

Chapter 2

The Global Entrepreneurship and Development Index

2.1 Introduction

The modern “temple” of the entrepreneurial ecosystem is like many temples of the ancient world: both are held up by pillars. Today’s economic ecosystem is supported by the pillars of development, which are held together by the cement of incentives created by institutions that influence the behavior of individuals. If a fully developed economy is to continue to flourish, these pillars need constant attention, continuous improvement, and careful maintenance, and they must be of similar height and strength.

In this chapter, we present the Global Entrepreneurship and Development Index (GEDI). We begin by discussing the S-shaped curve of entrepreneurship and the 14 pillars of entrepreneurship. We report country rankings and values in terms of GEDI and these 14 pillars. We then present the three sub-indexes: attitudes toward entrepreneurship, entrepreneurial abilities, and entrepreneurial aspirations. Finally, we analyze and compare the different countries and country groups included in the GEDI.

2.2 The S-Shaped Curve

Between 1945 and 1980, nearly one hundred colonies in Africa, Asia, and the Caribbean gained their independence and began creating a development strategy for their citizens.¹ Sadly, many of those countries have experienced neither significant per capita growth nor economic development.² Indeed, moderate to extreme poverty remains a significant concern for many developing countries (Sachs 2005).

¹For a review of the literature, see Acs and Virgil (2011).

²See Easterly (2001), who identifies the slowdowns in the economies of OECD trading partners of LDCs as a possible cause of the disappointing growth performance.

After failed attempts at development through import substitution (protecting domestic producers from the competition of imports) and programs to protect infant industries, as well as somewhat mixed results from export promotion strategies, developing countries are beginning to focus on improving their business environments and creating economic spaces that are conducive to private enterprise, both domestic and foreign. Indeed, in recent years, promoting entrepreneurship and the promulgation of small- and medium-sized enterprise policy have become important prescriptions for development (Ketkar and Acs 2013).

While focusing on entrepreneurship may seem a novel approach to development, it is consistent with and even complementary to older, more traditional development strategies. As developing economies have moved from centralized economies to market economies, enterprise and entrepreneurship have become increasingly important. As Woolridge writes, “The emerging world, long a source of cheap labor, now rivals the rich countries for business innovation. Developing countries are becoming hotbeds of business innovation in much the same way as Japan did from the 1950s onwards” (Woolridge 2009).

In his classic text, *The Stages of Economic Growth*, W. W. Rostow suggests that countries go through five stages of economic growth: (1) the traditional society, (2) the preconditions for take-off, (3) the take-off, (4) the drive to maturity, and (5) the age of high mass consumption (Rostow 1960). While these stages are an oversimplified way of looking at the development of modern economies, they do identify critical events. Michael Porter, who follows recent developments in the economics of innovation while conducting research on the current age of high mass consumption, provides a modern rendition of Rostow’s approach by identifying three stages of development: (1) a factor-driven stage, (2) an efficiency-driven stage, and (3) an innovation-driven stage (Porter et al. 2002).

Entrepreneurship is an important mechanism that can promote economic development through employment, innovation, and welfare, but it does not appear like manna from heaven as a country moves through the stages of development. Rather, it is a process that plays a role in all stages of development and continues over many years. Economists have come to recognize the “input-completing” and “gap-filling” capacities of entrepreneurial activity in development (Leibenstein 1968)—in other words, that someone has to create the technology for new products and create the markets where people will buy them. Figure 2.1 shows the relationship between entrepreneurship and economic development.

The S-shaped curve shown in Fig. 2.1 addresses two important questions on entrepreneurship. First, the S-shaped curve represents the source of poverty, whereas the intersection of the S-curve and the vertical axis suggests that, if individuals in a country are very poor, they may be in a poverty trap where the chances for growing their income or wealth are limited: tomorrow’s income may be less than today’s, and any attempt to get out of this trap may further reduce future income, since at very low levels of income any investment in future income will result in a decline in current consumption that cannot be afforded. This helps to explain why the poor, and poor countries, are so little involved in entrepreneurship (Banerjee and Duflo 2012).

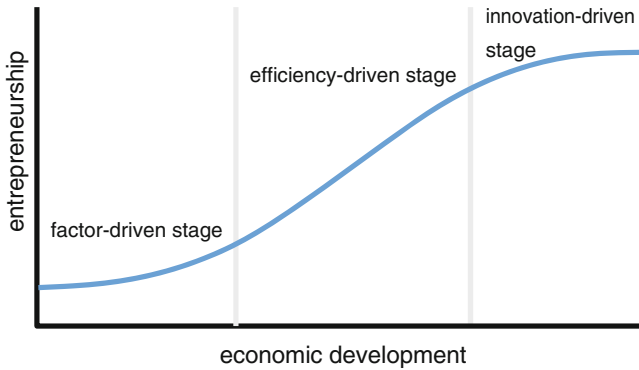


Fig. 2.1 The S-curve of entrepreneurship

The S-shaped curve also addresses how much productive entrepreneurship there is in countries at different stages of development and how rapidly it grows. Where the S-curve rises less steeply and then levels off, it represents a situation where tomorrow's income is greater than today's, so entrepreneurial activity is possible (Baumol 1990). How quickly countries modernize depends on the rise of this curve. The area above the curve is a "valley of backwardness," which can only be eliminated when nations build better institutions and change their society's incentive structure, all of which requires good government and governance (Acs 2010). As institutions become stronger, destructive and unproductive activities decline, and more entrepreneurial activity can focus on productive entrepreneurship, thus strengthening economic development (Acemoglu and Johnson 2005; Acs et al. 2009).

The second source of backwardness is unproductive entrepreneurship, where one group gives and another only takes. This form of rent-seeking is prevalent in many developed and developing countries. If rent-seeking by governments and other groups persists, entrepreneurs will remain reluctant to make the long-term investments of time and money that are needed to create productive, high-impact firms. If countries have extractive economies where only a few benefit at the expense of others, development will not take place.

Therefore, as activity shifts away from destructive and unproductive entrepreneurship, more productive forms of entrepreneurship can have a significant positive effect on the creation of social value. In today's interconnected world, we need to improve institutions and be able to measure this progress.

2.3 The 14 Pillars of Entrepreneurship

The pillars of entrepreneurship are many and complex. While a widely accepted definition of entrepreneurship is lacking, there is general agreement that the concept has numerous dimensions.³ We take this into account in creating our entrepreneurship index, as some businesses clearly have a larger impact on markets, create more new jobs, and grow faster and larger than others. We also take into account the fact that entrepreneurship plays a different role at different stages of development. Considering the various possibilities and limitations, we define entrepreneurship as “the dynamic, institutionally embedded interaction between entrepreneurial attitudes, entrepreneurial abilities, and entrepreneurial aspirations by individuals, which drives the allocation of resources through the creation and operation of new ventures” (Acs et al. 2014).

The GEDI is composed of three building blocks or sub-indexes—what we call the 3As: entrepreneurial attitudes, entrepreneurial abilities, and entrepreneurial aspirations. These three sub-indexes stand on 14 pillars, each of which contains an individual and an institutional variable that correspond to the micro- and the macro-level aspects of entrepreneurship. Unlike other indexes that incorporate only institutional or individual variables, the GEDI pillars include both individual and institutional variables. These pillars are an attempt to capture the open-ended nature of entrepreneurship; analyzing them can provide an in-depth view of the strengths and weaknesses of those listed in the index. We now describe the 14 pillars of entrepreneurship.

2.4 Entrepreneurial Attitude Pillars

Pillar 1: *Opportunity Perception*. This pillar captures the potential “opportunity perception” of a population by considering the size of its country’s domestic market and level of urbanization. This opportunity perception potential is an essential ingredient of entrepreneurial start-ups. Within this pillar is the individual variable Opportunity Recognition, which measures the percentage of the population that can identify good opportunities to start a business in the area where they live. However, the value of these opportunities also depends on the size of the market. The institutional variable Market Agglomeration consists of two smaller variables: the size of the domestic market (Domestic Market) and urbanization (Urbanization). The Urbanization variable is intended to capture which opportunities have better prospects in developed urban areas than they do in poorer rural areas. Market Agglomeration is determined by multiplying the size of the domestic market by the percentage of the population living in urban areas (Acs and Varga 2005).

³The following identify several dimensions of entrepreneurship: Gartner (1990), Davidsson (2004), Wennekers and Thurik (1999), Godin et al. (2008).

Pillar 2: *Start-up Skills*. Launching a successful venture requires the potential entrepreneur to have the necessary start-up skills. Skill Perception measures the percentage of the population that believes they have adequate start-up skills. Most people in developing countries think they have the necessary skills to start a business, but their skills usually are acquired through workplace trial and error in relatively simple business activities. In developed countries, business formation, operation, management, etc., require skills that are acquired through formal education and training. Hence education, especially postsecondary education, plays a vital role in teaching and developing entrepreneurial skills. Today there are 150 million students enrolled in some kind of education beyond high school, a 53 % increase in less than a decade. People all over the world see education as a pathway out of poverty (Papagiannidis and Li 2005).

Pillar 3: *Risk Acceptance*. Of the personal entrepreneurial traits, fear of failure is one of the most serious obstacles, as aversion to high-risk start-up enterprises can retard nascent entrepreneurship. Risk Perception is defined as the percentage of the population that does not believe that fear of failure would prevent them from starting a business. Business Risk reflects the availability and reliability of corporate financial information, legal protections for creditors, and institutional support of intercompany transactions (Caliendo et al. 2009).

Pillar 4: *Networking*. Networking combines an entrepreneur's personal knowledge with their ability to use the Internet for business purposes. This combination serves as a proxy for networking, which is also an important ingredient of successful venture creation and entrepreneurship. Entrepreneurs who have better networks are more successful, can identify more viable opportunities, and can access more and better resources. We define the basic networking potential of a possible entrepreneur by the percentage of the population that personally knows an entrepreneur who started a business within the previous two years (Know Entrepreneurs). However, connecting through cyberspace with the rest of the world adds another dimension to networking and opens up much greater opportunities than before (Internet usage) (Shane and Cable 2003).

Pillar 5: *Cultural Support*. This pillar is a combined measure of how a country's inhabitants view entrepreneurs in term of status and career choice, and how the level of corruption in that country affects this view. Without strong cultural support, the best and brightest do not want to be responsible entrepreneurs, and they decide to enter a traditional profession. Career Status is the average percentage of the population aged 18–64 that considers entrepreneurship as a good career choice that enjoys high status. The associated institutional variable measures the level of corruption. High levels of corruption can undermine the high status and steady career paths of legitimate entrepreneurs (Guiso et al. 2006).

2.5 Entrepreneurial Ability Pillars

Pillar 6: *Opportunity Start-up.* This is a measure of start-ups by people who are motivated by opportunity but face regulatory constraints. An entrepreneur's motivation for starting a business is an important sign of quality. Opportunity entrepreneurs are believed to be better prepared, to have superior skills, and to earn more than what we call necessity entrepreneurs. Opportunity Motivation is defined as the percentage of the Total Entrepreneurial Activity (TEA) businesses started to exploit a good opportunity, to increase income, or to fulfill personal aims, which contrasts with those started by people who have no other options for work. The institutional variable applied here is business freedom, one sub-index of the Index of Economic Freedom.

The Economic Freedom variable is appropriate for capturing the overall burden of regulation, and the regulatory efficiency of the government in influencing start-ups and operating businesses (Bhola et al. 2006).

Pillar 7: *Technology Absorption.* In the modern knowledge economy, information and communications technologies (ICT) play a crucial role in economic development. Not all sectors provide the same chances for businesses to survive or their potential for growth. The Technology Level variable is a measure of the businesses that are in technology sectors. The Tech Absorption institutional variable is a measure of a country's capacity for firm-level technology absorption, as reported by the World Economic Forum. The diffusion of new technology, as well as the capability to absorb it, is vital for innovative firms with high growth potential (Coad and Rao 2008).

Pillar 8: *Human Capital.* The prevalence of high-quality human capital is vitally important for ventures that are highly innovative and require an educated, experienced, and healthy workforce in order to continue to grow. An important feature of a venture with high growth potential is the entrepreneur's level of education. The Educational Level variable captures the quality of entrepreneurs; it is widely held that entrepreneurs with higher education degrees are more capable and willing to start and manage high-growth businesses. Employee quality also has an impact on business development, innovation, and growth potential. The institutional variable Staff Training signifies a country's level of investment in business training and employee development. It can be expected that investing heavily in employees pays off and that training increases their quality (Bates 1990).

Pillar 9: *Competition.* Competition is a measure of the uniqueness of a business's product or market, combined with the market power of existing businesses and business groups. The variable Competitors is defined as the percentage of TEA businesses that have only a few competitors offering the same product or service. However, market entry can be prevented or made more difficult if powerful business groups dominate a market. The extent of market dominance by a few business groups is measured by the variable Market Dominance, as reported by the World Economic Forum (Baumol et al. 2007).

2.6 Entrepreneurial Aspiration Pillars

Pillar 10: *Product Innovation.* New products play a crucial role in the economy of all countries. While rich countries for years were the source of most new products, developing countries today are producing products that are dramatically cheaper than their Western equivalents. New Product is a measure of a country's potential to generate new products and to adopt or imitate existing products. In order to quantify the potential for new product innovation, an institutional variable related to technology and innovation transfer seems to be relevant. Technology Transfer is a complex measure of whether a business environment allows the application of innovations for developing new products.

Pillar 11: *Process Innovation.* Applying and/or creating new technology is another important feature of businesses with high growth potential. New Tech is defined as the percentage of businesses whose principal underlying technology is less than five-years old. However, most entrepreneurial businesses do not just apply new technology, they create it. The problem is similar to the New Product variable; whereas many businesses in a developing country may apply the latest technology, they tend to buy or copy it. An appropriate institutional variable applied here is research and development (R&D). Gross Domestic Expenditure on Research and Development (GERD) is the R&D percentage of GDP as reported by the Organisation for Economic Co-operation and Development. While R&D alone does not guarantee successful growth, it is clear that, without systematic research activity, the development and the implementation of new technologies—and therefore future growth—will be inhibited (Stam and Wennberg 2009).

Pillar 12: *High Growth.* This is a combined measure of the percentage of high-growth businesses that intend to employ at least ten people and plan to grow more than 50 % in five years (the Gazelle variable) with business strategy sophistication (the Business Strategy variable). It might be argued that a short-coming of the Gazelle variable is that growth is not an actual but an expected rate. However, a measure of expected growth is in fact a more appropriate measure of aspiration than a measure of realized growth. Business Strategy refers to “the ability of companies to pursue distinctive strategies, which involves differentiated positioning and innovative means of production and service delivery.”⁴ High Growth combines high growth potential with a sophisticated strategy (Acs et al. 2008).

Pillar 13: *Internationalization.* Internationalization is believed to be a major determinant of growth. A widely applied proxy for internationalization is exporting, which demands capabilities beyond those needed by businesses that produce only for domestic markets. However, the institutional dimension is also important: a country's openness to international entrepreneurs—that is, the potential for internationalization—can be estimated by its degree of globalization. The Internationalization pillar is designed to capture the degree to which a country's entrepreneurs are internationalized, as measured by the exporting potential of

⁴The Global Competitiveness Report 2013–2014, p. 22.

businesses, controlling for the extent to which the country is economically globalized (De Clercq et al. 2005).

Pillar 14: Risk Capital. The availability of risk finance, particularly equity rather than debt, is an essential precondition for fulfilling entrepreneurial aspirations that are beyond an individual entrepreneur's personal financial resources (Gompers and Lerner 2004). Here we combine two kinds of finance, the informal investment (Informal Investment) and the institutional depth of capital market (DCM). Informal Investment is defined as the percentage of informal investors in the population aged 18–64, multiplied by the average size of individuals' investment in other people's new businesses. While the rate of informal investment is high in factor-driven economies, the amount of informal investment is considerably larger in efficiency- and innovation-driven countries; combining them balances these two effects. Our institutional variable here is DCM, one of the six sub-indexes of the Venture Capital and Private Equity index. This variable is a complex measure of the size and liquidity of the stock market, level of IPO, M&A, and debt and credit market activity, which encompass seven aspects of a country's debt and capital market (Groh et al. 2012).

2.7 The Global Entrepreneurship and Development Index, 2015 Rankings

In this section, we report the rankings of the 130 countries on the Global Entrepreneurship and Development Index and the three sub-indexes. The pillar values of the three sub-indexes are presented later.

We present the rankings in terms of country development, as measured by per capita GDP. The overall ranking of the countries by GEDI score is shown in Table 2.1. Anglo-Saxon, Nordic, and Western European countries in the innovation-driven stage of development are in the front ranks. The United States, Canada, Australia, and the United Kingdom lead the rankings. The big surprise is the UK's ranking in 4th place. Two of the five Nordic countries, Denmark and Sweden, are in the top ten, and Iceland and Finland are 11th and 14th, respectively—still a good performance. Taiwan, the highest ranked Asian country, is in 8th place, and Singapore is 10th. The Netherlands at 13th is still among the most entrepreneurial nations of the world and Switzerland is also a surprise ranking in 5th place.

Besides their high entrepreneurial performance, these countries also represent high levels of income.

The United States is in first place. Australia, Canada, and the Netherlands are good performers, but they all have weaknesses in at least one of the sub-indexes. Of the most populous EU countries, only the UK, in 4th place, is among the top ten countries. The other large European countries rank in the middle: France is 12th, Germany is 11th, Poland is 38th, and Spain is 32nd, followed by Italy in 49th place. While the UK, France, and Germany are relatively well balanced over the 15 pillars, Poland, Spain, and Italy are entrepreneurially less efficient.

Table 2.1 The global entrepreneurship and development index rank of all countries, 2015

Rank	Country	GDP 2012 ^a	GEDI	Rank	Country	GDP 2012 ^a	GEDI	Rank	Country	GDP 2012 ^a	GEDI
1	United States	45,336	85.0	44	Bulgaria	12,176	42.7	87	Nicaragua	3510	28.4
2	Canada	36,067	81.5	45	Hungary	17,073	42.7	88	Kazakhstan	11,978	28.4
3	Australia	35,608	77.6	46	Cyprus	23,452	42.5	89	Trinidad & Tobago	23,260	28.4
4	United Kingdom	32,514	72.7	47	Greece	21,275	42.0	90	Ecuador	8443	28.2
5	Sweden	34,926	71.8	48	Uruguay	13,821	41.4	91	Egypt	5795	28.1
6	Denmark	32,291	71.4	49	Italy	26,920	41.3	92	Bolivia	4552	28.0
7	Iceland	33,819	70.4	50	Lebanon	12,592	40.7	93	Gabon	13,811	27.7
8	Taiwan	34,817	69.1	51	Croatia	16,002	40.6	94	Iran	10,754	27.7
9	Switzerland	39,294	68.6	52	South Africa	9655	40.0	95	Philippines	3801	27.7
10	Singapore	53,266	68.1	53	Malaysia	14,822	40.0	96	Senegal	1671	27.3
11	Germany	35,453	67.4	54	Montenegro	10,602	39.1	97	Jamaica	7528	27.2
12	France	29,819	67.3	55	Costa Rica	11,156	37.7	98	Cambodia	2150	26.3
13	Netherlands	36,466	66.5	56	Argentina	16,425	37.2	99	Rwanda	1167	26.2
14	Finland	31,611	65.7	57	Moldova	2951	37.2	100	Brazil	10,264	25.8
15	Norway	47,517	65.6	58	Macedonia	9323	37.1	101	The Gambia	1667	25.6
16	Belgium	32,680	65.5	59	Barbados	23,205	37.1	102	Benin	1364	25.6
17	Ireland	36,102	65.3	60	Brunei Darussalam	45,979	36.9	103	Liberia	560	25.5
18	Austria	36,340	64.9	61	China	7958	36.4	104	India	3390	25.3
19	Chile	15,848	63.2	62	Paraguay	5290	36.0	105	Ghana	1764	24.8

(continued)

Table 2.1 (continued)

Rank	Country	GDP 2012 ^a	GEDI	Rank	Country	GDP 2012 ^a	GEDI	Rank	Country	GDP 2012 ^a	GEDI
20	United Arab Emirates	36,267	61.6	63	Tunisia	8442	35.5	106	Mozambique	882	24.3
21	Estonia	19,070	60.2	64	Ukraine	6394	33.6	107	Côte d'Ivoire	1757	24.1
22	Israel	27,882	59.9	65	Jordan	5289	33.3	108	Tanzania	1380	23.6
23	Luxembourg	65,798	57.2	66	Botswana	14,109	33.0	109	Myanmar	6677	23.1
24	Qatar	71,931	56.2	67	Panama	14,320	32.2	110	Zambia	1474	23.0
25	Turkey	13,737	54.6	68	Thailand	8463	32.1	111	Angola	5262	22.7
26	Lithuania	18,785	54.6	69	Namibia	6520	31.9	112	Venezuela	11,623	22.6
27	Latvia	15,757	54.5	70	Russia	15,177	31.7	113	Mali	1055	22.5
28	Korea	27,991	54.1	71	Sri Lanka	5384	31.1	114	Burkina Faso	1298	22.1
29	Slovenia	24,495	53.1	72	Lao PDR	2522	31.1	115	Cameroon	2025	22.0
30	Portugal	21,056	50.8	73	Libya	10,073	31.0	116	Madagascar	843	22.0
31	Saudi Arabia	27,346	49.6	74	Peru	9431	30.9	117	Sierra Leone	1171	21.6
32	Spain	26,089	49.6	75	Mexico	13,067	30.7	118	Swaziland	4522	21.4
33	Japan	31,429	49.5	76	Albania	8123	30.6	119	Mauritania	2244	21.1
34	Puerto Rico	30,248	48.9	77	Dominican Republic	8794	30.6	120	Indonesia	4272	21.0
35	Czech Republic	23,824	48.9	78	Serbia	9683	30.6	121	Suriname	7641	20.7
36	Colombia	9143	47.9	79	Algeria	7400	30.2	122	Guatemala	4397	20.3
37	Kuwait	40,637	47.7	80	Honduras	3657	29.8	123	Pakistan	2402	20.1
38	Poland	18,307	47.4	81	El Salvador	6125	29.6	124	Burundi	483	18.4
39	Oman	39,665	47.3	82	Morocco	4573	29.4	125	Ethiopia	971	17.2
40	Hong Kong	44,770	45.9	83	Bosnia	7356	28.9	126	Chad	1870	16.6

(continued)

Table 2.1 (continued)

Rank	Country	GDP 2012 ^a	GEDI	Rank	Country	GDP 2012 ^a	GEDI	Rank	Country	GDP 2012 ^a	GEDI
41	Slovakia	21,185	45.4	84	Nigeria	2295	28.9	127	Guyana	2930	16.2
42	Romania	11,946	45.3	85	Vietnam	3318	28.8	128	Malawi	660	15.6
43	Bahrain	21,543	45.1	86	Kenya	1522	28.5	129	Uganda	1165	15.1
								130	Bangladesh	1622	14.4

^a Per capita GDP in PPP 2012 or latest available data, in 2005 constant international dollars

Source: World Bank; Hong Kong is from IMF and Puerto Rico is from CIA

A likely explanation for the EU countries' relatively weak economic performance over the last decade is their low level of entrepreneurship; the same applies to Japan, which took 36th place. Factor-driven countries with low GDPs, such as Pakistan, Bangladesh, Uganda, and other poor African countries, are at the bottom of the entrepreneurship ranking, as expected. At the same time, these countries' entrepreneurial performance is the least unbalanced.

However, some countries—including two former socialist countries, Serbia and Russia, innovation-driven Italy, and two South American countries, Brazil and Trinidad and Tobago—should have higher levels of entrepreneurship, as implied by their development trend lines and more efficient use of entrepreneurial resources.

2.8 The Ranking of the 3As

By definition, the GEDI is a three-component index that takes into account the different aspects of the entrepreneurial ecosystem. However, all three components, called sub-indexes, are in themselves complex measures that include various characteristics of entrepreneurial attitudes, entrepreneurial abilities, and entrepreneurial aspirations.

Entrepreneurial attitudes are societies' attitudes toward entrepreneurship, which we define as a population's general feelings about recognizing opportunities, knowing entrepreneurs personally, endowing entrepreneurs with high status, accepting the risks associated with business start-ups, and having the skills to launch a business successfully. The benchmark individuals are those who can recognize valuable business opportunities and have the skills to exploit them; who attach high status to entrepreneurs; who can bear and handle start-up risks; who know other entrepreneurs personally (i.e., have a network or role models); and who can generate future entrepreneurial activities.

Moreover, these people can provide the cultural support, financial resources, and networking potential to those who are already entrepreneurs or want to start a business. Entrepreneurial attitudes are important because they express the general feeling of the population toward entrepreneurs and entrepreneurship. Countries need people who can recognize valuable business opportunities, and who believe that they have the skills required to exploit these opportunities. Moreover, if a nation's attitude toward entrepreneurship is positive, it will generate cultural support, financial support, and networking benefits to those who want to start businesses.

Entrepreneurial abilities refer to entrepreneurs' characteristics and those of their businesses. Different types of entrepreneurial abilities can be distinguished within the realm of new business efforts. Creating businesses may vary by industry sector, the legal form of organization, and demographics such as age and education. We define entrepreneurial abilities as start-ups in the medium- or high-technology sectors that are initiated by educated entrepreneurs, and launched because a person is motivated by an opportunity in an environment that is not overly competitive.

Entrepreneurial abilities also refer to the equal participation of women in start-ups and other opportunities. In order to calculate the opportunity start-up rate, we use the GEM TEA Opportunity Index. TEA captures new start-ups not only as the creation of new ventures but also as start-ups within existing businesses, such as a spinoff or other entrepreneurial effort. Differences in the quality of start-ups are quantified by the entrepreneur's education level—that is, if they have a postsecondary education—and the uniqueness of the product or service as measured by the level of competition. Moreover, it is generally maintained that opportunity motivation is a sign of better planning, a more sophisticated strategy, and higher growth expectations than “necessity” start-ups.

Entrepreneurial aspiration reflects the quality aspects of start-ups and new businesses. Some people simply hate their employer and want to be their own boss, while others want to create the next Microsoft. Entrepreneurial aspiration is defined as the early-stage entrepreneur's effort to introduce new products and/or services, develop new production processes, penetrate foreign markets, substantially increase their company's staff, and finance the business with formal and/or informal venture capital. Product and process innovation, internationalization, and high growth are considered the key characteristics of entrepreneurship. Here we added a finance variable to capture the informal and formal venture capital potential that is vital for innovative start-ups and high-growth firms.

Each of these three building blocks of entrepreneurship influences the other two. For example, entrepreneurial attitudes influence entrepreneurial abilities and entrepreneurial aspirations, while entrepreneurial aspirations and abilities also influence entrepreneurial attitudes.

Figure 2.2 shows the relationship between the GEDI, the three sub-indexes, and national per capita wealth, based on purchasing power parity GDP. In all the figures, we provide the associated trend line and R^2 values. All the trend lines are based on third-degree polynomial equations.

For example, the overall index shows a good fit and a positive relationship between development and entrepreneurship. The two move in the same direction, with an $R^2 = 0.78$, which implies a close, strong relationship between entrepreneurship and economic development. Unlike other entrepreneurship measures that find an L-shaped (self-employment rate) or a U-shaped (Total Early-Phase Entrepreneurial Activity Index) relationship between entrepreneurship and development, we find a mild S-shaped relationship.

The relationship between the Entrepreneurial Attitudes (ATT) sub-index and development is shown in the right-hand figure. The relationship is similar to the logarithmic function, implying that the overall entrepreneurship attitude increases as the country develops. The explanatory power, based on the $R^2 = 0.67$, shows a significant, strong correlation between ATT and per capita GDP.

The lower-left figure contains the Entrepreneurial Abilities (ABT) sub-index values in terms of economic development. The explanatory power, $R^2 = 0.74$, is the highest among the three sub-indexes, implying a close and strong relationship between entrepreneurial abilities and development.

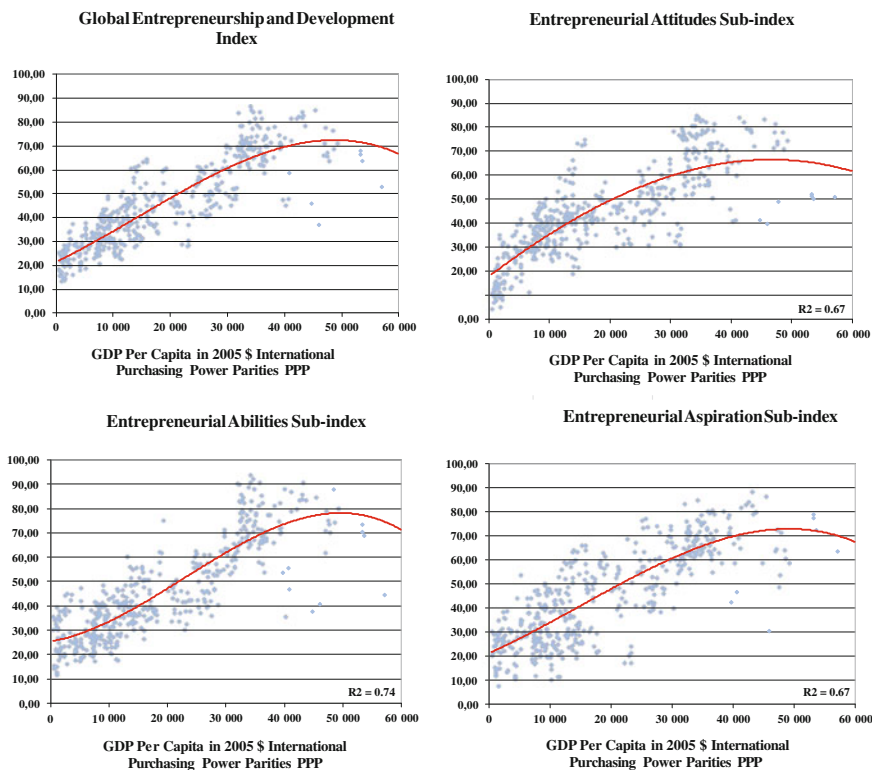


Fig. 2.2 The three sub-indices in terms of per capita real GDP (2006–2013, all data included). Number of observations: 425. As an outlier, UAE has been removed from the graphs

The trend of the Entrepreneurial Aspirations (ASP) sub-index is probably no surprise. The explanatory power of $R^2 = 0.67$ is significant and strong.

Table 2.2 shows the ranking of the top 25 countries by GEDI score and their sub-index rankings. The sub-index points and rankings for all 130 countries can be found in the Appendix. For example, the United States is first in the overall index, and also in two of the three sub-indices. Australia is 3rd in attitudes and in abilities but 5th in aspirations, as it is more interested in high-impact entrepreneurship than in replicative activities. Chile represents a more unbalanced case, ranking 19th in the overall index, 6th in attitudes, 34th in abilities, and 15th in aspirations. Generally, countries that rank at the bottom in GEDI also rank at the bottom of the three sub-indices.

Tables 2.3, 2.4, and 2.5 list the rankings and the 14 pillar values of the first 25 countries for the three sub-indices. Each table gives the pillar values for each of the pillars that make up the respective index. The ranks and the pillar values for all the 130 countries can be found in the Appendices.

Table 2.2 The global entrepreneurship and development index and sub-index ranks of the first 25 countries, 2015

Country	GEDI	GEDI rank	ATT	ATT rank	ABT	ABT rank	ASP	ASP rank
United States	85.0	1	83.4	1	84.7	2	86.8	1
Canada	81.5	2	79.2	2	85.7	1	79.6	2
Australia	77.6	3	77.9	3	81.3	5	73.5	5
United Kingdom	72.7	4	70.9	10	82.8	4	64.3	16
Sweden	71.8	5	77.1	4	74.7	7	63.5	18
Denmark	71.4	6	59.4	16	83.4	3	71.6	8
Iceland	70.4	7	71.5	8	69.9	13	69.7	13
Taiwan	69.1	8	60.8	14	67.5	15	79.0	3
Switzerland	68.6	9	62.8	12	72.0	9	71.1	10
Singapore	68.1	10	52.1	25	73.5	8	78.8	4
Germany	67.4	11	59.9	15	72.0	10	70.3	11
France	67.3	12	62.0	13	70.3	12	69.7	12
Netherlands	66.5	13	71.0	9	68.1	14	60.3	26
Finland	65.7	14	75.8	5	59.3	20	62.0	21
Norway	65.6	15	72.8	7	75.4	6	48.8	41
Belgium	65.5	16	57.5	18	66.1	17	72.8	6
Ireland	65.3	17	57.9	17	71.5	11	66.5	14
Austria	64.9	18	65.6	11	66.5	16	62.6	20
Chile	63.2	19	74.7	6	50.4	34	64.5	15
United Arab Emirates	61.6	20	55.8	21	57.6	23	71.4	9
Estonia	60.2	21	57.2	19	61.8	19	61.7	22
Israel	59.9	22	54.7	22	53.2	31	71.7	7
Luxembourg	57.2	23	45.1	43	64.9	18	61.6	23
Qatar	56.2	24	52.8	23	59.0	21	56.7	31
Turkey	54.6	25	51.7	27	48.5	37	63.7	17

As stated earlier, entrepreneurial attitude is defined as the general attitude of a country's population toward recognizing opportunities, knowing entrepreneurs personally, attaching high status to entrepreneurs, accepting the risks associated with a business start-up, and having the skills to successfully launch businesses. Entrepreneurial attitudes are important because they express the population's general feelings toward entrepreneurs and entrepreneurship.

The benchmark individuals are those who can (1) recognize valuable business opportunities, (2) have the necessary skills to exploit these opportunities, (3) attach high status and respect to entrepreneurs, (4) handle start-up risks, and (5) know entrepreneurs personally (i.e., have a network or role models). Moreover, these people can provide the cultural support, financial resources, and networking

Table 2.3 Entrepreneurial attitudes sub-index and pillar values for the first 25 countries, 2015^a

Countries	ATT	Opportunity perception	Start-up skills	Risk acceptance	Networking	Cultural support
United States	83.4	1.00	1.00	0.88	0.63	0.83
Canada	79.2	1.00	0.66	0.87	0.67	0.86
Australia	77.9	0.92	0.94	0.82	0.67	0.80
Sweden	77.1	1.00	0.61	0.83	1.00	0.90
Finland	75.8	0.73	0.71	0.81	1.00	0.96
Chile	74.7	1.00	0.95	0.79	0.71	0.77
Norway	72.8	0.91	0.53	0.92	0.87	0.90
Iceland	71.5	0.44	0.89	0.91	1.00	0.67
Netherlands	71.0	0.60	0.71	0.81	0.88	1.00
United Kingdom	70.9	0.69	0.60	0.81	0.71	0.79
Austria	65.6	0.65	0.78	0.75	0.85	0.64
Switzerland	62.8	0.55	0.47	0.94	0.73	0.70
France	62.0	0.66	0.41	0.70	0.76	0.74
Taiwan	60.8	0.70	0.48	0.64	0.69	0.62
Germany	59.9	0.65	0.44	0.66	0.57	0.77
Denmark	59.4	0.70	0.52	0.78	0.84	0.37
Ireland	57.9	0.30	0.71	0.75	0.74	0.72
Belgium	57.5	0.63	0.52	0.66	0.46	0.64
Estonia	57.2	0.40	0.65	0.57	0.80	0.57
Saudi Arabia	56.9	1.00	0.78	0.26	0.69	0.62
United Arab Emirates	55.8	0.67	0.36	0.43	0.73	0.79
Israel	54.7	0.65	0.43	0.55	0.70	0.63
Qatar	52.8	1.00	0.15	0.58	1.00	0.66
Spain	52.6	0.29	0.92	0.64	0.61	0.49
Singapore	52.1	0.43	0.38	0.79	0.38	0.76

^aPillar values are the normalized pillar scores after the average pillar correction

potential to those who are already entrepreneurs or want to start a business. The United States leads the Entrepreneurial Attitudes Index, followed by Canada, Australia, Sweden, Finland, Chile, Norway, Iceland, Netherlands, and the UK. Chile's 6th place is a very strong showing for a South American country. Factor-driven African and Asian countries, including Swaziland, Mali, Sierra Leone, Ethiopia, Bangladesh, Pakistan, Malawi, Chad, and Burundi, are at the bottom.

High entrepreneurial abilities are associated with start-ups in the medium- or high-technology sectors that are initiated by educated entrepreneurs and launched because of opportunity motivation in a not too competitive environment. Quality

Table 2.4 Entrepreneurial abilities sub-index and pillar values for the first 25 countries, 2015^a

Countries	ABT	Opportunity start-up	Technology absorption	Human capital	Competition
Canada	85.7	0.84	0.83	0.95	0.90
United States	84.7	0.73	0.86	0.94	1.00
Denmark	83.4	1.00	0.98	1.00	1.00
United Kingdom	82.8	0.87	0.75	0.86	0.97
Australia	81.3	0.93	1.00	0.89	0.69
Norway	75.4	1.00	0.93	0.79	0.73
Sweden	74.7	0.94	1.00	0.71	0.67
Singapore	73.5	1.00	0.77	1.00	0.57
Switzerland	72.0	0.63	0.80	0.78	1.00
Germany	72.0	0.78	0.76	0.62	0.93
Ireland	71.5	0.66	0.89	0.97	0.87
France	70.3	0.69	0.94	0.71	0.72
Iceland	69.9	1.00	1.00	0.53	0.53
Netherlands	68.1	0.94	0.69	0.60	0.79
Taiwan	67.5	0.84	0.73	0.85	0.45
Austria	66.5	0.65	0.98	0.54	0.87
Belgium	66.1	0.64	0.46	0.87	0.82
Luxembourg	64.9	0.54	1.00	0.98	0.92
Estonia	61.8	0.64	0.74	0.55	0.68
Finland	59.3	0.77	0.73	0.51	0.46
Qatar	59.0	0.51	0.80	0.75	0.90
Lithuania	58.1	0.67	0.69	0.84	0.38
United Arab Emirates	57.6	0.64	0.38	1.00	0.50
Puerto Rico	56.7	0.77	0.41	0.89	0.57
Latvia	56.2	0.64	0.63	0.60	0.53

^aPillar values are the normalized pillar scores after the average pillar correction

differences in start-ups are quantified by the motivation and education level of the entrepreneur, and the uniqueness of the product or service, as measured by the level of competition.

Canada ranks number one on the Entrepreneurial Abilities Index and has a very strong showing in two of the four pillars, including Human Capital and Competition. The U.S. ranks second and is relatively weak in Opportunity Start-up and Technology Absorption. Australia is stronger than the U.S. in two pillars, Opportunity Start-ups and Technology Absorption, but weaker in Human Capital and very weak in Competition. The UK ranks 4th, with a significantly lower entrepreneurial abilities score than the United States and Australia, but it is relatively strong in Competition, implying that fresh entrepreneurs are mainly looking for market niches that do not have many competitors. The large share of start-ups

Table 2.5 Entrepreneurial aspirations sub-index and pillar values for the first 25 countries, 2015^a

Countries	ASP	Product innovation	Process innovation	High growth	Internationalization	Risk capital
United States	86.8	0.84	0.88	0.87	0.94	1.00
Canada	79.6	0.69	0.70	0.75	1.00	0.93
Taiwan	79.0	1.00	0.80	1.00	0.60	1.00
Singapore	78.8	0.64	0.98	1.00	1.00	0.94
Australia	73.5	0.50	0.80	0.72	0.90	0.98
Belgium	72.8	0.73	0.80	0.63	0.96	0.77
Israel	71.7	1.00	1.00	0.63	0.68	0.97
Denmark	71.6	1.00	0.80	0.74	0.58	0.91
United Arab Emirates	71.4	0.81	0.48	1.00	0.79	1.00
Switzerland	71.1	0.86	0.80	0.38	1.00	1.00
Germany	70.3	0.73	0.83	0.78	0.67	0.72
France	69.7	0.85	0.83	0.68	0.74	0.66
Iceland	69.7	0.69	0.94	0.70	0.91	0.50
Ireland	66.5	0.70	0.71	0.86	0.90	0.64
Chile	64.5	1.00	0.38	0.72	0.86	0.59
United Kingdom	64.3	0.63	0.67	0.66	0.63	0.64
Turkey	63.7	0.80	0.45	1.00	0.45	0.81
Sweden	63.5	0.72	0.97	0.41	0.66	0.64
Czech Republic	63.5	0.65	0.87	0.75	1.00	0.64
Austria	62.6	0.77	0.75	0.31	0.92	0.79
Finland	62.0	0.91	0.93	0.53	0.55	0.41
Estonia	61.7	0.61	0.84	0.61	0.84	0.40
Luxembourg	61.6	1.00	0.80	0.42	1.00	0.79
Japan	61.5	0.98	1.00	1.00	0.55	0.59
Korea	61.4	0.82	0.89	0.64	0.48	0.83

^aPillar values are the normalized pillar scores after the average pillar correction

initiated in the medium- and high-technology sectors is also a strong point of the UK. The first four countries are followed by Australia, Norway, Sweden, Singapore, Switzerland, and Germany.

Entrepreneurial aspiration is early-stage entrepreneurs' efforts to introduce new products and/or services, develop new production processes, penetrate foreign markets, substantially increase a firm's number of employees, and finance a business with formal and/or informal venture capital. Product and process innovation, internationalization, and high growth are considered characteristics of entrepreneurship. The benchmark entrepreneurs are those whose businesses (1) produce and sell products/services considered to be new to at least some

customers, (2) use a technology less than five-years old, (3) have sales from foreign markets, (4) plan to employ at least ten people, and (5) have greater than 50 % growth over the next five years. The Finance variable captures the informal venture capital potential, as well as the development of capital, venture capital, and credit markets, which is vital for innovative start-ups and high-growth firms.

Like the two other sub-indexes, the United States leads in the Entrepreneurial Aspiration Index. While showing some weakness in Internationalization, it is very strong in Risk Capital and Process Innovation. Canada is second. Taiwan is third, with a strong showing in High Growth and Product Innovation, followed by Singapore, Australia, Belgium, Israel, Denmark, the UAE, and Switzerland, which round out the top ten. The surprise is the Czech Republic, with a very strong showing in Internationalization but a weak performance in Risk Capital.

2.9 Summary and Conclusion

Entrepreneurship is similar to other social creatures, in that it is a multidimensional phenomenon whose exact meaning is difficult to identify. There is only one thing more difficult: how to measure such a vaguely defined creature. Over the decades, researchers have created several entrepreneurship indicators, but none of them has been able to reflect the complex nature of entrepreneurship and provide a plausible explanation of its role in development. The Global Entrepreneurship and Development Index is the first, and presently the only, complex measure of the national-level entrepreneurship ecosystem that reflects the multifaceted nature of entrepreneurship. In this chapter, we have presented the entrepreneurial performance of 130 of the world's countries, including country-level values for GEDI—entrepreneurial attitudes, entrepreneurial abilities, and entrepreneurial aspirations—and for the 14 pillars.

While the GEDI represents the contextual features of entrepreneurship, it is also possible to analyze changes in entrepreneurship and its components in terms of development. We have presented the relationship between index values and development, as measured by per capita GDP. While previous studies have found that entrepreneurship, measured primarily in terms of activities, has a U- or L-shaped relationship with national per capita income, we noticed a linear, mildly S-shaped relationship, which indicates that entrepreneurship is higher in richer countries. This finding fits more accurately with our present knowledge of the nature of the entrepreneurial ecosystem than U- or L-shaped relationships between the variables. The final ranking, with Nordic and Anglo-Saxon countries at the top and developing countries at the bottom, also reflects what we expect development trends to look like.

In the final part of this chapter, we compared certain factors among some important countries and country groups. The pillar-level analysis provides a proper tool for showing the real differences and variations in entrepreneurship, which is found to vary substantially not only across countries with different levels of

development but also among countries with similar per capita GDP. There is no doubt that the United States is the leading entrepreneurial country; despite a minimal decline in its GEDI points, the U.S. is now number one not only in GEDI score but also in two sub-indexes. While the leading countries have similar entrepreneurial features, individual European nations and the European Union lag behind the United States, and this gap is widening; this is especially evident in the PIIGS—Portugal, Ireland, Italy, Greece, and Spain—which lag far behind the larger EU countries and the Nordic fringe. Latin America will also need a substantial increase in entrepreneurship to reach levels comparable to those of North America. Comparing the developing countries shows that the configuration of the 14 pillars is similar in shape but at different levels across the three main parts of the world. In the following chapter we provide a detailed examination of entrepreneurship and the change in its components over the phases of development.

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