empirical evidence, which points to a strong relationship between start-up rates, on the one hand, and economic growth and job creation, on the other hand; new and small firms take up labor released by elsewhere in the economy and increase national competitiveness (Acs et al. 2005; Stangler and Litan 2009). In particular, high-growth firms – which are firms able to grow rapidly over a short period of time and are the quintessential example of entrepreneurial SMEs – account for most job creation in the economy, with between 4% and 6% of high-growth firms generating half to three-quarters of all new jobs (Henrekson and Johansson 2010).

The key role of entrepreneurship for job creation has been confirmed by a recent analysis of the OECD covering 15 countries and showing that young businesses aged less than five years are the main source of new jobs, including during the financial crisis in 2008 when the majority of jobs destroyed reflected the downsizing of old businesses, while net job growth in young firms remained positive (see Figure “Net job growth, younger versus older firms”).

#### Net job growth, younger versus older firms, 2001-2011

Average over 15 countries



Legend: ■ Young firms (5 years old or less) ■ Old firms (6 years old or more) — Total

Preliminary results from the OECD DYNEMP project. Average over the following countries: Austria, Belgium, Brazil, Finland, France, Hungary, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Spain, Sweden and the United States. The sectors of the economy considered are: manufacturing, construction and services (except for financial services). Owing to methodological differences, figures may deviate from officially published national statistics. Net job growth is defined as the ratio of the difference in employment for each group of firms (young, old and total) in two subsequent years to the average employment in the two years considered.

Source: OECD (2013b). OECD Science, Technology and Industry Scoreboard. OECD Publishing, Paris, 2013.

In addition to an economic dimension, entrepreneurship also has a relevant social dimension. Self-employment provides an opportunity for those on the margins of the labor market to continue to be active and avoid the atrophy of professional skills, which could lead to long-term unemployment. Also, self-employment is a labor market alternative to wage employment for those who prefer the flexibility of the former over the relative rigidity of the latter, for example in order to better combine work and family life. Nonetheless, it should be recognized that self-employment is not suitable to everyone in the labor market. The objective of policies promoting socially inclusive entrepreneurship should therefore be to open up opportunities for business creation to more people, including those disadvantaged in the labor market (e.g. migrants and unemployed) or underrepresented in the business owner population (e.g. youth and women), and provide them with the skills and resources to succeed, rather than to turn indiscriminately unemployed or inactive people into entrepreneurs (OECD 2013c).

## II A benchmarking analysis of selected OECD and BRICS economies

### 1. Main messages

This section delves into innovation and entrepreneurship performance in selected OECD and BRICS countries. The focus is on Austria, Germany, the United Kingdom and the United States among the OECD member countries, and on the full set of BRICS countries (Brazil, Russia, India, China and South Africa). Whenever possible, statistical information is presented for the full set of nine countries, although this is not always possible due to lack of data harmonization in some cases.

The main message of this section is that over the last decade the BRICS economies, China in particular, have accomplished a remarkable process of economic convergence with OECD economies, including those taken into consideration by this paper. This process has accelerated in the aftermath of the 2008 global economic crisis, which hit the United States and the European Union more severely than the BRICS, while it has more recently subdued owing to both economic recovery in the Euro area and some signs of fragility in emerging economies. However, despite progress, the gaps in per-capita GDP between the BRICS and the United States remain considerable, three to four times as large as those with the selected OECD economies (Austria, Germany and the United Kingdom). The catch-up process is, thus, far from being completed and is likely to benefit from future bigger investments in innovation.

OECD statistics show, in fact, that with the significant exception of China, investments in R&D among other BRICS have not increased considerably in the last 10 to 12 years. For example, while it is true that BRICS countries have become top producers and exporters of manufactured goods, the rise of China overshadows the others and in value-added terms even the lead of China is less clear;<sup>5</sup> the United States is, in fact, still the top manufacturing producer ahead of China in value-added terms.

Data by firm size underscores that the SME sector performs better in the selected OECD countries than in the BRICS; this is especially true in Austria. This is also the consequence of product market regulations less conducive to entrepreneurship and SME development in the BRICS than in OECD economies. Nonetheless, a disaggregated analysis shows that there is room for reform in OECD countries as well. For example, the system of licenses and permits is still quite complex in the United Kingdom and Germany, while administrative burdens to start-ups could be further lowered in Austria.

The remainder of this section presents a more detailed analysis of our benchmarking exercise of innovation and entrepreneurship performance across the nine selected countries.<sup>6</sup>

### 2. Convergence in the BRICS area is in the making, but income gaps remain significant

BRICS countries have continued their catch-up process in the first decade of the new millennium. In the period from 2001 to 2012, any of the benchmarked OECD economies grew at an annual rate higher than 1.5% (Germany: 1.3%; Austria: 1.1%; United Kingdom and United States: 0.9%), whereas China expanded at a staggering yearly rate of 9.5; India at 5.7% and Russia at 4.9%. Nonetheless, the growth rates of Brazil and South Africa have been much less spectacular,

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<sup>5</sup> Value added is the outcome of both technological and non-technological innovation.

<sup>6</sup> Several of these indicators can be explored using the Innovation Policy Platform's data visualization tool (<http://www.innovationpolicyplatform.org>), on its Statistics section.

respectively 2.2% and 2% per year, as they have been emaciated by longstanding problems such as lack of infrastructure and high energy costs in the former and high unemployment rates and economic informality in the latter.

#### Annual GDP per capita growth rates, 2001-2012

Percentage values



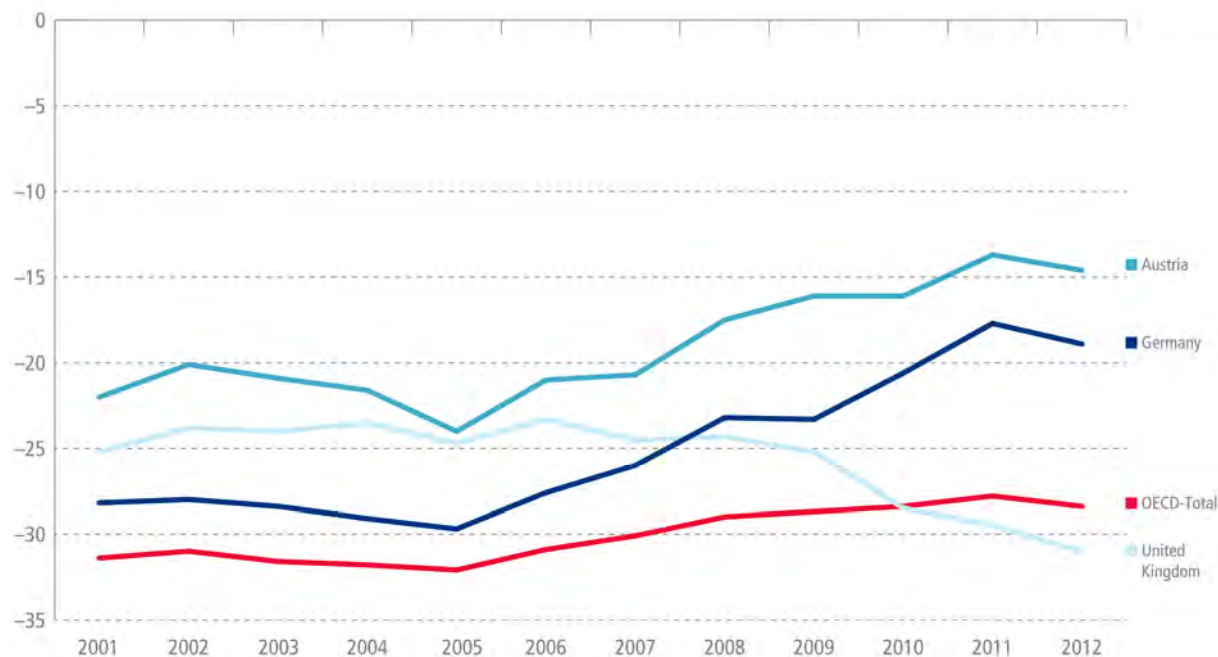
Source: World Bank World Development Indicators.

Economic convergence gained momentum in the wake of the 2008 financial and economic crisis, which struck advanced economies more than emerging economies. Indeed, the BRICS saw their annual growth rates reduced, but more marginally and more temporarily than the selected OECD economies. More recently, however, due to economic recovery in the United States and, more partially, in the Euro area and the emergence of some signs of fragility in the major BRICS economies (e.g. increasing production costs), the catch-up process has slowed down. For example, in the period from 2007 to 2009, on average, GDP per capita had risen by 5.3% in the BRICS countries and fallen by 2.4% in the OECD countries (i.e. a gap of 7.7 percentage points). In the following period from 2009 to 2012, average annual growth rates were respectively 6.3% and 1.5% in the BRICS and OECD areas (i.e. a gap of 4.8 percentage points).

Although BRICS economies have progressed significantly over the last 12 years, GDP per capita gaps with the leading American economy remain wide. Income gaps with the US economy in the BRICS area range between -54% (Russia) and -92% (India), while in the selected OECD economies between -15% (Austria) and -31% (the United Kingdom), with Germany being at -18%. Figure “GDP per capita gap of selected OECD economies with the United States”, in particular, shows that Austria and Germany have been more resilient to the economic crisis than the United States, as GDP per capita gap has narrowed since 2007, while the opposite is true for the United Kingdom.

GDP per capita gap of selected OECD economies with the United States, 2001-2012

Percentage values

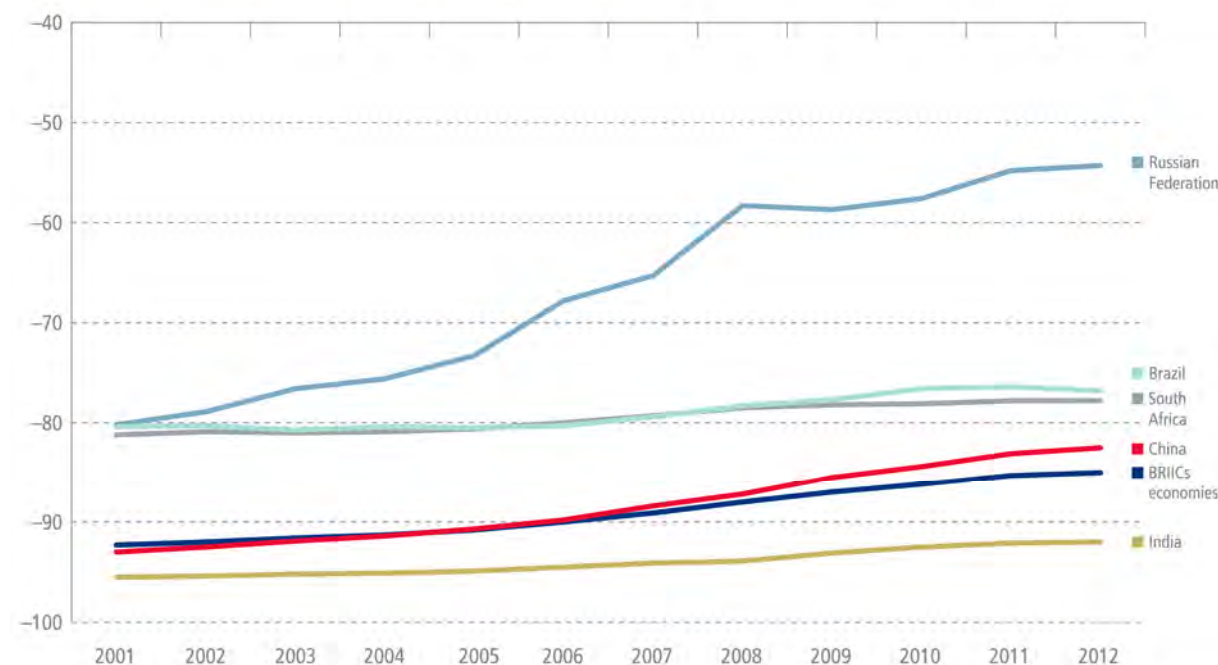


Calculations are based on GDP at constant prices, converted to USD using 2005 purchasing power parities.

Source: OECD (2013b). OECD Science, Technology and Industry Scoreboard. OECD Publishing. Paris 2013.

GDP per capita gap of BRICS economies with the United States, 2001-2012

Percentage values



Calculations are based on GDP at constant prices, converted to USD using 2005 purchasing power parities.

BRICS value also includes Indonesia.

Source: OECD (2013b). OECD Science, Technology and Industry Scoreboard. OECD Publishing. Paris 2013.



With respect to the BRICS (Figure “GDP per Capita of BRICS economies with the United States”), large income gaps are mainly the result of labor productivity shortfalls compared with the United States. For example, China’s GDP per capita soared during the years of the crisis, bridging the gap by over 6 percentage points (i.e. to 82.5% in 2012). As China’s labor force participation rates have remained above the OECD average, income differences are primarily the result of lower capital per worker and lower multifactor productivity. In Brazil, income gaps are narrowing more slowly (i.e. to 76.8% in 2012) and are due to comparatively weak labor productivity performance (OECD 2013b).

### **3. BRICS economies need to invest more in R&D to continue on the convergence path**

Labor productivity shortfalls stress the need for future larger investments in innovation if major emerging economies are to further bridge the income gap with advanced economies. As the returns from increased labor utilization tend to decline in the path to convergence and investments in physical capital have diminish returns to utilization, investments in both technological and non-technological innovation will become increasingly important for the BRICS to keep sustained rates of growth. This is illustrated by the case of another fast-growing economy from the past, South Korea, which rapidly caught up with OECD economies in the 1980s and 1990s thanks to technology imitation and adaptation, and which over the 1990s has raised R&D by 9.6%, becoming one of the few OECD members where the R&D to GDP ratio is above 3%.

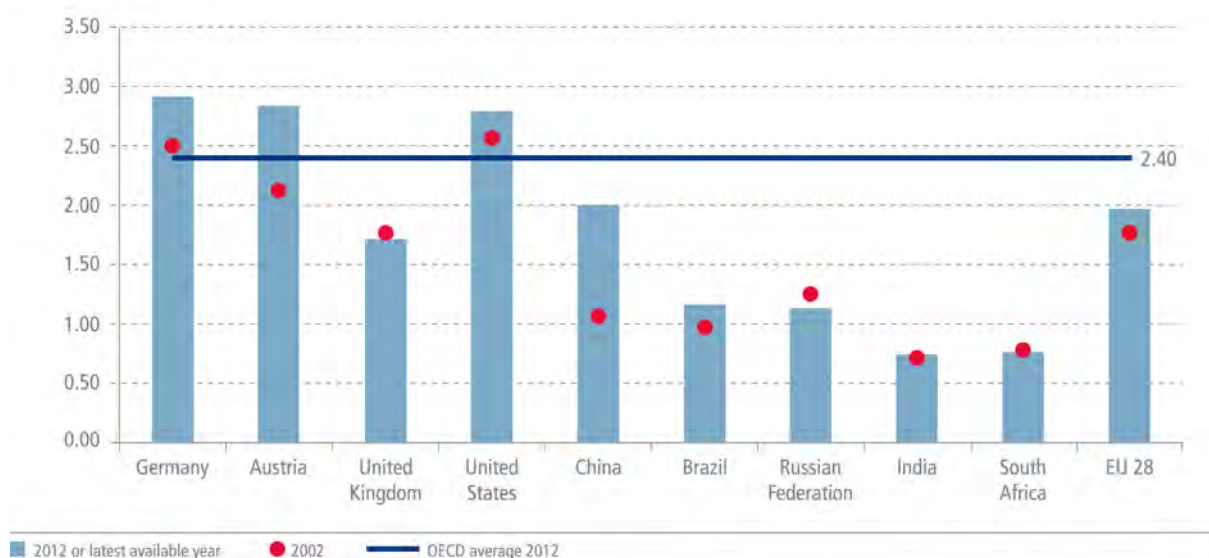
OECD harmonized innovation statistics show that, with the exception of China, the BRICS are still far from investing in innovation as much as the benchmarked OECD countries do. Over the period 2002-2012, China stepped up its public expenditure on R&D from \$42.5 billion to \$212 billion, at purchasing power parity, which corresponds to a fivefold increase. Since 2000, China’s average annual growth rate in R&D spending has been 17.6%, making it the world’s second largest R&D performer behind the United States but ahead of Japan since 2009 (OECD 2014). China’s current levels of R&D spending are already as much as three-quarters of those of the EU-28 and half of those of the United States. While it is true that much of this spending goes into military-related research, such research also has trickle-down effects into civil applications, as the history of the United States in the last century has widely shown.

However, growth in R&D spending in the remaining BRICS has been much less stellar. Over the observed period, for example, Russia inched up R&D public spending from \$17.3 billion to \$24 billion, which resulted into a drop by 0.13% relative to GDP. This suggests that Russia has not exploited increased fiscal revenues from resource-driven growth to proportionally commit more resources to R&D and that this might become a barrier to the future diversification of the economy. India and South Africa’s public investments in R&D relative to GDP have also remained stable in the last 10 years, which is possibly the outcome of low fiscal revenues due to the large swathes of informality in both countries, while those of Brazil have marginally increased (+0.2%).

In the benchmarked OECD economies, on the other hand, public R&D spending has been on the rise in the last ten years, with the exception of the United Kingdom where it has stalled. Germany has beefed up its public R&D budget from \$63 billion in 2002 to \$83 billion in 2012, corresponding to an increase of +0.4% relative to GDP. Austria’s growth in R&D government spending has been even stronger, from \$5.5 billion to \$8.7 billion, that is +0.7% relative to GDP.

## Gross domestic expenditure on R&amp;D, 2002 and 2012

Percentage of GDP



Legend: ■ 2012 or latest available year ● 2002 — OECD average 2012

Latest available year for Brazil and South Africa is 2010, for India 2007.

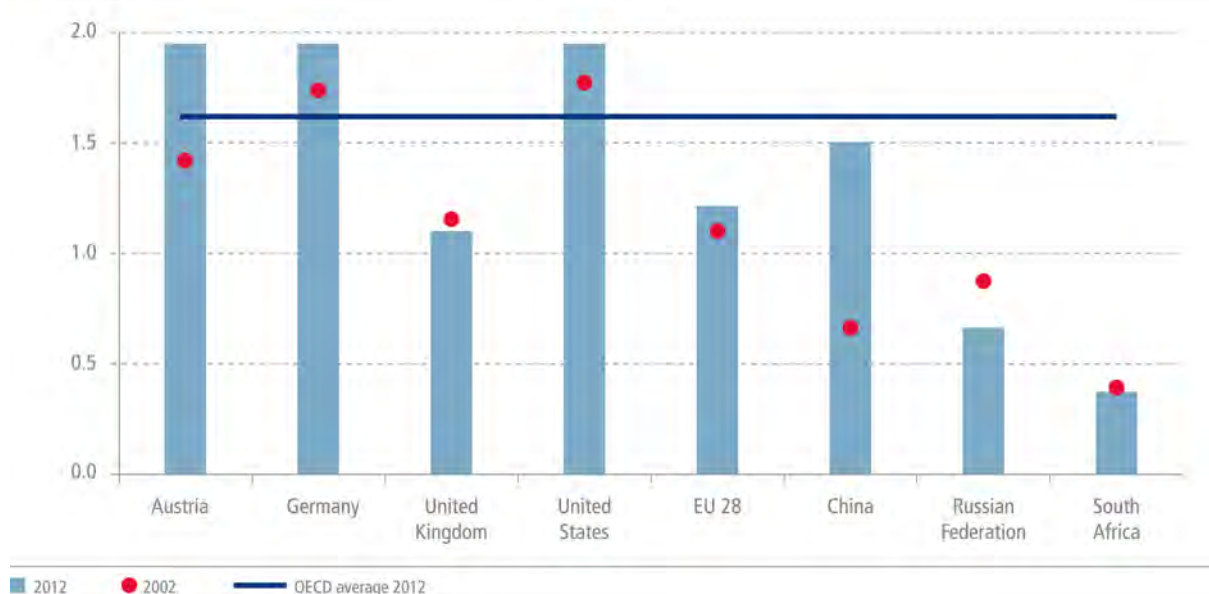
All figures are based on the OECD database, except for Brazil's and India's which are based on World Bank WDI and include both public and private R&D. OECD and World Bank values are not therefore strictly comparable. In particular, lower business R&D than government R&D, which is the reality of most countries, will push down the aggregate value for Brazil and South Africa.

Source: OECD. OECD Factbook: Economic, Environmental and Social Statistics. OECD Publishing Paris and World Bank World Development Indicators. 2014.

Figures on R&D business expenditure largely confirm the trends observed above, which shows the presence of a strong correlation between public and private spending on R&D. China's business enterprise R&D (BERD) has soared over the period 2002-2012, from 0.5% to 1.5% of GDP, which is essentially in line with the OECD average. In particular, over the period 2007-2012, the Chinese BERD has more than doubled, although it should be noted that a large share of the enterprises that carry out large volumes of R&D are state-owned in China. The solid performances of Germany and Austria and the weak record of the United Kingdom and Russia are also reflected in business R&D statistics.

## Business enterprise R&amp;D, 2002 and 2012

Percentage of GDP



Legend: ■ 2012 ● 2002 — OECD average 2012

Latest available year for South Africa is 2010.

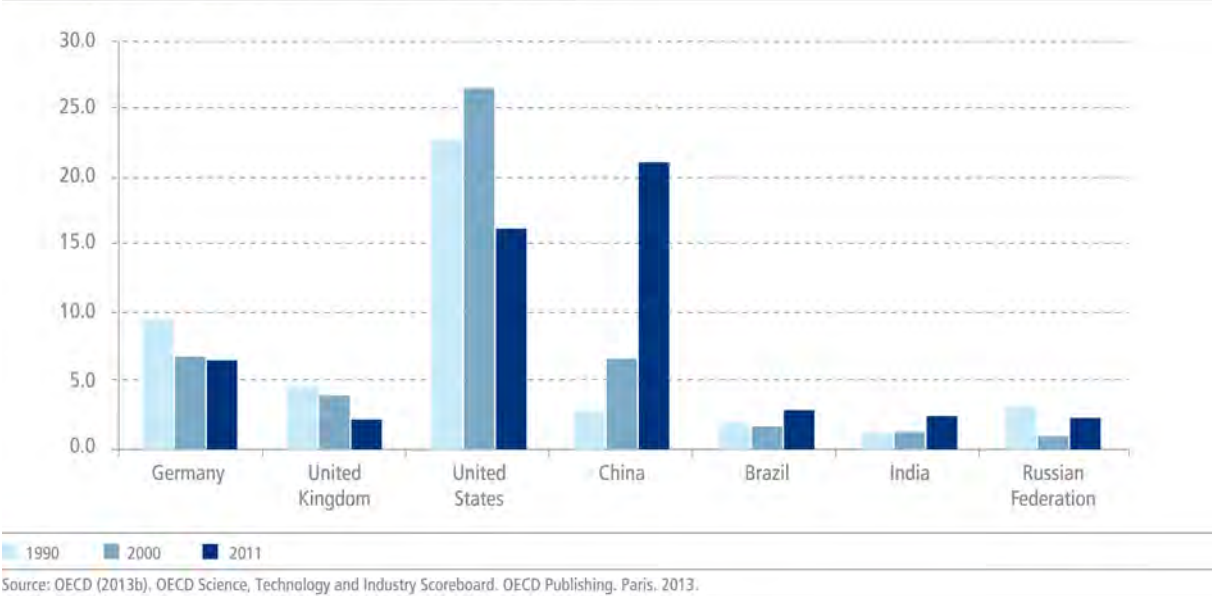
Source: OECD Main Science and Technology Indicators (MSTI) Database.

#### 4. Innovation in manufacturing continues to mainly happen in the OECD area

The rise of the BRICS as manufacturing powerhouses is unquestioned. In 1990, the G7 countries accounted for two-thirds of world manufacturing value added, but now account for about 40%. In 2010, China passed the United States to become the world’s leading manufacturing producer, while Brazil and India have moved ahead of the United Kingdom.

##### Selected top manufacturers over the last twenty years

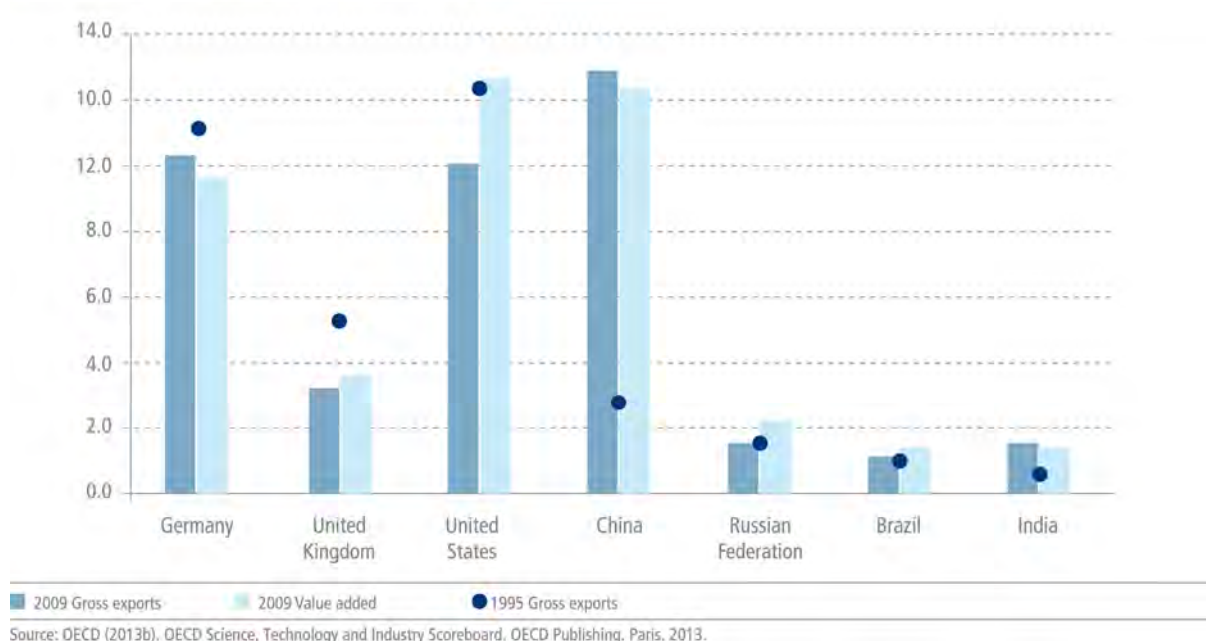
Percentage share of total world manufacturing value added



China has also become the top exporter of manufactured goods. However, in value added terms, its lead over the United States is less clear. In fact, in 2009, the share of manufacturing exports in value-added terms of the United States still exceeded that of China by a small margin (Figure “Selected top manufacturers over the last twenty years”). India has also marginally increased its share of manufacturing exports in gross terms, while Brazil and Russia have kept their levels stable since the mid-1995s. Conversely, and consistently with production statistics, the benchmarked OECD economies have seen their share of world trade exports diminished, although higher shares of manufacturing exports in value added terms than in gross terms for the United States and the United Kingdom signal that both countries export high-quality parts and components that are subsequently embodied in the exports of other countries.

### Top exporters of manufactured goods in gross (1995 and 2009) and value-added (2009) terms

Percentage share of total world manufactured goods



The interconnectedness of BRICS and OECD economies is confirmed by “value-added export ratios”, which are given by the total domestic value-added share of gross exports. In broad terms, these figures tell us how much countries contribute to the total value added of their exports and how much they depend on foreign value-added content. The indicator is, therefore, a proxy of both economic interdependence and domestic innovation. Figure “Top exporters of manufactured goods in gross (1995 and 2009) and value added (2009) terms” shows that value-added export ratios have dropped since the mid-1990s for almost all the benchmarked countries, with Russia being the only exception.<sup>7</sup> This means that national exports increasingly rely on foreign value-added content, that is, on parts and components previously imported from abroad. Interestingly, this is especially true for China and India, whose domestic value-added share of gross exports has fallen respectively by 21% and 12% in the period 1995-2009. This implies that China and India are both highly linked to the rest of the world – the most interlinked among those benchmarked in this paper – and that they are involved in the export of technology-intensive products more than they did fifteen years ago. However, between 22% (India) and 32.5% (China) of the value-added of their exports is of foreign origin, which makes them dependant on the import of technology from abroad. Conversely, the same values are 11.3% for the European Union and 13.6% for the United States, a sign that both areas generate internally most of the value added inherent to their exports.

#### 5. The SME sector is significantly more productive in the selected OECD economies, especially Austria<sup>8</sup>

Small enterprises (i.e. between 1 and 49 employees) make up everywhere the overwhelming majority of the business population (Figure “Contributions of the small business sector to number of firms, employment and value added”). The benchmarked countries are no exception, although there is still a considerable difference between the 98% found in Austria and the 93.7% in Russia. Differences, however, are more relevant when the contribution of the small business sector to employment and value added is taken into consideration. In Austria, for example, small enterprises

<sup>7</sup> Russia’s figures are possibly affected by a big slice of its exports stemming from natural resources.

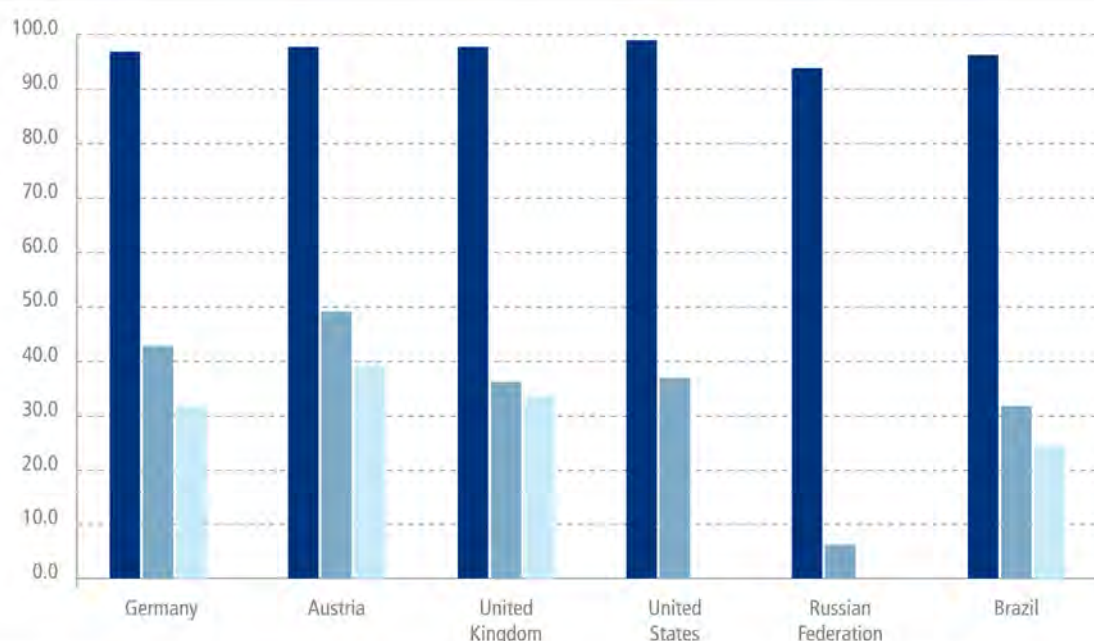
<sup>8</sup> Data by firm size on China, India and South Africa are not available.

contribute to 49.3% of total employment and 39.2% of the total value added generated by the business sector, whereas Brazil's values are considerably lower, i.e. 31.7% and 24.9%. This means that Brazilian small firms are less able to generate employment and value added, thereby contributing less than their peers elsewhere to national productivity.<sup>9</sup> It is also surprising the very small contribution of Russian small firms to employment, which might be the result of regulatory barriers to business growth for sole proprietor firms in this country.

In every country, the gap between the contribution of the small business sector to employment and value added is generally large, which is the result of the average low productivity of this segment of the business population. However, the United Kingdom is an exception: a gap of only 2.2 percentage points between the contributions of British small firms to employment and value added points to a performing small enterprise sector in this country.

#### Contributions of the small business sector to number of firms, employment and value added, 2010

Percent



The small business sector is defined as firms with between 1 and 49 employees. Size classes in the United States are different; small enterprises, in this case, are defined as having up to 99 employees.

■ Enterprises   ■ Employment   ■ Value Added

Source: OECD (2013d), *Entrepreneurship at a Glance*. OECD Publishing, Paris, 2013.

The characteristics of medium-sized firms (50 to 249 employees) are quite different from those of the small ones. Medium-sized firms have generally better access to external finance, invest more in training and innovation and are more present in international markets. Unsurprisingly, they are considered in many countries key drivers of national growth.

Germany, which has a strong reputation for its *Mittelstand* businesses, turns out to have the strongest medium-sized sector in terms of both size (i.e. share of the total number of firms) and employment (i.e. share of total employment). In terms of value added, however, Austria does better

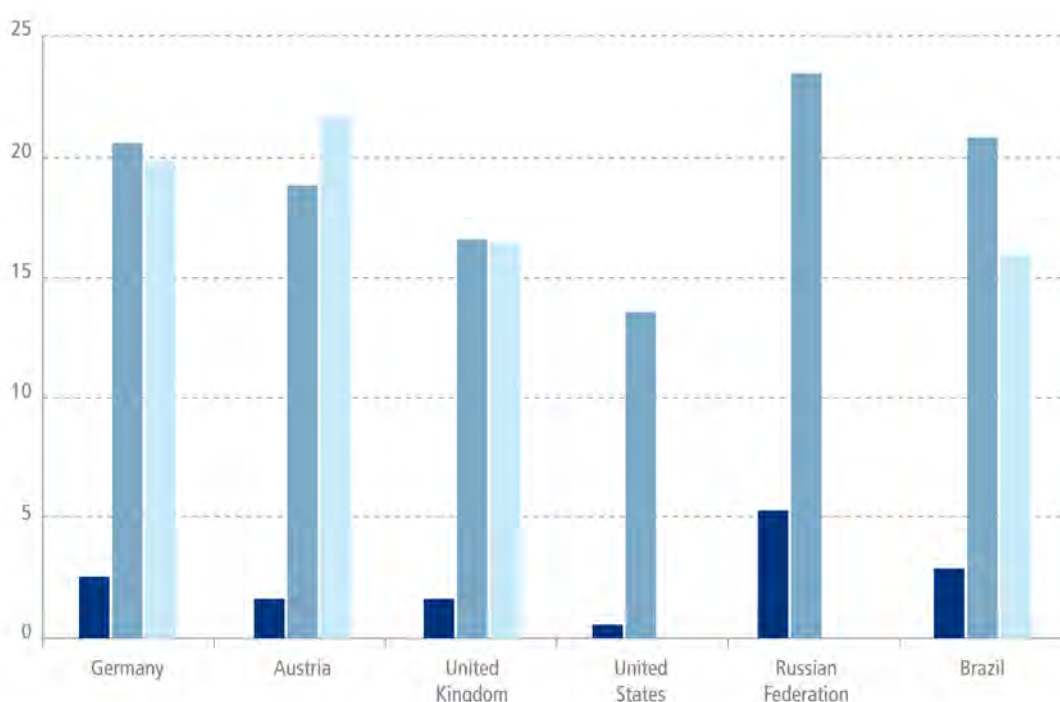
<sup>9</sup> It should be noted that cross-country comparisons within the same business size bands are also affected by the within-country performances of the other business size bands.

in spite of a smaller medium-sized sector. Together with a very productive small business sector, this makes the Austrian SME sector the strongest among those benchmarked.<sup>10</sup>

The gap between employment and value added is much lower in medium-sized firms than in small firms across all countries, a sign of greater average productivity in the medium-sized business sector compared with the small business sector. The largest gap is found in Brazil (5 percentage points), which therefore emerges as the country with the least productive medium-sized firms. Reasons might be multiple – for example, energy costs are reportedly high in Brazil – and include still high barriers to entrepreneurship in the Latin American country (see section below).

#### Contributions of the medium-sized business sector to number of firms, employment and value added, 2010

Percent



The medium business sector is defined as firms with between 50 and 249 employees. Size classes in the United States are different; medium enterprises, in this case, are defined as having up to 499 employees.

■ Enterprises   ■ Employment   ■ Value Added

Source: OECD (2013d). *Entrepreneurship at a Glance*. OECD Publishing, Paris, 2013.

## 6. The economic crisis has dampened entrepreneurship dynamics everywhere

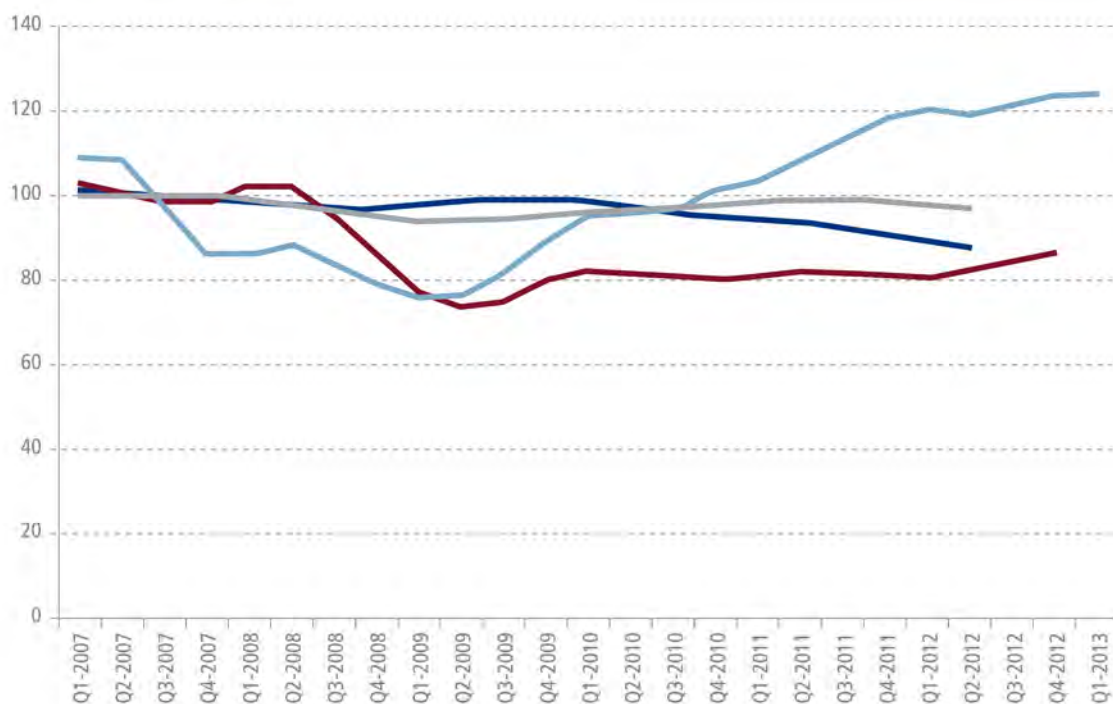
It has been observed that “creative destruction” – the process whereby economic growth and change force less productive firms to exit the market and allow more innovative firms to enter – can help improve overall economic performance. The process of creative destruction slowed with the onset of the global financial crisis. Business register data show a decline in the rate of enterprise creation as early as 2007 for some of the largest economies. In 2009, the downward trend became more pronounced in several European countries, including the United Kingdom and Russia. After only six years a few countries have returned to the pre-crisis levels of enterprise creation, one of which is the United Kingdom. In the other benchmarked countries the level of enterprises creation

<sup>10</sup> It should be noted that the value-added figures for the SME sector in Austria (61%) could also be influenced by a poorly productive large business sector. Yet, there are no apparent reasons to espouse this explanation, so that the paper keeps the view that the Austrian SME sector is the best performer in the group of benchmarked countries.

continues to be below the pre-crisis levels, which poses a problem both to productivity and social inclusion.

### New enterprise creations, 2007-2013

Trend-cycle average 2007 = 100



For the United States, data only refer to establishments with employees.

Legend: Germany (dark blue), Russian Federation (dark red), United Kingdom (light blue), United States (grey).

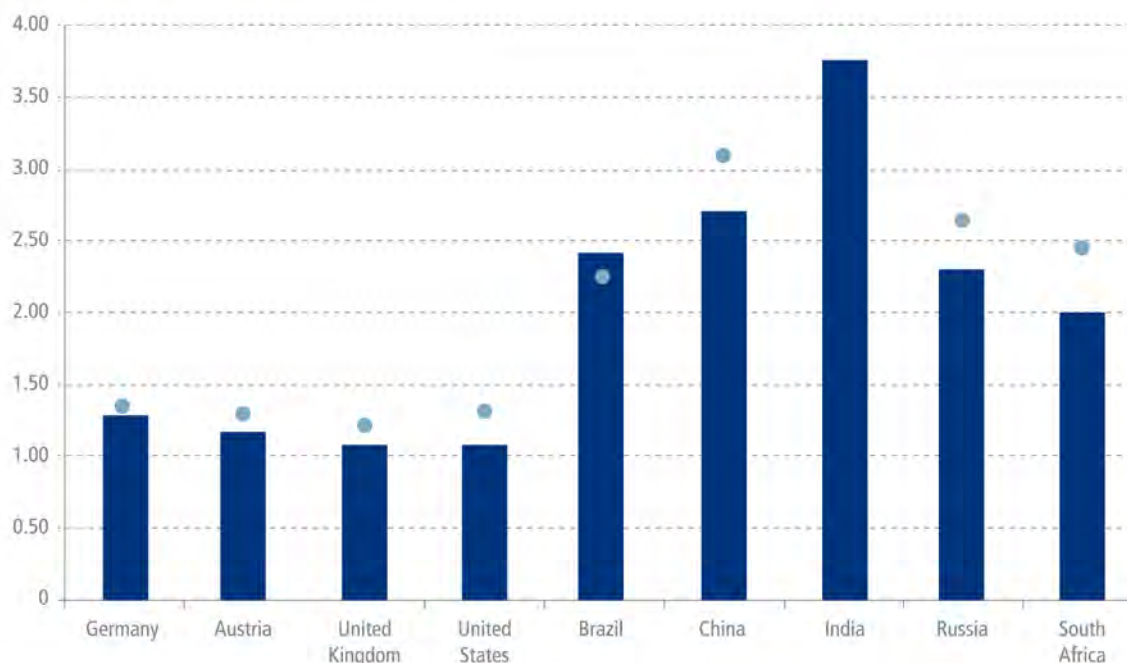
Source: OECD (2013d), Entrepreneurship at a Glance. OECD Publishing, Paris, 2013.

## 7. Product market regulations are more burdensome in the BRICS

It has been observed that for the BRICS for which data are available, the SME sector contributes less to national employment and value added than in OECD countries. This is partly owing to product market regulations that are less favorable to new and small businesses. Competitive product markets are crucial to entrepreneurship and SME development. An economy in which the state presence is too strong or in which incumbent firms are unduly protected will discourage entrepreneurs from entering the market, curbing the productivity-enhancing role of entrepreneurship. The OECD Product Market Regulation (PMR) index measures the degree to which government policies promote or inhibit competition in product markets by assessing state regulations in three domains: size and scope of state-ownership in the economy; legal and administrative barriers to entrepreneurship; and barriers to international trade and investment (Figure “Product market regulation (PMR index)”).

### Product market regulation (PMR) index, 2013 and 2008

Index value (0=most competitive; 6=least competitive)



The OECD Indicators of Product Market Regulation (PMR) are a comprehensive and internationally-comparable set of indicators that measure the degree to which policies promote or inhibit competition in areas of the product market where competition is viable. They measure the economy-wide regulatory and market environments in 34 OECD countries in (or around) 1998, 2003, 2008 and 2013, and in another set of non-OECD countries in 2013. They are consistent across time and countries. The indicators cover formal regulations in the following areas: state control of business enterprises; legal and administrative barriers to entrepreneurship; barriers to international trade and investment. Not all data are available for all countries for all years.

Values for the United States refer to 2008 and 2003 respectively. Values for India are only available for 2008.

■ 2013 ■ 2008

Source: OECD, Development Centre, Poverty Reduction and Social Development, Migration and the Brain Drain Phenomenon. Paris. 2007.

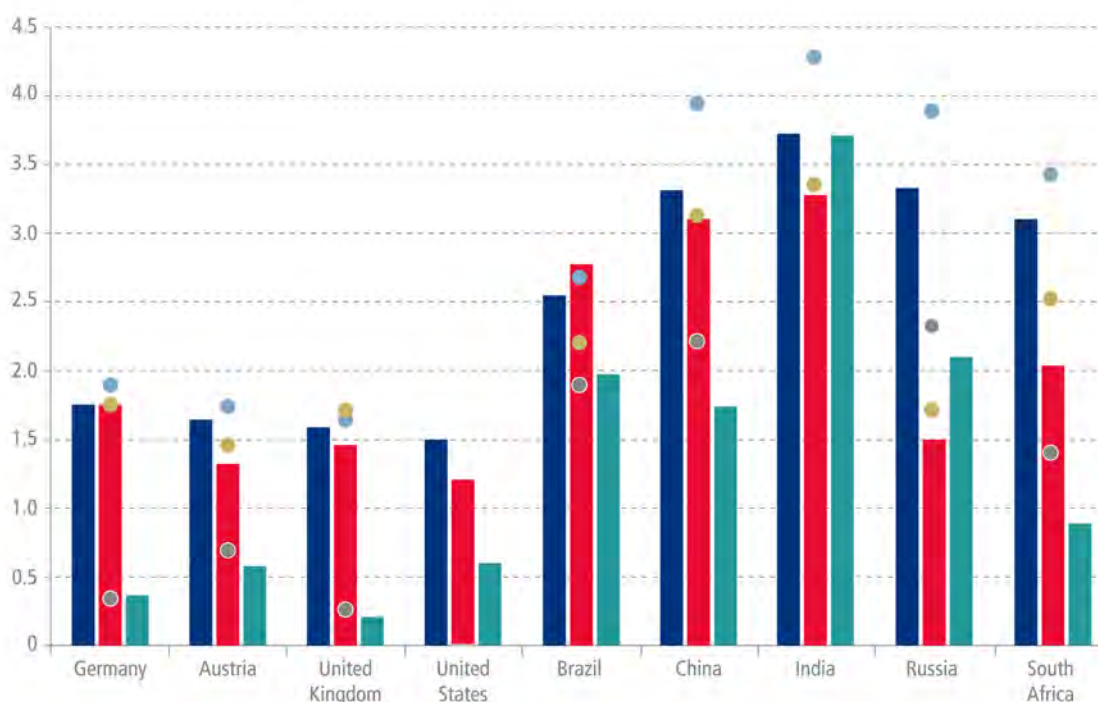
The four selected OECD countries have very similar standings, which have hardly budged during the last five years. Most progress in the liberalization of product markets was made in the European Union in the late 1990s, and member countries have now achieved a stable position where markets are open to start-ups and foreign investors and where the presence of the state is limited. On the other hand, the BRICS, especially India, have less competitive internal markets for reasons that differ by country (see section below). Nonetheless, with the exception of Brazil, they have made relevant strides in the liberalisation of domestic markets in the last five years.

A break-down of the PMR index in its three macro areas provides a more disaggregated analysis of where the points of strength and weakness of each country lie (Figure “Break-down of the PMR index”).



## Break-down of the PMR index, 2013 and 2008

Index value (0=most competitive; 6=least competitive)



Values for the United States refer to 2008.

■ State control 2013    ■ Barriers to entrepreneurship 2013    ■ Barriers to trade and investment 2013  
● State control 2008    ● Barriers to entrepreneurship 2008    ● Barriers to trade and investment 2008

Source: OECD Product Market Regulation Database.

India is the country that performs the worst in all three areas of state control of the economy, barriers to entrepreneurship, and barriers to trade and investment. Although the weight of the state in the economy has been reduced during the last five years, barriers to entrepreneurship have remained unchanged and are the highest among the benchmarked countries.

In a similar vein, China's barriers to entrepreneurship have not dropped, although China has done more progress than other countries in lowering the state control of the economy and trade and investment barriers, both of which have helped the country to become the world's top manufacturing exporter in gross terms.

Interesting is also the case of Brazil, which is the only country where barriers to trade and investment and barriers to entrepreneurship have increased in the last five years. However, among the BRICS, barriers to entrepreneurship are the highest in India and China and the lowest in Russia and South Africa; the value of the latter, in particular, is not very different from that of OECD countries.

With respect to the selected OECD countries, the disaggregated analysis confirms the similarity of these economies in the relative low weight of product market regulations. Only in one case is there a gap of above half a base point, which is between Germany (1.75) and the United States (1.20) in the barriers to entrepreneurship.

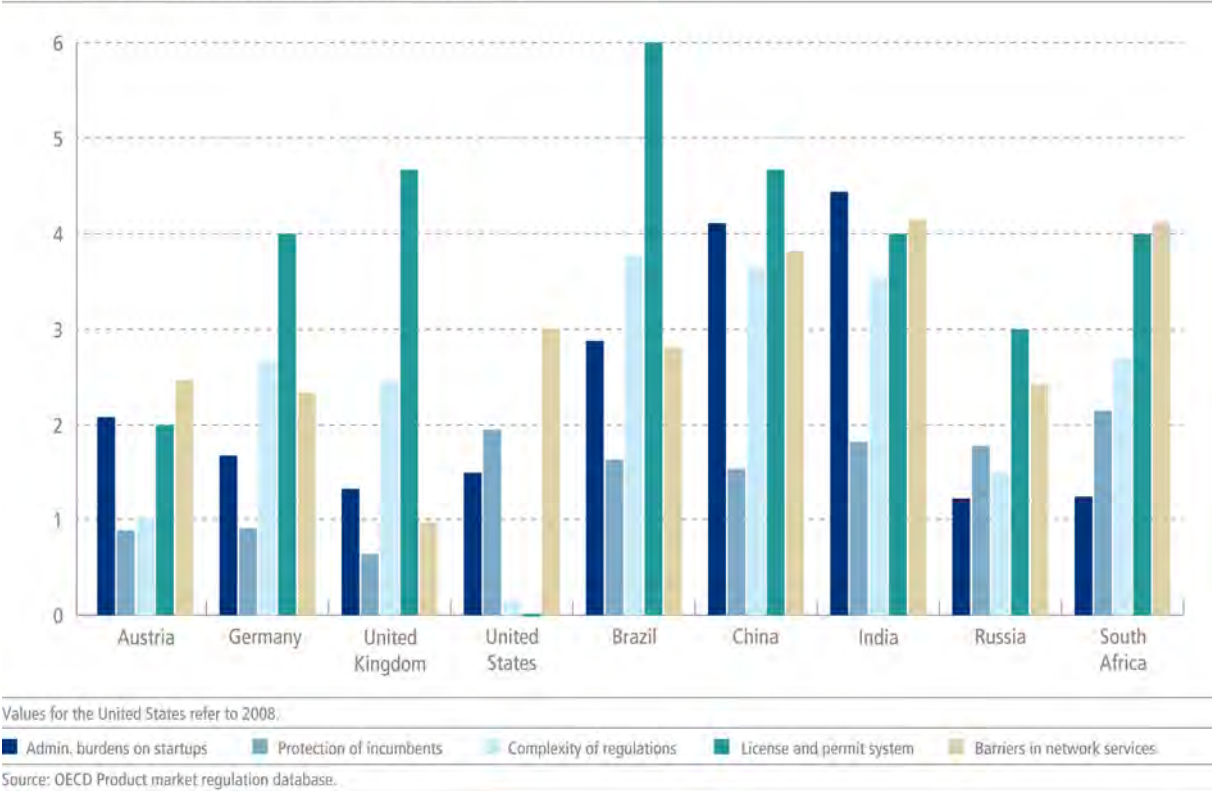
**8. A more detailed analysis of ‘barriers to entrepreneurship’ points to areas for reform also in OECD countries**

However, a further detailed analysis of selected PMR entrepreneurship indicators suggests that there is still scope for reform in entrepreneurship policies also in the benchmarked OECD countries (Figure “Break-down of “barriers to entrepreneurship” category in the PMR index”). The United Kingdom and Germany, for example, may be in need of an overhaul of their business license and permit system, which scores relatively poorly also when compared with that of some BRICS countries. Germany and the United Kingdom are also the economies with the most complex regulatory procedures among the OECD benchmarked countries. On the other hand, the United States does less well than the others in the liberalisation of network services and in dropping protections for incumbents, both of which are detrimental to the development of entrepreneurial opportunities. Finally, Austria could do more to lower administrative burdens on start-ups.

As to the BRICS, “licenses and permits” is confirmed to be the policy area where bolder reforms are most needed; this is especially true for Brazil. Administrative burdens on start-ups are exceptionally high in India and China, but lower than in the OECD economies in South Africa and Russia. This is corroborated by the indicator on the complexity of business regulations, where Russia and South Africa outperform India, China, and Brazil. Finally, network services are more open to competition in Russia and Brazil than in the other BRICS.

Break-down of “barriers to entrepreneurship” category in the PMR index, 2013

Index value (0=most competitive; 6: least competitive)



### III Policy implications

While policy recommendations need to be tailored to the specific national or local context,<sup>11</sup> there are a number of general points that can be made to strengthen innovation and entrepreneurship in OECD and BRICS economies. The OECD-World Bank Innovation Policy Platform provides a comprehensive mapping of policy dimensions relevant to innovation and entrepreneurship development. A graphic overview of this useful online platform is available in the Annex of this paper.

The list provided below, which is non-exhaustive, focuses on the aspects most closely related to innovation in business, while it does not dwell on important underlying factors such as the role of the education and training system for business innovation. It primarily deals with framework conditions and specific business innovation and entrepreneurship policies and programme, and it rests on the work of the OECD Innovation Strategy and of the OECD Centre for Entrepreneurship on issues and policies related to entrepreneurship and SME development (OECD 2010b).

#### 1. Framework conditions conducive to stronger innovation and entrepreneurship

##### **Ensure macroeconomic stability**

A sound macroeconomic framework supports investment in new business and business innovation through low and stable inflation rates and by reducing the volatility of real interest rates. Similarly, fickle exchange rates deter business expansion by internationalisation, as entrepreneurs seek to avoid potential financial losses owing to currency depreciation or devaluation.

##### **Foster competition in product and services markets**

Competition is a key driver of growth by allowing resources to be allocated more efficiently. Therefore, it is important that incumbent companies are not protected to the disadvantage of new start-ups if entrepreneurship is to unfold its productivity-enhancing role. While competition in product markets has greatly been enhanced during the last 20 years in most OECD economies, more progress can be made in the BRICS economies. Moreover in OECD countries as elsewhere, competition in the services sector has not advanced as much as in other sectors of the economy. This is especially true for network services and utilities which in many cases continue to be supplied by state-owned providers in monopolistic markets.<sup>12</sup>

##### **Open markets to trade and investment**

The benchmarking exercise has highlighted how much the world economy is connected and how much the innovative inputs of one country are integrated in the exports of another country. Keeping markets open to trade in goods and services and to international investment contributes to a positive environment for innovation. Thus, governments should pay attention to the quality of their investment policy framework, which includes not only the level of business taxation, but also the fairness and rapidness of the judicial system, a flexible labour market and light business

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<sup>11</sup> See, for example, the OECD series of National Studies on SMEs and Entrepreneurship, which has so far covered Poland, Thailand, Mexico, Italy and Russia, or the local reviews which have investigated many regions in OECD countries (e.g. Andalusia and Cantabria in Spain, Marche and Lombardy in Italy). For more information, see [www.oecd.org/cfe](http://www.oecd.org/cfe)

<sup>12</sup> For further reference, see the Innovation Policy Platform topic page “Market Access and Innovation” as part of the Innovative Entrepreneurship Module.

regulations. All these aspects impact on the chances of a country to attract foreign investment as well as on the choice of an individual to become an entrepreneur.<sup>13</sup>

### **Make sure business regulations are not burdensome for business start-up and business expansion**

Sound regulatory policy is essential to avoid excessive and burdensome regulations that impede starting up businesses and innovation. It is important to note that, unneeded regulations and inconsistency in the way regulations are applied are especially heavy for new and small firms, which have restrained human and financial resources to deal with administrative requirements. Regulatory impact assessment can help gauge whether the benefits of regulations justify the costs.

Bankruptcy laws should not be punitive or prevent unsuccessful entrepreneurs from trying again. Evidence shows, in fact, that serial entrepreneurs are often those able to set out fast-growing companies since, like any other job, business ownership also benefits from experience. At the same time, reforms in this direction should be wary of possible cases of moral hazard.<sup>14</sup>

### **Review the tax system to ensure that it does not impede entrepreneurship and innovation**

Personal income tax, corporate income tax and social security contributions play an important role in the decisions to open up a business, since they contribute to the opportunity cost of moving from wage employment to self-employment. Similarly, the taxation of capital gains and asset holdings (e.g. wealth tax and property tax) also has a bearing on the choice to become an entrepreneur. High levels of taxation on earned income can arguably increase the appeal of self-employment, because income from this activity can be more easily concealed from tax authorities than wage income. However, this is true only for micro-enterprises, whereas growth-oriented entrepreneurship will find it difficult to avoid taxation and will thus be hindered by high income taxes. In a similar vein, taxation on capital gains will influence the development of secondary markets and thus the possibility for expanding businesses to access to equity finance and for investors to capitalise on their investment.

R&D tax incentives have commonly been used to support business innovation. However, recent OECD analysis shows that the overall tax relief on R&D for multinational enterprises (MNEs) could be greater than in the initial government forecast if MNEs use cross-border tax planning strategies to reduce their overall tax burden. In this way, there is the risk that governments lose tax revenues from the commercialisation of subsidised R&D (OECD 2013a). Targeting R&D subsidies on smaller independent firms which are not part of larger business groups might alleviate public concerns on cross-border tax planning.<sup>15</sup>

### **Explore the potential of demand-side policies to strengthen business innovation and innovative entrepreneurship**

Regulations, standards and public procurement can all be used to promote innovation in a market-friendly way that does not harm competition.<sup>16</sup> Public procurement rules should also avoid favoring

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<sup>13</sup> The Innovation Policy Platform's module page on "Access to Finance and Foreign Markets" discusses this question further.

<sup>14</sup> The Innovation Policy Platform's topic pages on "Bankruptcy Regulation", the "Administrative Framework for Entry and Growth", and "Fiscal Measures" provide further detail.

<sup>15</sup> Further information on the relationship between tax schemes and innovative entrepreneurship is found in the Innovation Policy Platform's topic page "Fiscal Measures".

<sup>16</sup> Further information on "Innovation procurement schemes" is available in the relevant topic page of the Innovation Policy Platform's module on innovative entrepreneurship.

incumbent large companies over new and small firms, for example by bundling contracts or setting restrictive size and age criteria for tendering firms. There is, more generally, a need to make public procurement opportunities more visible to SMEs, including by posting all public tenders online and advertising them through the channels of national and local business associations.

## **2. Specific policies aimed at business innovation, knowledge networks and innovative entrepreneurship**

### **Ensure sufficient investment in public research and coherence between multi-level sources of funding for R&D**

The governance of research institutions and higher education institutions (HEIs) should be such that it enhances excellence, with better linkages to other innovation actors and stakeholders. This includes restructuring the institutional mechanisms of public research financing to better support multidisciplinary research and increase the ability of HEIs to work more closely with industry to bring ideas to market.

### **Encourage value creation from intellectual property and other intangible assets**

Policies should encourage value creation from intangible assets through intellectual proprietary mechanisms (e.g. patents) and the diffusion of such intellectual property through markets and networks. Adequate and effective implementation of intellectual property rights is important to provide the right set of incentives to innovators, although governments need to be wary of the declining quality of patents due to their proliferation in trivial fields. This phenomenon poses a challenge to innovation because it shifts innovations towards marginal improvements and increases uncertainty, thus lowering incentives to invest in inventive activities. Recent decisions by the US Supreme Court and the European Patent Office raising the bar for granting patents go in the right direction.

Intellectual property markets and intellectual property aggregating mechanisms promote the exchange and share of IPRs and are often based on licensing agreements. Examples of IP marketplaces include patent clearing houses, patent auction houses, licensing markets, and technology platforms. Examples of IP aggregating arrangements – which bundle complementary pieces of intellectual property and offer access to the pool – are patent pools and patent funds. Policies should foster the development of these mechanisms, which will require improving market transparency and the correct valuation of intellectual assets.<sup>17</sup>

### **Remove barriers and regulations that limit industry-university interactions**

In a landscape where innovation is collaborative, barriers to industry-university collaboration hinder the commercialisation of research. However, national laws still set obstacles to faculty members who are interested in collaborations with the business sector. Ensuring that researchers have incentives and opportunities to collaborate with industry is important; in this context, for example, research performance evaluation criteria should be adjusted to reflect the so-called “third mission” of universities, beyond teaching and research, which is transfer of knowledge to the private sector (OECD 2008).<sup>18</sup>

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<sup>17</sup> The Innovation Policy Platform’s topic page on “Intellectual Property Rights for Innovative Entrepreneurship” and the module on “Intellectual Property Rights” provide a detailed discussion on various factors and related instruments to strengthen this particular dimension.

<sup>18</sup> This is very much at the core of the “Technology Transfer and Commercialisation” module of the Innovation Policy Platform (within the Innovative Entrepreneurship module).

Moreover, past practices have tended to favor knowledge transfer through technology licensing to established firms, reflecting relatively easy administration, early returns and low risks for the HEI. But in some cases the creation of a portfolio of spinoff companies, in which the university has equity and/or licensing stakes, may provide greater returns. In other cases, collaborative research and consultancy may be more effective. Government should set incentives that encourage universities to find out their optimal mix of means of knowledge transfer.

### **Foster entrepreneurial culture and skills in the population**

With entrepreneurship at a premium, it is important for policy to engender a culture and attitudes that are conducive to business creation. For example, the education system, the media and business support organisations can help foster entrepreneurial motivations. Similarly, adequate entrepreneurship skills – which include small business management skills, strategic skills and entrepreneurial traits – can help new entrepreneurs to succeed. This implies the need for a change in the curriculum, pedagogies, structures and strategies in education and training systems to better import these skills.<sup>19</sup>

### **Design adequate business financing policies**

Lack of external finance is one of the major problems affecting business innovation and entrepreneurship development.<sup>20</sup> The problem is especially exacerbated in small and innovative enterprises. Small enterprises lack collateral and financing reporting of the standards required by banks. Innovative enterprises may paradoxically be considered more exposed to risks and uncertainty than non-innovative enterprises. For example, there is evidence that fast-growing firms find it more difficult to obtain loans than other SMEs.<sup>21</sup> Governments need to design policies that ease access to finance for innovative firms. Special segments of credit guarantee funds earmarked for innovative firms are an option, as well as setting a regulatory framework that favors the development of alternative forms of finance such as convertible and subordinated loans. Government support of equity finance, especially in the early stages of innovation development, is also relevant, although it requires strong coordination with private sector investors (OECD, forthcoming).

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<sup>19</sup> Additional information can be found in the Innovation Policy Platform's topic page on "Entrepreneurial capabilities and culture".

<sup>20</sup> Further information is available in the "Access to finance for innovative entrepreneurship" topic page in the Innovation Policy Platform.

<sup>21</sup> See, for example: <https://www.innovationpolicyplatform.org/content/debt-financing>

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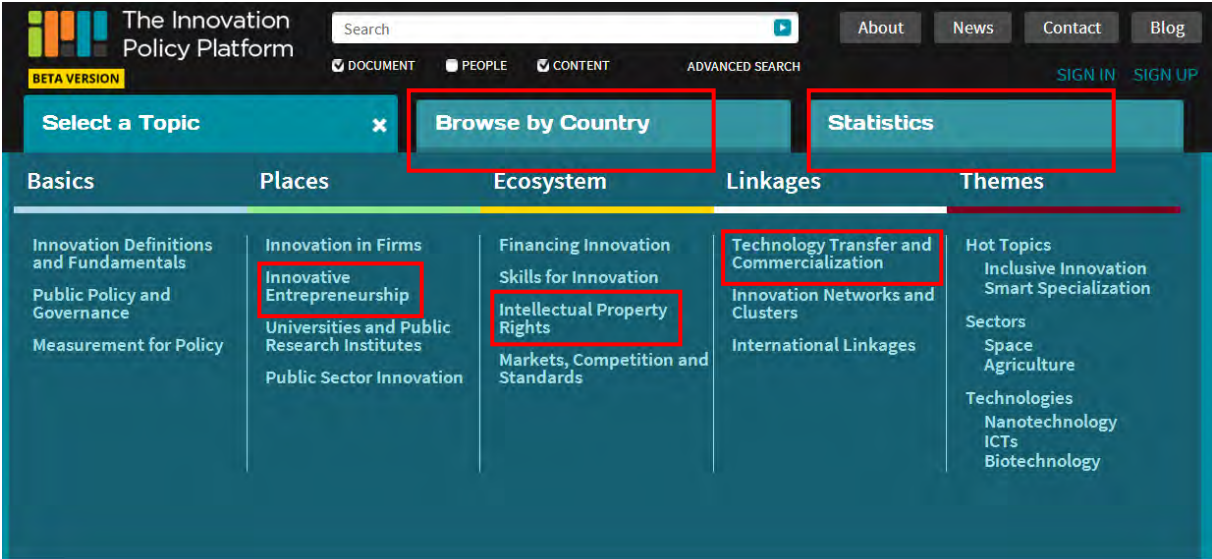
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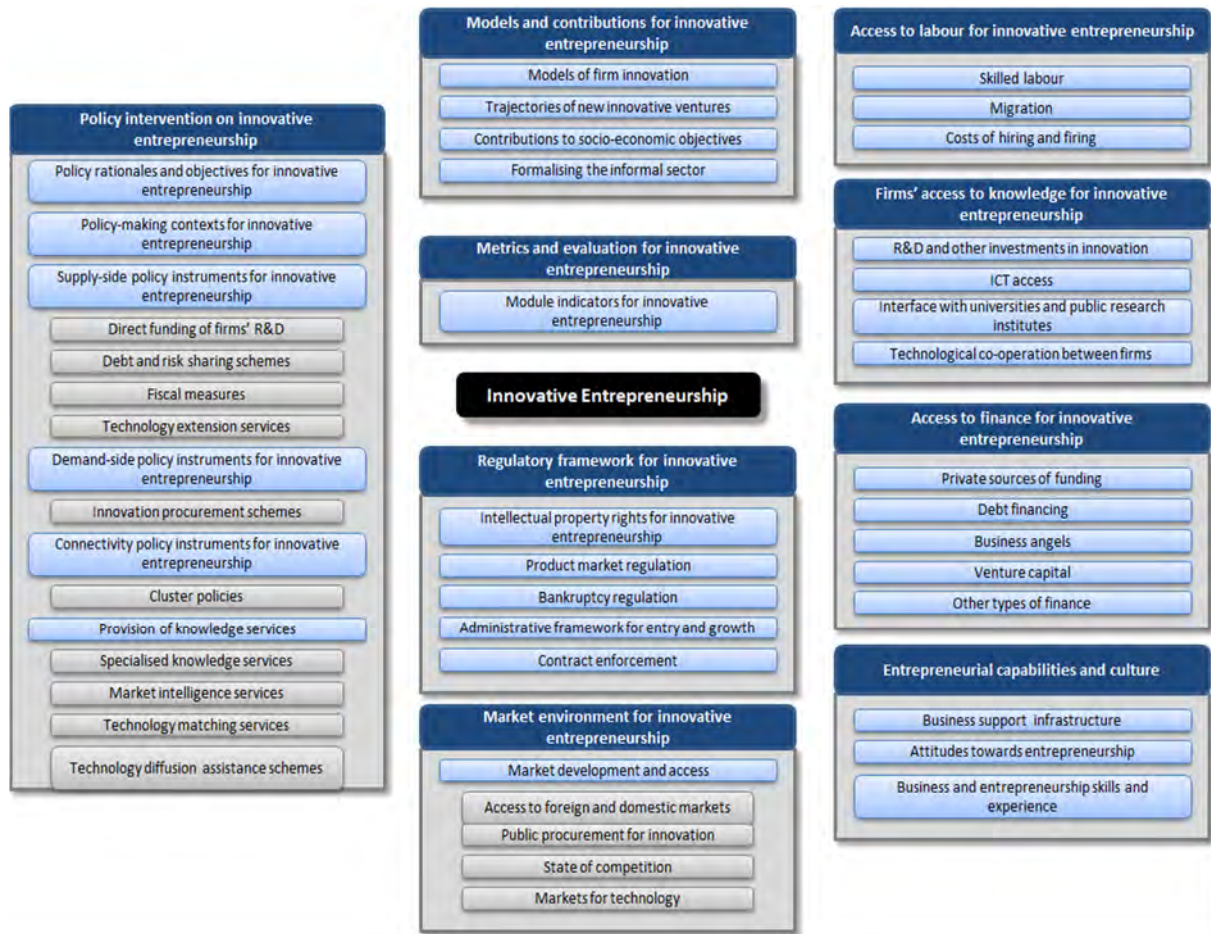
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### Annex 1: A snapshot of the Innovation Policy Platform Website

The Innovation Policy Platform (IPP) is a one-stop shop to support innovation policy, developed jointly by the OECD and the World Bank. It provides an online repository of reports and data to support better innovation policy making and analysis. Rectangles in the first snapshot indicate modules and links of relevance to the focus of this paper. The second snapshot gives a comprehensive overview of the issues and policies tackled in the module on “innovative entrepreneurship”, which is especially relevant to this paper.





## Innovative Entrepreneurs and Companies – What Does it Mean for Societies?

Michèle Morner

### I Introduction: Status quo and challenges

There is a general consensus that innovative entrepreneurs and companies bring growth and higher levels of employment to societies (e.g. European Commission 2013). The economic urge for innovative activities is also set to increase, as global change is expected to accelerate further in the future, with velocity already being called the “4<sup>th</sup> factor of production”.

New evidence shows that entrepreneurial activities not only influence economic factors but also enhance “subjective wellbeing”, based on work satisfaction and work-life balance. Empirical research reveals that this is especially true because entrepreneurs value the independence and lifestyle flexibility of running their own business (Global Entrepreneurship Monitor 2013a:62, with reference to Benz and Frey 2004).

Simultaneously, new opportunities for entrepreneurship, e.g. digitalization, swarm intelligence and crowdfunding, are arising. Yet as Figure “New enterprise creation in selected OECD countries” shows, in many OECD countries the level of entrepreneurial activity has not increased much. Only in France has the government succeeded in significantly boosting entrepreneurship by easing the legal restrictions on individual entrepreneurs and simultaneously allowing protection of individual assets (OECD 2013:16-17). ). However, this development may result as well from the extremely difficult situation at the French labor market – forcing more and more unemployed people into entrepreneurship.

New enterprise creation in selected OECD countries



\* Australia, Belgium, Denmark, Finland, Germany, Italy, Norway, Netherlands, Russian Federation, Spain, Sweden, United Kingdom, United States

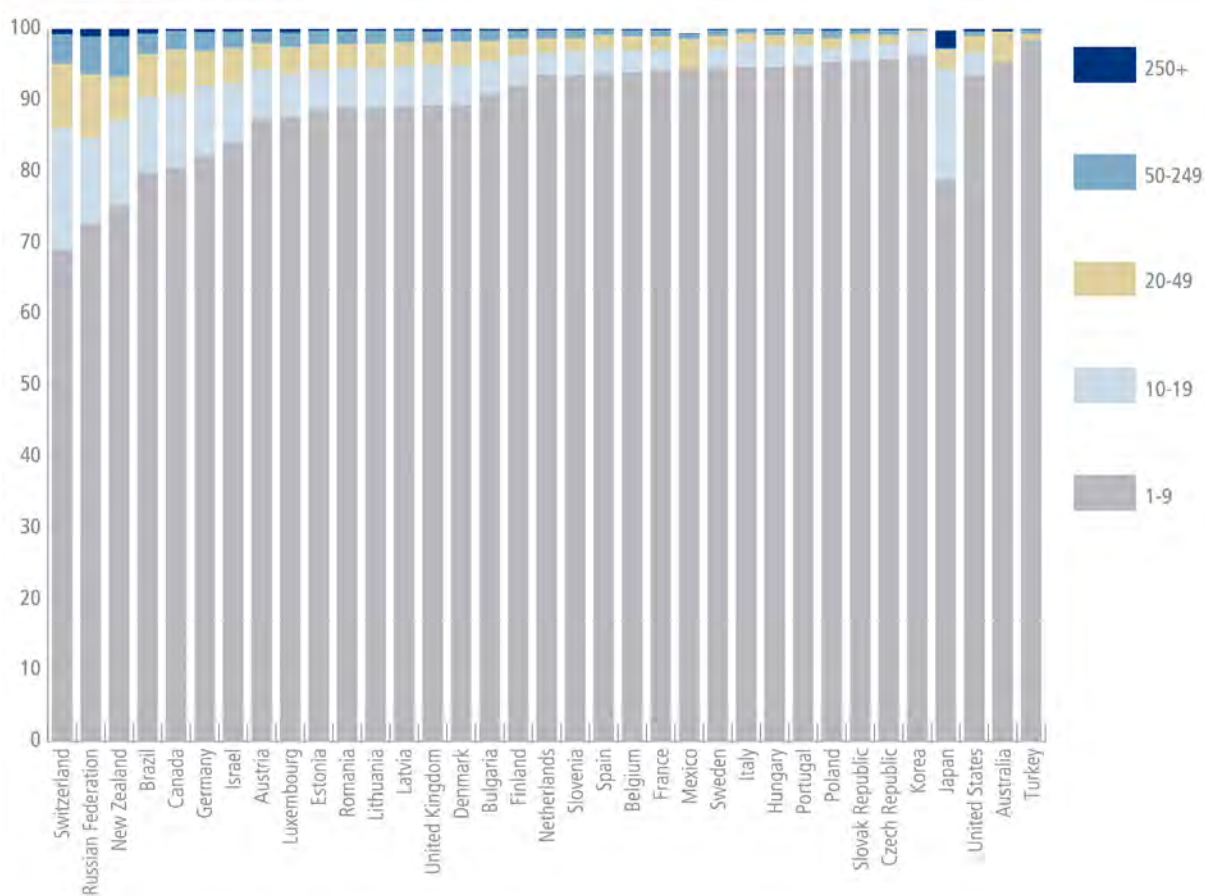
Source: OECD. Entrepreneurship at a Glance, Paris, 2013.

Thus, one main duty of responsible parties is to enhance the beneficial conditions for entrepreneurs. But larger companies too are an important engine for innovation and entrepreneurial activities. In the following it is shown how entrepreneurial conditions can be established at the individual level, on the one hand, creating societies with individual incentives for entrepreneurship (Section II), and at the corporate level on the other, fostering entrepreneurial behavior and innovations within companies (Section III). At each level adequate instruments for enhancing entrepreneurial activities are developed. Finally, we summarize our findings and derive policy recommendations as to how societies and companies can create an innovative climate for individual and corporate entrepreneurial behavior (Section IV).

## II Fostering entrepreneurs: Creating individual incentives for entrepreneurship

Entrepreneurship starts with the individual ability to turn ideas into action. It includes creativity and risk-taking, as well as the ability to plan and manage projects in order to achieve the entrepreneurial objectives (European Commission 2012a). Very often just one person, i.e. the entrepreneur, initiates the business, and very often the company remains small. Accordingly, as shown in Figure “More than 90% micro-enterprises”, micro-enterprises, i.e. firms with less than ten persons employed, account on average for more than 90 percent of companies in half of the OECD countries (OECD 2013:24).

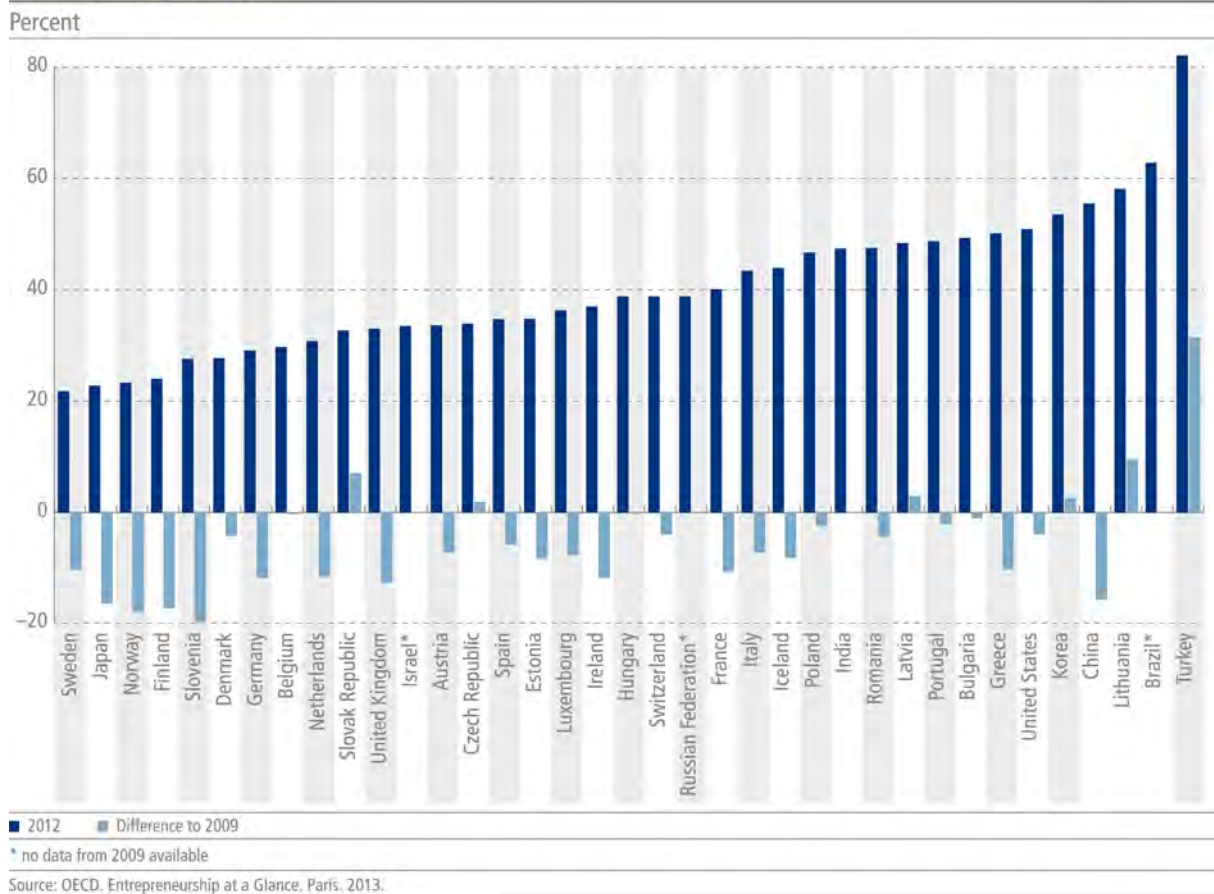
More than 90% micro-enterprises



Source: OECD, Entrepreneurship at a Glance, Paris, 2013.

Considering the important role that individual entrepreneurs play in founding new companies, it should be a cause of alarm that according to the Eurobarometer on Entrepreneurship (European Commission 2012b), since 2004 the percentage of people preferring self-employment has been dropping, particularly in Europe (see Figure “Preferences of self-employment”). While in 2009 45% of Europeans preferred self-employment, by 2012 this percentage had dropped to 37%. In contrast, in the United States 51%, in China 56% and in Turkey more than 80% prefer self-employment to being an employee. This high percentage especially in Turkey may as well result from people’s belief that the domestic economic situation is recovering.

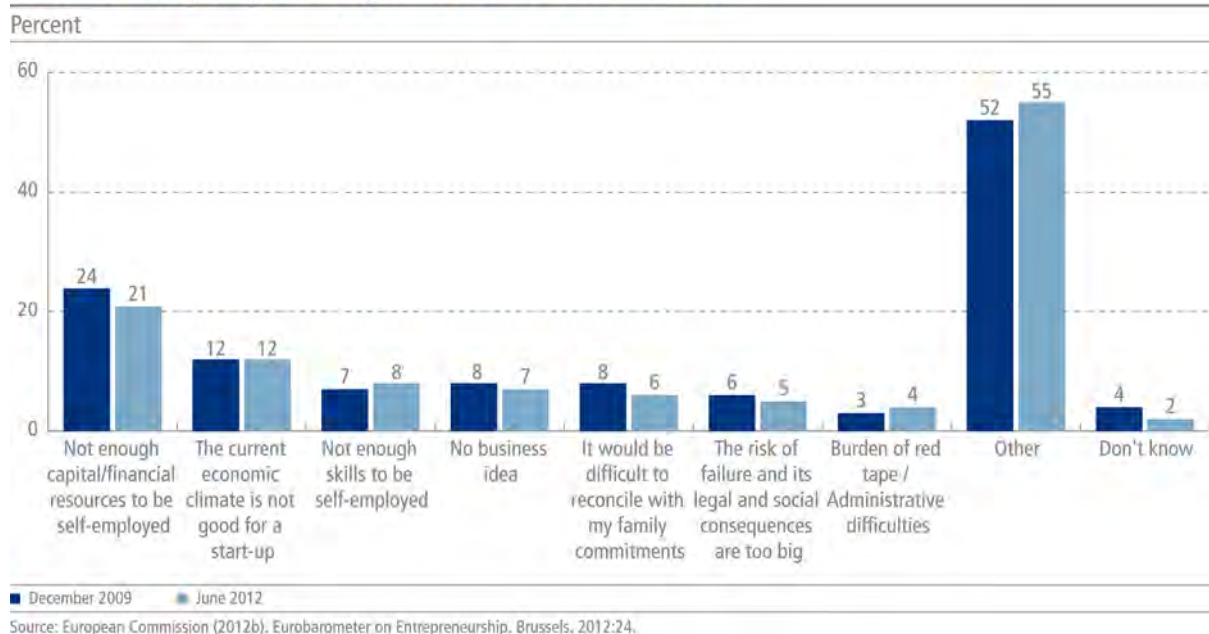
### Preferences of self-employment



The reasons why so many Europeans are uninterested in becoming entrepreneurs are manifold (see Figure “Preferences of self-employment”), but can be categorized into three main barriers to entrepreneurship. Because these barriers inform us about the main challenges in fostering entrepreneurial conditions, we discuss each of them in the following sections and show how they can be overcome:

- The principal barrier to entrepreneurship is a lack of capital; this means new forms of funding must be created (Section II.1).
- Other significant barriers to entrepreneurship include a lack of entrepreneurial skills and business ideas. Essentially, both can be traced back to the absence of an entrepreneurial education and entrepreneurial spirit (Section II.2).
- Entrepreneurial activities are also hindered by increasing regulation, especially in industrial countries. Accordingly, the burden of red tape and the risk of failure are also factors hindering self-employment (Section II.3).

### Reasons for not regarding self-employment as a feasible career alternative



## 1. Providing access to capital through alternative financial channels

One important factor hindering entrepreneurship is the lack of capital. According to the European Commission's Eurobarometer on Entrepreneurship (Figure "Preferences of self-employment"), it hinders 21% of all Europeans from becoming entrepreneurs. Only a few exceptions exist, such as Finland, where entrepreneurs have better access to capital and only 4% of inhabitants see capital as being a barrier to entrepreneurship.

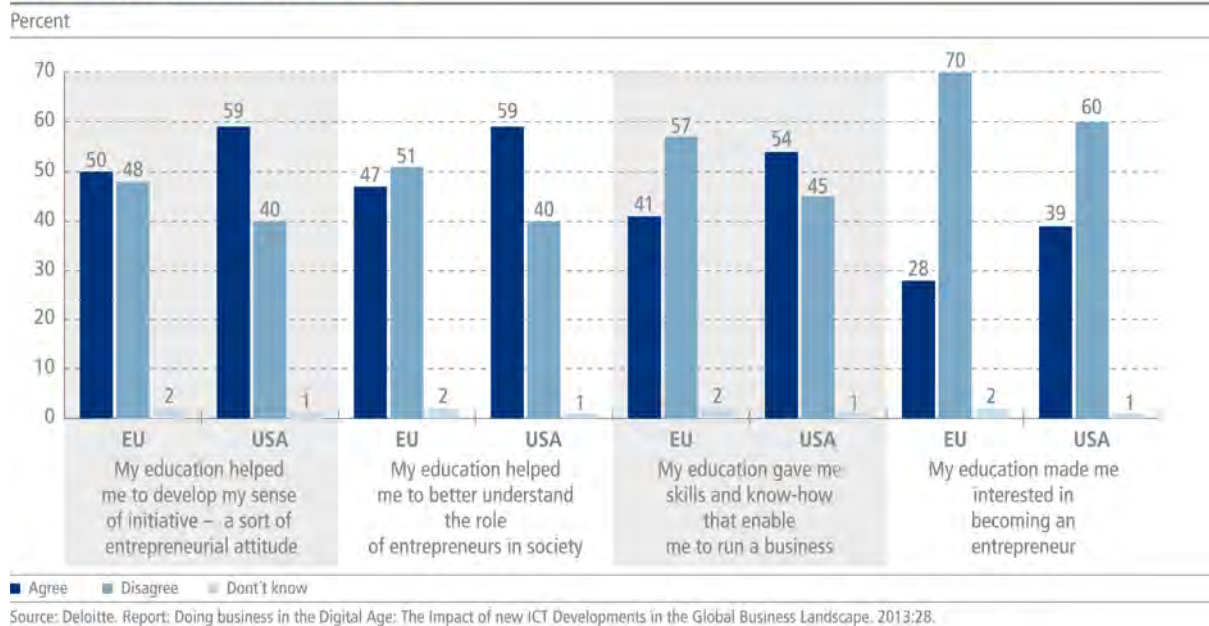
The need for entrepreneurial capital has given rise to new forms of funding and alternative modern financing channels such as crowdfunding, which means the collection of capital from the "crowd", representing a variety of participants interested in supporting an initiative. The crowd and the entrepreneurs seeking funding for their ideas come together on the respective internet platforms.

Crowdfunding allows new opportunities for future funding of entrepreneurship and has dramatically increased over the past few years. The amount raised globally by crowdfunding platforms in 2012 (€2.2 billion) was twice the amount in 2011 (€1.1 billion) and it successfully funded more than one million projects (Deloitte 2013:31). In Europe, the amount raised by crowdfunding platforms grew by 65% to €0.7 billion.

## 2. Developing entrepreneurial education and entrepreneurial spirit

The beginnings of entrepreneurship lie in the individual perception of good opportunities and the required skills and knowledge to use them (Global Entrepreneurship Monitor 2013b:19). Accordingly, it is alarming that only 41% of Europeans (compared to 51% in the United States) believe that their education gave them adequate skills to set up a new business (Figure "Effects of education on entrepreneurship").

## Effects of education on entrepreneurship



Entrepreneurial education starts at school, but even here the potentials are not fully exploited in all countries. In fact, significant cross-country differences exist when it comes to developing a sense of initiative and entrepreneurial spirit at school (OECD 2013:84). In Brazil, Norway and Portugal more than 75% of adults acknowledge the role played by school education, while in Japan this figure is less than 20%.

Yet investing in entrepreneurship education is one of the highest-return investments a country can make. Surveys suggest that between 15% and 20% of students who participate in a minicompany program in school will later start their own company (European Commission 2013:5, with reference to Jenner 2012.). The same applies to universities, which need to become more entrepreneurial (European Commission 2013:7, with reference to Gibb, Haskins and Robertson 2009) in two different ways: On the one hand, they should give their teaching a stronger entrepreneurial focus, including courses on basic skills for entrepreneurs. On the other, they should be more entrepreneurial themselves in the sense of encouraging and supporting students and/or employees to set up their own university-backed enterprises.

Even if an entrepreneurial education does not lead to the establishment of a business, the investment is not lost. An entrepreneurial education significantly influences the perception of entrepreneurship and individual risk-taking. Young people who are taught entrepreneurial skills not only develop business knowledge but also essential skills and attitudes, including creativity, initiative, tenacity, teamwork, understanding of risk and a sense of responsibility (European Commission 2013:6). This entrepreneurial mind-set is not lost and also brings value into the economy in the case that the person ends up as an employee at an existing company.

This entrepreneurial mind-set is urgently needed since the societal climate still cannot often be called innovative. Especially in Europe there is a widespread culture that neither rewards entrepreneurial endeavors enough nor celebrates successful entrepreneurs as role models who create jobs and income. Yet establishing role models is particularly important for encouraging entrepreneurs, since entrepreneurs throughout the world state that a role model was important in their decision to found a company (European Commission 2012b:56), with the highest percentages being in Brazil (87%) and Italy (86%).

### 3. Removing regulatory burdens

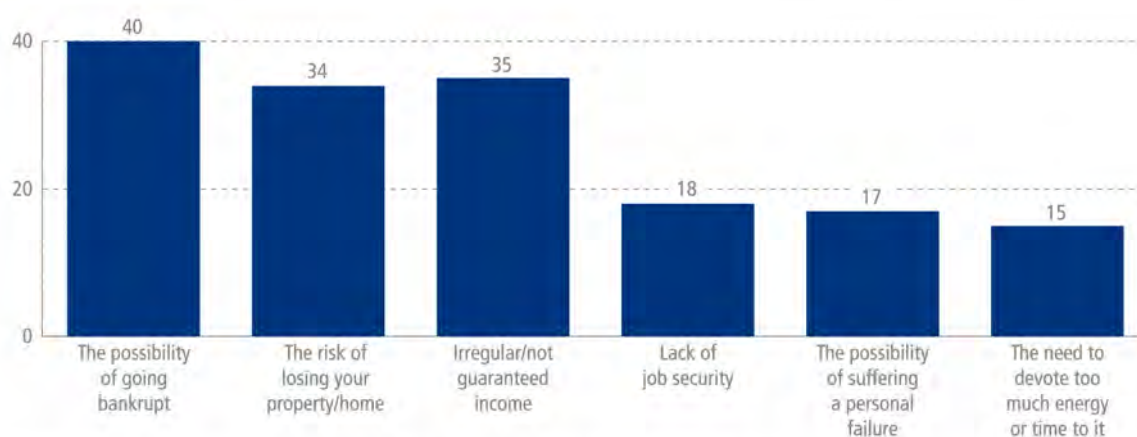
The development of entrepreneurial spirit in societies is often impeded by existing regulations concerning the foundation and operation of a company, as well as concerning entrepreneurial failure and starting anew afterwards. Accordingly, the burden of red tape and the risk of failure are significant factors in Europeans' preference to being employed rather than self-employed (Figure "Reasons for not regarding self-employment as a feasible career alternative").

Aware of this, the European Commission has committed itself to an action program to cut the red tape stemming from EU legislation by 25% by 2012. Yet the empirical results show that 72% of Europeans still find it difficult to start their own business due to complex administrative procedures (European Commission 2012b:78). Thus, the regulatory burden needs to be reduced further.

Moreover, it is important to reduce the anxiety connected to failure and the personal consequences thereof (Figure "Risks of setting up a business"). Among Europeans, 43% state that they would fear going bankrupt, while for more than a third (37%) the risk of losing their property would concern them the most (European Commission 2012:72). Thus, regulation should be changed accordingly. In most countries, a large majority believes that entrepreneurs who fail should be given a "second chance" (OECD 2013:84).

#### Risks of setting up a business

Percent



Average in Switzerland, Russian Federation, Brazil, Germany, Austria, Luxembourg, Estonia, Romania, Lithuania, Latvia, United Kingdom, Denmark, Bulgaria, Finland, Netherlands, Slovenia, Spain, Belgium, France, Sweden, Italy, Hungary, Portugal, Poland, Slovakia, Czech Republic, Korea, Japan, China, United States, Turkey, Ireland, Cyprus, Malta, Croatia, Iceland, Norway, Israel, India

Source: European Commission (2012b). Eurobarometer on Entrepreneurship. Brussels. 2012:74.

### III Fostering innovation in companies: Creating a climate for change

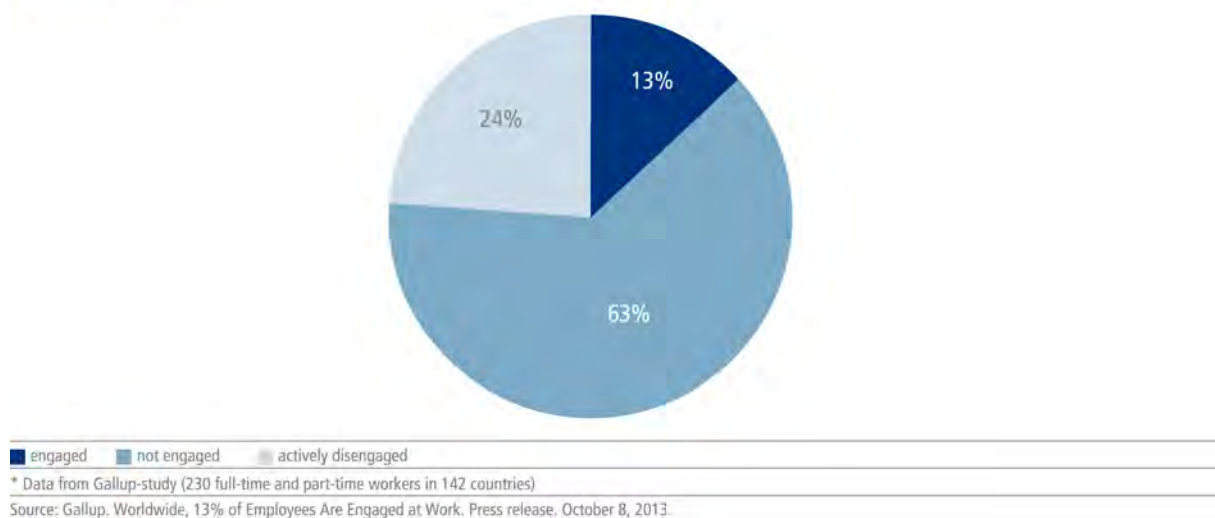
Whereas entrepreneurship starts at the individual level, a salient place for innovative activities is also within companies. The larger the economy, the higher is the proportion of larger enterprises that are responsible for innovations (OECD 2013:24). However, especially large firms still struggle to remain innovative (e.g. Morner 1997). Departmental self-interests, and bureaucratic structures often lead to inflexibility and hinder creativity.

Under these circumstances companies face serious challenges not only to be innovative, but also to attract creative and entrepreneurial employees. This is especially the case for the incoming Generation Y, born after 1980 and usually expecting more freedom (with regard to working hours, workplace and content), lifelong learning opportunities, etc. They are increasingly less interested



in traditional status symbols (e.g. a representative company car) and more interested in social values, responsibility and involvement, as well as in inspiring work environments. Accordingly, in conventional companies more and more employees are becoming less entrepreneurial, with no motivation to take on any responsibilities beyond their regular duties (Figure “Frustration in work”).

Frustration in work\*



In the following it is discussed how companies can attract creative and entrepreneurial people by creating an environment that fosters an intrinsic motivation to contribute to innovations and that encourages creative teamwork (Section III.1.). This requires more decentralized forms of governance fostering cooperation and creativity (Section III.2), which can be further supported by increasing digitalization (Section III.3).

### 1. Ingredients for entrepreneurial teamwork: Employees' cognitive ability and motivational willingness to innovate

Innovations in companies are first and foremost created by teams (Hoegl and Gemünden 2001). Only in cooperative teamwork can company-wide activities, decisions, resources, and knowledge chunks be complementarily bundled into product and process innovations (Frost and Morner 2010). This calls for employees who are not only creative and entrepreneurial (Section II), but also cognitively able and motivationally willing to collaborate with others in the innovative activities.

#### Fostering innovative teamwork by bridging cognitive distance

The precondition for innovative activities is sufficiently qualified employees. However, expertise and knowledge are not enough; they must be complementary, while still being understandable or at least translatable: A so called “optimal cognitive distance” (Nooteboom 2000).

Cognitive distances between involved knowledge workers are based on their different cognitive backgrounds and have a twofold effect on corporate innovations: On the one hand, the different cognitive backgrounds of employees are important for innovations because they enhance the generation of new knowledge and the discovery of alternative solutions to problems. If all members employees knew exactly the same things and interpreted the world in the same way, organizational learning would not take place (Hodgson 1998). Accordingly, cognitive distance based on sufficiently diverse teams and lateral thinkers leads to more in-depth sets of information and solutions, higher variation concerning ideas and creativity in teams.

On the other hand, a high level of cognitive distance may hinder team members' mutual understanding and thus prevent them from entering into the level of detail that is essential for sharing experiences and knowledge. To foster innovations, organizational governance must not reduce but "bridge" the cognitive differences between employees (Nootboom 2000). In this way cognitive overlaps are created that enable a shared understanding of problems while still retaining sufficient capacity for specialized knowledge. This can happen through different kinds of activities that foster interaction, e.g. joint workshops, job rotation, etc.

### **Fostering innovative teamwork by creating intrinsic motivation**

Innovative teamwork requires employees who are intrinsically motivated to a high degree. Considering this, it is alarming that worldwide 87% of employees are not engaged or actively disengaged in carrying out more than their nine-to-five obligations (Figure "Frustration in work").

To get involved in the innovative process without knowing the results is particularly difficult for employees who are trained to reach well-defined goals in a short-term manner. This kind of extrinsic motivation under certain circumstances even diminishes intrinsic motivation. This effect is called "crowding-out" (Osterloh and Frey 2000), and emerges if extrinsic goals restrict employees' perceived self-determination or harm existing norms of fairness and reciprocity.

## **2. Governing innovative teamwork: Fostering self-organization and creating a climate for change**

As shown above, the mutual understanding of employees, i.e. their "optimal cognitive distance", and their intrinsic motivation for innovative teamwork are indispensable for complementary knowledge creation and thus for corporate innovation. However, neither the cognitive understanding nor the motivational will and enthusiasm to contribute can be enforced hierarchically. Thus, in the following we show at first why conventional authoritative management and governance mechanisms are doomed to fail to foster innovations. Secondly we describe, why the currently hyped key performance indicators (KPIs) can be counterproductive to more complex innovations. Thirdly, we show that a more decentralized way of governance based on self-organization is needed to foster innovative teamwork.

### **The failure of authority-based governance in fostering innovative teamwork**

Authority-based governance is based on the formal authority of executives. It formally centralizes decision-making processes and the control of behavior (March and Simon 1958). Basically, two authority-based governance mechanisms exist: direct supervision and general rules. Both fail to foster innovative teamwork, primarily for three reasons:

- **Illusion of feasibility:** It is naïve to believe that management always has enough knowledge to adequately instruct and supervise innovative activities. Especially in the case of more complex innovations it becomes impossible to give the right instructions and to monitor results or sanction them. Thus, strict authoritative management rarely leads to promising innovations.
- **Destroying intrinsic motivation:** Even if managers could forecast innovations and/or the best way of innovating, their top-down-involvement would destroy the perceived self-determination of employees (Deci and Ryan 1985). This again, however, may crowd out employees' enthusiasm to develop something new and their intrinsic motivation to cooperate in a team. In such surroundings, it will be difficult to retain or acquire highly

intrinsically motivated knowledge workers, who usually seek a high degree of self-determination and flexibility.

- **Impeding mutual understanding:** Management cannot hierarchically enforce employees with different cognitive backgrounds to understand each other and to share their knowledge in an effort to develop something new (Frost and Morner 2010). Only through frequent interaction can the different contexts be bridged and this requires adequate intrinsic motivation on the part of employees.

### **The failure of performance control in fostering innovative teamwork**

In response to the challenges of purely authority-based governance, more decentralized, market-oriented governance mechanisms of performance control have been introduced. Performance control does not judge behavior, but measures the realized output via performance indicators. This requires, however, that the output must be principally measurable. As discussed above, however, this is seldom the case with innovative activities. Similar to authority-based governance, intrinsic motivation is crowded out. Furthermore, performance control often fosters competition, which again impedes cooperation for common innovative activities.

### **Fostering innovation through delegation and participation: The role of self-organization**

As shown above, authority-based governance and performance control alone are not able to foster innovative teamwork. They are still needed, however, and must be combined in a subtle way with more decentralized modes of governance including delegation and participation.

Delegation and participation are the basic ingredients of self-organizing governance. Responsibilities are delegated to employees and/or units that are cognitively able and willing to fulfill the respective tasks (Frost and Morner 2010). The employees mutually adapt and ideally reach a consensus or compromise regarding the common goal and how to proceed.

Self-organizing governance fosters employees' enthusiasm to engage in innovation, their intrinsic motivation to cooperate, and their mutual understanding, and is thus indispensable in innovative teamwork. Yet, self-organization does not mean complete "laissez-faire". Rather, the functioning of self-organizing governance is based on so-called soft integration mechanisms and is simultaneously dependent on qualified employees:

**Soft integration mechanisms:** Soft integration mechanisms support the procedure of mutual adjustment in self-organizing processes "nudging" employees into adequate behavior in favor of the company. They can be differentiated into "mechanisms bound to persons", such as charisma, natural authority, reputation and trust, and "mechanisms bound to corporate culture", such as fairness, solidarity and common values. The different mechanisms are closely connected and influence each other:

- Mechanisms bound to persons, such as charisma, natural authority, reputation and trust are usually described by the notion of leadership. Through charisma, natural authority and trust, successful leaders can enable self-organizing governance without using their formal authority. In this way, they shape behavior by enhancing employees' enthusiasm and intrinsic motivation for innovative activities rather than destroying those qualities.
- Mechanisms bound to corporate culture, such as fairness, solidarity and common values are usually connected to the notion of corporate culture. They foster employees' perception of belonging and convey a sense of purpose for innovative activities. To establish fairness and solidarity it is important that unfair behavior is sanctioned (Morner and Walder 2014).

Ideally, teams decide the “rules of the game” themselves and how to sanction if the rules are violated.

**Qualified employees:** Self-organizing governance requires adequate immaterial and material resources which flow into the respective activities (Frost and Morner 2010). The most important input for innovation processes, however, is the knowledge and expertise of employees. Therefore, one of the most important activities in fostering innovation is acquiring the right employees and/or developing them. The selection and development criteria therefore include not only the candidate’s knowledge and expertise, but also their willingness to share and enhance them. Accordingly, highly innovative companies like Google take the selection of future employees very seriously and invest a lot of resources in their development.

Such shifting of focus from “using resources” to “developing potential” fits well with the focus of self-organizing governance on fostering intrinsic motivation and mutual understanding. Only if companies understand that their most precious resources are people and their ability to innovate will they be on their way to being sustainably innovative.

### 3. The role of digitalization in governing innovation

These days, new information technology (IT) plays an increasing role in governing corporate innovation. Social media provide a wide spectrum of modern communication and support possibilities as well self-organizing governance. Artefacts such as blogs, database systems, email-archives and software codes emerge, so that direct communication is no longer necessary. IT is thus increasingly developing from being a pure medium to an own mechanism of integration that helps coordinate the sharing and creation of knowledge (Morner 2003). New forms of knowledge creation thereby emerge that also use the intelligence of the masses outside the company (e.g. “crowdsourcing”).

## IV Summary and “state of play”: Creating an entrepreneurial society

Be it at an individual or corporate level, entrepreneurial activities are one of the most valuable parameters for economic development and wellbeing in societies. Without any doubt, they will become even more valuable in the future. Yet we have shown that neither societies nor companies are currently well prepared for creating a fertile entrepreneurial landscape. We have outlined the challenges and several countervailing measures for entrepreneurship at the individual and corporate level, and these can be bundled into three broad recommendations for national governments and companies:

### Attracting and developing talent

The most important ingredient for entrepreneurial activities is highly talented entrepreneurs and/or employees. Thus, the current talent gaps should induce national governments and companies to urgently consider strategic and long-term methods for tackling entrepreneurial talent shortages. It is alarming that so many Europeans in particular think that their education did not equip them with adequate skills for setting up a new business. The same skills are missing at the corporate level for fostering entrepreneurial thinking within companies. At both levels countervailing measures include attracting the right skills and, even more importantly, developing them:

- **Attracting talent at the societal and corporate level:** Since knowledge and expertise are the most valuable assets for innovative enterprises, companies should invest more in attracting and selecting the right employees. The selection criteria should not only be the candidate's knowledge and expertise, but also their willingness to share and enhance their knowledge as well as their ability to think out of the box.
- Before selection starts, however, companies must create adequate opportunities for attracting highly skilled individuals. These opportunities are also an important precondition for a successful immigration policy, as countries can only attract highly skilled immigrants if adequate job opportunities exist. This has to be supported, however, by national governments creating a predictable and transparent immigration policy.
- **Developing talent at the societal and corporate level:** Even more important than attracting skilled entrepreneurial people are the efforts to develop them. This shifts the focus from "using existing resources" to "developing new potential". Instead of a "war for talent" the motto then becomes "increasing the global talent base", not only within companies and/or countries but also regardless of borders. It is not only skills and knowledge that need to be fostered, but also specific entrepreneurial competencies and the ability "to think out of the box". Furthermore, universities need to be more entrepreneurial. They not only need to improve their entrepreneurial teaching, but also offer more opportunities for climbing the first steps on the entrepreneurial ladder.

#### **Reducing bureaucracy and regulatory burdens:**

It has clearly been shown that the entrepreneurial spirit of individuals and companies is often impeded by existing regulations. National governments should therefore urgently continue their efforts to diminish the burden of red tape and other regulatory barriers which hinder entrepreneurs from founding and operating new businesses.

National and international regulatory burdens again negatively influence innovative environments at the corporate level. In some industries (e.g. banking) companies are so focused on compliance that not much energy is left for innovative activities. Increasing rules and laws also lead to an increase in rules within companies. Yet at the corporate level, too many rules stifle creativity and intrinsic motivation as well as lateral thinking. It is disconcerting that many European employees are no longer interested in making any contribution beyond their daily obligations. As we have shown, the same occurs when there is too much focus on performance control and respective performance indicators.

#### **Establishing an entrepreneurial climate at the societal and corporate level**

Instead of rules and laws, the focus at the societal and corporate level should shift to establishing an entrepreneurial climate that embraces talentism and creativity. It was shown above that Generation Y talents prefer creative work environments with more flexibility and less bureaucracy, and existing talent hubs (e.g. Silicon Valley) show how such environments attract highly skilled entrepreneurs.

Companies should also focus less on rules and compliance, and more on encouraging leadership based on natural authority and reputation, as well as on establishing a corporate culture based on trust, fairness, solidarity and common values. Only a few simple rules should be established, and breaking them should be adequately sanctioned. First and foremost, entrepreneurial activities and inventive thinking accompanied by fairness and solidarity should be encouraged. Only then can a sustainable entrepreneurial climate emerge.

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# Enemies of Innovation - How to Improve Organizational Success and to Create Innovative Ecosystems?

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## I Introduction

The capacity to innovate immensely impacts the ability of companies and regions to continue competing in their future market (Koc and Ceylan 2007). As technological advancements and thus consumer expectations change rapidly, today's challenge is not just to keep up to date but to actually surpass competitors with new and creative ways to meet yet unknown demands.

This is especially important for long-established firms that might have lost their ability to think outside of their usual boundaries. However, regions and cities also take part in the race to become the next hub of innovation in order to stimulate their economic growth and prosperity.

The following will address the issue of how companies and regions can become centers of innovation and progress.

## II Organizational architecture co-determines innovational capacity

### 1. Barriers to innovation

The most innovative employees will not produce a single disruptive idea if suppressed by the corporate climate that surrounds them.

Innovation should become an imperative from the bottom to the top of an organization. A lack of commitment on the part of top management not only affects all employees' motivation directly but diminishes the organization's ability for innovation and future growth through multiple channels.

First, a lack of organizational dedication to innovation activities is usually reflected in an inadequate reward and incentive system, which might signal low appreciation and trust, thereby greatly discouraging employees from innovating. Behavior that is rewarded and appreciated, however, will more likely be repeated (Martins and Terblanche 2003).

Even more than the passive impact of inappropriate reward systems, punishment for failures actively hinders innovation activities. A negative attitude towards risktaking and mistakes embedded in the organizational culture strongly affects employees' disposition to think beyond their general boundaries (Feyzbakhsh, Sadeghi and Shoraka 2008; Martins and Terblanche 2003). Risk and failures, however, are the basis of entrepreneurship and an inevitable component of innovative solutions, whose success is essentially based on creating the previously unknown (Andrews 2006). An efficient and well-run organization does not always equate to a creative and innovative business.

Another consequence of a poorly committed circle of senior executives (C-Suite) is an insufficient allocation of resources to the generation and implementation of ideas. Innovation, however, needs time and capital (Andrews 2006; Feyzbakhsh, Sadeghi and Shoraka 2008). Furthermore, entrepreneurial employees may feel undervalued and that their ideas will be hard to incubate if inadequate funding is dedicated to their initiatives. Innovative staff may also feel hindered if employers focus solely on fostering efficiency within the current system and on the additional costs of fostering innovation (Martins and Terblanche 2003).



Heavy bureaucratic structures and steep hierarchies create real barriers to the expression of unconventional ideas. An organization's structure has a strong impact on its level of innovation activity as it "seems to emphasize certain values which have an influence on the promotion or restriction of creativity and innovation in organizations" (Martins and Terblanche 2003).

Strict command structures usually impede a free flow of information between the source of an idea and the top management. This affects both the speed and rate of successfully implemented innovations. As decision-making and budget allocation are centralized at the top, a vast number of ideas might get lost on their way up (Feyzbakhsh, Sadeghi and Shoraka 2008). Strict hierarchies can also eclipse the visibility of talented employees. It can reduce the quality-of-worklife for an organization's potential innovators, and result in an organization shedding its best talent in order to preserve hierarchical integrity.

Falsely incentivized and bureaucratically-rooted organizational structures can also "cork" information flows between units and teams within businesses. This is fatal for innovation because it isolates thinking and the exchange of ideas into silos, limiting interdisciplinary thinking. Poor communication activities do not just negatively affect the acceptance of changes among staff (Koc and Ceylan 2007); the likeliness of breakthrough ideas decreases as opportunities for more diverse views and approaches resulting from cross-functional idea and knowledge sharing remain unexploited (Koc and Ceylan 2007; Martins and Terblanche 2003).

## **2. Organizational architecture and culture - Building an innovation-ecosystem from within**

Organizational architecture and culture greatly foster, or hinder the generation and implementation of innovation from within companies. The way these structures influence information flow is the key to gauging if an organization has built-in barriers to innovation.

Flexible and flat hierarchies favor spontaneous ideas and creativity (Martins and Terblanche 2003). A free flow of ideas and knowledge across teams and departments will activate the creative mind naturally. Accordingly, appropriate communication channels and regular opportunities for cross-functional co-working are essential to stimulate innovation activities (Koc and Ceylan 2007; Martins and Terblanche 2003). Furthermore, an integration of corporate functions beyond R&D will reduce resistance to change among staff and hence accelerate their implementation (Koc and Ceylan 2007).

A culture of common knowledge and co-creation must thus be developed. Especially in large companies, however, informal communication networks are frequently missing or not sufficient to spread knowledge across the organization. Google realized the need for network and communication opportunities and thus introduced among other things, Google Cafés – informal interaction spaces intended to trigger communication and exchange among employees from different teams (Forbes 2013a).

Likewise, institutionalized communication and idea generation procedures may help to prevent thoughts from getting lost, set a sign as to the importance of innovation and invite all employees regardless of their hierarchical level to share their views (Koc and Ceylan 2007). Some corporations have already recognized the value of such an internal "Market for Ideas" (Hamel 1999) and try to build their own ecosystems of innovation accordingly.

Ericsson, a global telecommunication's technology provider, has set up an internal brainstorming and venture capital space called Innova Box for this purpose. Employees are free to share their ideas with an online community and can do so easily. Others can directly provide feedback, appreciation or further ideas and use other employees' knowledge for their own purposes. The best ideas are granted funding and time for their further pursuit by an internal panel (Fast Company 2013).

Another approach for the stimulation of innovation is the introduction of regular workshops or idea labs aimed at bringing together employees from diverse teams, levels and backgrounds and providing them with the right setting for free idea generation (Hamel 1999). These internal drivers of innovation will also increase the speed at which ideas are being transformed into actual innovation – a consequence that will further increase employees' motivation (Accenture 2008; Koc and Ceylan 2007; Martins and Terblanche 2003).

Besides promoting internal innovation activities, companies should take a look outside to spur their innovation initiatives. A process called Open Innovation encourages companies to include external partners in their innovation process through collaborations and idea-sharing (Laursen and Salter 2006). As "innovation is being democratized" (Von Hippel 2005), research departments are not the sole source of ideas and creation anymore. Customers, suppliers, universities and other industry partners can provide useful insights on future needs, trends and possibilities. Even competitors can become valuable co-creation partners when resources complement each other (Laursen and Salter 2006). Based on the same ulterior motive, the Design Thinking method introduced by IDEO is centered around human needs and desires meeting both technological and economical requirements at the same time (Brown 2008).

Another very interesting concept in this context is the mutually beneficial collaboration of young start-ups, which bring in their fresh and entrepreneurial mindset, and long-established companies, which are able to contribute the necessary resources to realize projects.

Besides establishing promotional processes, a culture "which encourages, supports and directs idea generation activities" has been found to be "one of the most important determinants of innovation" (Koc and Ceylan 2007). In order to emphasize a commitment to innovation within an organization, resources need to be freed and especially dedicated to the implementation of novel ideas.

One way of demonstrating such commitment is the appointment of a senior-level executive for innovation. Innovation and creativity thereby become a dedicated part of the company's strategy with separate budgetary responsibility (Accenture 2008).

Yet not only the allocation of budget demonstrates commitment; time is a valuable resource as well. Accordingly, companies like Google (The New York Times 2014), Shell (Hamel 1999) or 3M invite their employees to spend a specified amount of their working time on their own undertakings thereby giving "talented people the time and resources to prove the worth of their ideas" (3M 2014).

Another important aspect of such an innovation-friendly climate is the way risks and failures are handled (Feyzbakhsh, Sadeghi and Shoraka 2008; Martins and Terblanche 2003). Innovation is always inevitably coupled with risk as it presents new and unknown ground (Andrews 2006). Innovation is believed to be an iterative process of experimentation, and initial perfection should

not be expected. Quick detection and correction of failures, however, is crucial (Harris and Junglas 2013).

Last but not least, an organization's culture is also strongly connected with its reward and incentive schemes. Among companies in Silicon Valley, for instance, it is very common to grant employees stock or options regardless of their level to trigger their ambition to perform (Harris and Junglas 2013). Interestingly, however, extrinsic rewards (i.e. monetary or career incentives) have been found to be less important to intrapreneurs (employees who act like entrepreneurs but within the boundaries of their organization (De Jong and Wennekers 2008)) than intrinsic rewards like peer recognition or autonomy (Harris and Junglas 2013). A fleet processing of ideas within the organization and prompt feedback will further enhance employees' motivation by demonstrating that suggestions are valued and taken seriously (Koc and Ceylan 2007).

After having built a structure and culture of innovation, entrepreneurial individuals and teams are needed to fuel creativity among staff.

### **3. Fostering a 'creative class' – Recruiting a creative mass of intrapreneurs**

In the process of designing an innovative organization, business leaders will not just have to build up appropriate structures and nurture a culture of ideas and innovation, but ask themselves which employees are needed to further increase the capacity of innovation within their organization. Employees are the heart of any organization and thus immensely influence the company's overall success.

As innovation capacity can be increased by the combination of different perspectives, views and ideas, a diverse workforce bringing together employees from various interests and backgrounds will positively influence each one's ability to generate ideas (Harris and Junglas 2013; Martins and Terblanche 2003).

Despite the notion that diversity will trigger innovation, typical characteristics exhibited by intrapreneurs can be observed. Intrapreneurs act more proactively, seeking challenges and opportunities deliberately and on their own initiative (De Jong and Wennekers 2008). This is closely related to their attitude toward changes and risks: Intrapreneurs are not afraid of leaving their safe and predictable ground. Very important in this context is their flexibility and adaptability in moments of uncertainty (Forbes 2013b). Innovators "know how to pivot" (Forbes 2013b) and thus are less reluctant to change. Furthermore, they exhibit a strong inner quest for achievement and creation, which actually drives them to search for new challenges and risky ventures (Rep 2004). They are willing to work harder and longer than other employees simply out of their enthusiasm for achievement and creation (Harris and Junglas 2013). Additionally, innovators demonstrate a greater ability to recognize opportunities, which is an immense advantage as opportunities are the starting point of innovation (Harvard Business Review Blog Network 2013). It is these traits and characteristics that make employees more capable of innovation than others. They think beyond the usual scope and connect the previously unconnected.

It is now the task of companies not just to attract and recruit these potential intrapreneurs, but to retain them by creating a supportive and gratifying working environment as outlined in the previous section. Otherwise, the most innovative talents will leave the company faster than expected as they have a higher tolerance for change and employment insecurity.

### III An ecosystem of innovation

Successful companies and start-ups in particular are the main drivers of economic growth and innovation activity. Their impact on a region's wealth is enormous (AustrianStartups 2013). According to a survey commissioned by the "Junge Wirtschaft", every newly established enterprise created on average 2.4 jobs directly and a further 5.3 jobs indirectly in Austria 2013 taking into account purchasing power effects and preliminary interrelations. In the long term, these companies will even have realized a total added value of €9.9 billion by 2024 (WKO 2013). Correspondingly, regions and cities are eager to become the next great start-up hub. A variety of factors influence a region's attractiveness to start-ups and innovators. Following is an analysis of what are currently some of the most vibrant hubs of innovation. Parameters of comparison have been identified with the aim of revealing a recipe for building an ecosystem for innovation. These parameters include governmental measures such as subsidies and incentives, as well as regulations and bureaucratic structures; the ease of access to funding and capital; and the intensity of a region's network, including other start-ups, influential, large corporations and regular networking opportunities and institutions like co-working spaces or accelerator programs. The existence of sophisticated universities and research institutes will be investigated as well, given the importance of fresh skills and talent to a market's growth.

The cities and regions of Vienna, Berlin, London, Dublin, Silicon Valley, Shanghai and Tel Aviv will be analyzed according to their attractiveness to start-ups along the parameters outlined above.

Silicon Valley, Tel Aviv, London and Berlin are ranked among the top 20 start-up locations within the Startup Ecosystem Report 2012 released by Startup Genome and Telefónica Digital (Startup Genome and Telefónica Digital 2012). Vienna emerged as Europe's leading start-up city within the Innovation Cities Global Index 2012/2013 released by the global innovation agency 2thinknow (2thinknow 2013) and Dublin achieved rank 14 among 142 countries within the Legatum Prosperity Index in terms of "Entrepreneurship & Opportunity" (Legatum Institute 2013). China's fast-moving development and growth was fueled by the economy's strong position in technological advancements and Shanghai played a leading role in driving innovation (StartupItalia 2013). These locations serve as role models for building hubs of innovation with their individual strengths and advantages.

#### 1. Vienna

Vienna has transformed into a vibrant start-up location and the hub of central and eastern Europe's community (AustrianStartups 2013). Runtastic is only one exemplary success story made in Austria. Founded in 2009, the start-up has developed its product into one of the world's leading mobile applications for sport's tracking. The international publishing house Axel Springer even aimed at securing its position in the digital market by acquiring a majority share of 51% in the fitness application (Axel Springer 2013).

This potential has not been gone unnoticed by government authorities as well. The promotion of start-ups and innovation has become an important part of the national agenda. Austria Wirtschaftsservice GmbH, for instance, set up a variety of programs to support start-ups financially. It has been noted, however, that these subsidies frequently do not meet the actual requirements of start-ups and that the Austrian regulatory environment in general is still rather unfavorable for young enterprises (AustrianStartups 2013).

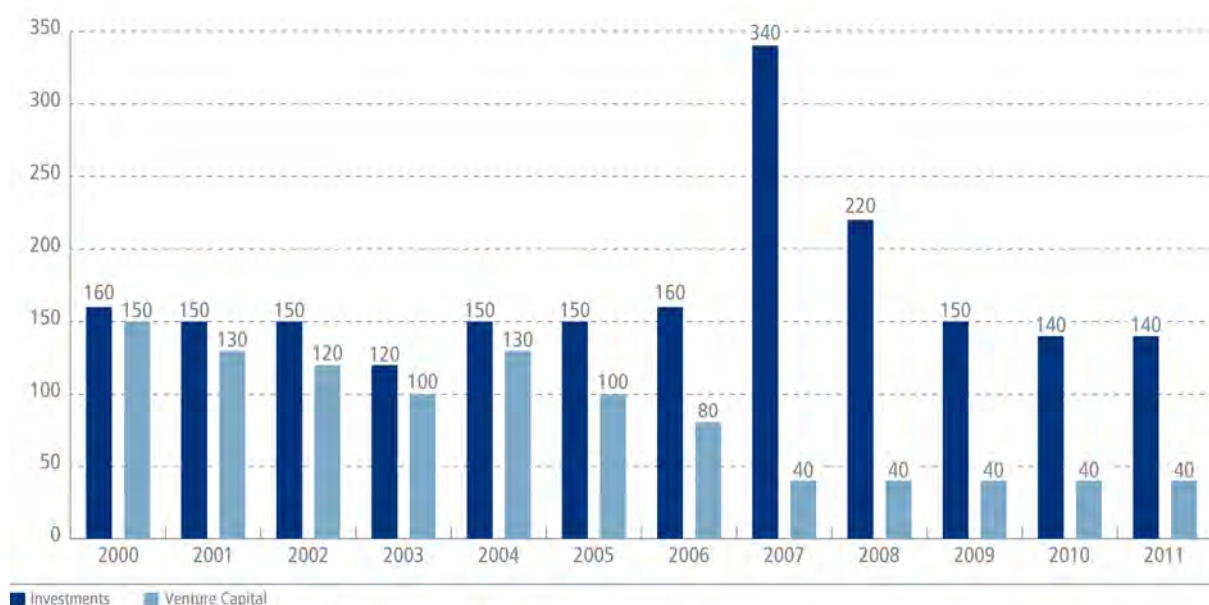
This also ties in with the rather conservative Austrian investment behavior, which has spurred a call for tax incentives on private investments to stimulate a mobilization of risk capital (AustrianStartups 2013; Speedinvest 2013). The Austrian Angel Investors Association (AAIA) co-founded by Johann “Hansi” Hansmann (probably one of the most active angel investors in Austria) is one of the most ambitious and successful institutions for the promotion of angel investments (investments by an affluent individual, who provides capital for a business start-up) in Austria.

Speedinvest, a rather young fund set up in 2011 in Vienna (Gründerszene Datenbank 2014), has recognized this funding gap as well and created an angel fund specifically targeted at early-stage companies in central and eastern Europe. Another example for successful start-up promotion made in Austria is i5invest, a Vienna-based incubator focusing on online and mobile businesses.

The supply of venture capital is still rather unsatisfactory as well. As displayed in the chart below (Figure “Venture Capital in Austria”), venture capital accounts for only a small percentage of total private equity in Austria.

#### Venture Capital in Austria, 2000-2011

Millions of €



Source: AustrianStartups. CEE Startup Ecosystem 2013. Original data by avco, europe.eu, Speedinvest and startupwiki.at. (Also available online at <http://www.austrianstartups.com/ecosystem>, accessed April 27, 2014)

Despite some regulatory and financial hurdles, a dynamic community has evolved. Internationally recognized events like the annual Pioneers Festival and a strong network of about 30 incubators, hacker- and co-working spaces provide a nurturing environment for start-ups and entrepreneurs (Borras 2014).

Concerning a continual inflow of fresh skills to the market, Vienna is not just attractive to young professionals from abroad but constantly produces new talent at its own education institutions. The University of Business and Economics Vienna (WU), for example, is placed 25th in the Financial Times Global Masters in Management 2013 ranking. Nevertheless, the Austrian Startups Report 2013 (Speedinvest 2013) revealed that there is still a perceived need to catch up in entrepreneurship-specific teaching. A respective political agenda and future investments in education will hence play an important role in Vienna’s future position as an innovation hub.

## 2. Berlin

Berlin is shaped by a culture of creativity, change and diversity. “Berlin feels like a startup itself” (Startup Genome and Telefónica Digital 2012). It is the city’s unconventional flair coupled with an affordable infrastructure that fuels Berlin’s community. Start-ups are free to choose from a myriad number of net- and co-working opportunities and there is probably an event every night to attend. Rocket Internet, the world’s largest internet incubator with a reference portfolio of over 100 companies, has also chosen Berlin as its place to be.

Yet the most prominent example of a Berlin-based start-up success story is Soundcloud, a music-sharing platform that has an estimated value of approximately \$700 million, following a major investment by Institutional Venture Partners (Gründerszene 2014). The city influenced the founders’ decision as to where to set up operations (Startup Genome and Telefónica Digital 2012) and they decided to make Berlin instead of Stockholm their home. Soundcloud’s success was also a major step toward Berlin’s becoming an international start-up hub.

Google recognized Berlin’s great potential and recently invested in the start-up and technology campus called “The Factory” thereby gaining direct access to potential groundbreaking innovations (Gründerszene 2012).

This reputation also accelerates the attraction of skills and talent from abroad interested in entrepreneurship and innovation. Berlin is famously known as a hub of creative minds and lateral thinking. In addition, the city has developed its own breeding ground for skilled people. The Technical University’s Centre for Entrepreneurship, for instance, not only equips future entrepreneurs with facts and figures, but also supports the planning and application of business ideas (Technische Universität Berlin 2014).

A strong community and a skilled workforce are not the only building points of a start-up ecosystem. Germany has notoriously been known for its bureaucratic hurdles. Especially the employment regulations placed on non-EU citizens are considered to be major disadvantages for start-ups in the city (Ripsas, Schaper and Nöll 2013). German immigration regulations for non-EU citizens impact both the location-preferences of start-up businesses, as well as their ability to staff companies in Germany.

Attracting capital appears to be difficult in Germany according to the German Startup Monitor 2013, an online survey of 454 German start-ups. Of start-ups questioned, 70% state that obtaining venture capital is challenging in Berlin. It takes 6.5 months on average, per financing round, to obtain capital. This is almost unbearably long in the global start-up scene (Ripsas, Schaper and Nöll 2013).

In contrast, concerning governmental subsidies, funding and support, Berlin offers a relatively wide range of initiatives which are profiled in the “Förderfibel”, published annually by Investitionsbank Berlin (IBB) (Investitionsbank Berlin 2013).

## 3. London

In the Startup Ecosystem Report 2012 published by Startup Genome and Telefónica Digital, London has been appointed Europe’s number one location for entrepreneurs (Startup Genome and Telefónica Digital 2012).

The government strongly supports the city's development. Tech City UK, a technology cluster located in East London, has been one of the government's most ambitious projects for promoting London as an innovation city (London and Partners 2014). Start-ups benefit from tax breaks, advisory services and a large network of companies. In addition, setting up a business is a comparably easy process, fully automated online and feasible within just a few minutes (Startup Genome and Telefónica Digital 2012).

In terms of capital provision, London lacks ample angel and micro-venture investments (Startup Genome and Telefónica Digital 2012). Nevertheless, raising money has improved tremendously in recent years thanks to seed funds like "#1seed" (Venturebeat 2014), Seedcamp or Seedrs.

The most important asset of the city's start-up ecosystem, however, is its strong community and networking opportunities with almost 60 accelerators, incubators, co-working spaces and other community institutions (TechBritain 2014). The Google Campus, for instance, enriches London with an incomparable hub for collaboration, co-working, events and networking.

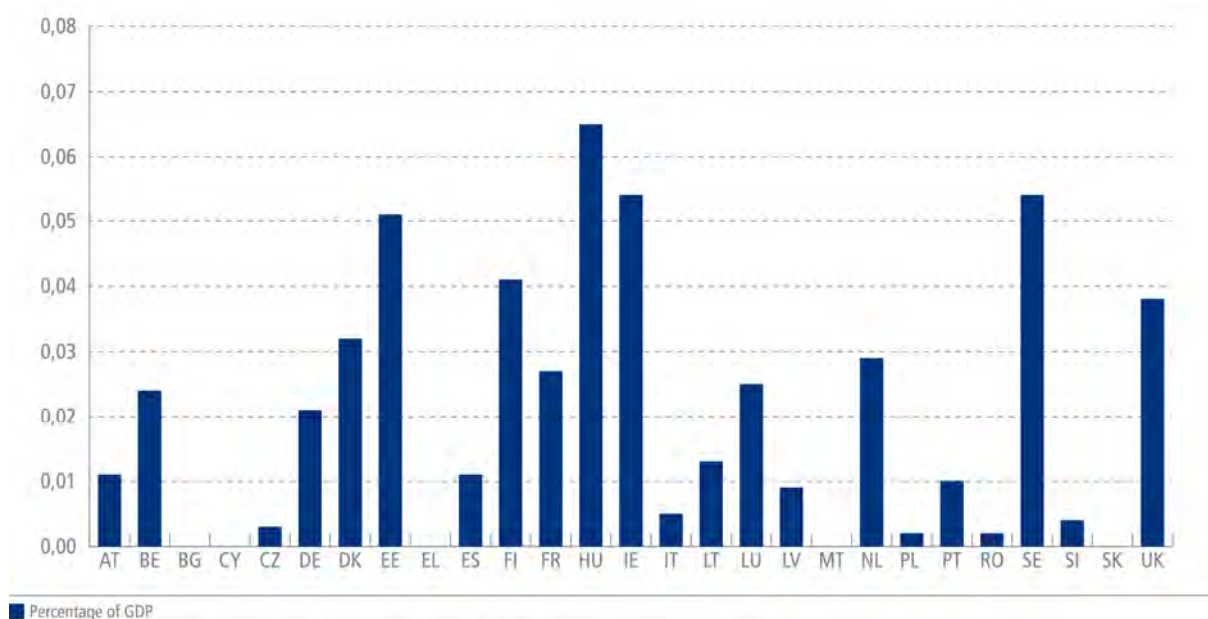
#### 4. Dublin

Ireland has attracted a lot of attention since becoming the European headquarters for some of the world's most powerful firms, such as Google, LinkedIn and Twitter. It is the country's regulatory environment including very low corporate taxes that makes Dublin an extremely attractive business location (Enterprise Ireland 2012).

Besides an attractive tax environment, Ireland is renowned for its ease of raising capital offering the third highest level of venture capital investments within the European Union (see Figure "Total Venture Capital Investment").

#### Total Venture Capital Investment, 2012

as % of GDP; available EU countries



■ Percentage of GDP

Source: European Commission, Venture Capital, 2013. Original data by EVCA and Eurostat. (Also available online at [http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/access-to-finance-indicators/venture-capital/index\\_en.htm](http://ec.europa.eu/enterprise/policies/finance/data/enterprise-finance-index/access-to-finance-indicators/venture-capital/index_en.htm); accessed April 27, 2014).

Angel investments are even further boosted by the country's tax incentives granted to start-up investors (Enterprise Ireland 2012).

Furthermore, collaborations between large multinationals and agile start-ups have the potential to initiate actual technological leaps (Dublin City Council and Dublin Chamber of Commerce 2013).

Additionally, Dublin-based start-ups benefit from an increasing supply of incubators and accelerator programs. Three of Europe's top eight technology accelerators are based in Dublin, namely NDRC Launchpad, Propeller Venture Accelerator Fund and Startupbootcamp (TechCocktail 2011).

Furthermore, the Irish government is well aware of the importance and potential of Europe's youngest workforce, and a annual investments in education by Irish government authorities have exceeded the European average by more than half (Enterprise Ireland 2012). With its education institutes delivering continual streams of highly skilled employees and future entrepreneurs, Dublin exhibits high potential for leading the future European start-up scene.

## **5. Silicon Valley**

Silicon Valley has been hyped as the start-up and innovation Eldorado. Other regions are trying to decode its success factors and it almost became a brand itself with replications like "Silicon Beach" in Los Angeles or Berlin's "Silicon Allee". This hype is to some extent justified by an impressive list of highly successful companies including Google, Apple and Adobe which have their roots in California's innovation hub. Currently, countless start-ups nestle among these global tech giants hoping to be nurtured by the region's ecosystem. Silicon Valley's community clearly has major appeal for young companies.

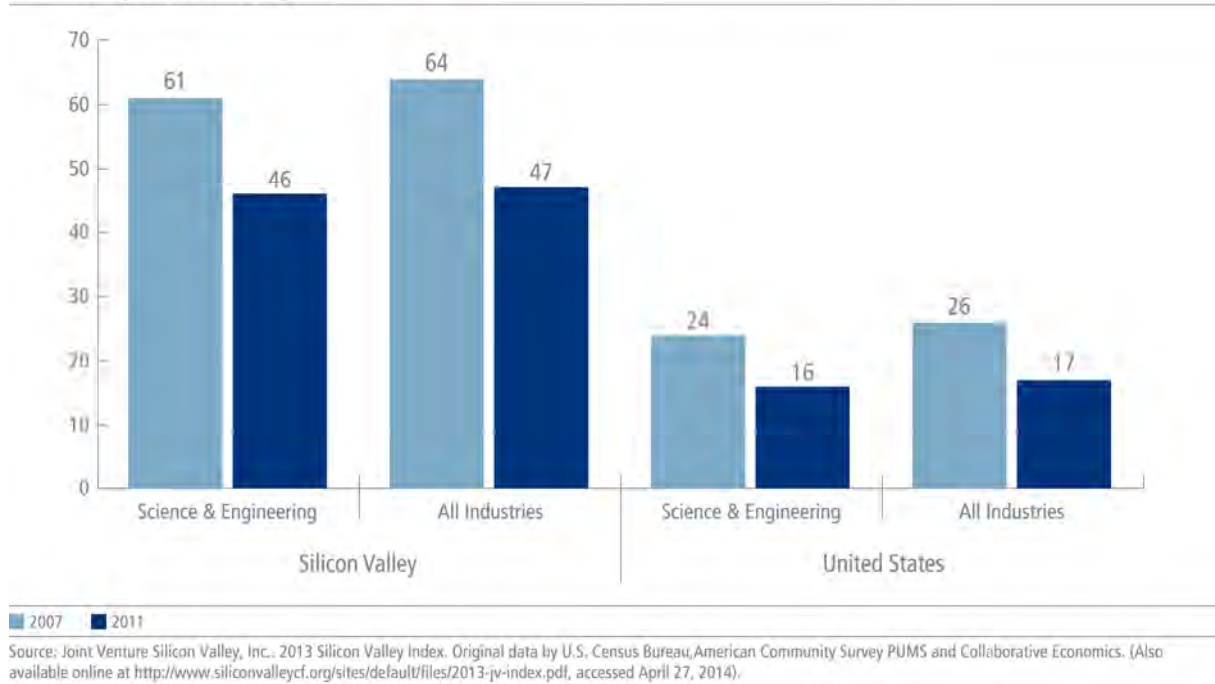
Yet the most important asset Silicon Valley has to offer for start-ups is probably its highly educated, diverse and success-driven workforce (Harris and Junglas 2013). Graduates of one of the most prestigious universities, Stanford University, have alone produced around 40,000 companies since the 1930s and 25% of those who graduated after 1990 have established a business within just 30 kilometers of their university (Eesley and Miller 2012).

Furthermore, the region's reputation entices talent and experts worldwide to settle in the Valley, especially in the fields of engineering and science (Joint Venture Silicon Valley, Inc. 2013). As emphasized by the table below, the share of educated foreign employees is remarkably higher in the region of Silicon Valley than in the rest of the United States.



Percentage of employed population with BA or higher that is foreign-born, 2007 and 2011

Silicon Valley vs. other US regions.

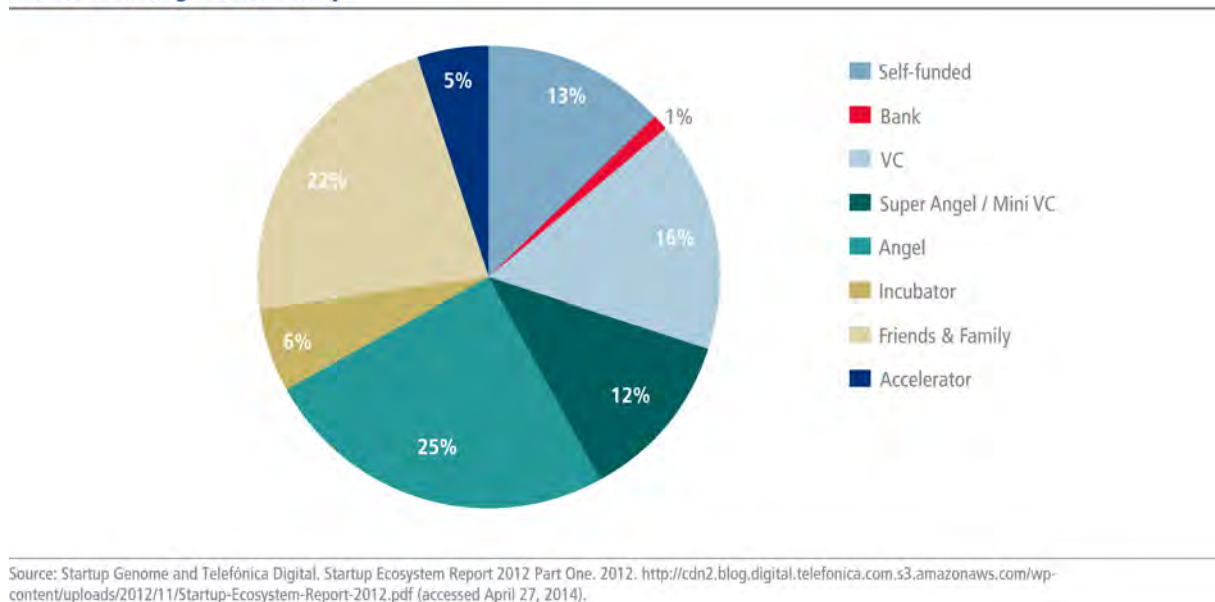


These numbers are especially impressive given the rather limited number of long-term visas available in the United States. Against this background, an initiative for the introduction of a special “Startup Visa” has been launched in Silicon Valley.

It has also been mentioned that there is still room for adaption regarding start-up-friendly taxes and public policies. Especially the introduction of preferential tax treatments for investors as well as the promotion of loans for pre-profit taxes are highly desired (Silicon Valley Bank 2013).

In terms of raising capital, angel investments appear to be the most important source of capital in Silicon Valley. This correlates with the recent immense increase of angel investments of 90% in the region (Joint Venture Silicon Valley, Inc. 2013).

Sources of funding in Silicon Valley



StartX, an accelerator program located in Silicon Valley, specifically supports Stanford University students, faculty and alumni in their entrepreneurial activities with funding and mentorship (StartX 2014).

Venture capital, by contrast, accounted for only 16% of all investments in 2013. These numbers confirm the common notion that raising venture capital is a rather difficult process in Silicon Valley due to the extremely high competition (Startup Genome and Telefónica Digital 2012).

Major obstacles for start-ups are the high rents and housing prices, which subsequently increase the average wage level in the area (Joint Venture Silicon Valley, Inc. 2013). In particular, very young companies with limited capital will struggle to survive in this environment.

## 6. Shanghai

With more than 600 incubators, tech parks and accelerators, Shanghai does not have to shun comparison (Techcrunch 2013). There is definitely a vital community existent in Shanghai and governmental authorities are eager to further stimulate it.

The Fengxian District is just one ambitious governmental project. Designed to attract overseas returnees to launch their business in the area, the program offers incentives like free or subsidized office and housing spaces (Boost New Media and Boost Agile 2012).

In addition to encouraging well-educated Chinese living abroad to return, Shanghai is also building up its own educated elite. Institutions like Fudan University and Jiao Tong University have become internationally recognized for the high quality of their teaching and research.

Investors have noticed the city's ambitious aspirations and high potential. Venture capitalists and business angels are providing a steady flow of capital and investing heavily in diverse industries (Forbes 2011). Strong competition between venture capitalists and Chinese corporate investors for the best deals further fuels the inflow of capital (The Wall Street Journal 2014).

Networking events are another very important part of the Chinese start-up community, especially given the fact that the Chinese culture attaches great importance to trust building in (business) relationships. Techyizu is one of the most important supporters of the start-up community, hosting regular events on technology, innovation and entrepreneurship (Techyizu 2014).

Apart from numerous start-ups, Shanghai hosts some of the most influential international corporations including Google and Siemens. These global players can greatly assist small start-ups with their experience, networks and resources.

A major detriment of innovating in Shanghai is the high risk of intellectual plagiarism in China. Protecting intellectual property rights is frequently too costly for young start-ups, and they feel simply powerless in seeking justice when their rights are violated (Where to Startup 2012). The enforcement of law will continue to be a major task for China's government if it wants to attract foreign investments.

## 7. Tel Aviv

Israel established itself as “Startup Nation” (Senor and Singer 2012). With the highest density of start-ups worldwide and more companies listed on the NASDAQ than all other European countries together, Israel clearly leads the way (Senor and Singer 2012). The Startup Ecosystem Report 2013 even ranks Tel Aviv as second most attractive location, right after Silicon Valley (Startup Genome and Telefónica Digital 2012).

Israeli culture, shaped by a strong military presence, is what caused Tel Aviv’s rise, helping it become one of the most important locations in the global start-up scene.

Tel Aviv has a well-established community and favorable support systems making it a highly attractive location for local and foreign start-ups. Manifold incubators and accelerator programs emerged in the city and the government actively hosts several events and competitions throughout the year (Tel Aviv-Yafo Municipality 2013).

The country’s strong investment landscape clearly represents an attractive playground for start-ups as well. Based on the number of inhabitants, more than twice as much venture capital has been invested in Israel than in the United States in 2008 (Senor and Singer 2012). International investments already represent an important share of this venture capital. Almost 20% of the 70 funds currently active in Israel are headquartered abroad (ArcticStartup 2011).

The country’s attractive investment opportunities have also been recognized by the world’s leading technology corporations and half of them have made major acquisitions or set up their own innovation centers in the city (Senor and Singer 2012). Finding strong partners for collaboration in Tel Aviv should not be too difficult given the wide range of choices.

The further sponsorship of Israel’s position in the international start-up community has become a major priority of the local government. The Municipality of Tel Aviv has recognized the city’s great economic potential and recently promulgated a comprehensive action plan for 2013/2014.

The attraction of international talent and foreign investments are clearly in focus (Tel Aviv-Yafo Municipality 2013). In this sense, the government’s Startup Visa initiative is intended to greatly simplify the process of residence permits for foreigners aiming to set up or work for a start-up (Tel Aviv-Yafo Municipality 2013). Moreover, measures such as municipal services targeting foreigners, the installation of bilingual signs or free Wi-Fi-access throughout the city will transform Tel Aviv into an international hub of innovation (Tel Aviv-Yafo Municipality 2013).

International talent is drawn to the city because of its attractive education services. The Tel Aviv-Yafo Academic College, for instance, set up a study and coaching program aimed at providing future entrepreneurs with practical business know-how and experiences (Tel Aviv-Yafo Municipality 2013).

## IV Lessons learned

Both companies and regions have recognized the need to accelerate their innovation activities.

Business leaders must now reorganize their processes and structures in a way that supports intrapreneurs in their creative work. Flat and fast channels of communication as well as flexible procedures act like catalyzers of corporate innovation. Even more important is a culture that encourages and rewards proactivity and entrepreneurial thinking and a reasonable attitude towards risks. Only in this way will employees feel motivated to contribute to their organization's future success.

Whereas business leaders have to guide their organizations to become innovation leaders, governments play a major role in the promotion of regions as innovation hubs. The regions and cities presented above have already established themselves as renowned locations for starting a high-growth business. All of them exhibit specific strengths and weaknesses and taken together could fuse into an ideal breeding ground for start-ups.

The following parameters can enhance a region's attractiveness to start-ups immensely (AustrianStartups 2013; Feld 2012; Jud, Marchart, Haslinger, Friesenbichler and Peneder 2012):

- Governmental subsidies and incentive programs (e.g. state-supported loans, tax allowances, etc.) as well as reduced bureaucratic barriers and favorable regulations (e.g. trade regulations, labor laws, etc.).
- Access to funding and risk capital as traditional methods of financing are frequently not suitable for start-ups due to the higher risk involved.
- A vibrant community with a wide range of events and co-working opportunities as well as other supportive institutions like accelerators, incubators or co-working spaces.
- A high density of large and influential corporations supporting young companies in mutually beneficial collaborations with their resources and networks.
- Renowned universities and research institutes supplying a region with fresh talent and skills as well as research facilities and support programs.
- The chart below presents the performance of each region investigated in the above-mentioned categories of comparison.

## Hubs of innovation strengths and weaknesses

	Strengths	Weaknesses
Vienna	<ul style="list-style-type: none"> <li>• Vibrant and strong growing community with internationally recognized events and networking opportunities</li> </ul>	<ul style="list-style-type: none"> <li>• Governmental subsidies frequently not suitable for start-ups</li> <li>• Rather unfavorable regulatory environment</li> <li>• Relatively conservative investment behavior and unsatisfactory supply of venture capital</li> <li>• Improvement potential in entrepreneurship specific teaching</li> </ul>
Berlin	<ul style="list-style-type: none"> <li>• Strong and historically developed art and creativity scene fostering the start-up community</li> <li>• Pool of talent, given the city's attractiveness and its educational offerings</li> </ul>	<ul style="list-style-type: none"> <li>• Major bureaucratic hurdles, especially concerning employment regulations for non-EU citizens</li> <li>• Attraction of venture capital challenging</li> </ul>
London	<ul style="list-style-type: none"> <li>• Ambitious governmental support and development programs, e.g. Tech City UK</li> <li>• Start-ups friendly regulatory environment, e.g. ease of incorporation</li> <li>• co-working spaces, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Substantial lack of angel and micro venture investments</li> </ul>
Dublin	<ul style="list-style-type: none"> <li>• Highly favorable regulatory environment, e.g. low corporate taxes</li> <li>• Third highest EU level of VC investments</li> <li>• Strong potential for collaborations between multinationals and start-ups</li> <li>• Very high public investment in education</li> </ul>	<ul style="list-style-type: none"> <li>• Start-up / tech scene not as diverse as elsewhere, e.g. in Berlin (technologies)</li> </ul>
Silicon Valley	<ul style="list-style-type: none"> <li>• Many collaboration opportunities with tech giants including Google, Apple and Adobe</li> <li>• Highly educated, diverse and success-driven workforce and internationally recognized university (Stanford)</li> </ul>	<ul style="list-style-type: none"> <li>• Strict labor and immigration regulations, e.g. very limited number of long-term visas</li> <li>• Lack of start-up-friendly taxes and policies</li> <li>• High competition for the attraction of capital</li> <li>• Extremely high cost of living</li> </ul>
Shanghai	<ul style="list-style-type: none"> <li>• Ambitious governmental action plan</li> <li>• High quality of teaching and research institutions</li> <li>• Strong and active investment landscape</li> <li>• Collaboration opportunities with influential international corporations like Google and Siemens</li> </ul>	<ul style="list-style-type: none"> <li>• Weak enforcement of law including intellectual property rights</li> </ul>
Tel Aviv	<ul style="list-style-type: none"> <li>• High involvement and interest of government authorities in the community, e.g. sponsorship of events, Startups Visa initiative, etc.</li> <li>• Very active community with the highest density of start-ups worldwide</li> <li>• Easy access to capital</li> <li>• High interest of international corporations in collaborations and investments</li> </ul>	<ul style="list-style-type: none"> <li>• When compared to Silicon Valley or Shanghai, Tel Aviv lacks internationally recognized education and research</li> </ul>

Source: Authors.

In terms of governmental promotion and an overall favorable regulatory environment, clearly Dublin and Tel Aviv serve as role models. Dublin's generous taxation greatly facilitates starting and running a business from a financial perspective. Tel Aviv in turn set up an ambitious action plan including the promotion of collaboration and networking platforms, as well as specific measures simplifying business processes for foreigners.

A favorable business environment also benefits start-ups via indirect channels. Tax incentives on investments spur the activity of business angels and thus benefit the region's funding landscape as evident in Dublin. Moreover, large companies also want to avail themselves of regulatory advantages and thus settle down in the corresponding region. Mutually beneficial collaborations

between these companies and start-ups stimulate the innovation activities within a region to a great degree, as evident in most of the hubs addressed in this paper.

The promotion of incubators and accelerators further promotes regions' attractiveness in terms of capital availability.

The importance of first-class research and educational institutions is evident by the influence of Stanford University on Silicon Valley. Likewise, Shanghai's universities are major attractors of international talent. A highly educated population not only secures the future growth of an economy but also enhances the attractiveness of a region for other start-ups. Consequently, it is important for governments to understand the significance of allocating funds to education and research.

Last but not least, a vibrant community and start-up scene – possibly with a success story like Soundcloud – has the power to accelerate awareness of a region internationally. Such communities sometimes emerge naturally and from a historical background, as in Berlin, whose tradition of art and creativity scene has favored the formation of its start-up scene. Vienna has long been recognized for its cultural offerings as well, thus naturally attracting creative minds.

In most cases, however, a beneficial environment has to be created from scratch and then benefit from strong word-of-mouth. The power of a region's image is particularly evident in the case of Silicon Valley, which still attracts numerous start-ups every day, despite the extremely harsh competition for workforce, capital, working and living space and customers.

## V Policy recommendations

The leverage effect of public action on the creation of a start-up-friendly environment is clearly evident. Specifically, governments must identify potential “enemies of innovation” within their existing regulatory and support landscape and identify suitable measures for the stimulation of new businesses in their region.

Policy measures such as the following can greatly stimulate innovation and start-up activity:

- A preferential tax treatment of private investments directly favors the activities of angel investors and thus the ease of access to capital.
- Financial subsidies targeting entrepreneurs incite the establishment of new ventures. These subsidies are, however, only conducive when specifically designed for the needs and circumstances of young ventures and easily accessible for start-ups.
- Apart from financial assistance, governments should simplify incorporation policies to encourage innovators to establish their own business.
- By introducing beneficial immigration and employment regulations, governments can stimulate the in-flow of entrepreneurs and fresh talent to the market.
- Finally, the greatest priority should be given to publically promoting educational and research institutions in light of the immense importance skilled and talented inhabitants have for a region's innovativeness and development.

Ultimately, however, a region can only be transformed into a hub of innovation – and, as a result, thrive – when government authorities begin collaborating closely with the actual players in the start-up community.

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## Psychology of Entrepreneurship

### Ernst Pöppel

Research in brain science and psychology from the last years has given new insights into human nature, i.e. how we think and how we behave. Do these insights also provide ideas and applications, which can be of benefit in the field of economics and beyond? To answer these questions, I proceed here in the following way:

First, in parts A, I want to describe some biological, neurophysiological and psychological facts about our brains and our behavior. This description brings together knowledge on an interdisciplinary and international level. Some basic knowledge is necessary to foster considerations of economic implications with a solid basis, avoiding talking in platitudes. Neglect of these basic facts results in unsuccessful communication and wrong decisions of entrepreneurs.

Obviously, successful entrepreneurship as a key factor in the development and maintenance of successful economies. Therefore, in the second parts B, I would like to focus on the implications of parts A guided by the following questions:

- I. What are fallacies and mistakes entrepreneurs are prone to because of our human nature?
- II. What should entrepreneurs know about decision-making?
- III. Which biological, neurophysiological and psychological constraints should be considered by entrepreneurs when bringing new products and services to the market?

For easier navigation through the arguments and better memory of what is presented, I play with the numbers 1 to 10; each number is associated with specific insights from brain science and psychology and its potential applications.

### A 1. Unity of consciousness

It may come as a surprise, but with respect to our topic I will start with the origin of life. The development of life on earth emerged jointly with the invention of the ability to make “decisions”. Already unicellular organisms are able to move into a specific pre-programmed direction, to find a place with better living conditions. To do so, a “decision” on the basis of the available information is necessary, to decide between better and worse. Decisions and life are fundamentally linked.

The precondition of this close tie between decision and life is “movement” in its original sense. Who is moving has to decide – in a practical sense to move from one place to another, in a metaphorical sense to change conditions and situations. Decisions presuppose that the whole organism is involved. This integrity, the necessary unity or identity of the organism, is always the target value of a decision. And only if a decision has taken place, an action can be executed.

However, the motion of an organism can only take place in one direction. All information processing serves the purpose to orient the organism to this one direction. With respect to higher living beings, this fact enforces the unity of consciousness as a necessity.

At every moment, the brain has to filter something specific out of the immense amount of information it has to deal with. And this something is always **one** something. This implies that we

refer to the unity of consciousness, despite the multiplicity of (implicit) parallel processing in the brain.

## **B 1. Implications**

Like maintaining the integrity of the organism by moving to better conditions, the totality of a company has to be always the target of a decision. This requires like in organisms a reliable information transfer between different compartments. In the moment such mutual information is disrupted (as it happens after certain brain injuries), instability is the consequence. This can both be observed in the economic and political sphere.

Another consequence of the necessary unity of consciousness is that “multitasking” in a strict sense (to execute several tasks simultaneously on the conscious level) is not possible. The subjective present (lasting approximately three seconds) allows only one content of consciousness. Choosing a longer time interval, for example half an hour, we are of course able to cope with different tasks. However, this “asynchronous multitasking” needs a special logistics of the brain to store information in the working memory and to recall it again. To be efficient, high concentration is required. If a company or even an entire country would stay away from multitasking for just one hour a day, and if everybody would focus his or her attention on just **one** task, the greatest push for innovation could be expected.

## **A 2. Two hemispheres, a duality of brain functions and two states of consciousness**

The left and the right hemispheres of our brain represent different functions. For most of us, the left hemisphere is considered to be dominant, because most language functions are located on the left side. Furthermore, analytical functions and inferences about what is going on are associated with the left. The right hemisphere is associated with spatial cognition, with registering what is going on and also emotional evaluation. In other words, the left hemisphere is responsible for detailed analytic information processing, the right hemisphere for more holistic processing.

However, both hemispheres are connected, a connection which is necessary to allow for the unity of consciousness. The conceptual competence of the left hemisphere is not separated from the pictorial competence of the right hemisphere. Concept and image are complementary and represent different aspects of our knowledge about events and facts.

A duality of functions is also given concerning the repertoire of the mind. There is always “something” in our mind, i.e., we see, feel, believe or want something. But this content of consciousness, the “what”, can only be made available when logistical functions are operative. Without “how” functions no content could be made available. At first we have to think about the “power supply” of the brain, i.e. the activation machinery that fluctuates throughout the day and force us to sleep regularly. The second logistical function is the temporal organization of functions, which are represented in spatiotemporal patterns, and which are glued together with a temporal machinery. And the third logistical function is attention, the ability to be focused on something. “What” and “how” functions are necessary to be able to perceive, to think and to act, to be conscious.

And there is another aspect of duality that has great importance: Approximately at the age of four, humans develop the ability to be aware of being conscious of oneself; and in discovering this, it is

also evident for the child that other human beings also have consciousness; this research is referred to as having a “theory of mind”. This implies the possibility to understand the situation of another human being, to take a position external to oneself. Therefore, in principle, we have two states of consciousness: an internal self-related perspective and an external perspective.

These two perspectives of an internal and external point of view are quite important with respect to decisions: It has been shown that moral and economic judgments elicit very different brain patterns when judgments are made from the “first -person perspective” compared to the “third-person perspective”; the alternatives are: “I should (not) do it” – “One should (not) do it.”

## **B 2. Implications**

The dual organization of the brain can also instruct entrepreneurs in decision-making. Detailed analytic information processing together with the view for the whole, analysis and synthesis are necessary to reach excellent decisions, which promote future creative processes. It is not sufficient to have only an analytic view towards problem-solving, but at the same time it is also not sufficient to have only a holistic perspective. The complementarity of paying attention to details and to the whole provides stability.

The ability to take an external perspective allows thinking about facts and circumstances in an abstract way. The internal perspective is on the other hand the basis of sensitivity for others, the source of empathy. With respect to enterprises the implications should be to look for the right balance in strategic behavior. Hierarchical relations between decision-making levels are necessary to be capable of acting operatively. Heterarchy is necessary to involve all members of a company – independent of their position – in the knowledge generation of the company. Hierarchy and heterarchy have to be conceptually separated, however, both have to be actualized to promote creativity and to foster innovations. The challenge of leadership is to develop sensitivity for the frame of reference and to communicate and even teach the two perspectives: In which situation does hierarchy, in which does heterarchy apply? It has to be understood by everybody that responsibility requires a hierarchical structure, whereas knowledge creation occurs within a non-hierarchical environment; the latter is also essential for the development and maintenance of a genuine corporate identity.

## **A 3. Three types of nerve cells in the brain, and three types of knowledge**

All nervous systems consist of three types of nerve cells only: receptors or sensory cells (approximately 500 million in humans) receiving information from outside and informing us about the world; motor cells (approximately 4 million) representing the output and making actions possible; and the great intermediate net (more than 100 billion), or what we usually refer to as “the brain”.

The receptors represent the specific adaptation of an organism to its environment. The human light receptors, for example, can only process a very narrow band of electromagnetic waves. Outside this band, we are blind to the rest of the world, which actually implies that we are “blind” to most of the things that happen around us. The motor cells regulate the motion apparatus, the inner organs and ensure the stability of the organism. And they also control the emotional expression with our face muscles.

Concerning the intermediate net, every nerve cell distributes its activity to approximately 10,000 other cells; and it also receives and integrates information from approximately 10,000 other cells. Because of this principle of divergence and convergence of nerve cells, in other words because of the spatially distributed activities of parallel working elements within this neuronal net, all psychological domains represented in the brain are highly interconnected: There is no percept without memory, without emotional evaluation and the planning of an action.

Such a “trinity” is also a characteristic of human knowledge. When we refer to “knowledge” we usually concentrate only on the consciously available or explicit knowledge. However, modern brain science reveals that there are three types of knowledge: explicit knowledge, but also implicit or intuitive knowledge and, third, pictorial knowledge.

Explicit knowledge can be represented in words or signs and is associated more with the left hemisphere of the brain. Implicit knowledge is referred to also as “tacit” knowledge, and is for instance, dominant in our ritual or automatized behavior. Pictorial knowledge is more associated with the right hemisphere, and can in itself be triangulated into visual perception (because “seeing is knowing”), topological or geometrical knowledge represented, for example, in diagrams or histograms, and, third, into episodic knowledge.

Episodic knowledge is built up of the pictures of unique experiences from our past, which are imprinted in our memory. With episodic memory, we are able to time travel to our past and to contact not only these episodes, but also to contact our “self”. Many of these pictures are re-coded and newly staged in the way that we ourselves are part of the image; we become our own “Doppelgänger”. In this way, pictorial knowledge represents and is necessary for our personal identity; we know who we are, because we can double ourselves. (The tragedy of Alzheimer’s disease is no longer being able to time travel to the past because of the loss of memory and, thus, being unable to consciously confirm one’s identity.)

### **B 3. Implications**

Interestingly, the output cells are much smaller in number than the receptor cells. Once a decision for an action has been made, the effort to execute an action is much lower than information processing before the decision. With respect to entrepreneurs, this tells us that avoiding decisions at the right time can be very cost-intensive; one may be lost in an ocean of too much information to be processed. Complexity reduction is required, and one can learn from the brain that “informational garbage disposal” is most important.

The limitations of our senses, the blindness for most parts of the world can also be used as metaphor. Quite often entrepreneurs (like every person) tend to register only that information that corresponds to their expectations. The challenge for the entrepreneur is to orient the sensitivity of the information channels in such a way that relevant information from beyond the frame of expectations can be identified, incorporated and turned into creativity and action.

Implicit or intuitive knowledge works best the richer the working platform of our brain is. In implicit thinking, unconsciously relations are established between islands of knowledge, and potentially successful actions are acted out implicitly. Those actions become conscious if they seem to be successful; an insight is the result of this implicit processing and it can be accompanied by the so-called “Aha-experience”. Therefore, strategic planning of entrepreneurs should incorporate intuitive knowledge to promote creativity and success.

## **A 4. Four functional domains of the mind, four rules of thinking, and four sources of error**

There are only four functional domains of the mind, i.e., perceptions, memories, emotions and planned actions (or “volitions”). These provide the possible contents of our immediate experience. However, this modular representation of functions does not imply that these domains are isolated from each other, because of the architecture of the brain they are highly connected. In every mental act, many areas of the brain are involved simultaneously. Whatever is represented in our conscious mind is always colored by an emotion, has always a memory component; nothing is independent of each other, and the words we are using are often misleading: “Pure” rationality or emotionality is not possible.

The belief in such pure rationality goes back to the French philosopher and mathematician René Descartes, and is still dominant in the Western culture. Descartes formulated four rules of thinking (*Discours de la Méthode*, 1637), and our confidence that we are rationally thinking and acting is mainly attributable to Descartes’ historical impact. The first rule demands to formulate a problem clearly and distinctly, without hastiness and prejudice. The second rule requires dividing a problem into its parts. Third, to solve a problem, one should start with the simple and proceed to the complex. The fourth rule is the most difficult one: All the ideas and facts to treat a problem have to be taken care of, and a problem has to be considered in its entirety. These rules are of course quite relevant on an operational level like writing a budget. But can they be generalized? Are we capable to think without prejudices, to disentangle a problem before we know what the problem is, to consider all details? The answer is an emphatic “No”, and this answer had already been given at approximately the same time by the English politician, businessman and philosopher Francis Bacon (*Novum Organon*, 1620) who discussed four errors of thinking.

The first error is to overrate our analytic abilities. Our think tools are imprinted and constrained by natural evolution. Imprinting by evolution is also the source of the second error; We usually are not aware of our personal and cultural imprinting, and we often enjoy our prejudices. The third error in thinking is related to the fact that we use language. Thinking can never be expressed perfectly in language; explicit communication with others represents only a subset of our thinking processes. And the fourth error is conditioned by the theories or expectations we adhere to on an implicit or explicit level. Theories and indeed prejudices are necessary to navigate effortlessly through our social and physical surroundings; they express the economical principle of our brain, i.e., to work efficiently and effortlessly. However, this conditioning usually implies not being aware of our hidden theories, which model our thinking.

## **B 4. Implications**

The high interconnectivity of all brain cells ensures that there are for example no decisions, which are not neuronally embedded into processes of perception, emotional evaluation, memories of the past and intended actions. In a goal-directed decision all these processes are involved.

Descartes second rule of thinking, the necessity of dividing a complex problem into its parts, has the disadvantage that often in concentrating on the parts the problem as a whole is not considered adequately. This rule, on the one hand being predominantly responsible for the success of modern science, has, on the other hand, caused the splitting of societies, politics, economics and science into “partial cultures”. Inter- or transdisciplinarity is the difficult but necessary challenge to overcome

this particularization. This is also true for companies because disconnected activities often ruin investigations and creativity for innovations.

For the entrepreneur, not being aware of the four errors of thinking, i.e. overrating our analytic abilities, neglecting the constraints of imprinting, counting too much on explicit communication and forgetting that we often rely on implicit theories and prejudices, is a serious obstacle for creativity and innovation. Therefore, knowledge and transparency about our human nature should be part of the corporate culture of a company. Everybody can know about it, and in fact knowledge about ourselves can easily be acquired.

## **A 5. Five ways of learning, five universal traits of personality and five mental operations for making decisions**

Learning is the way to acquire knowledge, and five different ways of learning have to be distinguished. The first form is learning by imprinting. We enter the world with genetically determined programs, but they are confirmed or switched off in early phases of life. The second form of learning is habituation, which is actually a very intelligent way of learning. Habituation enables us to neglect irrelevant information and to free up mental space for focusing on the essential. The third form of learning is sensorimotor or procedural learning. Movement patterns like in sports, are acquired which are then implicitly stored. This kind of learning is basic to being able to write and read.

The fourth mode of learning is classical conditioning. A specific stimulus (for example an air blast onto the eye) releases an innate reflex (an instant closure of the eye), i.e. an unconditioned stimulus drives an unconditioned response. If another stimulus repeatedly precedes an unconditioned stimulus, this new stimulus, which at first was irrelevant, serves as a notification to release the reflex; it becomes the so-called conditioned stimulus, and it elicits the unconditioned response. With classical conditioning, something which may have been meaningless in the beginning is now associated with a response. The fifth form of learning is learning by trial-and-error (also called operant conditioning) or learning by consequences. The basic idea is that successful action is imprinted, because success causes satisfaction of needs.

It may come as a surprise, but every human being can be described with reference to only five different traits, the "big five", and they represent anthropological universals being independent of cultural background. The five personality domains are: extraversion versus introversion, emotional stability versus instability, placidity versus aggression, openness versus reticence, diligence versus laziness. Despite this small number of traits, individuality and personal identity is not an illusion; every person is unique, representing a special position in a five-dimensional space (mathematically speaking).

And the number five can also be identified when we make decisions, as they are based on five mental operations. First, facts and situations have to be determined, i.e. have to be classified. Second, these classifications have to be compared, and comparison can take place with respect to quality or quantity. Third, results of a comparison allow choices between alternatives, this choice being, fourth, the basis of a decision. The fifth step is then an action following the preceding decision. The accomplished action opens the next cycle to create new mental categories.



## B 5. Implications

Advanced societies and their economies require “lifelong learning”. However, because our entire mental repertoire is mostly conditioned in the early years of life, it is an absolute necessity to cater for the right balance of abundance of provided possibilities and adequate time to learn in this first imprinting phase.

In a metaphorical sense, what is appropriate for societies is also appropriate for companies to achieve a high level of creativity and innovation. Members of the company should be offered possibilities and time to develop ideas. Interdisciplinary teams are an excellent way to enhance the richness of production of innovative ideas.

With respect to advertisement of services and products, the fourth form of learning, i.e. classical conditioning, should not be underestimated. With classical conditioning, a meaningless stimulus or event becomes, via repetition, meaningful and triggers a response. Because of this effect, which may be positive or negative, the entrepreneur has to consider the market environment carefully. The entrepreneur should also not forget that he himself could be the target of classical conditioning. Especially for decision processes, classical conditioning may provide a hidden framework.

Learning by trial-and-error or learning by consequences is also of importance for companies. Obvious rewards for the staff are of course money; but also social appreciation or affiliation with the company is important. However, fundamental for this type of learning is activity to test situations and conditions. If spontaneous activity of this kind is too much restricted within the company, employees learn less. Here we can also see a source of creativity by harvesting serendipity. Often consequences cannot be anticipated; if a chance event or a sudden insight, which was not anticipated, results in a feeling of satisfaction, this event or this idea may be the beginning of a new product.

## A 6. Six basic emotions

In all our actions, emotions play implicitly or explicitly an important role. Emotions seem to be manifold; can they be classified in psychology? Surprisingly, this can be done in examining the emotional expressions in different cultures. Independent of the cultural frame, there exist only six basic emotions: fear, sadness, anger, disgust, joy and surprise.

How is it possible that these emotions are understood and experienced interculturally? The reason is again our genetically imprinted programs; they encompass these emotions as basic configuration. This enables us to experience certain reliability in intercultural communication, even without understanding the foreign language.

Why do we have emotions at all? Emotions are evaluation authorities of our brain to classify the relevance of experiences and events. Without reference to our own emotions, it is also not possible to take appropriate decisions.

Another important feature of emotions is that, compared to the other contents of our consciousness (perception, memories and actions), only emotions show longer time constants – up to hours and even longer if we think about sadness or happiness. Emotional evaluations are also necessary to ensure the continuity of the neuronal processes of our brain.

Sometimes patients suffer injuries in frontal areas of the brain. It has been shown that in these cases emotional evaluations are decoupled from other functions. Such patients show no difference with respect to intelligence, but they are no longer capable for meaningful decisions with long-term consequences. Without the emotional framing we are captured in a present without a future perspective.

## **B 6. Implications**

Actually, the different muscles in our face have been selected during evolution to express our emotions, to inform other human beings about our specific internal feelings. In this way, the evolutionary selection processes determine the social sphere. As a consequence to restrict communication with others using email contacts only, neglects our human heritage. Working environments should be constructed in such a way that immediate personal contacts are possible.

Another important feature of our emotional apparatus is that decision processes are possible only if they are emotionally embedded. The loss of emotionality often causes irrational decisions. Successful entrepreneurs have an intuitive knowledge that authentic and communicable decisions need both: deliberate rationality and immediate emotionality. Only if decisions are also based on the level of emotions, targets will be pursued in the long run and the staff can identify themselves with these goals and are motivated to achieve them.

## **A 7. Seven competences in speech and communication**

To communicate adequately, seven linguistic competences are necessary. First, to be able to speak, we have to produce speech sounds, i.e. we own “phonetic” competence. The reservoir of phonemes in the more than 5,000 languages still existing in the world is extremely similar; there exist approximately only 100 phonemes in all languages, which are genetically given. In learning our mother tongue, only a subset of these genetically given phonemes is confirmed, the other ones are turned off. Thus, the English, Chinese or German repertoires of speech sounds are different which shows up in the accents in speaking as grown-ups when we talk in a foreign language. In learning the words of a language, we build up “lexical” competence. Talking to each other, we normally use not only single words but whole sentences. To be able to do this, we need to know grammatical rules; this is our third “syntactic” competence.

Using words and correct grammar is necessary but not sufficient to transport meaning. Meaningful speech needs “semantic” competence. After certain brain injuries patients may lose semantic competence; their language may sound normal, but they don’t say anything. And in communicating with language, we deploy specific intonations; with this “prosodic” competence we communicate our emotional states.

Talking also has to be adapted to the context at a given moment, and it has to match the specific situation. Adequate speech, i.e. understanding the frame of reference represents our “pragmatic” competence. The list of linguistic competences is completed by number seven, the “social” competence. In different cultures, in different social circumstances different linguistic habits are applied, which have to be taken into account to communicate successfully.

## B 7. Implications

A successful decision-maker and entrepreneur has to master all seven linguistic competences, or has to be at least aware of their importance for successful negotiations, or to reach other people in an empathic way.

Usually, one of the greatest obstacles in intercultural communication is our inability to speak foreign languages free from accent. Accent-free speech is possible only if the repertoire of phonemes we learn up to puberty is widespread and encompasses at least three different languages, for example, in the European context, a Germanic, a Romanic and a Slavic language. To support this, language fluency should be the prominent target in a globalized world. A language is not just a medium to transfer information, but a language carries also its cultural environment.

A special reference has to be made to “semantic competence.” It is often observed that spoken language is content-free, and that the person who speaks is searching for an idea that should be expressed. Similarly, one may observe that a person who speaks gives the impression of talking mainly to himself. Pragmatic and social competences can be learned and should be adequately employed; the necessary personal frame of the entrepreneur should be, however, to maintain one’s authenticity.

## A 8. Eight phases of life, eight corners, and a lucky number

Human life can be divided into eight phases, some being phases of transition. The first phase begins after conception and ends with entering the world. This prenatal phase is already essential for how we will master life until its end. The second phase is the first years up to approximately three or four years when, in particular, trust in the world may be established. A third phase follows: after we discover our own thinking and learn that other people also have a mind (“theory of mind”), and this phase is characterized by learning in kindergarten or primary school.

The fourth phase is puberty as a phase of transition and discovery of one’s own self. It follows phase five when we learn and prepare ourselves for a professional life. Phase six is the longest phase, on average half of life expectancy, when we work and provide for ourselves and the social system financial security, for the young and the older generations. In the seventh phase after retirement we may start something new in the sense of “re-tiring”, i.e. putting on new tires, or enjoying what we have accomplished previously. The phase eight is that of old age at the end of life, which may be in wisdom.

The number eight can also be used to illustrate another important result of modern neuroscience. Let us imagine a cube, which is transparent (a so-called “Necker cube”). The cube has eight corners, and it can be seen in two perspectives, either the front side ahead or the backside up front. This cube is a symbol for the dynamics of our perception. Once we are aware of the two perspectives, we are not able to avoid a change in perspective. Approximately every three seconds, one perspective transforms into the other one.

This openness for change is a characteristic of our entire cognitive apparatus. We keep something in mind for several seconds (identity of content of consciousness). Then, an inner decision process occurs, the brain wonders “Is there something new in the world?” If the new something is another perspective, this perspective enters consciousness. This change in consciousness points to “complementary” as an essential feature of our neuronal apparatus. Identity and change,

stationarity and dynamics are complementary processes, which are basic characteristics of our brain.

It is not a secret that most people suffer from some kind of superstition. We all have a tendency to believe in supernatural powers. Here the magic number 8 comes in, which in China is considered to be a happy number promising wealth. The number 13 in some Western cultures is not attractive, and a ship should not leave the harbor on a Friday, a 13<sup>th</sup> of a month. Here a particular weakness of the human mind can be seen which affects human behavior both in a negative but also in a positive sense.

## B 8. Implications

Socially and economically, an interesting aspect characterizes phase seven, the “generation plus”. Humans in this phase of life are less homogeneous than humans in the preceding phases. Most of them want to allow for more individual interests and goals. For entrepreneurs, this individuality creates specific challenges in providing and advertising services and goods. Developing landscapes of needs and requests for the “generation plus” will certainly trigger innovative ideas.

A question which often comes up, is whether leadership and entrepreneurial competence can be learned. This is partly true, but from a psychological point of view certain features of a personality are determined in early phases of life like trusting in others or trusting in oneself, which is essential for successful work as an entrepreneur.

The complementarity of stationarity and dynamics should also guide the decision processes of an entrepreneur. On the one hand, what has been proven to be successful has to be conserved. On the other hand, openness for new situations and developments are essential.

## A 9. Nine stumbling blocks in navigating through the world

In thinking, decision-making and acting, we can identify at least nine stumbling blocks or traps in reaching the adequate thought, the right decision and the appropriate action.

First, our evolutionary heritage results in a “disease” which I would like to call “monocausality”. If we want to understand something, we usually are searching for only *one* underlying cause; and usually we find only *one* reason. However, because the world is mostly not as simple as we would like to have it, adequate comprehension of most situations and adequate problem-solving should be better based on “multicausal” strategies.

The second stumbling block is due to the way we display complex issues, for example, in using “boxological” drawings. Every picture is an abstraction, and abstraction neglects information. Schematic pictures represent specific states of a problem or situation; they are timeless pictures. The temporal correlation and interaction of the process dynamics of the elements are neglected and need an extra explicit simulation. Power Point presentations can be utterly misleading.

Third: The fact that we talk (or write) to each other opens up the language trap. Not everything what we think can be represented in language appropriately. This is particularly experienced in intercultural communication, which is typically characterized by misunderstandings.

The fourth trap is our dependency on the assessment of others. For example, the expected media coverage with respect to a decision and its consequences may influence the decision. The feedback through other persons or the media generates a frame of dependency. We may not be able to avoid this; however, we should be able to know that such a frame exists.

Stumbling block number five is blindness to chance events. Not all strategies and actions can be calculated rationally in advance. Sometimes serendipity plays a decisive role in finding creative new solutions.

The sixth trap is short-term thinking. To follow short-term plans and goals prevents long-term strategies. Tunnel vision and short-term actions may destroy future possibilities. Long-term strategy has to be robust with respect to short-term fluctuating scenarios.

Closely connected is trap seven, the myth of speed in thinking or acting. We often mistakenly mix up speed and high competence. Unfortunately, with this respect psychological research has made unfortunate contributions in judging intelligence by means of the speed of problem-solving. Wanting to be fast (and first) often prevents deepness in thinking.

A widely unknown source of errors is that we miss a “statistical sense”. As the result of our evolutionary heritage and the imprinting of our brain, we are inclined to create simple categories and to treat problems in an effortless way. However, our lack of a statistical sense often leads to false interpretations of statistics, for example, in judging risks.

Stumble block number nine is the person we are – with all our human weaknesses. One of our worst enemies is laziness, another one is stupidity. Stupidity can be evil if one is not willing to take note of available knowledge. Self-staging and having no respect for others is another personal trap. Facing all these human weaknesses with self-transparency is necessary to be able to step out. And one should add the erotic trap, i.e. that decisions are sometimes made to attract somebody.

## **B 9. Implications**

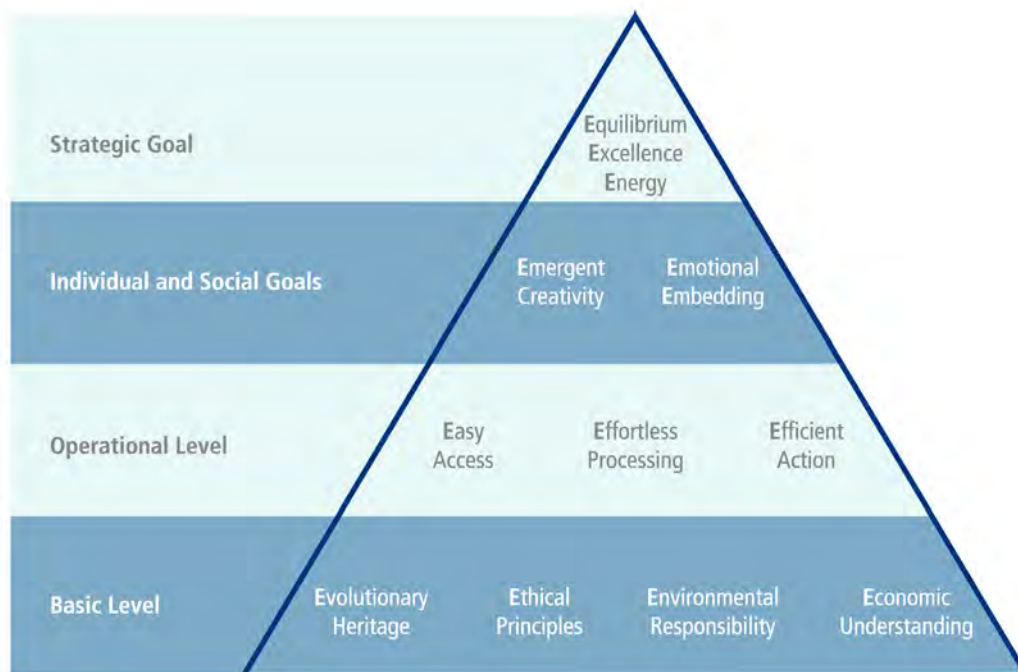
Every politician and entrepreneur should be aware of the listed nine stumbling blocks in reaching adequate thoughts, right decisions, and appropriate actions. Not enough transparency with respect to these obstacles could result in enormous social and economic expenses.

“Monocausality” prevents adequate problem-solving using “multicausal” approaches; “boxology” neglects information and temporal processes; the language trap narrows our communicative possibilities; dependency on the assessment of others may influence decisions in an inadequate way; blindness for serendipity prevents new creative ideas; short-term thinking and the myth of speed in thinking or acting may destroy future possibilities; our lack of a statistical sense may result in errors in judging risks; and our human nature asks for self-transparency to avoid too many conflicts with ourselves and others.

## 10. The E-pyramid

The E-pyramid represents a summary of the basic conditions revealed by modern neuroscience and psychology to support socially responsible and economically successful decisions to stimulate an innovative culture.

### E-Pyramide



Source: Author.

The E-pyramid consists of four hierarchically ordered levels. At the lowest basic level, the most fundamental and ineluctable conditions are displayed. Our evolutionary heritage, the impact of an evolutionary process of millions of years, manifests itself in the imprinted constraints of our (physical and) mental apparatus.

Ethical principles, for example, responsibility with respect to employees, are another evolutionary feature. A human being without other humans is unviable, we need to be embedded in social communities, and we need to pursue pro-social behavior. And as evolutionary products, we also need to show environmental responsibility. Economic understanding is necessary to utilize resources on the personal, institutional and global level and to guarantee long-term stability.

On the second operational level, the principles underlying all our mental operations are to be found. To create easy access to new information and to confirm previous information with our sense organs is again an evolutionary experiment spanning millions of years. Interfaces must be designed in such ways that easy access to information and straightforward transformation into knowledge can be achieved.

Effortless processing of information characterizes the processing of stored and assessed information. Failures of effortless processing can be transferred with respect to institutions and companies in various ways. If the emotional context is missing, which is important for any mental

activity, if – with respect to companies – the common motivation and enthusiasm is lost, effortless communication within the company breaks down.

In the evolutionary process, all living beings are programmed to act efficiently. In the biological context, acting is the execution of a goal-oriented movement. In reaching the goal, needs of the organism are satisfied and as a result a dynamical equilibrium is achieved. In companies, efficient action requires clear targets to motivate and to release creative processes.

The third level outlines individual and social goals. Foster individual creativity, i.e. to develop the emergence of something new out of the own consciousness, is a challenge for every individual. Legitimately, no simple formula can be given to meet this challenge. However, curiosity, incorporation of knowledge from other fields, openness for serendipity, reflection and consideration of the demonstrated human conditions will generate a supporting context. The need for emotional embedding for many performances was already discussed.

At the top of the pyramid we find the three strategic goals of a culture of decision and innovation. Since the beginning of life, reaching homeostatic balance has been the driving force. This equilibrium is never stable it is always dynamic. Paradoxically, such an implemented dynamics guarantees long-term stability. Excellence and energy are necessary to achieve dynamical stability.

Ignoring the knowledge condensed in the E-pyramid would imply ignoring human nature, human needs and strengths. Politicians as well as leaders can best support entrepreneurial activities and an innovative culture by integrating the demonstrated results from modern life sciences into their decision processes.

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## Trilogue Salzburg

Surrounded by the stimulating atmosphere of the Salzburg Festival, the Trilogue Salzburg convenes leading thinkers, decision-makers and renowned personalities from the arts, civil society, business and politics to engage in crosscutting, inter-cultural and future-oriented debate at a roundtable. The Trilogue Salzburg was originally initiated by Dr. Wolfgang Schüssel, member of the Bertelsmann Stiftung Supervisory Board and former Austrian Chancellor. The Trilogue 2014 focuses on the question how to foster entrepreneurship and innovation.

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