



Innovation for economic diversification – experience from the Middle East

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The Middle East's reliance on oil for its wealth can hardly be overstressed. Diversification for the region is a highly desirable aim, but how can it be achieved? One key requirement is innovation, which is why governments in the region have launched different initiatives to foster innovation, with varying levels of success. This article explores the major gaps in the region's innovation capacity and considers key actions that need to be taken.

The Middle East, especially the Arabian Gulf, is home to many national economies that are heavily reliant on one sector – oil. For example, in Saudi Arabia oil accounts for roughly 80 % of budget revenues and 90 % of export earnings, whereas in Kuwait it accounts for 95 % of budget revenues and 95 % of export earnings. Overexposure to a commodity sector leaves the national economy highly vulnerable to fluctuations in supply, demand and pricing of the commodity, which makes planning for economic development difficult. Multiple studies including Hesse (2008) and Leiderman & Maloney (2007) have established that diversified economies in the long term perform better than mono-sector economies. One of the reasons for this phenomenon is enhanced learning, which occurs especially through manufacturing and ends up raising income and productivity levels within the economy. Hence we can say that an economy needs to have a reasonable degree of diversification if it is to achieve sustained long-term economic development.

Countries in the Middle East have already made some efforts towards diversification. For example, the Kingdom of Saudi Arabia has developed economic cities to develop Centers of Excellence focused on specific economic activities. UAE, Bahrain and Qatar have also invested in developing competitive positions in sectors such as finance, tourism, construction and education. While there have been some successes in some of the service sectors, it has proven to be difficult to achieve significant diversification into other product-based sectors such as manufacturing and engineering.

Almost by definition, one of the key requirements for economic diversification is innovation, which Peter Drucker defined as the ability to achieve change that creates a new dimension of performance - at least new to the national economy, if not new to the wider world. This does not just mean 'invention' or 'R&D', but rather the capacity to absorb, implement and exploit innovation effectively within

industrial sectors in order to build competitive strength and generate added value for the economy.

Governments in the region have launched and implemented various initiatives to foster innovation. However, the innovation output in the region has generally fallen short of expectations. In 2010, Google's managing director for Southern/Eastern Europe, Middle East and Africa highlighted the lack of innovation in the Middle East by pointing to the fact that a mere 3,224 patents were filed from the Middle East and North Africa (MENA) region in the last 13 years. Japan, in 2008 alone, filed 233,000 patents.

In this article we explore the reasons for the major gaps that exist today in the region's innovation capacity, using countries such as UAE, Saudi, Bahrain, Qatar, Kuwait, Egypt and Jordan as examples. We then go on to consider the key actions required from policy makers as well as major companies in the region for developing a comprehensive innovation system to drive economic diversification.

Key challenges for innovation in the Middle East

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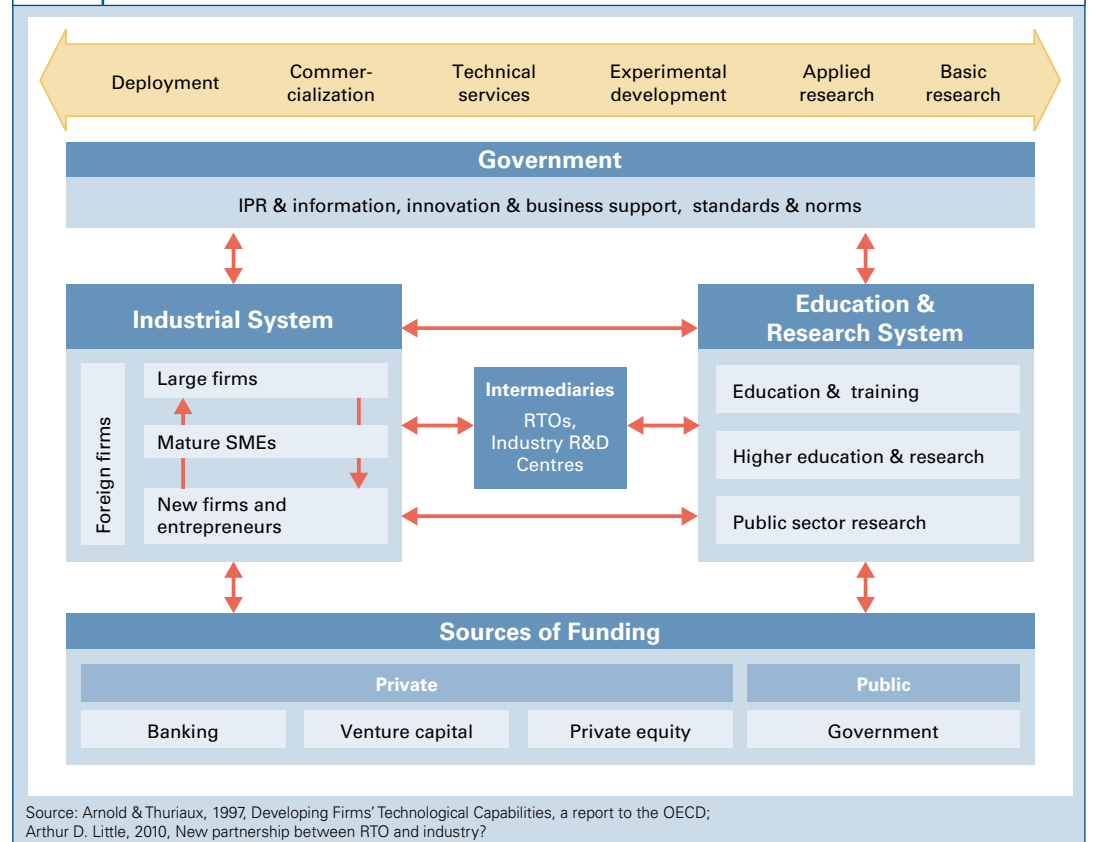
At a national level, innovation performance is a function of the collective capabilities of a range of players and the effectiveness with which they are able to interact. These players, comprising government, industry, education and research providers and funders, together form a so-called national innovation system, as shown in Table 1.

In order to understand the shortcomings of the national innovation systems of the Middle East, we need to consider each of these players and the issues associated with their roles.

Government

The government has a primary role in setting the regulatory and policy framework that encourages innovation. In the Middle East, many governments still have some way to go to develop and implement an effective regulatory framework. One of the reasons is the lack of an overarching policy aimed at building up innovation capability within the

Table 1 **Players in the national innovation system**



economy. The absence of a central body to ensure effective implementation of the current policy initiatives is also hindering the progress of innovation efforts. According to the International Monetary Fund (IMF), typical shortcomings of the current policy regime include underdeveloped capital markets, high transaction costs, discriminatory policies towards private investors (e.g. controls and restrictions on private-sector investment), and restrictive domestic trade and competition policies. Often, the emphasis is on public-sector support for innovation rather than support for small and medium-sized enterprises (SMEs) and entrepreneurs. For example, access to credit remains restricted in some countries because SMEs have to rely on bank lending since alternative sources of capital are limited. The banks are constrained in their lending due to lack of SME transparency, poor credit information from credit registries and bureaus, and weak creditor rights.

Dubai Internet City and Dubai Media City in UAE, Science City in Jordan and Smart Village in Cairo are all examples of government investments to build innovation infrastructure and provide a knowledge hub for the development of SMEs and large enterprises. While there have been successes, often insufficient emphasis is given to developing the means for dissipating knowledge across the economy, for example by supporting the development of the appropriate industries to absorb and implement the innovations created. Technology transfer without technology absorption is an often-observed phenomenon in Middle Eastern countries. While international trade agreements between Middle Eastern countries and the major economies elsewhere have resulted in a high inflow of knowledge and technology, this inflow has not kick-started initiatives aimed at developing indigenous knowledge due to the 'buy rather than make' approach to innovations.

Education providers

There is a high rate of unemployment among nationals in the region, which is caused partly by shortcomings in education provision. The Arab Knowledge Report 2009 and International Labor Organization (ILO) research indicate that the region is suffering from unemployment rates of 10.3 % compared to a global average of 6.2 %, with the youth segment of the population (under the age of 25) suffering from unemployment rates as high as 40 %. Another issue is the presence of a segmented labor market, with nationals sometimes accounting for as little as 0.3 % of the private sector in economies like UAE. This is a significant concern as the expatriates on whom the private sector is heavily dependent generally stay in the region only for a short time, which is detrimental to innovation.

A segmented labor market also has a detrimental effect on the quality of education provided in the region. Absorption of locals into the public sector, which provides numerous perks, has resulted in a lack of interest in R&D and venture creation among students. In spite of initiatives such as Sharjah University City, Dubai Knowledge Village, Education City in Doha and King Abdullah University for Science & Technology in Saudi, education programs in the region are in general not geared towards the needs of industry. Some

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countries in the region have not changed their policies for managing higher education since central government interventions in the 1960s and 1970s, and have outdated pedagogy and delivery procedures that are unable to keep up with market demands.

Industry and research providers

Inadequate spending on R&D, a passive approach towards technology dissemination and lack of knowledge flow linkages have hampered research efforts undertaken by the Middle East economies. According to the Arab Knowledge Report 2009, Arab countries spend around 0.7 % of GDP on R&D activities; in OECD countries the average is 2.3 % (2008). Most of this funding for R&D (around 97 %) in the Middle East comes from government. By contrast, in developed economies the private sector contributes around 40-60 % of R&D spending. To some degree this is a "chicken-and-egg" problem: a weak industrial sector and below-par research provision in Middle Eastern countries mean that there is little demand for national R&D from universities and institutes. Furthermore, the tendency of cash-rich countries to 'buy' rather than 'make' means that there is little impetus for industry to do its own R&D in-house. And because national sources of R&D are relatively weak, any needs that industry does have are bought in from leading global R&D providers rather than the local university or research institute. Hence universities and institutes remain weak.

Even within current R&D endeavors, knowledge sharing and information collaboration are low. Joint research projects among scientific research institutions in the region, even within the same field, remain extremely rare, mainly due to the lack of a platform where such information exchange can happen. Lack of facilitation between research, academia and industry is hindering government efforts at research and education.

Funders

In many Middle Eastern countries, especially in the Gulf, there is no shortage of funding. Many funds are set up to encourage entrepreneurial activities, such as UAE's Khalifa

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Fund, the Arab Science and Technology Foundation and the Omani Center for Investment Promotion. Nevertheless entrepreneurial activity remains very low. According to the Global Entrepreneurship Monitor, Middle Eastern countries score low on early-stage entrepreneurship activity compared to other factor-driven economies. For example, the prevalence of individuals in the working-age population who are actively involved in business start-ups is 7 % in Egypt and 9 % in Saudi Arabia, compared to the average of 23 % for factor-driven economies in general. While the availability of funding and investment capital is essential for economic growth, entrepreneurial and innovation capacity also depends on many other factors, including education, regulation and social norms and expectations.

Given all of the above challenges, let's consider what government policymakers could do to address the obstacles to innovation and accelerate the slow progress to date towards greater economic diversity. Likewise, let's indicate the roles that companies investing in the Middle East could adopt to help bring about a win-win for both themselves and the national economy.

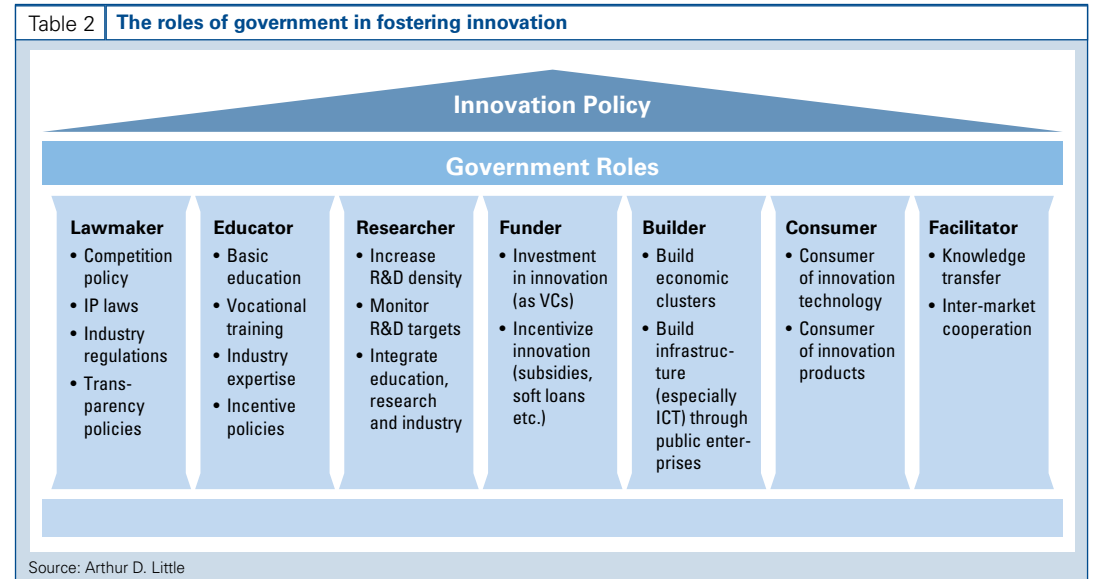
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What governments can do

Governments have an especially crucial part to play in developing economies. The range of roles they need to adopt is illustrated in Table 2.

Setting innovation policy

To foster innovation in a country, it is essential to establish a vision, identify sectors/industries to develop, determine short-term and long-term strategies and set clear targets and expectations. This needs to be outlined within an integrated innovation policy. Governments in the region also need to establish overarching bodies that coordinate and collaborate with other ministries and agencies for effective design and implementation of such an integrated innovation policy. For example, four Middle Eastern countries – Lebanon, Bahrain, UAE and Qatar – each have an independent council to monitor and support R&D. However, they need to venture a step further and set up an independent body to monitor and support the totality of innovation efforts in



entrepreneurship, technology diffusion, R&D and education, covering all the players in the national innovation system.

The interdependencies that exist between regulation, education, R&D, industry and funding make it essential for government to act along multiple fronts to achieve tangible and sustainable results. The government of Mauritius, for example, has successfully diversified from sugar and textile industries into the IT, finance and tourism sectors through its efforts in simplifying and cutting taxes, reducing regulations, lowering or removing tariffs, enacting new laws to make it easier to hire and fire workers, and investing heavily in upgrading the ICT infrastructure.

To support a comprehensive innovation policy, governments need to assume seven other roles, which we describe below.

Government as lawmaker

Governments of the Middle East should focus on providing a regulatory framework that promotes the development of SMEs and entrepreneurial sectors by facilitating technology adoption and absorption, and by encouraging product and process innovation. Measures such as licence reform, which eliminates redundant licensing measures, help in

reducing bureaucratic barriers and simplifying business processes. This builds a favorable environment for the growth of the private sector, particularly SMEs and new ventures.

Governments also need to pay attention to the intellectual property rights (IPR) regime and its suitability to the country's current level of development. A flexible, differentiated IPR protection regime needs to be adopted, which allows for the recognition of different types of companies and different types of IP. In particular, ensuring that IPRs and measures are adequately and consistently defined, communicated and – in particular – enforced in a timely manner will encourage inventors to seek IPR protection within the country's jurisdiction. This will give them a temporary right of exclusivity and – if commercialized effectively – reward their innovation efforts.

Governments could consider utility patents as an additional means of protecting IPRs. These require a lesser degree of inventiveness and are suitable for more incremental innovations, such as those involved in producing consumer goods. Similarly, protection for industrial designs can be used to cover the visual design of objects that are not purely utilitarian, such as clothing, and protect against the basic copying and imitation found often in developing economies.

Government as educator

The focus of Middle Eastern economies needs to be on tackling the current unemployment problem as well as developing a strong skilled indigenous labor force in the long term. This could include building occupationally oriented skills and competencies through sponsoring and initiating programs aimed at bridging the gap between academia and industry. For example, youth entrepreneurship programs in the US and Singapore as well as Germany's Dual System programs link the school and the firm to encourage work-based learning. Current nationalization initiatives that aim to increase the proportion of local population in private companies are just a Band-Aid measure for unemployment, since they neither build skills among the employees nor do they counter the issues causing a segmented labor market.

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Currently, most of the educational institutions focus on rote learning with a lack of emphasis on group learning, creative thinking and proactive learning. Social security nets and absorption into the public sector remove the motivation for pursuing higher education and developing skill levels. Hence, governments should establish pedagogical tools such as work placement with entrepreneurs, establishing student enterprises and in-service training. Involvement of students in the private sector during their education might help the more enterprising students to take up entrepreneurship, research or academic careers. In the long run, governments need to develop a competitive labor market for both nationals and expatriates to build up a skilled indigenous labour force that can sustain the nation's innovation efforts.

Building a competitive labor force also involves retention of highly qualified human capital. The Arab Knowledge Report 2009 states that almost 45 % of Arab students who study abroad do not return to their home countries. According to Arab League research, unemployment in the region is expected to rise from 15 million in 2008 to 50 million in 2023. Middle Eastern governments can actually leverage this phenomenon and turn their brain-drain into a brain-gain by following in the footsteps of the Brain Gain Initiative of UNESCO and HP, which joined forces to establish remote access to virtual classrooms and virtual laboratories with the help of the migrant population.

Government as researcher

Governments need to focus on bridging the gap between industry and R&D centers and increase knowledge absorption by the industrial sector. Incentives such as tax concessions will not be effective in fostering in-house R&D efforts as the countries already have relatively relaxed taxation systems. Instead competitive grants and subsidies can be utilized to help government direct R&D efforts into specific sectors as a means of influencing diversification. Governments should consider schemes such as the UK's Small Business Research Initiative, which raises R&D effectiveness by providing R&D contracts to technologically based small businesses in the desired sectors, and the former Knowledge Vouchers scheme of the Netherlands, which

distributes coupons for SMEs providing a specific amount of free consultancy hours or research visits to large, knowledge-intensive organizations.

Government as funder

There are two areas which prominently require funding support from government. One of them is the development of the SME and entrepreneurship sector. Funding programs, such as Bahrain Business Incubator, which also help young people by providing capacity building, training, counseling, validity assessment and financial advisory services, need to be replicated across the region. Governments can also fund applied research and support SMEs through Matching Fund programs, where governments provide a matching grant, equal to a specified percentage of money invested by an SME entity in innovation projects.

The second area of funding which requires attention is R&D spend, which, as mentioned earlier, is low compared to that in other developed economies. But increasing R&D spend blindly is not a solution. Governments should direct their R&D toward areas where significant knowledge spillovers can take place. Encouraging private-sector companies to invest in R&D is equally important, but they generally tend to concentrate on applied research. This leaves government as one of the primary sources of funding for basic research. Hence, government funding of basic research should be complemented by policies to encourage private spending on applied research.

Government as builder

Well-designed innovation clusters have generally been successful across the world. Agglomeration of interrelated industries in a concentrated region, underpinned by a sound strategy, and spatial proximity of companies leads to knowledge spillovers, stimulating technological innovations among neighbors. Proximity helps to create an atmosphere of mutual cooperation that reduces negotiation and transaction costs and increases productivity.

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City in Dubai, Science City in Jordan and Smart Village in Cairo. However, dissemination and absorption is the key to harnessing the value of innovations. To this end, governments in the Middle East need to develop a supply chain for these clusters, along with forward market linkages and partnerships, to enable the mainstream economy to absorb the output of the innovation clusters. Opening these clusters to global competition might help in building competitiveness as well as developing more forward linkages for knowledge absorption and dissemination.

Government as consumer

The limitations posed by small local markets can be overcome, in part, by public procurement measures. Offering a share of contracts to SMEs is one way of fostering their development in a particular industry. Government can help to achieve critical mass in demand by bundling the demand from different bodies, and its ability to pay a premium for innovations can boost short-term demand. Net-metering and feed-in tariffs to encourage renewable electricity generation are examples. In Germany feed-in tariffs have contributed to developing the renewable energy sector into an industry with more than €36 billion investment and 370,000 jobs (in 2010). Most of these jobs are at SMEs.

Another measure that government can employ is catalytic procurement, i.e. purchasing on behalf of individual consumers and acting as an aggregator of demand to overcome market and system failures and to promote market entry and diffusion. Government can also use its purchasing power as a powerful incentive for business to develop innovative products, processes and services. For example, the UK's Small Business Research Initiative ran a competition for ideas and new technologies to tackle MRSA infection in hospitals. It is clear that such measures must be seen as a means rather than an end, since ultimately market forces must prevail for sustainable business success.

Government as facilitator

Governments of Middle Eastern economies can facilitate the development of SMEs and industrial sectors by providing business support services such as advisory and con-

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sulting services, financial advisory services and access to technology, knowledge and resources. Support bodies such as technology transfer centres and sector-oriented entities for new and small enterprises can be set up by the government to provide critical support for SMEs and startups in the targeted sector. For example, a regional network of technology centers in France provides market information, testing and export support services, and is funded by specific taxes, public aid and service revenues.

It is the responsibility of the government to facilitate linkages and associations that assist in technology, knowledge and information transfer between innovation centres located across academia, R&D centers and industry. Singapore, for example, has implemented a service portal called Technopreneurs that creates links between technology entrepreneurs and investors. In Rwanda, the government facilitated a partnership between the former Maraba district authorities and the National University of Rwanda to develop an international specialty coffee market. This partnership brought in stakeholders including cooperatives, buyers, partners, such as Michigan State University and Texas A&M, NGOs, donors such as USAID, Union roasters and government agencies. The establishment of such a network of linkages for innovation was instrumental in the successful development of the international specialty coffee market in that country.

What companies can do

The involvement of the private sector to complement the innovation efforts of government is essential for absorption and diffusion of innovations. Nelson and Rosenberg defined the national innovation system as “the set of institutions whose interactions determine the innovative performance of national firms”. In this context, it becomes vital for foreign inward investors to understand the role of interactions with other institutions in driving innovation performance within the economy. They should interact with the following:

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- **R&D institutions:** Private-sector investment can drive applied research, product development and process innovation in R&D centers, creating a push for innovations. On the other hand, demand for innovations from the private sector, creating a pull, ensures that research carried out in R&D centres is attuned to market demands and social needs.
- **Educational institutions:** Industry can collaborate with educational institutions in exchanging knowledge, developing co-patents, producing co-publications, assigning R&D projects to academia, offering research internships to students pursuing higher education and participating in personnel exchange programs.
- **Government:** Business leaders are one of the key stakeholders in developing a good governance and regulatory framework. Active participation of business leaders in the national innovation system provides them with leverage to lobby for government intervention in the areas of policy, regulation, infrastructure investment, public procurement and financial incentives.
- **The market:** The private sector will have to invest in building up the supply chain and go-to-market capabilities. Collaborating across the value chain is necessary to induce collective action towards innovation efforts. Such efforts help organizations respond to marketplace changes, enhance customer satisfaction, simplify business processes and reduce costs. It is also essential for the private sector to monitor market trends, collect feedback from customers and keep abreast of changes in the marketplace to sustain their innovation efforts.

Insights for the public policymaker and executive

Middle Eastern economies have come to the realization that they need to transition from mono-sector economies into diversified economies that are sustainable, productive and less volatile. However, in many countries there are still major gaps in the national innovation system. A weak industrial sector, a 'buy rather than make' approach to innovations, inadequate support for the development of SMEs and startups, insufficient research provision and a segmented labor market due to underdeveloped education systems are some of the key challenges to innovation within the region. This is exacerbated by the lack of linkages between institutions and the absence of a knowledge flow between innovation players in the region.

Policymakers need to act along multiple fronts to overcome the obstacles to innovation efforts. Government can act as lawmaker, educator, researcher, funder, builder, consumer and facilitator to enact an integrated and focused innovation policy for the country.

Foreign inward investors and private sector firms also play a vital role in supplementing the innovation efforts of government by establishing linkages with educational institutions, R&D centers, government agencies and the market. These linkages enable the private sector to absorb and diffuse new technologies through commercialization and industrialization.

Properly implemented, innovation efforts by government and industry can complement and support each other in the economy's pursuit of diversification and help to strengthen the education, R&D and industrial base of the economy. As Richard Turner, a prominent UK industrialist put it at an Arthur D. Little event, 'Government's task is to create an environment where winners can win. Industry's task is to produce the winners.'

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