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POLICY CHOICES IN AN ERA OF INTANGIBLES – WHERE TO START?

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Send correspondence to:
Rohinton P. Medhora
Centre for International Governance Innovation
rmedhora@cigionline.org

[1] President, Centre for International Governance Innovation, Waterloo, Canada.

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Abstract

Based on the author's keynote talk at the ERF's 25th anniversary conference in Kuwait City (March 10-12, 2019), this paper outlines the research and policy dimensions of the fast-rising intangibles economy. The key features of such economic structures are – the centrality of (mostly proprietary) intellectual property; high upfront costs for firms but near-zero marginal costs of production if successful; first-mover advantage especially if backed up by standard-setting; and handsome rewards for strategic behavior. There is no single route to success in such a world; in fact many successful countries have had *ex ante* daunting challenges not unknown among ERF countries. The ethos that drives the ERF has never been more essential than it is today.
Keywords: Intangibles economy; intellectual property; innovation; technology.
JEL Classifications: O3.

1. Introduction: Rise of the Intangibles Economy

The Kuznets-Chenery-Syrquin exposition of structural change, portrayed in Figure 1, serves as a capable stylized fact of economic development. Stripped of nuances in trends in individual countries and of issues around causality of the change, the pattern of economic transformation portrays a remarkable consistency across countries and over time.[2] With development the share of agriculture in GDP declines, that of industry rises and that of services rises further and faster.

Underlying this pattern of change is a trend less explored, the growing size and scope of intangible assets in the economy ("capitalism without capital", as the evocative title of a recent book on the subject terms it).[3] Although it does not always have to be proprietary, intangible assets are also associated with a parallel trend, the rise in importance of intellectual property as a form of capital. Table 1 shows a typology of intangible assets. Although the classification portrayed in it is appealing and increasingly accepted, it is not universally used in, for example, data collection. A global public good in the tradition of the United Nations System of National Accounts pioneered in the 1950s would be created if a multilateral organization were to systematize and universalize the classification of intangible assets, and if national statistical agencies incorporated this dimension in their regular data-gathering work.

The scant data that exist for intangible assets suggest an asset class that [a] is rising in importance and [b] cuts across the Chenery-Syrquin sectoral portrayal of the economy. In 1975 intangible assets represented just one-sixth of the market value of companies in the S&P 500 Index, with tangible assets comprising the other five-sixths. Forty years later, the ratios were effectively reversed (Figure 1). Data for the EU11 and the US show that investment in intangibles overtook investment in tangibles in the mid-2000s (Figure 2). Using the US and EU14 as a proxy for high income economies, and The Czech Republic, Hungary, Slovakia and Slovenia as representative of middle-income economies, Figures 3-5 show that:

- Although the share of investment in intangibles in middle-income countries of the EU compares with that of the richer EU and the US, it is still the case that investment in tangibles is higher in middle-income countries than in high-income countries (Figure 3);
- Software is quantitatively less important than the other two categories of intangible assets across all three country groups (Figure 4); and
- Although investment in intangibles straddles all three sectors in all three country groups it is higher in manufacturing and services than it is in agriculture (Figure 5).

2. Features of an Intangible Economy and Implications for Policy

Firms driven by intangible assets (and by extension, industries and countries dominated by intangible assets) have characteristics that are known separately to economists but have not

[2] Chenery and Syrquin (1975) describe this as "a systematic variation in any significant aspect of the economic or social structure associated with a rising level of income or other index of development" [p. 4].

[3] Although they are not, strictly speaking, entirely equivalent concepts, this paper variously uses the terms "intangibles economy", "digital economy", "IP-based economy" and "economy of the future" to portray the same broad set of features described in this section.

necessarily come together in the manner that they now have, with implications for a range of economic policies. In the intangibles area, be it software development, mineral exploration, creation of entertainment or building a brand, participants face high upfront costs and associated with this, high risk of failure. But once success is achieved, it is sweet – marginal costs of reproduction are zero or near-zero, and if protected by any form of intellectual property, profits are the proverbial economic rent. There is a first-mover advantage that is accentuated if product or industry standards are developed concomitantly.

Standards, the technical and process "handshake" that provide conformity across diverse products, production and distribution, are the underappreciated ground game here. For example, the standardization of the dimensions of the shipping container through ISO 668 in 1968 is credited as one of the principal drivers of globalization.[4] In the information and communication technology sector, between 1998 and 2012 alone some 435 consortia were created to develop and lock in standards.[5] These are neither fully inclusive in the producers and technologies they represent nor are they neutral across sectors or companies in their economic impacts.

Finally, success in this area is underwritten by economies of agglomeration and geopolitical strategy. In the high-tech sector "clustering", be it of firms, talent, finance or support services, coupled with an active national strategy to nurture and build out the sector, is key to understanding the winners and "the 'collective' character of innovation".[6]

An economy with these characteristic features has implications for policy. Three policy streams – innovation; macroeconomics and trade; and social policy are considered below.[7]

2.1. Stimulating and Protecting Innovation

Although creating an ideas-driven economy is a complex enterprise of many interconnected processes, there are several specific policy measures that bear mention. Government procurement, a standard tool of industrial strategy, is one. Building digital infrastructure and digitizing production and government operations provides opportunities for budding local suppliers to provide high-tech materials, but the economics of the industry is biased towards established players. Desai (2017) points to the case of software, where large firms, often multinationals, can strategically outbid local firms on price criteria alone. But there are instances where "off-the-shelf" solutions fail, and end up costing more in the long run. In such instances, a "co-development" approach in which the bidding standard is not price but "minimal viable product", should be used. Here there is greater potential for the government (as user) to work with the vendor to jointly develop and produce the final product. There is therefore also greater potential for the

[4] Girard (2019) p. 4.
[5] Girard (2019) p. 11.
[6] For an account of the combination of clustering and national purpose in Ireland, Israel and Taiwan see Breznitz (2007). For an account of the role of the State in innovation see Mazzucato (2014) from where this quote is drawn (p. 193).
[7] For fuller accounts of policy-making in a digital or intangibles-driven economy see Ciuriak (2018), Haskel and Westlake (2018a) Chapter 10, and Medhora (2018).

vendor to be a local firm that is willing and able to work with the government iteratively to produce the final product, without a government violating WTO commitments.

Patent pools and patent collectives are another tool available to, in this case, protect holders of intellectual property (IP) through collectivization. At its core, a patent pool is an agreement between two or more companies to cross-license patents related to a particular technology or production process, thus reducing various transactions costs, fees and litigation. Patent pools have also be used at the national level (called Sovereign Patent Funds, in France, Japan and South Korea) to nurture and protect the IP sector. Objectives include defensive ones, such as protecting firms from vexatious litigation from patent trolls, to more developmental ones such as helping firms commercialize their IP, providing IP expertise to start-ups, and helping to retain IP in the country if a firm goes bankrupt or in publicly -funded institutions such as laboratories and universities.[8]

In developing countries, or for technologies particularly suited to issues that are global (such as climate change) or disproportionately impact developing countries (such as some forms of pandemics) there is also a global cooperation angle here, which when used well can stimulate high tech sectors in the developing world.

Since 1971, the CGIAR network of research centres, now numbering 15 spread across the world, has conducted research on the science and policy of agriculture, aquaculture and nutrition. The system is funded by dozens of national governments, and private and public organizations. Patents are held in the public interest and advances in technology and technique are disseminated swiftly and freely across countries. Reviews have consistently noted the path-breaking technologies the CGIAR Centers have developed and spread, and the millions of lives that have improved as a result.

Another example, the Advanced Market Commitment (AMC) mechanism, is “demand pull”. An AMC creates a fund to guarantee a profitable market for a technical advance that is pre-specified and unlikely to be produced without such an incentive. Building on the experience that Canada, Italy, Norway, Russia, the United Kingdom and the Bill & Melinda Gates Foundation gained on pneumococcal vaccines, a mechanism such as this might be used to stimulate responses to address a particular public problem, and help countries or firms get over the entry barrier of high upfront costs coupled with unknown future market.

2.2. Macroeconomic and Trade Policy

The distinct characteristics of the digital economy also have implications for macroeconomic policy. Once it is recognized that intangibles constitute the new capital stock and that it produces outputs at near zero marginal cost, consider for example the implication for the exchange rate, the standard equilibrating tool to maintain external payments balance. In a conventional economy dominated by trade in goods and services with a positive and often upward sloping marginal cost

[8] Bawa (2017) and Clarke (2017).

curve, a depreciation/devaluation raises the domestic currency cost of imports and lowers the foreign currency cost of exports. With the usual caveat about the J-curve and Marshall-Lerner condition[9], the deficit (surplus) in the balance of trade is thus lowered (raised). In an economy where IP stocks constitute an appreciable part of the economy, a depreciation/devaluation, by lowering the foreign currency cost of IP, makes its acquisition more attractive to potential foreign buyers.

In this as in other effects, the modern IP-based economy exhibits characteristics associated with land- and natural resource-based rentier economies. The policy dilemma is a familiar one, for in these cases changes in the value of the currency pits the interests of "holders of stocks" (like land and IP) against those whose revenue depends on "flows" (like manufactures). This does not diminish the importance of the exchange rate as a policy tool; rather, it highlights the importance of understanding the disaggregated and often long-term implications of such moves. In the digital economy, it places a renewed focus on foreign acquisitions policy to avoid predatory behavior (where emerging threats to an existing monopoly are taken out before they reach their full potential) or to retain control of what used to be called the "commanding heights" of the economy.

The stock-flow dilemma puts foreign investment review and the structure of revenue-sharing agreements for high tech firm acquisitions as a key consideration in policy design in the digital era.

There are also implications for the conduct of monetary policy in the digital era, for three reasons.[10] First, as national statistics currently under-report the new forms of investment in intangibles, policy makers do not have good information on the size and performance of the economy. Second, intangibles are less attractive as collateral to lenders than are physical assets that can be parceled and sold off more easily. As a result, IP-based firms rely more on forms of finance such as equity and venture capital that are less sensitive to the short-term interest rate, the policy tool of choice for central bankers. Third, in a near zero-marginal cost economy, prices do not start increasing faster as the economy reaches capacity. Instead, the economy might be characterized by more firms each producing slightly differentiated products. The measured rate of inflation thus conveys different information than it does conventionally.

The uncertainty around the signals the economic statistics send and the transmission mechanism for monetary policy raises another issue. It is likely that in the face of radical technological change

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[9] The Marshall -Lerner condition is a mathematical statement that an exchange rate depreciation/devaluation will only improve the balance of trade if the absolute value of the sum of the elasticities of demand for imports and exports exceeds one. The J-curve is a special case of this verity. It refers to the phenomenon wherein under fixed-price contracts (which is how much trade occurs), the initial effect of a depreciation/devaluation on the balance of trade will be perverse, only improving in the medium to long term as these contracts come to an end and their successors reflect the new price structure of imports and exports caused by the exchange rate change.

[10] Haskel and Westlake (2018b).

particularly in the areas of machine learning and AI, we might enter a period of prolonged secular decline in prices. In such an environment, maintaining aggregate demand becomes important if a deflationary spiral is to be avoided. Initiatives that are currently seen as experimental or exceptional, such as a universal basic income scheme and "helicopter money"[11], will enter the mainstream of the policy arsenal.

The rise of natural monopolies in the digital era also has implications for tax policy as the rent-driven profits of IP-centric firms must be monitored and taxed effectively. Although the trend in recent years has been towards consumption-based taxation and away from corporate taxation the digital economy heralds an era that reverses this trend, with good reason. An interesting variant of this idea is Bill Gates' proposal to tax the owners of robots.[12] This is not a radical proposal, grounded as it is in the notion that in a rentier economy the source of rent (be it land or soft capital like IP) provides a rich, efficient and economically and socially justifiable basis to levy taxes. The focus on appropriate taxation of rents of what are large, powerful and agile multinational firms puts tax base erosion and profit shifting in focus and places a greater onus on cross-border tax cooperation.[13]

2.3. Social Policy

A final set of policy considerations relates specifically to the impact robotics and AI are likely to have on jobs and labour markets. This has implications for a series of social policies.

Support – in areas like transport, childcare, education and pensions – should move from "job centered" to "person centered". Student loan programs, tax deductions for fees and learning, currently often related to the age of income level of the individual, might have to become universal. Barriers to reskilling and public-private partnerships in learning will have to be removed. Limits on tax-free savings might give way altogether, while pension plans might go either entirely public or have total portability as a central feature. Indeed, a universal basic income scheme may be the dominant form of social safety net, with public goods like education and perhaps transport paid for by taxes on economic rents and wealth.

3. Implications for the ERF Region

Where does the ERF region lie in the economy of the future? Figure 6 portrays global patenting activity by country. Since these are absolute numbers of patents registered, large countries with appreciable science sectors – Egypt, Iran, Saudi Arabia and Turkey - feature in the upper middle (but not top) ranks. On a per capita basis (Figure 7) only Iran (and Israel, as a non-ERF country from the region) feature in a Top 20 list of patenting activity. Although it is also the case that raw

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[11] the digital era equivalent of which is a "cash blast" to every individual's bank account or e-payer.
[12] Delaney (2017).
[13] OECD (2019).

figures such as these do not indicate the quality and commercial and social usefulness of the patents, the main story to note is the rise of China as a global technology power.

Since most of the region is at a pre-innovation economy stage the more germane question is what prerequisites exist for countries in the region to become more present in the ideas-driven economy of the future. A key platform for success in this area is the availability and use of information and communications technologies (ICTs). The World Economic Forum and INSEAD[14] produce an annual Networked Readiness Index that combines performance in three areas:

- The market, political, regulatory and infrastructure environment for ICTs;
- The capability of individuals, businesses and government to use ICTs; and
- Actual use of ICTs by these groups.

Table 2 shows where several ERF region countries rank in the Networked Readiness Index. Of the 139 countries that are ranked, ERF countries range from 23 (United Arab Emirates) to 94 (Egypt).

In another facet of platform for innovation, spending on Research and Development (R&D, an input to innovation capacity, not an output or indicator of prowess here), Table 3 shows ERF region countries ranging from 17th place globally (Turkey) to 84th (Oman).

The Global Innovation Index[15] ranks 126 countries based on 80 indicators, ranging from IP filing rates to mobile-application creation, spending on education, and scientific and technical publications. Table 4 shows the position of ERF region countries, ranging from number 38 (United Arab Emirates) to 126 (Yemen).

Finally in the index sweepstakes, Figures 8 and 9 present data derived from the World Bank's Worldwide Governance Indicators.[16] The comprehensive index combines data across several countries in six categories – Voice and Accountability; Political Stability and Absence of Violence; Government Effectiveness; Regulatory Quality; Rule of Law; and Control of Corruption.[17] As an indicator of capacity to innovate, the latter four indicators are presented for the period 2007-17 for the Middle East and North Africa (not totally the ERF region but a good representation of it that is readily available in the project dataset) compared to High Income OECD countries (Figure 8) and to East Asia and the Pacific (as a proxy for China, Japan and South Korea, Figure 9).

[14] WEF (2016).
[15] Cornell University, INSEAD and WIPO (2018).
[16] World Bank (2019).
[17] Kaufmann, Kraay and Mastruzzi (2010).

Unsurprisingly, the MENA region does not compare favourably to the advanced OECD countries. However, it is remarkable how much closer the MENA region is to the East Asian countries many of which have achieved success in the modern economy.

The narrative that emerges from the evidence presented in this section is that the ERF region lies in the middle to lower tiers globally using any indicator of actual or potential performance in the economy of the future. Fundamentally, it raises the question of what are the necessary versus sufficient conditions of success in this field. Here the evidence is not so clear cut and perhaps even leaves room for optimism. While the evidence on patenting, ICTs, R&D and innovation performance suggests the ERF region has some way to go before it can enter the middle and upper ranks of innovation economies, many of the success stories – China, Israel, South Korea, Ireland – did not launch from a uniform and strong platform either. If there is one lesson for researchers and for policy makers that emerges from this assessment it is that negatives like history, neighborhood and quality of leadership can be overcome; nor is there a cookie-cutter approach to the constituents of success.

What is a common theme underlying success in this arena is the fostering of a culture where, in Michael Spence's words "creativity is fully unleashed and innovation is deeply embedded".[18] There is ample room to forge a way forward, building analytical capacities and promoting evidence-based decision-making. In other words, the ethos that drives the ERF has never been more essential than it is today.

[18] Spence (2017), p. x.

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Table 1. Intangibles

Broad category	Type of investment	Type of legal property that might be created
Computerized information	Software development Database development	Patent, copyright, design IPR, trademark, other Copyright, other
Innovative Property	R&D Mineral exploration Creating entertainment and artistic originals Design and other product development costs	Patents, design IPR Patents, other Copyright, design IPR Copyright, design IPR, trademark
Economic Competencies	Training Market research and branding Business process re-engineering	Other Copyright, trademark Patent, copyright, other

Source: Haskel and Westlake (2018)

Table 2. Middle East and North Africa: Top 10 Countries Harnessing Information Technology: Networked Readiness Index 2015

Country	Global Rank*
United Arab Emirates	23
Qatar	27
Bahrain	30
Saudi Arabia	35
Oman	42
Jordan	52
Kuwait	72
Morocco	78
Tunisia	81
Egypt	94

*2015 rank out of 143 economies
Source: WEF (2016)

Table 3. R & D

Rank	Country/Region	Expenditures on R&D (billions of US$, PPP)	% of GDP PPP
1	United States	511.1	2.744%
2	China	451.9	2.107%
3	Japan	165.7	3.147%
4	Germany	118.8	2.94%
5	South Korea	91.6	4.292%
6	India	66.5	0.85%
7	France	60.0	2.256%
8	UK	44.8	1.701%
9	Russia	42.6	1.187%
10	Brazil	38.4	1.17%
17	Turkey	15.3	1.007%
20	Israel	12.7	4.3%
30	Egypt	6.2	0.68%
34	UAE	4.28	0.70%
45	Saudi Arabia	1.8	0.25%
52	Qatar	1.3	0.47%
55	Kuwait	0.83	0.30%
59	Tunisia	0.78	0.68%
64	Iran	0.7	0.12%
77	Algeria	0.16	0.07%
84	Oman	0.07	0.23%

Table 4. Global Innovation Index (2018)

1. Switzerland	38. United Arab Emirates
2. Netherlands	51. Qatar
3. Sweden	60. Kuwait
4. United Kingdom	61. Saudi Arabia
5. Singapore	66. Tunisia
6. United States of America	69. Oman
7. Finland	72. Bahrain
8. Denmark	76. Morocco
9. Germany	79. Jordan
10. Ireland	90. Lebanon
	95. Egypt
	110. Algeria
	126. Yemen

Source: Cornell University, INSEAD and WIPO (2018)

Figure 1. Shifting Tangible and Intangible Asset Ratios of S&P 500 Market Value, 1975-2015

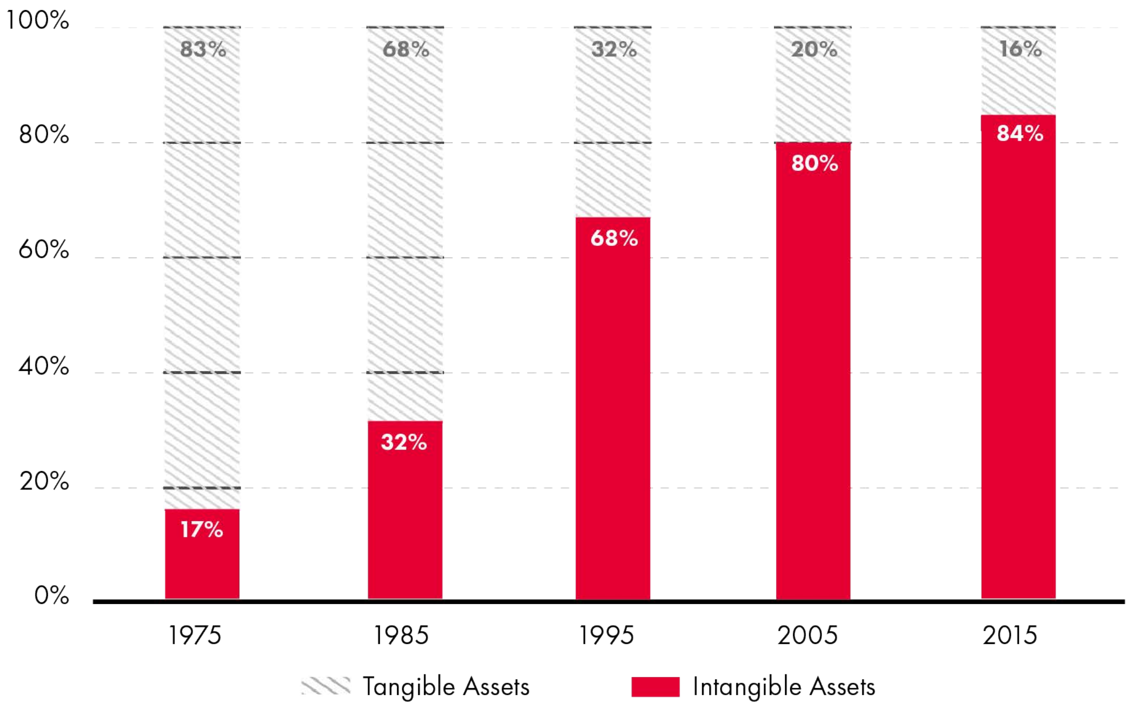
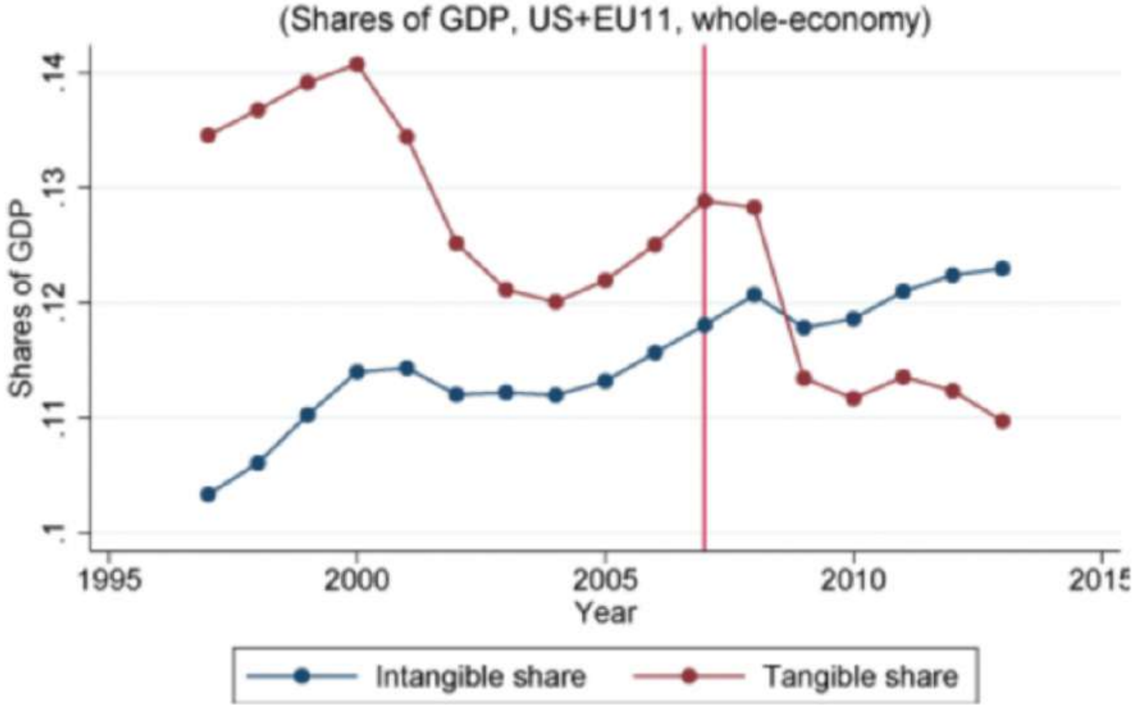


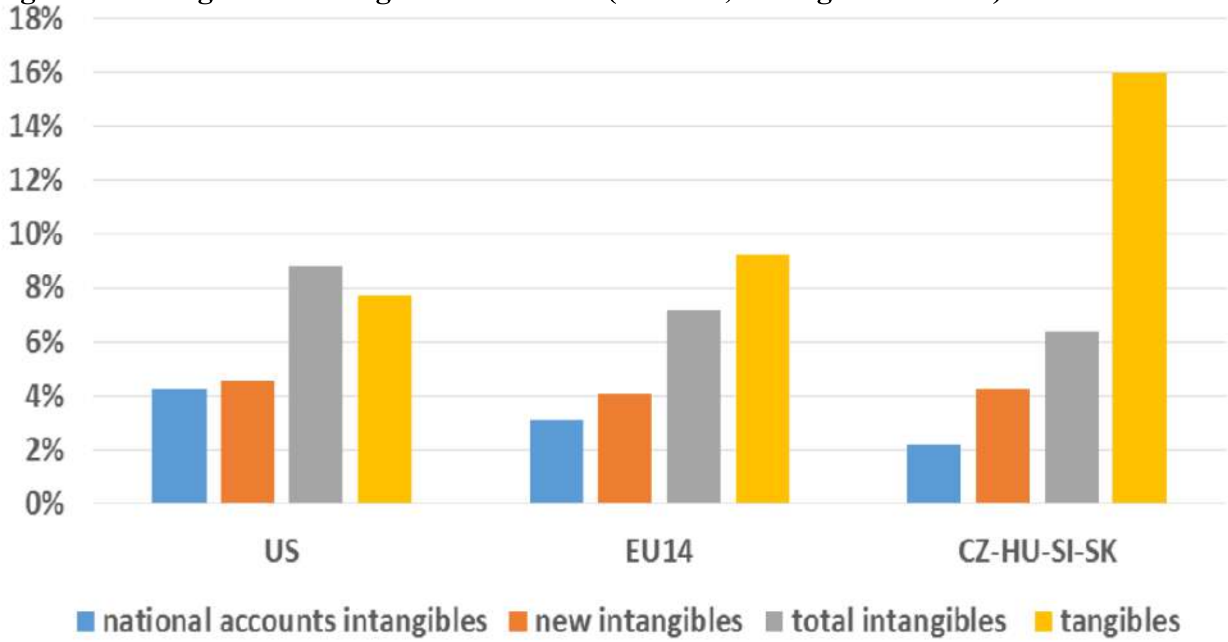
Figure 2. Tangible and intangible investment shares of GDP



Note: GDP adjusted to include intangibles.

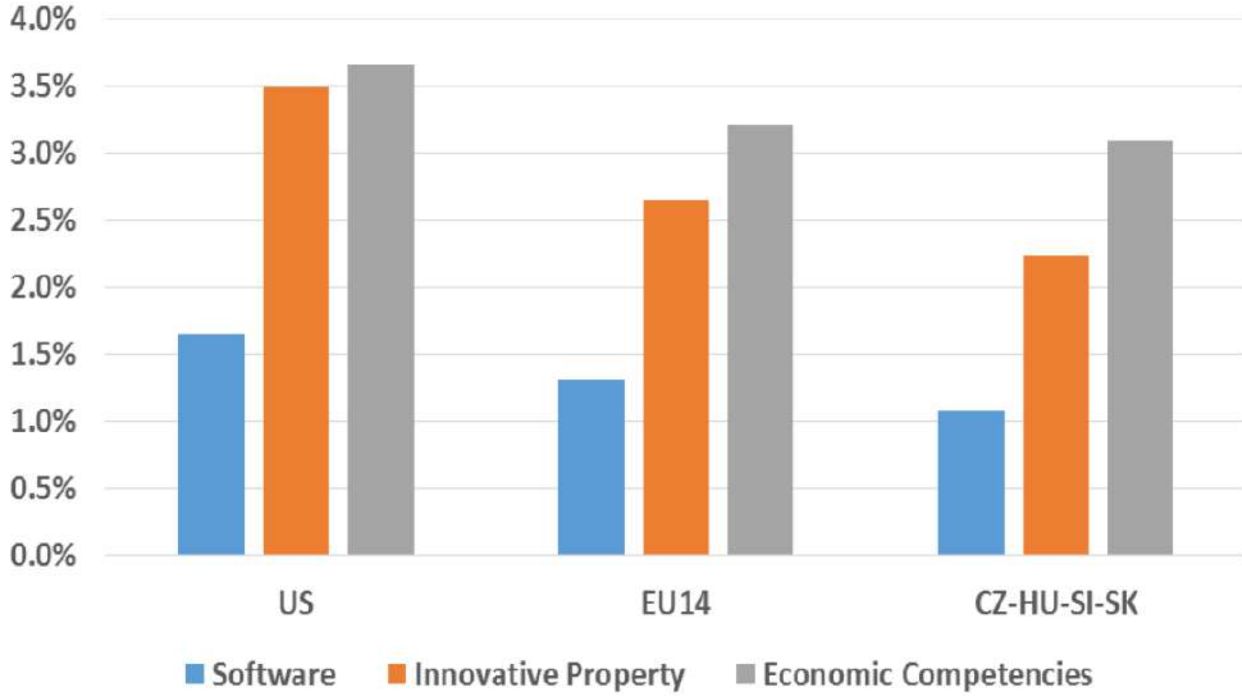
Source: Haskel and Westlake (2018)

Figure 3. Intangible and tangible investment (% GDP, average 2000-2013)



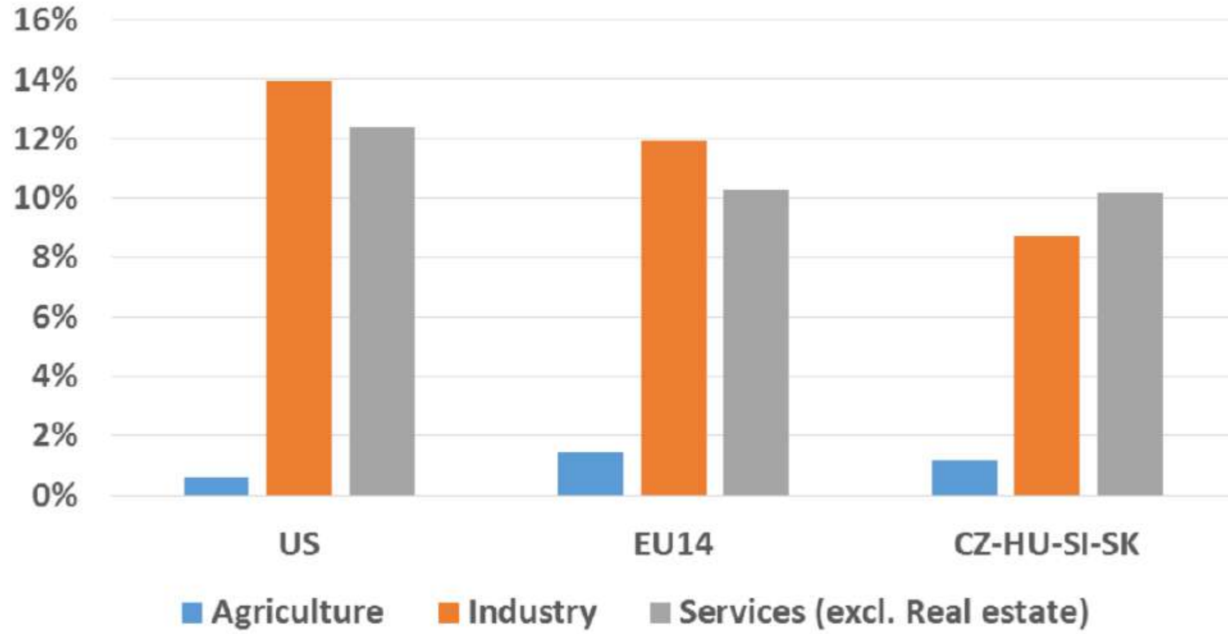
Source: EIB (2016)

Figure 4. Asset composition of intangible investment (% GDP, average 2000-2013)



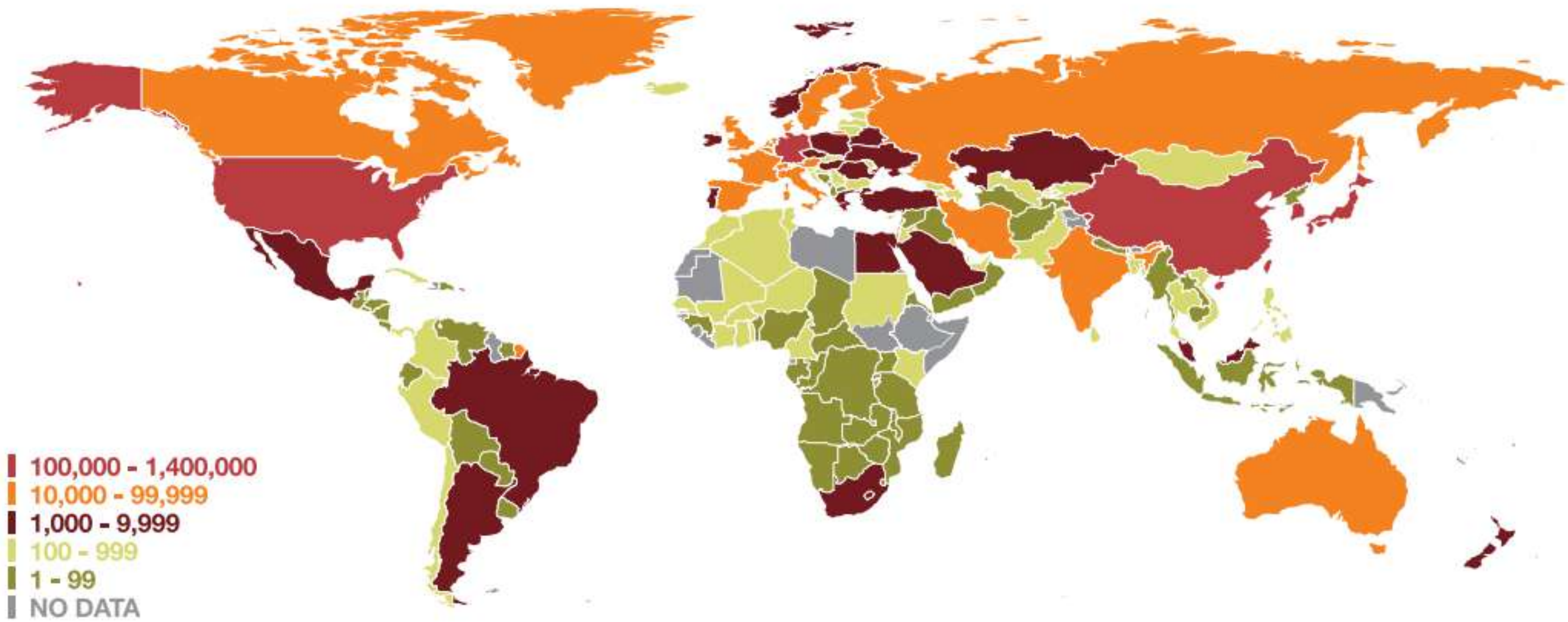
Source: EIB (2016)

Figure 5. Intangible investment by industry (% officially measured industry value added, average 2000-2013)



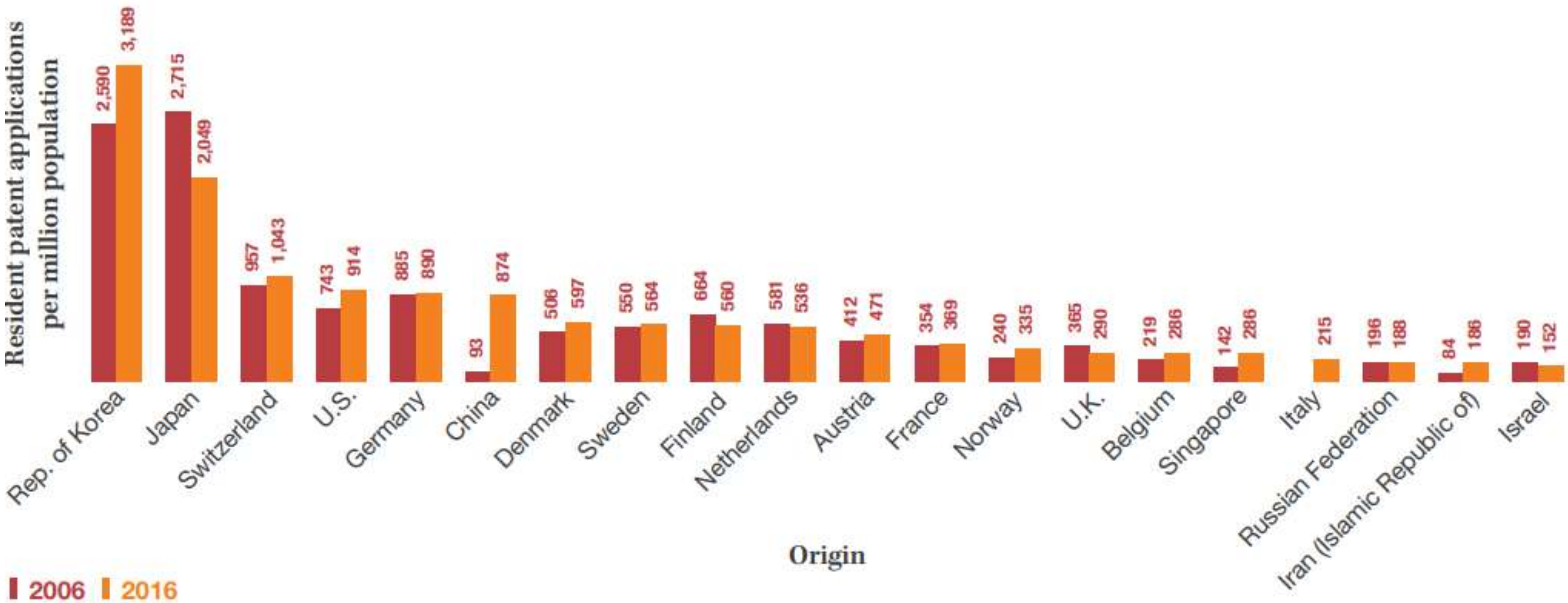
Source: EIB (2016)

Figure 6. Patent Applications by Origin, 2016



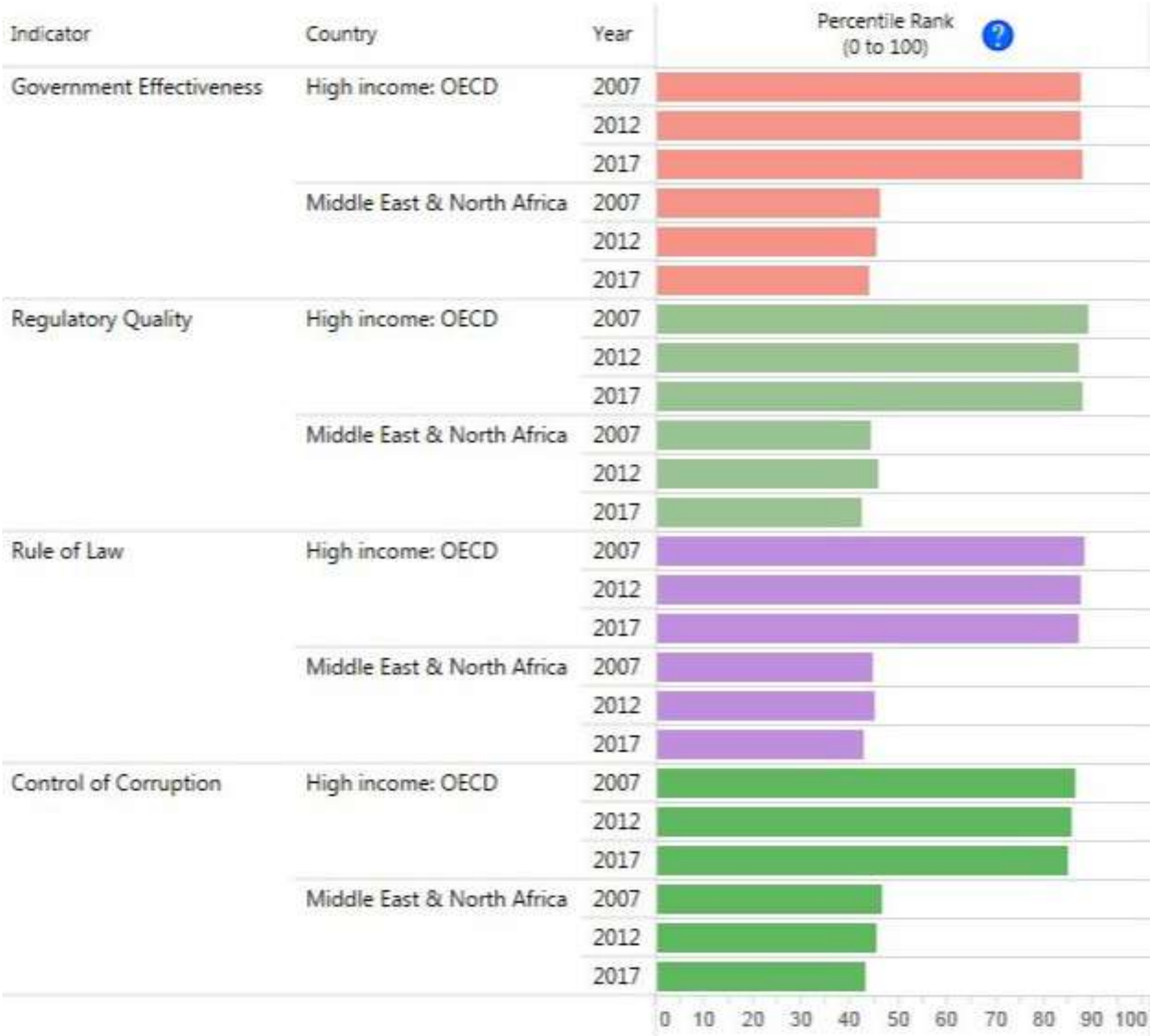
Source: WIPO (2017), Figure A17

Figure 7. Resident patent applications per million population for the top 20 origins



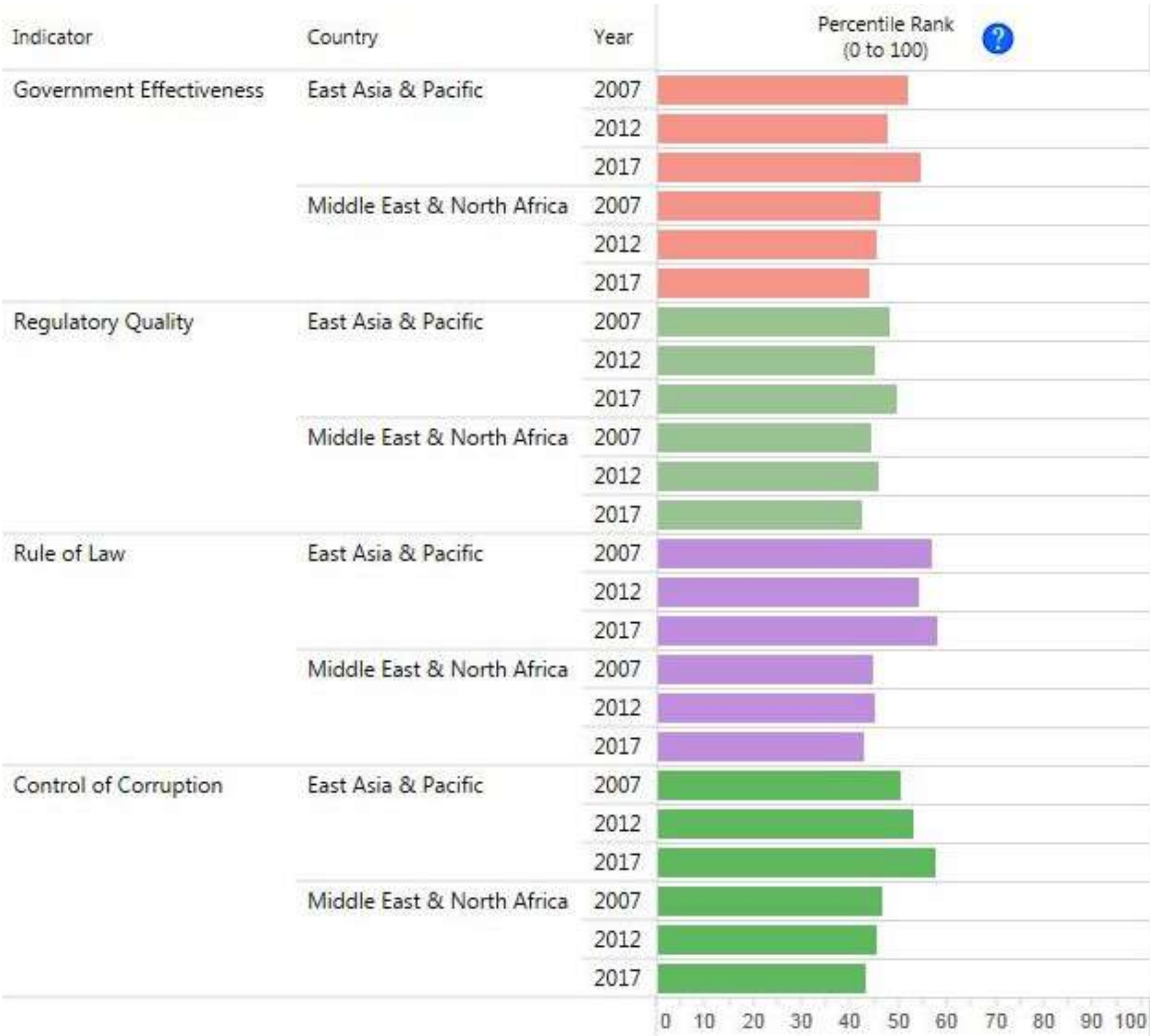
Source: WIPO Statistics Database and World Bank, September 2017

Figure 8. Capacity to Innovate



Source: World Bank (2019)

Figure 9. Capacity to Innovate



Source: World Bank (2019)