

# Measuring Competitiveness

**A**S GLOBAL MARKETS remain in flux, both developed and developing nations struggle to compete with one another in new ways in the evolving economic landscape. Clearly, over the past 30 years we have seen the rise of India as a global economic force along with the Philippines, Ireland, China and other nations in the Eastern bloc. The economic accelerant for these nations and others that have followed (as well as others to follow) has been technology and specifically, information technology.

In some sense these shifts caught the world and developed nations by surprise. Offshore competitiveness truly rocked the world of the major U.S. and European IT suppliers. Non-technology businesses raced offshore and scurried to create captive sites. Most were blindsided by this major economic shift because of a lack of transparency into the

dynamics of the new global economy — a technology economy. The economic indicators of the Industrial Age have failed badly and slipped in relevance. Perhaps this phenomenon parallels the existence of the navigational measure of latitude before the development of “longitude” — we need a new measure or measures that account for the full dimensionality of our new economy.

In order to understand the role that technology plays in the economy, it is first necessary to reexamine the traditional measures of economic development. Perhaps approaches like gross domestic product (GDP) and the consumer price index are still useful rear-view measures of development, but they fail to assist in forecasting future development potential or sustainability.



**Howard A. Rubin** is the founder and CEO of Rubin Worldwide, a research and advisory firm focused on the economics of business technology. [howardarubin@gmail.com](mailto:howardarubin@gmail.com)

## The Technology Link

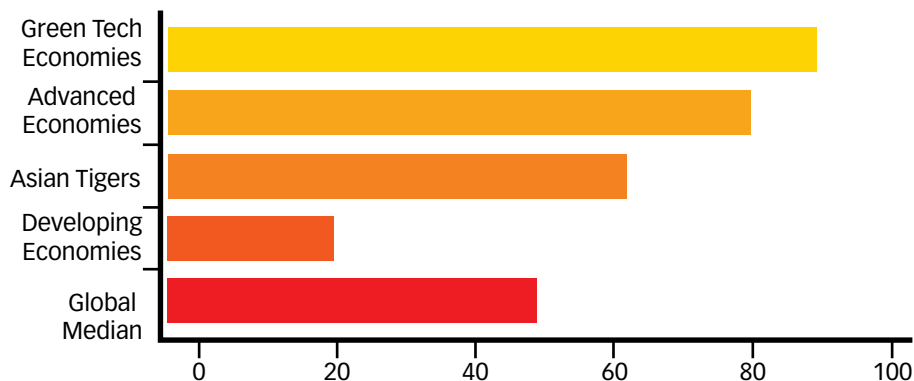
Over the past several years, there has been increasing interest in measuring the linkage between technology

**Table 1. Global Technology Index Results by Category**

Rank	Technology National Investment	Technology Trade	Investment in Scientific Education	Distribution of Information Wealth	Green Technology	Overall
1	United States	United States	Denmark	Denmark	Finland	United States
2	Japan	Germany	Sweden	Sweden	Sweden	Sweden
3	United Kingdom	Japan	United States	South Korea	Japan	Denmark
4	Brazil	United Kingdom	Norway	Finland	Switzerland	United Kingdom
5	Germany	France	Switzerland	Japan	Netherlands	Germany
6	France	Italy	Iceland	Netherlands	Denmark	Japan
7	Netherlands	Sweden	Finland	United States	Norway	Netherlands
8	Canada	Netherlands	Netherlands	Switzerland	Germany	Netherlands
9	Australia	South Korea	Canada	Norway	United Kingdom	Finland
10	China	Canada	Austria	United Kingdom	Iceland	Canada
11	Spain	Turkey	Belgium	Taiwan	United States	South Korea
12	Italy	Taiwan	Germany	Iceland	Spain	France
13	South Africa	Chile	United Kingdom	Germany	Austria	Norway
14	Sweden	Indonesia	South Korea	Canada	Australia	Australia
15	South Korea	Switzerland	New Zealand	Singapore	France	Taiwan
16	Switzerland	Colombia	Israel	Austria	South Korea	Belgium
17	Denmark	Slovenia	Ireland	France	Canada	Austria
18	Belgium	Slovakia	Taiwan	Hong Kong	Belgium	Iceland
19	Singapore	Lithuania	Australia	Australia	New Zealand	New Zealand
20	India	Iceland	France	Luxembourg	Taiwan	Italy

Source: Rubin Worldwide 2010.

Chart 1: Green Technology Index



Source: Rubin Worldwide 2010

and productivity. Several major studies have linked information technology and productivity acceleration growth in the U.S. economy, revealing that IT has been responsible for at least half of the productivity growth acceleration between 1974 and 2000.

More recent attempts to track the evolution of technology economies include the Economist's eReadiness index, which combines measures of connectivity and technology infrastructure, business environment, social and cultural environment, legal environment, government policy and vision, and consumer and business adoption of new technology to assess the changing digital landscape. Key findings of the most eReadiness recent study, completed in 2009, appear to demonstrate that there is in fact some narrowing of the digital divide between emerging and developed countries, as well as continued investment in technology despite market failures.

Rubin Worldwide's research on this topic, the Global Technology Index (GTI), similar to the Economist eReadiness initiative, was conducted between 2009 and 2010 and combines leading and lagging indicators in national

investment in technology, technology trade, investment in scientific education, distribution of information wealth and green technology (see Table 1, previous page). Overall, the eReadiness and the GTI approaches generate similar lists, with established economies occupying the majority of the top 20 rankings (although the ordering does vary and the Economist excludes Japan, Iceland and Italy in the top 20; the GTI excludes Singapore, Hong Kong and Ireland).

But deeper analysis of

the GTI reveals a dynamic interaction among four primary groupings of countries: the traditional economic leaders; the green technology economies of Northern and Central Europe; the Asian Tigers; and the larger developing economies of Brazil, Russia, India and China, known as the BRIC countries.

### Mature Economies

The results of the GTI show that traditional economic leaders such as the United States, Germany, the United Kingdom and Japan have a large influence on the development of technology throughout the world through both trade and investment. These economies import and export large amounts of technology, and they account for a disproportionately large amount of the world's investment in technology, both public and private.

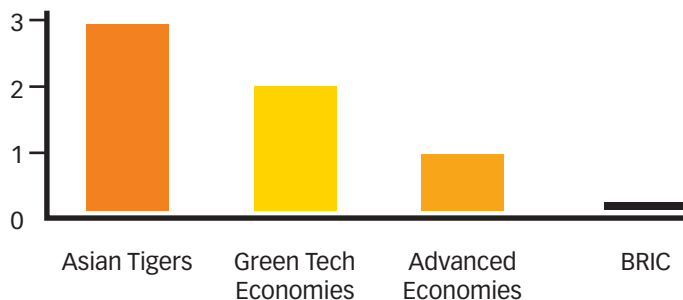
The United States led the world in its focus on investment in technology, followed by Japan and the United Kingdom, and the United States led the world in technology trade, with no close second. The primary weakness shared by these mature economies was the low level of government sponsorship of education relative to other spending categories, both overall and particularly at the university level, though this can be explained partially by the advanced private university system in certain cases.

### Green Technology Economies

Perhaps the most surprising result of the GTI study is the discovery of a set of countries in Northern and Central Europe that dominate the GTI in terms of green technology adoption (see Chart 1, at top). Through a broad combination of national investment in technology development and technology education, high distributions of informational wealth, and the highest levels of green technology adoption, these economies are predicted to lead the new technology economy.

Among these countries, notable examples include Denmark (first both in the commitment to technology

Chart 2: Top 100 Universities per 10,000,000 Population



Source: Rubin Worldwide 2010

education and the high distribution of informational wealth), Finland (first in its adoption of green technology) and Sweden (second overall after the United States). The best opportunity for these green technology economies to drive the future of technology lies in their ability to expand their technology trade, currently dominated by the mature economies.

### The Asian Tigers and Beyond

The Asian Tigers — Singapore, South Korea, Taiwan and Hong Kong — also are competitive in their potential to drive future technological innovation. Exhibiting a strong combination of technology trade (both embodied and disembodied), information and communication infrastructure, and moderately strong green technology adoption, they are expected to contribute more to the future of technology than their size alone might predict. Countries such as Indonesia, the Philippines and particularly Malaysia have a high potential relative to their current level of economic development — and might soon challenge the dominant position in technology currently held by the four traditional Asian Tigers.

The scientific education in the Asian Tiger nations is especially strong at the university level (*see Chart 2, opposite page*). Each of the four Asian Tigers hosts at least one of the top 100 universities worldwide, and their higher education is characterized by some of the highest levels of collaboration between industry and universities worldwide.

Although it varies from country to country, the scale of national investment by the public sector is generally found below the global median, possibly the result of the historical dependence these economies have had on foreign direct investment as a source of capital. Government investment in green technology initiatives could be a source of technological growth for these economies.

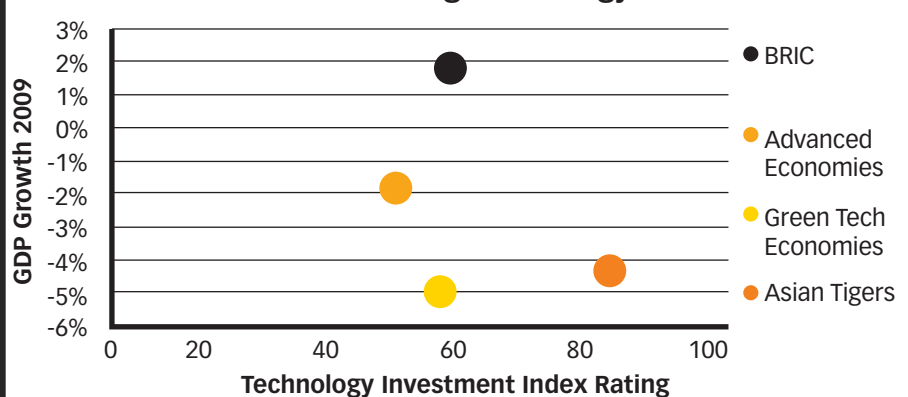
### Developing Economies

On the whole, the GTI predicts that the developing economies will have less of an impact on the future of technology than previously believed. The low distribution of informational wealth and limited trade specifically in embodied and disembodied technology hinder these economies from driving the future of technology.

In the critical space of green technology, the BRIC countries have fallen far behind more developed economies of comparable size, which could have adverse consequences on potential future growth as the international community places a greater focus on increasingly stringent environmental targets.

The strength that the developing economies share can

Chart 3: BRIC Countries' Growing Technology Investment



Source: Rubin Worldwide 2010

be found in the high level of national investment that characterizes them and enables them to sustain a high level of economic and technological growth, as well as their size — they capture a high proportion of foreign direct investment globally and represent some of the fastest-growing economies in the world (*see Chart 3, above*).

### A New World Order

The current economic environment is expected to have a continued negative impact on global technology investment, and this is likely to have the following outcomes:

- Developed economies will continue to maintain their market dominance, but limited investment in education and infrastructure may have a long-term impact on competitive standing.
- Developing countries that curb technology investments will see competitive gaps widen from developing countries and their peers that continue to improve their GTI standing.

As we have seen on a microeconomic level with firms that invest in technology to create business value, the nations that leverage technology economics will redefine and redistribute global economic wealth. Clearly, a new “lens” — new economic indicators — and a real-time view of the interaction of technology and the global economy is needed. Looking at indicators such as the GTI provides new insights into the dynamics of the global technology economy.

An understanding of these dynamics is essential for businesses as they explore and identify opportunities in the global marketplace. The understanding is essential for technology and business leadership as they seek new pools of talent and resources for key business processes. Perhaps just as longitude improved the navigation capabilities afforded by latitude, today's economic indicators will be enhanced and brought to full value with the introduction of and experimentation with new measures, such as the GTI. ■